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The Effectiveness Of Health Education Using Pocketbooks And Animation Video In Increasing Adolescents' Knowledge About Thalassemia

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ABSTRACT

Thalassemia is a hereditary blood disorder. The main principle for preventing thalassemia is to avoid marriage between individuals who have thalassemia. Adolescence is the stage of life closest to marriage. One way to increase knowledge is through health education, where pocketbooks and animation videos are examples of media that can be using for health education. This study aims to determine the effectiveness of health education using pocketbooks and animation videos in improving knowledge about thalassemia among adolescents. A quasi-experimental design with a pretest and posttest design and a control group was employed in this study, consisting of 29 respondents in each group. Normality was tested using Skewness Test. Statistical analysis was conducted using paired sample T-test and independent sample T-test. The results of this study showed a significant difference in knowledge levels between the pretest and posttest in both groups, with a p-value of 0.000 < 0.05. The independent sample T-test yielded a p-value of 0.043 < 0.05, indicating a significant difference in effectiveness between the intervention group that received pocketbooks and animation videos and the control group that only received pocketbooks. Health education using pocketbooks and animation videos is effective for improving adolescents' knowledge about thalassemia

1. INTRODUCTION

Thalassemia is an inherited disease caused by the imperfect formation of hemoglobin due to the failure in productioning of one of the four amino acid chains that make up hemoglobin. As a result, the body unable to produce normal red blood cells, leading to anemia in individuals affected by this condition (Putri & Iskandar, 2021). Worldwide, approximately 1,5% of people are carriers of Thalassemia, with the highest prevalence found in the Mediterranean region, Middle East, sub-Saharan Africa, and Southeast Asia, commonly referred to as the Thalassemia belt area (Husna, Arif, Putri, Leonard, & Handayani, 2017). Indonesia is among the countries at high risk of Thalassemia, with a carrier prevalence of approximately 3 - 10% (Aisyah & Setiadi, 2021).

Data collected from the Indonesian Thalassemia Parents Association (Perhimpunan Orang Tua Penderita Thalasemia Indonesia - POPTI) Tasikmalaya in 2022 showed that there were 273 thalassemia patients in Tasikmalaya who underwent regular blood transfusions at three hospitals: RSU Prasetya Bunda, RSUD Dr. Soekardjo, and RSUD Singaparna Medika Citrautama. Over the past three years, there has been an increase of 9 individuals with thalassemia undergoing active transfusions in Tasikmalaya.

Thalassemia is a disease that currently has no cure. The available treatment involves blood transfusions to defend hemoglobin levels within normal limits and iron chelation medication to address the side effects of regular blood transfusions (Elsevier, 2022). The primary principle for preventing new cases of Thalassemia is to prevent the birth of babies with Thalassemia major. This prevention can be achieved through educating the public about Thalassemia, conducting hemoglobin screening tests, and premarital counseling to determine whether individuals carry the Thalassemia trait or not (Setiawan, Setiawan, & Nurmalasari, 2022).

Education has a crucial role in preventing new cases of Thalassemia. The community should be provided with health education regarding Thalassemia, including its definition, early symptoms, modes of inheritance, and preventive measures (Minister of Health Regulation of Indonesia, 2018). The Law No. 16 of 2019 on Amendments to Law No. 1 of 1974 on Marriage states that marriage is only permitted when both the man and woman have reached the age of 19, which emphasizes the importance of Thalassemia education and premarital screening targeting adolescents, as outlined in the Ministry of Health Regulation No. 25 of 2014 on Child Health Efforts, which categorizes the adolescent age range as 10 to 18 years old.

Health education is inseparable from media because through media can be conveyed in a more engaging and understandable manner. There are various media that can be used for education, such as pocketbook and animation video. According to Sulistyani, Jamzuri, & Rahardjo, (2013) pocketbooks have a simple and practical format, easy to store, with an attractive design combining text and images that can capture attention. They can be used as one-way learning materials, allowing readers to develop into independent learners. Animation video have visually appealing presentations, making the information provided easier to remember. They have showing to increase knowledge significantly among patients in various age groups and disease categories. Respondents also reported higher satisfaction and enjoyment, proving the effectiveness of animated videos in health education (Aisyah & Setiadi, 2021).

