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Relationship between Knowledge Level and Preventive Behavior of Septic Arthritis in Student Batch 2019-2020, Faculty of Medicine, University of North Sumatra

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A B S T R A C T

Background: Septic arthritis is an infectious disease that severely damages the joints with clinical manifestations such as swelling, erythema and warmth of the affected joint. The most common cause of this disease is the result of hematogenous spread of microorganisms. Some of the risk factors include injection drug use, prosthetic joints and skin infection. The incidence of septic arthritis is 5 to 8 per 100,000 population per year with 5-10% mortality rate, therefore preventive behavior is needed to minimize the incidence of septic arthritis. **Methods:** This study is an observational analytic study with a cross-sectional approach. The research population consisted of students from batch 2019-2020 of the Faculty of Medicine, University of North Sumatra and the sample was determined using stratified random sampling method. Primary data were obtained directly from research subjects using questionnaires via Google Forms. **Results:** The univariate research analysis found that the knowledge level of the majority of respondents was in the good category, with 45 subjects (53.6%). The most predominant behavior observed in the respondents was negative behavior, with 49 subjects (58.3%). Bivariate analysis found that there was no significant relationship between knowledge level and septic arthritis prevention behavior with p value = 0.809. **Conclusion:** Students from batch 2019-2020 of the Faculty of Medicine, University of North Sumatra, on average have a good level of knowledge and negative behavior on the prevention of septic arthritis. There is no relationship between the level of knowledge with septic arthritis prevention behavior.

1. Introduction

Septic arthritis is a type of arthritis caused by microorganisms. Septic arthritis can also cause increased morbidity and mortality, as well as loss of joint integrity and function. Bacterial infection is a common cause of septic arthritis. Other microorganisms can also cause septic arthritis, with clinical symptoms differing from those caused by bacteria.[1]

Cases of septic arthritis are more common in children than in adults. Young people and newborns have an increased risk of getting gonococcal septic arthritis. Infections that occur in healthy children usually occur hematogenously.[2]

The incidence of septic arthritis affecting the joints ranges from 5 to 8 cases per 100,000 patients per year. Approximately 20,000 cases of septic arthritis occur annually in the United States (7.8 cases per 100,000 people), and similar number occurs in Europe.[3]

The prevalence of septic arthritis in patients with acute swelling and joint pain varies widely, ranging

from less than 10% to 27%, depending on population characteristics. Non-gonococcal septic arthritis is a form that is more common in men than women.[1]

Staphylococcus and Streptococcus are responsible for more than 90% of septic arthritis cases. Septic arthritis can also be caused by direct inoculation, such as from an accident, animal bite, surgery, or the spread of an infected bone into an adjacent joint space. About 75% of cases are due to hematogenous spread, especially in patients with indwelling catheters and immunocompromised patients.[1]

Symptoms of this disease include acute monoarticular joint pain, redness, heat, immobility, limited range of motion of the joint, effusion with varying degrees of redness, increased temperature around the joint, and fever at onset. A single joint is affected in up to 80-90 percent of gonococcal arthritis cases. Any joint can become infected, but in adults, the most commonly affected joints are the knee and hip joints, while in children, the hip joints are more commonly involved.[4]

Up to 50% of adults with septic arthritis have reduced range of motion and chronic pain, especially if treatment is delayed. Mortality from septic arthritis is about 5-10%, which is usually due to respiratory complications caused by sepsis.5 Septic arthritis is an infectious disease of the joints with a poor prognosis and prevention is an important factor to reduce the risk of developing septic arthritis.

To improve outcomes and prevent septic arthritis, it is essential to enhance the understanding and prevention practices among medical professionals. This is particularly relevant for medical students, as their knowledge and behavior significantly impact community health education. Research assessing the knowledge and preventive behaviors regarding septic arthritis among medical students, such as those from the University of North Sumatra's Faculty of Medicine, can inform educational strategies and improve preventative measures. Therefore, the authors are interested in conducting a study on the relationship between knowledge level and septic arthritis prevention behavior in students of the batch 2019-2020 of the Faculty of Medicine, University of North Sumatra.

