Indonesian Journal of Global Health Research
Volume 6 Number S6, December 2024
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

THE INFLUENCE OF HEALTH EDUCATION IN INCREASING KNOWLEDGE OF PREVENTING URINARY TRACT INFECTIONS (UTIS) IN CHILDREN

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ABSTRACT
Increasing knowledge about the prevention of urinary tract infections (UTIs) in children is very relevant to nursing. UTIs are common in children, potentially affecting their quality of life and causing significant complications if not treated or prevented properly. Health education plays a crucial role in empowering caregivers and children to adopt preventive measures. This health education aims to increase children's awareness, improve their quality of life, and reduce the incidence of urinary tract infections (UTIs). This study is a quantitative research, using a pre-experimental study with a one-group pretest posttest design. The research sample included 22 children selected based on purposive sampling. The data collected includes demographic data and pretest-posttest data. The data analysis will be displayed in distribution, frequency, and percentage formats. The results of this study showed that of the 22 respondents, the average pretest score was 5.45, which increased to 8.55 after the intervention. The results of the pretest-posttest showed an increase in knowledge with a percentage of 18.4%. Statistical analysis showed that the pretest-posttest assessment resulted in a p-value of 0.000 (< 0.05) and a t-value of -15.739. These results show a significant increase in knowledge after the health education intervention.

Keywords: elementary school children; health education; prevention knowledge; urinary tract infections (UTIs)

How to cite (in APA style)
Putri, E., & Arifah, S. (2024). The Influence of Health Education in Increasing Knowledge of Preventing Urinary Tract Infections (UTIs) in Children. Indonesian Journal of Global Health Research, 6(S6), 1143-1152. https://doi.org/10.37287/ijghr.v6iS6.5260.

INTRODUCTION

Knowledge of personal hygiene is essential for children to establish good health practices, understand proper hygiene from head to toe, and prevent health problems. Keeping the genitals clean is a very important aspect of personal hygiene. According to (Ismail & Handayani, 2022), the lack of knowledge about genital personal hygiene is the occurrence of health disorders in the reproductive tract such as urinary tract infections. Urinary tract infections (UTIs) are a common health problem in children, potentially affecting their quality of life and leading to serious complications if left untreated. This infection is caused by bacteria that enter the urinary tract, *E. Coli* bacteria have the highest position in the infection process (Ismail & Handayani, 2022). Other bacteria that can infect include *Klebsiella Sp, Proteus Sp, Providensiac, P. Aeruginosa, Acinobacter, and Enterococus faecali.*

Urinary tract infections are common in children and are associated with significant short-term and long-term morbidity. They have a high rate of repetition and are associated with anatomical and functional abnormalities. The decision to test for urinary tract infections is based on the child's risk factors and age (Veauthier et al., 2020). The prevalence of urinary tract infections (UTIs) ranges from 5% to 15%, with an incidence rate of 90–100 cases per 100,000 people per year (Kusumah, 2022). In Indonesia, a study found that among 200 children, the incidence of urinary tract infections (UTIs) was higher in girls (67%) than in boys (33%) (Sukmonurcahyo & Hartono, 2024). Based on age group, the incidence of urinary

tract infections (UTIs) is 35%–42% in adolescents aged 10–18 years and 27%–33% in young adults aged 19–22 years (Abbas et al., 2023).

The trigger for urinary tract infections in children is caused by frequent urinary retention which causes urine reflux or the occurrence of backflow of urine from the bladder to the kidneys (CNN Indonesia, 2022). Lack of maintaining health and hygiene of the urogenital area is another triggering factor for UTIs. This is due to the lack of exposure to information about urinary tract infestations and many still ignore information about the urogenitalia system. This is also what makes it easier for a person to get a urinary tract infection (Maulani & Siagian, 2022). The risk factors for urinary tract infections include that women are more at risk of UTIs because their urethra is shorter, and anatomically the location of a woman's urethra is also close to the anal orifisium, which makes it easier for bacteria to enter the urinary tract (Dewi & Donna, 2023).

