

Differences in of Adolescent Girls Knowledge and Attitudes on Vulva Hygiene Before and After Health Education in Mojokerto Regency

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Abstract

Introduction: Fluor albus or vaginal discharge is a common condition among adolescent girls and may be physiological or pathological in nature. Inadequate knowledge and improper vulva hygiene practices can increase the risk of pathological fluor albus. **Objective:** This study aimed to determine the differences in knowledge and attitudes of adolescent girls regarding vulva hygiene in the prevention of fluor albus before and after health education at MAN X Mojokerto Regency. **Method:** This study used a pre-experimental one-group pretest-posttest design involving 71 respondents selected through convenience sampling. Data were collected using validated and reliable knowledge and attitude questionnaires and analyzed using the Wilcoxon Signed-Rank Test. **Result and Discussion:** The average knowledge score increased from 67.96 in the pre-test to 84.15 in the post-test, while the average attitude score increased from 69.42 to 80.51. The Wilcoxon Signed -Rank Test showed significant differences in adolescent girls' knowledge and attitudes regarding vulva hygiene in prevention of fluor albus before and after health education intervention ($p < 0.001$). **Conclusions:** Significant differences observed in adolescent girls' knowledge were and attitudes regarding vulva hygiene in the prevention of fluor albus before and after health education.

Introduction

Fluor albus or vaginal discharge is a common reproductive health problem among women worldwide (Hildebrand, 2024). Pathological fluor albus is associated with reproductive tract infections and, if not treated appropriately, may spread to the upper reproductive tract (ascending infection), leading to complications such as bacterial vaginosis, pelvic inflammatory disease, infertility, and increased risk of cervical cancer (Vodstril, 2021). The World Health Organization reports that bacterial vaginosis affects 23–29% of women of reproductive age (WHO, 2024). In addition, around 75% of women experience vaginal discharge at least once in their lifetime, and 45% experience it more than once (WHO, 2018). In Indonesia, reproductive health problems among adolescents remain high. Data from the Indonesian Basic Health Research (Riskesdas) show that 63.2% of adolescent girls aged 15–19 years have experienced reproductive health problems, with vaginal discharge as one of the most common complaints (Kementerian Kesehatan RI, 2019).

Adolescents are a vulnerable group in reproductive health due to physical, psychological, and social changes during development (WHO, 2014). Indonesia has a large adolescent population, reaching 66.3 million individuals aged 10–24 years (BKKBN, 2016). However, this large population is still accompanied by a high incidence of reproductive health problems among adolescents. The high incidence of vaginal discharge among adolescents may be associated with limited knowledge regarding reproductive health. The Indonesian Adolescent Reproductive Health Survey (SKRRI) reported that only 34% of adolescents have adequate knowledge regarding genital hygiene (Anggreni, 2024). This situation may be influenced by limited access to reproductive health information.

Several studies have reported that pathological vaginal discharge remains highly prevalent among adolescents. Fauziah (2017) found that among 150 respondents, most experienced pathological fluor albus with symptoms such as itching (82%), unpleasant odor (45%), abnormal discharge color (23%), and burning sensation (2%). In line with this, Arifah (2025) reported that 58% of adolescent girls in Tuban Regency experienced abnormal vaginal discharge, with 18% demonstrating poor hygiene practices. The findings indicate that pathological fluor albus among adolescents remains highly prevalent and is closely associated with personal hygiene practices. Preventive efforts through vulva hygiene practices are considered an important strategy in preventing pathological fluor albus. Vulva hygiene refers to practices aimed at maintaining cleanliness of the external female genital organs and surrounding areas (Fitriani, 2020). Health education is one approach that can be used to improve adolescents' understanding and attitudes regarding vulva hygiene practices.

Uma'iyah (2024) reported a 13% increase in adolescents' knowledge following a health education intervention on vulva hygiene. Based on a preliminary study at MAN X Mojokerto Regency involving 12 female students, it was found that 10 of them had experienced vaginal discharge, with some of them reporting symptoms such as pain when urinating and itching in the genital area. Therefore, this study aimed to analyse differences in adolescent girls' knowledge and attitudes regarding vulva hygiene for the prevention of fluor albus before and after receiving health education.