2. Methods

This study has received ethical approval from the Health Research Ethics Committee of University of North Sumatra number 752/KEPK/USU/2022. This study uses a quantitative approach with a survey of students. Data were collected using a questionnaire measuring knowledge levels and preventive behaviors towards septic arthritis in the period of July 2022 to September 2022. Data analysis was conducted using Spearman's correlation analysis to test the proposed hypotheses.

Primary data in this study were collected from data sources directly by researchers.6 The sample for this research consists of students from the 2019-2020 class of the Faculty of Medicine, University of North Sumatra who met the inclusion criteria, namely active students who are willing to participate in the research and fill out a Google Form questionnaire. Students who do not answer all the questions in full were excluded. The formula used in this research to determine the sample size was the Slovin formula, calculated as follows:

$$n = \frac{N}{1 + N(e)^2}$$

n : Number of samples

N : Total population = 494

e : Confidence level = 0.1

$$n = \frac{494}{1 + 494(0.1)^2} = \frac{494}{5.94} = 83.164 \approx 84$$

Therefore, the minimum sample size for this research is 84. The sampling technique used in this research is stratified random sampling. Sample selection involves dividing the population into strata, selecting a simple random sample from each stratum, and combining them. The population with the same characteristics is then divided into strata.

The distribution of the sample size using stratified random sampling is determined using the following formula:

$$n_h = \frac{N_h}{N} n$$

n_h : Number of samples selected using stratified random sampling

N_h : Total population strata

N : Total population = 494

n : Number of samples (using the Slovin formula)

The number of samples for the 2019 class is as follows:

$$n_h = \frac{239}{494} 84 = 40.6 \approx 41$$

The sample size for the class of 2020 is as follows:

$$n_h = \frac{255}{494} 84 = 43.3 \approx 43$$

The sample size from the class of 2019 was forty-one samples and from the class of 2020 was forty-three samples.

These data were obtained directly from the respondents using a questionnaire about knowledge and preventive behavior against septic arthritis.

This study uses the following outcome definitions:[7]

(1) The level of knowledge is good if the answers are correct 76-100%. (2) The level of knowledge is fair if the answers are correct 56-75%. (3) The level of knowledge is poor if the answer is correct <56%.

Behavior was measured using statements that have been answered and passed reliability and validity tests, revealing the behavior of the respondents.[8]

The behavioral variable of this study uses the following measurement criteria:

(1) Positive behavior if T-score > T-mean is obtained. (2) 2. Negative behavior if T-score ≤ T-mean is obtained.

The T-mean can be determined when all the respondents' information has been obtained using the following formula:

$$T\ mean = (\sum \mathbf{T})/\mathbf{n}$$

∑T : The sum of the average score of the respondents

n : Number of respondents

To be able to determine the behavior of respondents through the calculation of the T score, the following formula is used:

$$T\ score = 50 + 10\left(\frac{xi - \bar{x}}{SD}\right)$$

SD : Standard deviation

xi : Respondent score

$\bar{x}$: Group mean value

The formula for the standard deviation is:

$$SD = \sqrt{\frac{\sum_{i=1}^{n}(x_i - x)^2}{n-1}}$$

SD : Standard deviation

xi : Data – i (i = 1, 2, 3... n)

$\bar{x}$: Average of the sample

i : Data number (i = 1, 2, 3... n)

n : Number of data

Bivariate analysis is needed to evaluate the relationship between the independent variable, namely the level of knowledge of septic arthritis, and the dependent variable, namely septic arthritis prevention behavior. The analysis was carried out using the Spearman correlation analysis test to obtain a p-value, with a significance level of <0.05 used in this study. If a p-value < 0.05 is obtained, then $H0$ is rejected and $H1$ is accepted, and vice versa.