Symptoms of urinary tract infections (UTIs) in school-age children may differ from those in adults and can include low back pain, fever up to 38ºC, chills, painful or uncomfortable urination (dysuria), vomiting, and decreased appetite (Kementerian Kesehatan Indonesia, 2022b). UTIs can be prevented by cleaning the genital area after urinating, avoiding prolonged urine retention, increasing water intake to regulate urine production, and avoiding the use of feminine hygiene products with perfume ingredients as they can cause irritation (Kementerian Kesehatan Indonesia, 2022a). Urinary tract infections (UTIs) in school-age children can significantly affect their well-being, leading to prolonged health problems and school absenteeism that interfere with academic performance and social interaction. Providing health education to children is an important early intervention to increase awareness and knowledge about UTIs. Knowledge is the result of understanding, which occurs after individuals process and interpret information (Dharma & Irdawati, 2017).

The topic, "The Effect of Health Education in Increasing Knowledge of Urinary Tract Infection Prevention in Children," is very relevant to nursing. Increasing children's knowledge to prevent UTIs is essential to improve their overall health and prevent future complications. The findings of this study have significant implications for nursing practice as educators to provide information on how to prevent certain diseases by providing health education. Health education is a fundamental nursing intervention, and this study emphasizes its effectiveness in increasing knowledge—an important precursor to behavior change. Nurses can integrate structured educational programs into routine pediatric care, focusing on simple, actionable strategies for UTIs prevention. Health education has a positive impact on the patient's health situation, but for some patients, the health education they receive is not satisfactory. (Halse et al., 2013). Increased knowledge is closely related to behavior change; Thus, effective health education has the potential to influence knowledge and action (Baroo'ah & Arifah, 2015).

Health education plays an important role in empowering caregivers and children to adopt preventive measures, aligned with nursing's focus on health promotion and disease prevention. Health education programs can be provided at the individual, group, or community level (Zakiyah & Febriati, 2023). Health education is very important to prevent urinary tract infections (UTIs) in children, but research related to the influence of health education on UTIs knowledge in children is still limited. The limitations of this study require careful interpretation of the implications. This research was conducted at SD Negeri Luwang 01 to implement preventive measures through educational efforts that focus on increasing children's knowledge about UTIs prevention. The location was chosen because of its proximity to the researcher's educational institution and has received approval from the local

primary health facility. Ultimately, this health education aims to increase children's awareness, improve their quality of life, and reduce the incidence of urinary tract infections (UTIs).

METHOD

This study is a quantitative research, using a pre-experimental study with a one group pretest and posttest design. This research was conducted at SD Negeri Luwang 01, Gatak District, Sukoharjo Regency in September 2024. Nonprobability purposive sampling was used to select 22 children who met the following inclusion criteria: 1) students of SD Negeri Luwang 01, 2) age 10-12 years, 3) willing to participate as respondents, 4) able to read and write well, 5) fluent in Indonesian, and 6) willing to attend the entire research process.

The data collected included demographic data and data from pretest-posttest questionnaires. The intervention in the form of health education presented material containing definitions, causes, symptoms, risk factors, and methods of preventing urinary tract infections (UTIs), presented in the form of PowerPoint and leaflets. The intervention lasted about ± 40 minutes. Questionnaires were given both before (pretest) and after (posttest) the intervention to evaluate children's knowledge about UTIs prevention. The questionnaire used in this study was adapted and modified from (Intari, 2019). The validity test was carried out using the face validity method, with approval obtained from expert lecturers and academic advisors. The questionnaire consisted of 10 questions using the Guttman scale, with the "True" answer given a score of 1 and the "False" answer given a score of 0. The study was conducted for eight days divided into three sessions, with a seven-day interval between the pretest and the posttest. During the first session (Day 1), a pretest is administered, followed by an initial health education intervention. The second session (Day 4), the second health education intervention. In the last session (Day 8), the material was reviewed and a posttest was carried out.

