RELATIONSHIP BETWEEN 3R KNOWLEDGE, DISEASE ASSOCIATED WITH GLOBAL WARMING AND 3R BEHAVIOUR

Vincent Aditya Budi Hartono[1]*, Novendy[2]

Program Studi Pendidikan Kedokteran, Fakultas Kedokteran Universitas Tarumanagara Jakarta[1],
Bagian Ilmu Kesehatan Masyarakat, Fakultas Kedokteran Universitas Tarumanagara Jakarta[2]
Corresponding Author : novendy@fk.untar.ac.id

ABSTRAK

Pemanasan global adalah peristiwa kenaikan suhu rata-rata pada permukaan bumi. Pemanasan global terjadi karena salah satunya adalah aktivitas manusia. Pemanasan global tidak hanya berdampak pada masalah lingkungan, tetapi juga berdampak pada masalah kesehatan. Masalah kesehatan tersebut dapat berupa penyakit alergi, infeksi, malnutrisi, dan lain-lain. Untuk itu, pencegahan pemanasan global tidak hanya dilakukan oleh pemerintah saja tetapi dilakukan oleh semua orang, salah satunya adalah usia remaja. Berdasarkan pengamatan peneliti, penggunaan produk tidak terurai dengan baik karena penerapan *Reuse, Reduce, Recycle* jarang dilakukan sehingga penumpukan sampah menjadi lebih banyak. Penelitian ini bertujuan untuk mengetahui pengetahuan dan perliaku siswa/i SMAK di Tangerang tentang kegiatan *reuse, reduce, recycle* dalam upaya pencegahan pemanasan global. Penelitian ini merupakan studi *cross sectional* dilakukan pada 155 siswa/i SMAK di Tangerang. Pengumpulan data dilakukan secara daring dengan kuesioner elektronik dan dianalisis dengan uji statistic *Chi-Square*. Penelitian ini didapatkan tingkat perilaku kegaiatan 3R dengan tingkat pengetahuan kegiatan 3R siswa/i SMAK di Tangerang adalah baik (*p-value* = 1,000) dan hubungan tingkat perilaku kegiatan 3R dengan tingkat pengetahuan penyakit terkait pemanasan global adalah baik (*p-value* = 0,331). Tidak terdapat hubungan antara pengetahuan kegiatan 3R dengan perilaku kegiatan 3R siswa/i SMAK di Tangerang dan tidak terdapat hubungan antara pengetahuan penyakit terkait pemanasan global dengan perilaku kegiatan 3R siswa/i SMAK di Tangerang.

Kata kunci   : pemanasan global, pengetahuan, penyakit, perilaku, *recycle, reduce, reuse*

ABSTRACT

Global warming is an event of an increase in the average temperature on the earth's surface. Global warming occurs because one of them is human activity. Global warming affects not only environmental issues but also health concerns, which can include allergies, infections, malnutrition, and more. Therefore, the prevention of global warming is carried out not only by the government but also by everyone, one of which is teenagers.. This study aims to determine the knowledge and behavior of Christian Senior High School students in Tangerang about reuse, reduce, and recycle activities in efforts to prevent global warming. This study is a cross-sectional study conducted on 155 Christian Senior High School students in Tangerang. Data was collected online with a questionnaire and analyzed using the Chi-Square test. It was found that the level of 3R activity behavior with the level of knowledge of 3R activities of Christian Senior High School students in Tangerang was good (p-value = 1,000 (0.148-3.592)), and the relationship between the level of 3R activity behavior and the level of knowledge of diseases related to global warming was good (p-value = 0.331 (1.229-1.486)). It was found that there was no relationship between knowledge of 3R activities and the behavior of 3R activities of Christian Senior High School students in Tangerang, and there was no relationship between knowledge of diseases related to global warming and the behavior of 3R activities of Christian Senior High School students in Tangerang.

Keywords   : behaviour, disease, global warming, knowledge, recycle, reduce

INTRODUCTION

Earth is a planet inhabited by billions of humans and other living things; because of its good ecosystem conditions, we can live on it. However, at the end of this year, the condition

of the Earth is different from the previous year, such as prolonged dry seasons, floods, and temperatures in some areas getting hotter. This is due to human actions resulting in global warming. Global warming is a phenomenon of a gradual increase in the average temperature on the Earth's surface. Based on data from the National Centers for Environmental Information, 2022 was the sixth hottest year since global records began in 1880, with a temperature of 0.86°C (1.55°F) above the 20th-century average of 13.9°C (57.0°F).This is 0.13°C (0.23°F) lower than the record set in 2016 and only 0.02°C (0.04°F) higher than last year's (2021) record, which is now the seventh highest. The ten warmest years in the 143-year record have all occurred since 2010, with the last nine years (2014–2022) ranking as the nine warmest years on record. Of note, 2005, the first year to set a new global temperature record in the 21st century, is now tied with 2013 as the 11th warmest year. According to a graph from the NOAA National Centers for Environmental Information, the Earth's temperature has been increasing progressively from 1880 to 2020 (National Centers for Enviromental Information. Annual, 2022)

Global warming impacts not only environmental issues but also health issues. In the 21st century, health issues related to global warming have become one of the medical emergencies in world health. Based on data from WHO, the world mortality rate is estimated to be around 250,000 people each year from 2030 to 2050. Global warming can cause health problems directly and indirectly. These health problems are cardiovascular diseases, respiratory diseases, infectious diseases, digestive diseases, and others. That for, global warming can be prevented not only by government policies but also by actions taken by all members of society. One of the most influential age groups in controlling and preventing global warming is the adolescent (Widiyaningrum P, Lisdiana L, Purwantoyo E, 2016).