3. Results

Table 1. Frequency Distribution of Characteristics Research

Characteristics		Frequency	Percentage (%)
Batch	2019	41	48.8
	2020	43	51.2
Gender	Male	28	33.3
	Female	56	66.7
Age	19	10	11.9
	20	39	46.4
	21	29	34.5
	22	6	7.1
	Total	**84**	**100**

Based on Table 1, the student respondents consisted of 41 students (48.8%) from batch 2019 and 43 students (51.2%) from batch 2020. Regarding gender, majority of respondents were female with a total of 56 people (66.7%) and according to age, most respondents were students aged 20 years with a total of 39 people (46.4%).

Table 2. Frequency distribution of the level knowledge of respondents

Level of Knowledge	Total	Percentage (%)
Good	45	53.6
Fair	30	35.7
Poor	9	10.7
Total	**84**	**100**

In Table 2, it is shown that 45 subjects (53.6%) had a good level of knowledge, 30 subjects (35.7%) had a fair level of knowledge, and 9 subjects (10.7%) had a low level of knowledge.

Table 3. Frequency distribution of the level knowledge based on the types of respondents.

	Level of Knowledge		
	Good	**Fair**	**Poor**
	N (%)	N (%)	N (%)
2019	23 (56.1%)	14 (34.1%)	4 (9.8%)
2020	22 (51.2%)	16 (37.2%)	5 (11.6%)
Total	**45 (53.6%)**	**30 (35.7%)**	**9 (10.7%)**
Male	14 (50%)	10 (35.7%)	4 (14.3%)
Female	31 (55.4%)	20 (35.7%)	5 (8.9%)
Total	**45 (53.6%)**	**30 (35.7%)**	**9 (10.7%)**
19	5 (50%)	5 (50%)	0 (0%)
20	19 (48.7%)	14 (35.9%)	6 (15.4%)
21	17 (58.6%)	9 (31%)	3 (10.3%)
22	4 (66.7%)	2 (33.3%)	0 (0%)
Total	**45 (53.6%)**	**30 (35.7%)**	**9 (10.7%)**

Based on Table 3, the 2019 batch had the highest percentage of respondents with a good level of knowledge, with 23 students (56.1%). Based on gender, female students had the highest percentage of respondents with good knowledge level, with 31 subjects (55.4%). Based on age, 22-year-old students had the highest percentage of respondents with a good level of knowledge, with 4 subjects (66.7%).

Table 4. Frequency distribution of prevention behavior of respondents

Prevention Behavior	Total	Percentage (%)	T Mean
Positive Behavior	35	41.7	
Negative Behavior	49	58.3	49.99
Total	84	100	

Figure 3. Correlation of sCTLA-4 Levels with SLE Disease Activity (SLEDAI)

From statistical tests, it was found that the mean T value was 49.9. There were 35 students (41.7%) who behaved positively, namely students who obtained a T score below the mean T value, while there were 49 students (58.3%) who behaved negatively and obtained a T score above the mean T value, as shown in Table 4.

Table 5. Frequency distribution of prevention behavior based on the types of respondent

	Prevention Behavior	
	Positive Behavior	**Negative Behavior**
	N (%)	N (%)
2019	18 (43.9%)	23 (56.1%)
2020	17 (39.5%)	26 (60.5%)
Total	**35 (41.7%)**	**49 (58.3%)**
Male	10 (35.7%)	18 (64.3%)
Female	25 (44.6%)	31 (55.4%)
Total	**35 (41.7%)**	**49 (58.3%)**
19	5 (50%)	5 (50%)
20	15 (38.5%)	24 (61.5%)
21	11 (37.9%)	18 (62.1%)
22	4 (66.7%)	2 (33.3%)
Total	**35 (41.7%)**	**49 (58.3%)**

In Table 5, students from the 2019 batch had the highest percentage of positive behavior, with 18 students (43.9%), whereas the 2020 batch had the highest percentage of negative behavior, with 26 students (60.5%). Based on gender, female students had the highest percentage of positive behavior, namely 25 students (44.6%), while male students had the highest percentage of negative behavior, namely 18 people (64.3%). Based on age, students who were 22 years old had the most positive behavior, namely 4 students (66.7%), while students who are 21 years old had the most negative behavior, namely 18 students (62.1%).