Based on the description above, the aim of this study is to analyze the effectiveness of health education using pocketbook and animation video in increasing adolescents' knowledge about thalassemia. The measurement of knowledge about thalassemia was using a questionnaire administered before and after the health education intervention

2. METHODS

The Quasy experimental design with pre-test and post-test design with the control group was employed in this study. This research employed participants who were divided into two groups:

1. Intervention Gruop: Adolescents who were provided health education using pocketbook and animation video as media.
2. Control Gruop: Adolescents who were provided health education using pocketbook as media.

This study was conducted at SMAN 4 Tasikmalaya, located at Jl. Letnan Kolonel. RE, Djaenali, Cilembang, Cihideung, Tasikmalaya, and SMAN 3 Tasikmalaya, located at Jl. Kolonel Basyir Surya No.89, Sukanagara, Purbaratu, Tasikmalaya. The sampling technique used in this study was Random Sampling with the Cluster Sampling technique. Sample inclusion criteria were adolescents who had never received health education about Thalassemia, students in grade XI Science, willing to participate as respondents by signing the informed consent, and willing to complete the study. The exclusion criteria included students who were absent on the day of the study and those who did not complete the study. The sample size in this study was 58 individuals (29 in the intervention group

and 29 in the control group). This study utilized a questionnaire developed by Mariani, Cahyati, & Rochimat, (2022) consisting of 20 true or false questions covering components related to understanding, signs and symptoms, classification, decline, complications, and prevention of Thalassemia. The questionnaire's reliability was tested with a value of r = 0.87.

The media used in this research were pocketbooks and animated videos containing material about thalassemia, including definitions, signs and symptoms, classifications, inheritance, treatment, and prevention of thalassemia. The book had been validated by thalassemia experts and health promotion specialists and had been tested for its usability among high school students.

Skewness value was used to test the normality of the data, paired sample T-test was used to assess the level of knowledge before and after health education in both groups, and an independent T-test was used to assess the effectiveness of health education between the intervention group, which received two media, and the control group, which received one media.

3. FINDINGS AND DISCUSSION

This study was performed between April – Mei 2023, with up to 58 respondents required to meet criteria. The following are the results of the data study processed and analyzed using the application SPSS version 26:

Table 1. Distribution of Respondent Characteristics in the Intervention and the Control Group

Variable	Intervention (n=29)	Control (n=29)
	n (%) / Mean ± SD	n (%) / Mean ± SD
Age	17,03 ± 0,421	16,90 ± 0,409
Sex		
Male	13 (44,8)	9 (31)
Female	16 (55,2)	20 (69)
Religion		
Muslim	28 (96,6)	27 (93,1)
Christian	1 (3,4)	2 (6,9)

Table 1 illustrates that the Mean ± SD of the adolescents in the intervention group was 17.03 ± 0.421 years and the mean ± SD age in the control group was 16.90 ± 0.409 years. The number of female respondents was higher than male, with a total of 16 (55.2%) in the intervention group and 20 (69%) in the control group. The majority of respondents were Muslims, with a total of 28 (96.6%) in the intervention group and 27 (93.1%) in the control group.

Table 2. Analysis of Differences in Knowledge Levels Before and After Health Education in the Intervention and Control Groups

Variable	n	Min - Max	Mean ± SD	p value
Intervention Group				
Pre Test	29	55 – 75	65,17 ± 6,085	0,000
Post Test	29	70 – 100	90,27 ± 8,503	
Control Gruop				
Pre Test	29	45 – 85	63,62 ± 11,945	0,000
Post Test	29	60 – 100	84,14 ± 10,779	

Table 2 illustrates the analysis of the difference in knowledge levels before and after health education in both groups. In the intervention group, before health education, the minimum obtained knowledge score was 55 and the maximum was 75, with a mean ± SD of 65.17 ± 6.085. After the health education, the minimum knowledge level score was 70 and the maximum was 100, with a mean ± SD of 90.27 ± 8.503. The difference in the mean score before and after receiving health education was 25.

In the control group, before health education the minimum knowledge score was 45 and the maximum was 85, with a mean ± SD of 63.62 ± 11.945. After the health education using the pocketbook media, the minimum knowledge score was 60 and the maximum was 100, with a mean ± SD of 84.14 ± 10.779. The difference in the mean score before and after receiving health education was 20.517.

The paired sample T-test results for the intervention group yielded a p-value of 0.000 < 0.05, and similarly for the control group, the p-value obtained was 0.000 < 0.05. Therefore, it can be concluded that there is a significant difference between the knowledge levels before and after the intervention in both groups.

