Knowledge And Anemia Prevention Behavior In Medical Laboratory Technology Students In Indonesia

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ABSTRACT

Introduction: A disorder known as iron deficiency anaemia occurs when there are fewer red blood cells or when their haemoglobin level is smaller than usual. The ability of the blood to deliver oxygen to the body's tissues is reduced if there are insufficient or defective red blood cells, or if there is just not enough haemoglobin. Riskesdas instances in Indonesia confirmed incidents of teenage anaemia at 32 percent in 2018, meaning that 3-4 out of 10 teenage patients have anaemia. According to B. Bloom, a person's conduct can be divided into three categories: information, emotions, and acts. This study's objective was to ascertain how female students' knowledge and practises for preventing anaemia correlated with one another.

Materials and Methods: This kind of study is quantitative and cross-sectional. 191 students from the Medical Laboratory Technologist programme at the Department of Health Analyst, Poltekkes Kemenkes Semarang, made up the study's sample. Online questionnaires were utilised to collect the data for this study, and the results were then descriptively analysed (univariate analysis). The results did not adhere to the conditions of the test of normality, so a bivariate analysis using the Chi-Square test was then performed. The analysis's findings are provided as a frequency distribution table with accompanying commentary.

Result: The findings revealed that most students in the high ranking scored highly yet exhibited neutral behaviour 83 (43.5%). Using Chi - square test comparison, the statistical test analysis between knowledge and student behaviour revealed that there was no significant correlation between knowledge and anaemia prevention behaviour in female students, with a p-value of 0.562.

Conclusion: Knowledge and student behaviour revealed that there was no significant correlation between knowledge and anaemia prevention behaviour. It's critical to provide continual health education about anaemia to pupils so that they might alter their behaviour and stop students from developing the condition.

Keywords: Knowledge, Anemia Prevention, Behaviour, Student.

INTRODUCTION

deficit in iron Blood disorder when there are fewer red blood cells present or their haemoglobin content is smaller than usual. The ability of the blood to carry oxygen to the body's tissues will decline if there are insufficient amounts of haemoglobin or red blood cells, or if there are too few or aberrant red blood cells ¹. Anemia could be brought on by a diet that is lacking in minerals. The definition of anaemia in teenagers is a condition where the blood's haemoglobin (Hb) level is lower than usual for the person's gender and age group. According to WHO guidelines, the threshold value for anaemia in teenagers is 12 g/dL in females and 13 g/dL in boys². Anemia is a chronic disease that cannot be transmitted to other people with a long duration and long development³. Likewise, cholesterol, diabetes mellitus and hypertension are non-communicable diseases that often occur in society 4,5 .

According to the most recent information worldwide on May 17, 2022, incidences of anaemia were confirmed in 228 nations and one-third of all women of reproductive age are thought to be anaemic. Riskesdas (2018) confirmed incidents of teenage anaemia at a rate of 32 percent, which translates to 3–4 cases of anaemia every 10 teenage incidents in Indonesia ⁶.

Dr. Kartini stated that the Ministry of Health decided to carry out intervention programs by giving pregnant women and teenage girls Blood Transfusion Tablets (TTD). The Ministry of Health also promotes iron supplementation in foodstuffs, strong and hygienic lifestyle, and educates the public about balanced diet to combat anaemia⁷.

The lengthy effects of anaemia in young women include LBW, preterm, stillbirth, and an increased risk of infant death according to Hidayati $(2008)^8$. Whereas the term is fragile, quickly exhausted, and sleepy. According to earlier research, midwifery DIII students at the Semarang Ministry of Health Polytechnic had a correlation and attempts to avoid anaemia, with a p-value of $0.164 > 0.05^9$. Results of this study are the same as research conducted by Simanungkalit and Osterthat there is a relationship between knowledge and

anemia in female students at SMA/SMK Depok with a p value of 0.004, young women who have less knowledge about anemia are 3.3 times more at risk than those who have good knowledge ¹⁰.. The results of this study support the findings of research done at SMAN 4 Jambi City that there is a link among awareness and the treatment of teenaged anaemia¹¹. There was no correlation among knowledge and efforts to prevent anaemia, according to research done on class XI and XII students at SMAN 11 Bengkulu City, because only 25 of the 41 students with strong knowledge actually took action to prevent anaemia¹².