Table 6. Relationship between Knowledge Level and Preventive Behavior and Spearman Correlation Test Results

		Prevention Behavior		
		Positive Behavior	**Negative Behavior**	**Total**
Level of Knowledge	Good	19 (42.2%)	26 (57.8%)	45 (100%)
	Fair	13 (43.3%)	17 (56.7%)	30 (100%)
	Poor	3 (33.3%)	6 (66.7%)	9 (100%)
	Total	35 (41.7%)	49 (58.3%)	84 (100%)
P value		**0.809**		
Correlation coefficient		**0.027**		

Based on Table 6, the Spearman correlation test results showed a p-value of 0.809. Since p value > 0.05, it can be concluded that there is no significant relationship between the level of knowledge and the behavior of preventing septic arthritis.

The correlation coefficient obtained from the Spearman test results is 0.027, indicating a very weak relationship. The value of the correlation coefficient obtained is positive, therefore the relationship between the two variables is unidirectional, suggesting that an increase in the level of knowledge is related to an increase in preventive behavior.

4. Discussion

The students' general level of knowledge about septic arthritis was predominantly good, with 45 subjects (53.6%) demonstrating a good level of knowledge, followed 30 students (35.7%) showing a sufficient level of knowledge, and 9 students (10.7%) showing a low level of knowledge.

The results of this study are in line with a January 2022 study by Azmi et al., which investigated more information about arthritis in the city of Samarinda. In that study, a pre-test was conducted and the median score of the respondents was 50, then arthritis counseling was given. Subsequently, a post-test was conducted and there was an increase in the median score to 90.[9]

This study is also in line with Mohammad et al.'s 2020 study in Saudi Arabia on septic arthritis in a community consisting mostly of students, which found that 73% of respondents already had good awareness and understanding.[10] However, the results of this study are not in line with a 2021 study by Dunleavy and McCallion in Ireland on arthritis in students. It was found that most respondents had a moderate level of knowledge, with a total of 114 subjects (61.3%).[11]

The students' septic arthritis prevention behavior as a whole was mostly negative, with 49 subjects (58.3%), while 35 subjects (41.7%) displayed positive behavior.

The results of the preventive behavior study are not in line with a 2020 study by Nanda et al., which investigated the level of knowledge, attitudes and behavior towards rheumatic diseases in the elderly in Gianyar, Bali, showing that most respondents had good preventive behavior 48.6%, followed by 37.1% with adequate behavior and only 14.3% with poor behavior.[12]

In this study, there was no significant association between knowledge level and septic arthritis prevention behavior. This is because most of the respondents have a good level of knowledge but have a negative attitude towards the prevention of septic arthritis.

The results of this study are in line with the study conducted by Poernomo and Rimawati in 2016 at the outpatient clinic of Kediri Baptist Hospital. This study investigated the relationship between knowledge level and arthritis prevention behavior in patients aged 25 to 40 years. No association was found between

knowledge level and arthritis prevention behavior (p = 0.136). It was found that the level of knowledge was mostly good, but most of the preventive behavior was sufficient in this study.[13]

This study reinforces the understanding that knowledge alone is not enough to change behavior. It emphasizes the importance of multifaceted approaches in health education that include changes in attitudes and motivations.

For practitioners, the results of this study indicate that health education programs should include strategies to motivate and change attitudes in addition to providing information. Interventions that simultaneously focus on increasing knowledge, attitudes, and motivation may be more effective in improving preventive behaviors.

By synthesizing the theoretical framework in this manner, the study provides a strong foundation for more effective interventions in the prevention of septic arthritis and enhances public health outcomes.

5. Conclusion

Most of the respondents had a good level of knowledge about septic arthritis but the prevention behavior was mostly negative. There is no significant relationship between knowledge level and septic arthritis prevention behavior in students from batch 2019-2020 of the Faculty of Medicine, University of North Sumatra.

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