Table 3. Analysis of Differences in Effectiveness between the Intervention Group and the Control Group on Increasing Knowledge

Variable	n	ΔMean	ΔMean Difference	p value
Intervention Group				
Pre Test	29	25	4,483	0,043
Post Test	29			
Control Gruop				
Pre Test	29	20,52		
Post Test	29			

Table 3 shows the delta mean, which is the result of subtracting the mean post-test and the mean pre-test in each group. In the intervention group, which received health education using pocketbook and animation video, the delta mean obtained was 25. In the control group, which received health education using pocketbook, the delta mean was 20.52. The difference in delta mean between the two groups was 4.483. Based on the results of the independent sample T-test, a p-value of 0.043 < 0.05 was obtained, indicating a significant difference between the delta mean of the intervention group and the control group

1) Characteristics of Respondents

The respondents in this study consisted of 29 individuals in the intervention group and 29 individuals in the control group. Table 1 shows that both groups were predominantly female, with 16 respondents (55.2%) in the intervention group and 20 respondents (69%) in the control group. The majority of respondents in both groups also belonged to Muslims, with 28 respondents (96.6%) in the intervention group and 27 respondents (93.1%) in the control group.

Table 1 shows that out of the 29 respondents in each group, all of them are within the age range of 16 to 18 years, which falls under the category of adolescents according to the Ministry of Health Regulation No. 25 of 2014 on Child Health Efforts, which defines adolescence as the age group between 10 to 18 years old.

Adolescence is a transitional period from childhood to adulthood, which is the time of significant physical, cognitive, and emotional development. According to Aulia, (2017) one way to prevent the birth of babies with thalassemia major is through early detection targeting the adolescent age group. Dewanto et al., (2016) in his research titled "Increased Knowledge of Thalassemia Promotes Early Carrier Status Examination Among Medical Students concluded that education plays a crucial role in the success of early detection. Therefore, adolescents should be provided with knowledge about the dangers of thalassemia and its prevention to achieve zero births of thalassemia major in Indonesia.

One way to prevent the birth of thalassemia major is by avoiding marriages between carriers of thalassemia. According to Law No. 16 of 2019 on Amendments to Law No. 1 of 1974 on Marriage, marriage is only permitted when both individuals have reached the age of 19. Therefore, thalassemia education is more effectively targeted when directed toward the adolescent age group

2) The effect of health education on increasing adolescent knowledge about thalassemia

Based on the results obtained in this study, Table 3 shows that the average level of knowledge among adolescents before receiving the health education intervention was 65.34 in the intervention

group and 63.62 in the control group. After receiving the health education intervention, there was an increase in the average level of knowledge to 90.17 in the intervention group and 84.83 in the control group. These results indicate a difference in the average values between before and after health education, with an increase of 24.828 in the intervention group and 21.207 in the control group.

The mean pre-test scores indicate that many adolescents have lack of knowledge about thalassemia due to a lack of information and understanding. According to the result of the interviews conducted, respondents mentioned that they have never received any knowledge about thalassemia. This is supported by Wulansari, Winarmi, & Lala, (2021) opinion that the level of knowledge is influenced by education level, information, culture, and experience.

The study conducted by Fitrianingrum & Armyanti, (2020) titled "Knowledge Level about Thalassemia among High School Students in Pontianak City, West Kalimantan, Indonesia" concluded that the majority of high school students in Pontianak City have poor knowledge about thalassemia. Knowledge refers to everything known about a particular subject that is perceived by the human senses, including sight, hearing, smell, taste, and touch. Humans acquire knowledge primarily through sight and hearing (Notoatmodjo, 2012).

The mean scores in the posttest of this research indicate that many adolescents have acquired knowledge about thalassemia after the health education intervention. Notoatmodjo, (2012) states that there are six levels of knowledge, with the first level being "know," which means being able to recall and remember the received and learned material, demonstrated by being able to state, explain, and answer questions correctly. In this study, it is evident that adolescents were able to answer the questionnaire correctly, demonstrating their knowledge about thalassemia.

The result of statistical analysis using the paired sample T-test showed a p-value of $0.000 < 0.05$ for both the intervention and control groups. Based on these findings, it can concluded that there is a significant difference in knowledge levels before and after the health education intervention, both in the intervention and control groups.