The four dimensions of a person's behaviour, according to B. Bloom, are information, attitudes, and acts. That information is someone's comprehension of the subject at hand. Knowledge, which is impacted by knowledge and training, is the capacity to accept, apply, and remember stuff. The sources of this knowledge typically include official and informal education, firsthand experience, other people, the environment, and the media¹³.

Three areas of behavior—knowledge, attitudes, and actions—are recognised by B. Bloom¹³. Information is the extent to which a member comprehends the subject at hand. Knowledge, which is impacted by practice and abilities, is the capacity to take in, remember, and apply knowledge. A person learns much of what they understand through official and casual learning, as well as from individual perspective, various individuals, the atmosphere, and the news. A person's predisposition to behave, whether in favor of or against support of a cause, can be understood as their mindset. Although it is a contributing component to conduct, mindset is still not an activity. Elements of awareness, attachment, and conjecture work together to create an entire attitude ¹³.

Health students are included in the category of college students who are still considered to be teenagers at risk for anaemia. Students studying health are undoubtedly more knowledgeable than students in general. However, a lot of health students still experience the symptoms and signs of anaemia, particularly midwives. This may be influenced by their lack of awareness of iron-rich foods or by their busy schedules, which prevent them from taking care of their nutrition. They may also be affected by their financial condition as a result of living in a boarding home. Having the right information and a positive outlook will help prevent anaemi¹⁴. The goal of this study was to ascertain the connection between

female students' knowledge and anaemia prevention behaviour. The advantage of this study is that it can be used as a source of literature regarding the relationship between knowledge and behaviour for the prevention of anaemia in female students.

METHOD

This study uses a cross-sectional quantitative research methodology. All Diploma III and Diploma IV Medical Laboratory Technologists students at the Health Polytechnic of the Ministry of Health Semarang made up the study's population. Purposive sampling, which involves choosing samples based on specific criteria, was used to choose the study's sample, which consisted of 191 students who were willing to complete a questionnaire. The awareness of pupils about anaemia and how female students avoid anaemia were the variables of the study. A Online survey has been used to disseminate an online questionnaire about knowledge of 12 gradings and 11 statement elements of behaviour. This questionnaire has undergone validity and reliability testing before being used. The behavioural questionnaire has a confirmation value with r testing with a value > 0.03 r count>r table and a Cronbach Alpha reliability value R = 0.697 elevated outcomes so that it is recognised workable to be a research measurement device, in contrast to the knowledge questionnaire, which has a reliability coefficient with r implementing and a reliability significance of 0.572.

A knowledge questionnaire featuring a score with correct and incorrect answers for shooters is used to score the research questionnaire. For right answers to affirmative questions, a value of 1 is awarded, while a score of 0 is awarded for incorrect answers, and vise versa for negative statements. a survey of behaviour using the Likert scale. For positive remarks, the behavioural questionnaire yielded scores of 5, frequently 4, occasionally 3, seldom 2, and never 1, while for negative words, the values were the opposite. A nonparametric test, the Chi-Square test, was utilisedbecause the outcomes of the normality test using the Kolmogorov-Smirnov indicated that the variables are not normally distributed because p 0.05. The analysis's findings were univariately evaluated to provide a summary of the students' knowledge and behaviour about anaemia avoidance. Tables, graphs, and narration are used to present the data in a descriptive format with a frequency and percentage. The data weren't normally distributed, so a bivariate test using chi-square testing was then carried out.

The normality test

	Kolmogorov-Smirnov S		Shapiro-Wilk			
	Statistic	df	Say.	Statistic	df	Say.
BEHAVIOR	.087	191	.001	.985	191	.046
KNOWLEDGE	.209	191	.000	.907	191	.000

a. Lilliefors Significance Correction

RESULTS

Table 1.