The adolescent group will feel the impact of global warming in the future, so they need education and knowledge about preventing global warming and its impact on health.Based on research conducted by Anbarsari M et al., in 2020 at Government Junior High School East Bekasi District, it was found that students with less knowledge with the behavior of sorting waste were more than students with good knowledge (67.9%). Meanwhile, students who had a good attitude (81.1%) in the behavior of sorting waste were more than students who had a less attitude (58.2%). The data results show no relationship between knowledge and waste sorting behavior at Government Junior High School East Bekasi District (Anbarsari, M., Asiah, N., & Hidayat Ramli Inaku, A, 2022).

Based on the researcher's observations, students often use containers such as plastic, styrofoam, and others that cannot be decomposed adequately to store food so that the food/drinks can be adequately maintained. Likewise, school canteen traders often use waste that cannot be decomposed appropriately. Reuse, Reduce, and Recycle activities for students are also rarely carried out, so the accumulation of plastic waste becomes more and is just thrown away. Based on the background above, a study was conducted entitled The Relationship between Knowledge of 3R Activities and Diseases Associated with Global Warming and Behavior related to 3R Activities in Preventing Global Warming. This study aims to determine the knowledge and behavior of Christian Senior High School students in Tangerang about reuse, reduce, and recycle activities in efforts to prevent global warming.

METHOD

This research is an observational analytical study with a quantitative approach and cross-sectional design. The study was conducted from May 2024 to August 2024. The minimum number of respondents required is 92 respondents. Target population are Christian Senior High School students in grades XI dan XII. The inclusion criteria in this study are Christian Senior High School students in grades XI and XII who are willing to be research respondents and sign

an informed consent. Meanwhile, the exclusion criteria are Christian Senior High School students in grades XI-XII who do not bring a cell phone, so they cannot fill out the questionnaire. This study used simple random sampling. The research instrument to be used is a Google Form questionnaire. Respondents will enter the electronic social platform. The researcher will explain how to fill out the questionnaire, and the respondents will fill it out. The data obtained will be analysed using the Chi-square test using IBM SPSS Statistics software. This study has been approved by the Tarumanagara University research ethics committee, which has been confirmed by a research ethics eligibility letter No. 370/KEPK/FK UNTAR/II/2024.

RESULT

Table 1. **The Characteristic of Christian Senior High School Respondent in Tangerang**

Variable Characteristic	Proportion n = 155 (%)	Mean
Gender		
Male	61 (39.4)	
Female	94 (60.6)	
Grade		
11	100 (64.5)	
12	55 (35.5)	
Age		16,78

In this study, the number of respondents was 155 respondents. Based on Table 1, the majority of respondents in this study were female, with 61 female students (60.6%).

Table 2. **The Characteristics of Christian Senior High School Student's Behavior Level Regarding 3R Activities**

Respondents' Behavior Level	Proportion n = 155 (%)
Good	116 (74,8)
Less	39 (25,2)

Table 2 shows the characteristics of the level of respondent behavior regarding 3R activities. The table shows that Christian Senior High School students in Tangerang with good behavior in carrying out 3R activities are more significant than Christian Senior High School students in Tangerang with less behavior in carrying out 3R activities.

Table 3. **The Characteristic of Christian Senior High School Respondents' Knowledge Level Regarding 3R Activities and Disease Related to Global Warming**

Respondents' Knowledge Level Regarding 3R Activities	Proportion n = 155 (%)
Good	139 (89,7)
Less	16 (10,3)
Respondents' Knowledge Level Regarding Disease Related to Global Warming	Proportion n = 155 (%)
Good	150 (96,8)
Less	5 (3,2)

In table 3, the first table shows the characteristics of respondent knowledge regarding 3R activities. The table shows that Christian Senior High School students in Tangerang with a good level of knowledge regarding 3R activities are more significant than Christian Senior High School students in Tangerang with a less level of knowledge regarding 3R activities. The second table shows the characteristics of the respondents' knowledge level regarding global

warming-related diseases. From the table, it is found that Christian Senior High School students in Tangerang with a good level of knowledge about diseases related to global warming are more remarkable than Christian Senior High School students in Tangerang with a less level of knowledge about diseases related to global warming.