In line with the study conducted by Triatin, Rakhmilia, Sribudiani, & Susanah, (2022) titled "Knowledge towards Thalassemia and Willingness to Screen among Students in Public Senior High School 3 Bandung," it concluded that health education about thalassemia significantly improves adolescents' knowledge of thalassemia. This finding is also supported by a study conducted by Shokravi, Eisapareh, & B, (2016) titled "The Effect of Multimedia-Based Education on the Adoption of Thalassemia Prevention Behaviors among High School Students in Sardasht, Khuzezta, Iran," which obtained a p-value of 0.001, indicating that multimedia education packages are highly efficient in enhancing students' knowledge, attitudes, and practices regarding Thalassemia.

Setyawan, (2018) in his study titled "The Influence of Health Education on Adolescent's Knowledge of Reproductive Health" concluded that respondents' knowledge improved after receiving reproductive health education. This is further supported by the study conducted by Ningsih, Suseno, Yuni, & Hamidiyanti, (2021), stating that health education is an effective educational method for enhancing adolescent knowledge.

Education is one of the strategies for preventing thalassemia that has been internationally recognized. According to a study conducted by Cheng, Fucharoen, Sanchaisuriya, & Fucharoen, (2018) there is a correlation between knowledge level and awareness of thalassemia. Individuals with a high understanding of thalassemia have a better understanding of its risks and a higher level of awareness regarding screening.

The Republic of Indonesia Law Number 35 Year 2009 concerning health states that community health education is conducted to enhance the knowledge, awareness, willingness, and ability of the community to live a healthy life and actively participate in health efforts. Currently, the government does not have a specific genetic screening program, particularly for thalassemia, based on schools to reduce the incidence of new cases of thalassemia in Indonesia. School-based thalassemia education is expected to encourage students to undergo independent screening and encourage their families to do

the same. One way to achieve this is by incorporating genetic diseases and their dangers into the school curriculum, thus helping to create a community with a high awareness of disease prevention.

In this research, health education using pocket books and animated videos has an influence on increasing adolescents' knowledge about thalassemia. It is expected that with the increased knowledge, adolescents will become more aware of the dangers of thalassemia and actively contribute to breaking the chain of thalassemia.

3) Differences in the Effectiveness of Health Education between the Intervention Group who were given Pocket Book Media and Video Animation and the Control Group who were given Pocket Book Media

Based on the results obtained in this study, Table 4 shows the delta mean results between the intervention group and the control group, obtained by subtracting the average post-test scores from the average pre-test scores in each group. The intervention group had a delta mean of 25, while the control group had a delta mean of 20.52, resulting in a difference in delta mean between the two groups of 4.483.

The results of the independent samples T-test for the level of knowledge between the intervention group, which received health education using pocketbook and animation video, and the control group, which received health education using pocketbook, showed a p-value of $0.042 < 0.05$. This means that there is a significant difference between the intervention group and the control group. The intervention group, which received pocket books and animated videos, was more effective compared to the control group, which only received pocket books, with a delta mean difference of 4.483.

In line with the study conducted by Monalisya, (2021) it is found that knowledge improvement is more optimal when combining two or more health education media, such as the use of videos and modules, to facilitate the illustration and visualization of the presented material. This is also supported by the research conducted by Tuzzaroh, Elida, & Sudaryanto, (2015), stating that the sensory organs can be stimulated through various types of educational media, and knowledge levels can increase when multiple media are combined in the delivery process.

Health education is closely associated with media, as through media, the conveyed messages can be more engaging and easily understood, allowing the target audience to better comprehend the message and make informed decisions to adopt positive behaviors. Books, videos, leaflets, posters, PowerPoint presentations, and modules are examples of supportive media for health promotion that have been proven to enhance knowledge, regardless of the advantages and limitations of each medium (Farra, 2020). According to Setiawati, (2020), media plays a vital role in delivering information to the public, as it greatly influences opinions and beliefs. Therefore, the appropriate selection of media can significantly impact knowledge levels.

In this study, it was found that health education using two media, pocket books and animated videos, has a greater influence in improving adolescents' knowledge about thalassemia compared to health education using pocket books only.

4. CONCLUSION

In this study, there was an improvement in thalassemia knowledge among adolescents after receiving health education in both the intervention and control groups. The use of two media pocketbook and animation videos, for health education was more effective in enhancing adolescents' knowledge of thalassemia.

It is expected that schools can utilize pocketbooks and animated videos as learning resources or counseling guidance. For healthcare provider it is hoped that regular health education activities on thalassemia can conducted to increase public knowledge about thalassemia and help break the chain of thalassemia transmission

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