Student Characteristics Premised on Socioeconomic variables Factors

No	Sociodemographic	F	%
	characteristics		
1	Age		
	1. 16-17 years old (early	1	0,5
	adolescence)		
	2. 18-19 years (Late	96	50,3
	adolescence)		
	3. 20-21 tahun	94	49,2
	Total	191	100
2	Tingkat		
	1. Level 1	80	41,9
	2. Level 2	38	19,9
	3 Level 3	73	38,2
	Total	191	100
3	History of Anemia		
	1. Yes	38	19,9
	2. No	153	80,1
	Total	191	100
4	Current Condition		
	1. Dizziness	15	7,9
	2. Eyes Dizzy	2	1,0
	3. Weak and Lethargic	9	4,7
	4. Healthy	165	86,4
	Total	191	100

Based on sex, age, study programme, background of anaemia, and present health, Table 1 displays the sociodemographic behavior of students. According to Table 1, the results of the descriptive analysis based on the sociodemographic attributes reveal that 191 (100%) of the students are female, 94 (49.2%) are between the ages of 20 and 21, 191 (100%) are enrolled in Diploma III study programmes, no students have a history of anaemia, and 165 (86.4%) of the students' existing health issues are favourable.

Question	Wrong	g r	Correct answer	
	F	%	F	%
CONCEPT				
Anemia is an event that does not need to be watched out for	38	19,9	153	80,1
Deficiency in iron Anemia is a condition that frequently affects female pupils.	16	8,4	175	91,6
Someone prone to anemia is children, young men, and pregnant women	128	67	63	33
Meat, eggs, and liver are foods that contain a source of iron and can prevent anemia	3	1,6	188	98,4
FACT				•
An abnormal menstrual cycle is one of the factors that can cause a person to experience anemia	41	21,5	150	78,5
Anemia causes blood in the body to not bind enough and transport oxygen from the lungs throughout the body	4	2,1	187	97,9
Anemia can affect a person's weight such as losing weight	29	15,2	162	84,8
Doing tasks until late can not cause someone to become anemic	48	25,1	143	74,9
PROSECEDURAL				
Anemia is enough to be treated only with foods that contain a source of nutrients	56	29,3	135	70,7
Female students who are menstruating do not need more iron	21	11	170	89
Fulfillment of iron in the body can help students concentrate more and be able to fight infections	6	3,1	185	96,9
Vitamin C is needed to increase iron absorption in the body	4	2,1	187	97,9

Fable 2. Student Knowledge	Distribution i	in Relation to .	Anemia (N=191)
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Table 2 shows. The statistical value of students' knowledge about anemia in the highest correct answer concept category is 188 (98.4%), the highest wrong answer is 128 (67%) and the lowest correct answer concept category is 63 (33%) and the lowest wrong is 3 (1.6%)). The highest category of correct answers was 150 (78.5%), the highest wrong answer was 48 (25.1%)

and the lowest category of correct answers was 143 (74.9%), the lowest wrong was 4 (2.1%). The highest correct answer procedural category was 185 (96.9%), the highest wrong answer was 56 (29.3%), and the lowest correct answer procedural category was 135 (70.7%), and the lowest wrong answer was 4 (2.1%).

Question	Very bad		Bad		Neutral		Good		Very good	
	F	%	F	%	F	%	F	%	F	%
ANEMIA PREVENTION BEHAV	IOR		•	•	•					
My food menu every day is complex carbohydrates, vitamins, proteins like side dishes, vegetables, tempeh, and fruit.	1	5	3	1,6	79	41,4	83	43,5	25	13,1
My food menu includes green vegetables and meat every day	2	1	9	4,7	101	52,9	67	35,1	12	6,3
I regularly exercise like walking or cycling for at least 30 minutes a day or 150 minutes a week	14	7,3	71	37,2	75	39,3	18	9,4	13	6,8
I sunbathe every morning so that I am healthy and not anemic	23	12,0	68	35,6	76	39,8	18	9,4	6	3,1
I regularly drink one glass of milk every day	36	18,8	56	29,3	67	35,1	23	12,0	9	4,7
If I menstruate, I take iron tablets and consume nutritious food	66	34,6	60	31,4	40	20,9	18	9,4	7	3,7
Before eating or after eating, I consume fruit such as bananas, papaya, or other things	9	4,7	55	28,8	79	41,4	38	19,9	10	5,2
I drink not enough 8 glasses of water per day	28	14,7	31	16,2	67	35,1	44	23	21	11
I stay up late to do my homework	10	5,2	60	31,4	52	27,2	47	24,6	22	11,5
I take blood booster tablets only when I have a headache or I'mtired	26	13,6	22	11,5	39	20,4	39	20,4	65	34
I take tablets containing vitamin C when I'm sick or when I have flu symptoms	17	8,9	38	19,9	66	34,6	47	24,6	23	12

Table 3. Frequency Distribution of Anemia Prevention Benavior (N=191	Table 3.	Frequency	Distribution	of Anemia	Prevention	Behavior	(N=191)
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Table 3 shows.Statistical Value of Student Behavior About Anemia in the category of behavior answers in the highest bad category was 71 (37.2%) and categories bad the lowest by 3 (1.6%).