Table 4. **The Characteristic of the Relationship between Knowledge of Christian Senior High School Students in Tangerang Regarding 3R Activities and Disease Related to Global Warming with Behaviour in 3R Activities**

The Knowledge about 3R Activities	The Behavior of 3R Activities		95% CI	p-value
	Less **n = 39 (%)**	**Good** **n = 116 (%)**		
Less	2 (20%)	8 (80%)	0,730	1,000
Good	37 (25,5%)	108 (74,5%)		

The Knowledge on Diseases Related to Global Warming	The Behavior of 3R Activities		95% CI	p-value
	Less **n = 39 (%)**	**Good** **n = 116 (%)**		
Less	0 (0%)	5 (100%)	1,351	0,331
Good	39 (26%)	111 (74%)		

In tables 4, the first and second table shows the characteristics of the relationship between Christian Senior High School students' knowledge about 3R activities and diseases related to global warming and 3R activity behavior. From the table, it is found that the relationship between Christian Senior High School students' knowledge about 3R activities and the level of Christian Senior High School students' behavior in carrying out 3R activities is obtained with a 95% Confidence Interval of 0.730 (p-value = 1.000) from the results of the Fisher Exact test. The relationship between Christian Senior High School students' knowledge about diseases related to global warming and the level of Christian Senior High School students' behavior in carrying out 3R activities is obtained with a 95% Confidence Interval of 1.351 (p-value = 0.331) from the results of the Fisher Exact test. Thus, there is no statistically significant relationship between Christian Senior High School students' knowledge regarding 3R activities and Christian Senior High School students' behavior in carrying out 3R activities, and there is no statistically significant relationship between Christian Senior High School students' knowledge regarding diseases related to global warming and Christian Senior High School students' behavior in carrying out 3R activities.

DISCUSSION

The minimum sample of this study was 94 respondents. Moreover, the respondents obtained 155 respondents according to the inclusion criteria. The gender of Christian Senior High School respondents in Tangerang was male, with a total of 61 students (39.4%), with the majority of respondents being female, with a total of 94 female students (60.6%). These results are in line with research by Heryawan KF and Mukono J (2023), which found that the majority of respondents were female, namely 166 (73.5%), while male respondents were 60 (26.5%). Based on the results of this study, it was found that the number of Senior High School students in Tangerang with a good level of knowledge regarding 3R activities was 145 students (93.5%), while the number of Christian Senior High School students in Tangerang with a less level of knowledge was 5 students (6.5%). The number of Christian Senior High School students in Tangerang with a good level of knowledge regarding 3R is higher than Christian Senior High School students in Tangerang with a less level of knowledge. This study is in line with previous research studies, which found that the level of knowledge of good students regarding 3R

activities is higher than that of less students. Based on the results of this study, it was found that the number of Christian Senior High School students in Tangerang with a good level of behavior in carrying out 3R activities was 116 (74.8%).

In comparison, the number of Christian Senior High School students in Tangerang with a less level of behavior was 39 students (25.2%). The number of Christian Senior High School students in Tangerang with a good level of behavior regarding activities is higher than Christian Senior High School students in Tangerang with a less level of behavior. This study is in line with previous studies conducted by Widiyaningrum P et al., which found that the level of behavior of high school students in carrying out 3R activities was said to be active/good with an active score range of 162.5 < score ≤ 200 (Widiyaningrum P, Lisdiana L, Purwantoyo E, 2016).

Based on the results of this study, it was found that the number of Christian Senior High School students in Tangerang with a good level of knowledge about diseases related to global warming was 150 students (96.8%), and the level of knowledge of Christian Senior High School with less knowledge was five students (3.2%). It can be concluded that the level of knowledge of Christian Senior High School students in Tangerang regarding diseases related to global warming is good. Global warming can increase the number and activity of disease vectors, which can increase diseases caused by disease vectors such as malaria, dengue fever, Japanese encephalitis, tick-borne encephalitis, and others. The increasing prevalence of allergic diseases, such as asthma, conjunctivitis, rhinitis, and others, is also caused by global warming. In addition, the increase in temperature caused by global warming can cause the risk of heat stroke, increasing the risk of cardiovascular disease (Khambali I, Soesanto T, 2019).

Based on the results of this study, the relationship between Christian Senior High School students' knowledge of 3R activities and the behavior of Christian Senior High School students in carrying out 3R activities obtained a significance test of 1,000 in the Fisher Exact test. Therefore, there is no statistically significant relationship between Christian Senior High School students' knowledge of 3R activities and the behavior of Christian Senior High School students in carrying out 3R activities because the p-value is <0.05. activities obtained a significance test of 0.331 in the Fisher Exact test. Therefore, there is no statistically significant relationship between Christian Senior High School students' knowledge of diseases related to global warming and Christian Senior High School students' behavior in carrying out 3R activities because the p-value is <0.05. This study is in line with a study conducted by Heryawan KF dan Mukono J, which found that there was no relationship between knowledge and 3R actions (p-value = 0.395) and no relationship between knowledge and waste sorting actions (p-value = 0.167) (Heryawan KF, Mukono J, 2023).

CONCLUSION

Based on the results of the study, it can be concluded that there is no statistically significant relationship between knowledge of 3R activities and the behavior of Christian Senior High School students in Tangerang (p-value = 1,000). There is no statistically significant relationship between knowledge of global warming-related diseases and Christian Senior High School students' behavior in Tangerang (p-value = 0.331).

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