In the data analysis stage, the type of analysis used is univariate analysis to obtain a descriptive of the demograpic data and data pretest-posttest will be categorized based on the correct number into low (score 1-4), enough (5-7), and good (8-10). In the bivariate analysis, a data normality test and a paired T-test were carried out to determine whether there was an influence of health education on the level of children's knowledge through the results of pretest-posttest. Data analysis will be displayed in the form of distribution, frequency, and percentage so that it is easy for readers to understand. This research has received an ethics permit from the Research Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta with No.563/KEPK-FIK/IX/2024.

RESULT

Demographic Data

This study involved 22 respondents. Of these, it was found that 68.2% (15) were boys, and 31.8% (7) were girls. Furthermore, the grade levels are distributed as follows: 18.2% (4) in Grade 4, 31.8% (7) in Grade 5, and 50% (11) in Grade 6. Demographic data by age showed that 31.8% (7) were 10 years old, 45.5% (10) were 11 years old, and 22.7% (5) were 12 years old, with a mean age of 10.91 years.

Table 1.
Frequency Distribution by Gender (n=22)

Variable	f	%
Gender		
Man	15	68,2
Woman	7	31,8

Table 2.
Frequency Distribution by Grade Level (n=22)

Variable	f	%	SD	Median	Min	Max
Grade			0,780	5,50	4	6
4	4	18,2				
5	7	31,8				
6	11	50,0				

Table 3.
Frequency Distribution by Age (n=22)

Variable	f	%	Mean	SD	Median	Min	Max
Age			10,91	0,750	11,00	10	12
10	7	31,8					
11	10	45,5					
12	5	22,7					

Pretest-Posttest Data

As mentioned earlier, the pretest-posttest data will be categorized based on the correct number, showing that the percentage of pretest data is 22.7% (5) low and 77.3% (17) enough, and the percentage of posttest data is 22.7% (5) enough and 77.3% (17) good. The average score in the pretest data was 5.45, and the posttest was 8.55.

In the pretest results based on the grade level, grade 4 students had low (4.5%) and enough(13.5%) knowledge levels, grade 5 students showed low (13.6%) and enough (18.1%) knowledge levels, and grade 6 students were more at enoughknowledge levels (45.4%) compared to other classes. After the intervention, there was a significant improvement in all classes. The posttest results showed that 4th grade students who initially did not have a good level of knowledge, increased to 13.5%. Grade 5 showed a significant increase in the good level (27.2%), and grade 6 had the highest proportion at the good level (36.3%).

The results of the pretest by age showed that at the age of 10 years, the majority of students were at the enough level (22.7%), and none reached the good level. The age of 11 years showed similar results, but with a higher proportion at the enough rate (31.9%). The age of 12 years is only at the enoughlevel (22.7%). After the intervention, all age groups showed an increase in the level of good, with 10 years (27.3%), 11 years (31.9%), and 12 years (18.2%) years old.

Male students tended to be more at the low level (16.7%) than female students who were all at the enough level (23.3%) in the pretest results based on gender. Then in the posttest results, men showed a significant increase in the level of good (33.3%), while women also experienced an increase with a good proportion (23.3%).

Table 4.
Pretest-Posttest Frequency Distribution (n=22)

		Total score classification			Total
		Low	Enough	Good	
Pretest	Frequency	5	17	0	22
	%	22,7	77,3	0	100,0
Posttest	Frequency	0	5	17	7
	%	0	22,7	77,3	100,0

Table 5.
Mean value of pretest-posttest (n=22)

	f	%	Mean	SD	Min	Max
			5,45	1,184	3	7
Pretest	22	100,0				
			8,55	1,143	7	10
Posttest	22	100,0				

Table 6.
Pretest results based on grade level (n=22)

		Pretest			Total
		Low	Enough	Good	
Grade 4	Frequency	1	3	0	4
	%	4,5	13,5	0	18,2
Grade 5	Frequency	3	4	0	7
	%	13,6	18,1	0	31,8
Grade 6	Frequency	1	10	0	11
	%	4,5	45,4	0	50,0

Table 7.
Posttest results based on grade level (n=22)