Variabel	Frequency (N)	Percentage(%)	Mean ± SD	
Knowledge				
Low	0	0		
Quite	59	30,9	2 (0) 0 4(2	
High	132	69,1	2,09±0,403	
Total	191	100		
Behaviour				
Very Bad	0	0		
Bad	63	33	7	
Neutral	116	60,7	2,73±0,568	
Good	12	6,3		
Very Good	0	0		
Total	191	100		

Table 4.	Univariate Analysis	Between Knowledge an	d Behavior of Female	Students with A	Anemia (N=191)
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Using table 4, shows the category of student knowledge, namely out of a total of 191 respondents with a very sufficient category 59 (30.9%), and a high category of 132 (69.1%), and no respondents with a low knowledge category. The majority of knowledge in the high category is 132 (69.1). This shows that students already know important things related to Anemia such as signs, symptoms, and how to prevent it. In this case, the educational level of participants who are from

institutions of higher learning in the field of health is highly linked to the information of pupils. The percentages for each category of student behaviour are as follows: zero percent for the very good category, twelve percent for the good category, one hundred sixteen percent for the neutral category, sixty-three percent for the terrible category, and zero percent for the very bad category. The majority of student behavior is in the neutral category of 116 (60.7%).

Variable	Anem	ia Preve	ention Bel	Total		Sign			
	Bad		Neutral		Good				
	F	%	F	%	F	%	F	%	
Knowledge									
Low	21	11	33	17,3	5	2,6	59	30,9	0,562
High	42	22	83	43,5	7	3,7	132	69,1	
Total	63	33	116	60,7	12	6,3	191	100	

 Table 5. Chi_Square Test Between Knowledge and Behavior of Students with Anemia Status (n=191)

Table 5 indicates that most pupils in the student knowledge category fall into the high range and have an impartial conduct score of 83. (43.5 percent). The findings indicated that the majority of pupils had neutral behaviour and high levels of knowledge. According to the findings of the statistical test analysis among knowledge and student behaviour using Chi Square analysis, there was no correlation between knowledge and anaemia prevention behaviour in students with a p-value of 0.562.

DISCUSSION

Table 1, which details the sociodemographic characteristics of students, demonstrates that the research sample met the requirements, with 191 (100 percent) respondents. Table 1 shows the age of DIII Health Analyst students at the Semarang Poltekkes, most of whom were aged 18-19 years, with 96 respondents (50.3%), aged 20-21 years, namely 94

respondents (49.2%), and aged 16- 17 years there were 1 respondent (0.5%). 153 (80.1%) did not have a history of anemia, and as many as 165 (86.4%) were currently in good health. The majority of respondents are female. Sociodemographics include characteristics of age, gender, education, family, and work¹⁵. There were more characteristics of students who did not have anemia at DIII Health Analyst, Poltekkes Kemenkes Semarang, namely 153 respondents (80.1%).

Table 2 provides an explanation of the location of each item for the student knowledge measure related to anaemia, showing the Statistical value of Student knowledge About Anemia in the highest correct answer concept category of 188 (98.4%), the highest wrong answer is 128 (67%) and the correct answer concept category the lowest was 63 (33%) and the lowest was 3 (1.6%). The highest category of correct answers was 187 (97.9%), the highest wrong answer was 48 (25.1%) and the lowest category of correct answers was 143 (74.9%), the lowest wrong was 4(2.1%). The highest procedural category of correct answers was 187 (97.9%), the highest wrong answer was 56 (29.3%), and the lowest correct answer procedural category was 135 (70.7%), and the lowest wrong answer was 4 (2.1%). These results indicate that the correct concept category has a higher degree of knowledge than the poor concept category, and for the fact category, the correct responses outnumber the incorrect answers, for the procedural category the correct answers are also greater than the wrong ones.

In the meantime, Table 3 provides an explanation of the behaviour variable for preventing anaemia. It displays the significance level of student behaviour about anaemia in the category of answer behaviour for the worst category of 71 (37.2 percent) and the best category of 3 (1.6 percent). The majority of students do not frequently exercise, such as walking or cycling for at least 30 minutes per day or 150 minutes per week, according to these figures.

Knowledge is influenced by a variety of elements, including education, employment, age, environment, and sociocultural factors. Students must learn about the prevention of anaemia so that their understanding is more comprehensive ¹⁶. According to research by Setyowati, Riyanti, and Indraswari (2017), there is a significant correlation between awareness and anaemia prevention behaviour in the working environment of the Ngemplak Simongan Health Center¹⁷. But this is in contrast to research by Sari & Anggraini (2020), which found that awareness is significantly correlated with efforts to prevent anaemia in midwifery study programme students at the Semarang Ministry of Health Polytechnic ⁹.. This study contradicts Tashara et al (2015)'s finding that behaviour in preventing anaemia is significantly influenced by knowledge ¹⁸. Young women with good information do not necessarily engage in effective practises for preventing anaemia since learning new things does not always result in behavioural changes¹⁹.

Table 4 illustrates the test of the relationship between education and student behavior with the prevalence of anaemia in students, displaying the category of student knowledge, namely out of a total of 191 participants, with a very with enough category of 59 (30.9%), a high category of 132 (69.1%), and no respondents with low knowledge category. There are 132 people with the most expertise in the high category (69.1). This demonstrates that students are already aware of key anemia-related concepts such symptoms, indications, and prevention. In this instance, the degree of education of respondents who attended institutions of higher learning in the field of health is directly related to the knowledge of pupils. In the field of student behaviour, the following scores were given: very good category of 0 (0%), good category of 12, neutral category of 116 (60.7%), terrible category of 63 (33%) and very bad category of 0 (0 percent). The vast majority of student behaviour falls into the 116 category of neutrality (60.7 percent), so it can be concluded that there is no relationship between student knowledge and behavior and the incidence of anemia among female students.

The test of the association between knowledge and conduct of students with anaemic status is shown in Table 5, which reveals that the vast majority of children in the category of student understanding are in the upper quartile and have neutral behaviour of 83. (43.5 percent). The findings indicated that the majority of pupils had neutral behaviour and high levels of knowledge. A substantial association among knowledge and the frequency of anaemia was found utilising person correlation analysis of the correlation test between knowledge and student behaviour in the case of anaemia, with a p-value of 0.562. It can be concluded that increasing knowledge about anemia will influence student behavior with the incidence of anemia in female students. The results of this research are in line with research conducted in Surakarta which shows that the majority of young women's knowledge about anemia is in the sufficient category, namely 72.4%²⁰. However, the results of this study contradict the research of Setyowati et al (2017) who had poor knowledge regarding anemia as many as 31 respondents (59.6%) and 21 (40.2%) had good knowledge out of 52 respondents. Likewise, research in Pekalongan shows that the majority of young women do not know about anemia, namely 64.3%.

Relationship of Knowledge with Anemia Prevention Behavior

According to Table 5's statistical test findings, the majority of pupils in the student knowledge classification fall into the high range and have a neutral behaviour score of 83. (43.5 percent). The findings reported that more than half of pupils had neutral behaviour and high levels of knowledge. According to the findings of the statistical test analysis between knowledge and student behaviour using Chi Square analysis, there was no correlation among knowledge and anaemia prevention behaviour in students with a p-value of 0.562.

This is consistent with studies conducted on 81 female pupils in first and second grade at Muhammadiyah High School in Depok City. It is well recognized that over half of adolescents with less education are 22. (40.7 percent). According to the results of the statistical test, p = 0.621(p > 0.05), there is no correlation between knowledge and anaemia prevention behaviour. The factthat there was a high degree of information about anaemia but no changes in behaviour in everyday life might be one reason why there was no association in this study. Consequently, a healthy diet includes level won't improve²¹. Likewise, research in Surakarta shows that there is no relationship between the knowledge and attitudes of young women about anemia and their behavior in consuming iron tablets ²⁰.