		Posttest			Total
		Low	Enough	Good	
Grade 4	Frequency	0	1	3	4
	%	0	4,5	13,5	18,2
Grade 5	Frequency	0	1	6	7
	%	0	4,5	27,2	31,8
Grade 6	Frequency	0	3	8	11
	%	0	13,6	36,3	50,0

Table 8.
Pretest results based on age (n=22)

Variable		Pretest			Total
Age		Low	Enough	Good	
10	Frequency	2	5	0	7
	%	9,1	22,7	0	31,8
11	Frequency	3	7	0	10
	%	13,6	31,9	0	45,5
12	Frequency	0	5	0	5
	%	0	22,7	0	22,7

Table 9.
Posttest results based on age (n=22)

Variable		Posttest			Total
Age		Low	Enough	Good	
10	Frequency	0	1	6	7
	%	0	13,5	27,3	31,8
11	Frequency	0	3	7	10
	%	0	13,6	31,9	45,5
12	Frequency	0	1	4	11
	%	0	4,5	18,2	22,7

Table 10.
Pretest results by gender (n=22)

Variable		Pretest			Total
Gender		Low	Enough	Good	
Man	Frequency	5	10	0	15
	%	16,7	33,3	0	50,0
Woman	Frequency	0	7	0	7
	%	0	23,3	0	23,3

Table 11.
Posttest results by gender (n=22)

Variable		Posttest			Total
Gender		Low	Enough	Good	
Man	Frequency	0	5	10	7
	%	0	16,7	33,3	50,0
Woman	Frequency	0	0	7	10
	%	0	0	23,3	23,3

The normality test was carried out using the Kolmogorov-Smirnov test, with a p-value threshold of >0.05 indicating normally distributed data. The results of the pretest-posttest normality showed a pretest-p-value of 0.070 and a posttest-p-value of 0.053, confirming that the data was normally distributed. The results of the pretests and posttests showed an increase in knowledge by 18.4% after health education. Furthermore, the pretest-posttest data was carried out by the paired t-test with a p-value of 0.000 (<0.05) and a t-value of -15.739, showing a statistically significant increase in scores.

Table 12.
Normality Test (n=22)

		Normal Parameters[a,b]		Most Extreme Differences				
	N	Mean	Std. Deviation	Absolute	Positive	Negative	Test Statistic	Asymp. Sig. (2-tailed)
Pretest	22	5,45	1,184	,177	,149	-,177	,177	,070[c]
Posttest	22	8,55	1,143	,183	,183	-,171	,183	,053[c]

Tabel 13.
Statistic ratio of pretest-posttest data

		Coefficient of Variation
Price Related Differential	Coefficient of Dispersion	Median Centered
,999	,128	18,4%

Table 14.
Paired T-Test (n=22)

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pretest - Posttest	-3,091	,921	,196	-3,499	-2,683	-15,739	21	,000

DISCUSSION

Urinary tract infections (UTIs) are one of the most common infectious diseases in children and can lead to serious complications if left untreated. Adopting proper health behaviors is essential to prevent urinary tract infections (UTIs), underscoring the need for educational interventions to improve prevention practices (Ahmadi et al., 2020). Health education plays

an important role in preventing UTIs by raising awareness, promoting hygiene practices, and encouraging healthy habits, ultimately contributing to a healthier society (Afiah et al., 2021).

The results of the study showed that the level of class, age, and gender were proven to have an effect on the level of children's knowledge. According to (Hager et al., 2020), knowledge is related to age, gender, education, background, and nationality. Another study by (Dawood et al., 2011) children's knowledge is influenced by age, parental education and parental work as health professionals. The grade level affects the level of initial knowledge and the impact of the intervention. Students in higher grades tend to have better improvement because they may be more mature in comprehending the material. Age plays a role in students' cognitive development. In this study, it was found that older students had better comprehension skills, but the level of material mastery remained increased in all age groups after the intervention. In line with research (Setiyaningrum et al., 2024), researchers concluded that increasing age will affect a person's ability to practice because the more information and experience they get. Thus with research (Febryani et al., 2021), the better the level of formal education a person has, the better knowledge he will have about health.