The findings of this study are consistent with previous research done by students at the University of Muhammadiyah Surakarta's Public Health Study Program, which found that anaemia affects 48 (64.9%) of participants with less education and 22 (20.8%) of participants with more knowledge. This demonstrates good that there are more respondents with understanding than those with weak knowledge. The prevalence of anaemia in young women at SMA Negeri 1 Polokarto, Sukoharjo Regency, was shown to be correlated with knowledge level, according to the findings of the chi-square test, which showed a value of p = 0.03 < 0.05, so it can be concluded that there is a relationship between the level of knowledge and the incidence of anemia in female adolescents at SMA Negeri 1 Polokarto, Sukoharjo Regency. In the statistical test results, a Prevalence Ratio (RP) value of 0.81 (95% CI: 0.67 - 0.99) was obtained, which means

that knowledge is a protective factor that can reduce the occurrence of anemia ²².

The research of D IV programme students at Aisyiyah Yogjakarta High School of Health Sciences does not support this. Kendall's Tau value was 0.495 with a sig pvalue of 0.000 based on the results of class X researchat Gamping 1 Islamic High School. Given that the probability value is 0.000 0.05, it can be said that there is a correlation between SMA Islam 1 Gamping students' awareness of anaemia and their activity in regard to its avoidance. With a Kendall Tau regression analysis of 0.495 and scores between 0.400 and 0.599, it is possible to say that the link is medium. Additionally, because the correlation coefficient (0.495) is favorable, the relationship between the two variables is unidirectional, implying that SMA Islam 1 Gamping students' protective behaviour will improve if their degree of knowledge about anaemia increases²³. Likewise, research conducted in Banjarmasin stated that there was a significant relationship between knowledge and the incidence of anemia in young women at SMA PGRI 4 Banjarmasin²⁴.

In contrast to research by the Jakarta Mitra Sejahtera Midwifery Academy, which examined the frequency of anaemia in 39 respondents were aged between 14 and 16 at the Paal Merah I Health Center in Jambi City, 6 respondents (15.4 percent) were under the age of 14, 17 respondents (43.6 percent) were between 15 and 16, and 16 respondents (41.0 percent) were over the age of 16. In contrast, for the frequency of anaemia, among 39 respondents at the Paal Merah I Community Health Center in Jambi City, 10 respondents (25.7%) had completed junior high school, and 28 respondents (74.3%) had completed high school. 16 respondents (41.0 percent) and 23 respondents (59.0 percent) had strong knowledge about the frequency of anaemia in young women, respectively, among the 39 respondents were asked about their knowledge of the condition at the Paal Merah I Health Center in Jambi City. 39 respondents provided an answer, and 23 (59.0 percent) of them reported having low level of knowledge. This is influenced by the respondent's knowledge about knowing the problem of anemia that occurs in adolescent girls. The most important problem during adolescent girls is good knowledge and sources of information so that the expected results are that adolescent girls know about the incidence of anemia in adolescent girls and are able to understand the problem of change, which occurs during adolescence if you do not suffer from anemia²⁵.

The research results show that there are 3 factors related to anemia risk behavior in adolescents, namely predisposing factors which include knowledge, attitudes, education and income. Supporting factors or enabling factors which include information media, infrastructure. As well as reinforcing factors including the role of parents and the role of teachers²⁶. It is important to carry out activities related to health education about the dangers of anemia and how to prevent it so that anemia in young women can be overcome²⁷.

CONCLUSION

The findings indicated that the majority of participants were female, the average life expectancy was 20–21 years, and 80.1% of them had no background of anaemia and were in excellent health. The sociodemographic features of the participants also shows that the respondents were mostly female. The knowledge segment reveals that 83 respondents had neutral behaviour and that the majority of pupils scored in the high range for their knowledge (43.5 percent). According to the findings of the statistical test analysis between knowledge and student behaviour using Chi Square analysis, there was no correlation among knowledge and anaemia prevention behaviour in pupils with a p-value of 0.562.

SUGGESTION

In order to avoid cases of anaemia in female students and improve their quality of health, it is expected that students' knowledge must still be increased by ongoing education and motivation of female students to be able to adopt anaemia prevention behaviour.

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