Research (Hager et al., 2020) shows that knowledge is related to gender. In the results of the posttest in this study, men showed a significant increase in the level of good (33.3%), while women also experienced an increase with a good proportion (23.3%). Of the results, the sexes did not show significant differences in the level of initial knowledge, but after the intervention, males showed greater improvement. This is different from the findings obtained (Utario & Khorini, 2022), 64.7% of girls have good knowledge while 36.6% of boys have good knowledge. Then it is the same with the study (Charisma et al., 2022), that the results show that the average score obtained by the researcher in the posttest questions of male students is 71.79, while the average score of the posttest questions of female students is 85.21. According to (Khaleel, 2017), girls have better academic knowledge and abilities than boys. This is supported by research (Wulandari et al., 2020), that women also have more time to read. However, the influence of gender on pretest and posttest results often varies depending on the educational context and the subject being taught, and the comparison of sample sizes between males and females may affect the results.

Health education provides accurate information, dispels myths, and promotes evidence-based practices. This study shows a significant increase in students' knowledge regarding the prevention of urinary tract infections (UTIs). According to (Telaumbanua & Natalia, 2023), health education can increase knowledge and behavior of UTI prevention with the result that 56.4% of students have good behavior. The average percentage of correct answers increased from 63% in the pretest phase to 83% in the posttest phase (Albaar et al., 2024). Similarly, (Anindita et al., 2023) highlight that early prevention through health education is essential to reduce the risk and impact of UTIs. Understanding UTIs is essential for raising awareness about the importance of personal hygiene. In this study, the average pretest score was 3.48, while the posttest score increased to 8.76, reflecting an increase in knowledge of 15.17%. According to (Prihatiningsih et al., 2024), it shows that 33.33% of students have enough knowledge and 50% have less knowledge about UTIs in the pretest results. After the activity, the posttest showed a significant improvement: 91.67% of students had good knowledge of UTIs (an increase of 116%).

Findings from other studies also showed that knowledge improved significantly after health education interventions. In this study, the analysis of pretest-posttest data revealed a clear effect of health education on children's knowledge about UTIs prevention. Among the 22 respondents, the average pretest score was 5.45, which increased to 8.55 after the

intervention. The results of the pretest-posttest showed an increase in knowledge with a percentage of 18.4%. Statistical analysis showed that the pretest-posttest assessment resulted in a p-value of 0.000 (< 0.05) and a t-value of -15.739. This p-value indicates statistical significance, while a negative t-value and far from zero confirms that the posttest score is much higher than the pretest score. These results show a significant increase in knowledge after the health education intervention. Based on these findings, the null hypothesis (H_0) was rejected, and the alternative hypothesis (H_a) was accepted, confirming that health education had a significant effect on increasing knowledge about UTIs prevention among children. This study supports the conclusion that health education positively affects children's understanding of UTIs prevention, as shown in SD Negeri Luwang 01.

CONCLUSION

This study shows that health education is effective in increasing the knowledge of elementary school-age children about the prevention of urinary tract infections (UTIs). A significant increase in knowledge was seen from the results of the pretest with an average score of 5.45 which increased to 8.55 in the posttest, with an increase in percentage by 18.4%. Statistical analysis using the paired t-test showed a p-value of 0.000, which confirms the significance of the health education intervention. These results confirm the importance of health education as a nursing intervention in promoting UTIs prevention practices. The education provided not only improves children's understanding but can also encourage sustainable behavior change to maintain their health. The application of community-based health education, such as the one conducted in this study, can be an effective model to be adopted in various educational institutions to prevent UTIs and improve the quality of life of children.

ACKNOWLEDGEMENTS

The researcher expressed his gratitude to SD Negeri Luwang 01 for its cooperation and support in the implementation of this research. Thank you also to the Faculty of Health Sciences, Universitas Muhammadiyah Surakarta for the academic guidance and ethical permits given. Highest appreciation to the respondents and their families who have been willing to participate in this study. The support from all parties involved has greatly contributed to the success of this research.

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