Method

This study employed a pre-experimental design using a one-group pre-test post-test approach. Without a control group. The study was conducted at MAN X, Mojokerto Regency, in January 2026. The population for this study comprised all female students at the study site, with a sample size of 71 respondents selected using a non-probability sampling technique, namely convenience sampling. Data were collected using a structured questionnaire to assess adolescent girls' knowledge and attitudes towards vulva hygiene in the prevention of fluor albus. The knowledge questionnaire was adapted from Dian Pertiwi (2018), while the attitude questionnaire was adapted from Rani (2022). Both instruments had been validated in previous studies, with all questionnaire items were confirmed to be valid. Reliability testing demonstrated Cronbach's Alpha coefficients of 0.920 for the knowledge questionnaire and 0.787 for the attitude questionnaire, indicating good reliability for both instruments.

The intervention consisted of health education regarding vulva hygiene in the prevention of fluor albus delivered through PowerPoint presentation and leaflets for approximately 45 minutes. Data were collected twice, before the intervention (pre-test) and after the intervention (post-test). The post-test was administered on the same day, approximately 10 minutes after the completion of the health education session. The independent variable in this study was the provision of health education on vulva hygiene, whereas the dependent variables were adolescent girls' knowledge and attitudes towards the prevention of fluor albus. Data analysis was carried out using the Wilcoxon Signed-Rank Test with a significance level 0.05 to determine differences in knowledge and attitudes before and after the health education.

Result and Discussion

1. Result

Univariate Analysis

Table 1

Distribution of Respondents by Age and Parental Occupation (n=71)

Variable	Category	n	%
Age (years)	15 years	9	12.7%
	16 years	35	49.3%
	17 years	27	38.0%
	18 years	0	0.0%
Parental Occupation			
Father's occupation	Unemployed	0	0.0%
	Manual worker	4	5.6%
	Private employee	23	32.4%
	Self-employed	33	46.5%
	Civil servants	9	12.7%
	Military/Police	2	2.8%
Mother's occupation	Unemployed	64	90.1%
	Manual worker	0	0.0%
	Private employee	2	2.8%
	Self-employed	1	1.4%
	Civil servants	4	5.6%
	Military/Police	0	0.0%

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The characteristics of the respondents show that most respondents were aged 16 years (49.3%). Based on their parents' occupations, most fathers were self-employed or traders (46.5%), while most mothers were unemployed (90.1%).

Table 2

Distribution of Adolescent Girl's Knowledge on Vulva Hygiene in the Prevention of Fluor Albus Before and After Health Education (n=71)

Knowledge category	Pre-test n (%)		Post-test n (%)	
	n	%	n	%
Good	32	45.1%	57	80.3%
Moderate	20	28.2%	11	15.5%
Poor	19	26.7%	3	4.2%

The univariate analysis shows that respondents' knowledge regarding vulva hygiene in the prevention of fluor albus increased after health education. Before the intervention, the largest proportion of respondents had good knowledge (45.1%), while (28.2%) had adequate knowledge and (26.7%) had poor knowledge. After the intervention, the proportion of respondents with good knowledge increased to (80.3%), whereas the percentages of adequate and poor knowledge decreased to (15.5%) and (4.2%) respectively.

Table 3

Distribution of Adolescent Girl's Attitude on Vulva Hygiene in the Prevention of Fluor Albus Before and After Health Education (n=71)

Attitude category	Pre-test n (%)		Post-test n (%)	
	n	%	n	%
Positive	30	42.3%	69	97.2%
Negative	41	57.7%	2	2.8%

The univariate analysis shows that respondents' attitudes regarding vulva hygiene in the prevention of fluor albus improved after health education. Before the intervention, most respondents showed negative attitudes (57.7%), while 42.3% demonstrated positive attitudes. After the intervention, the proportion of respondents with positive attitudes increased to 97.2%, whereas respondents with negative attitudes decreased 2.8%.

Table 4

Differences in Knowledge and Attitudes of Adolescent Regarding Vulva Hygiene in the Prevention of Fluor Albus Before and After Health Education (n=71)

Variable	Pre-test		Post-test		p-value
	Mean	SD	Mean	SD	
Knowledge	67.96	20.13	84.15	13.40	<0.001
Attitude	67.42	9.49	80.51	9.11	<0.001

The bivariate analysis showed significant differences in Respondents' knowledge and attitudes regarding vulva hygiene in the prevention of fluor albus before and after health education. The mean knowledge score increased from 67.96 ± 20.13 before the intervention to 84.15 ± 13.40 after intervention. Likewise, the mean attitude score increased from 67.42 ± 9.49 to 80.51 ± 9.11 following health education. The Wilcoxon

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Signed Rank Test showed p-values of $<0,001$ for both variables, indicating statistically significant differences before and after the intervention.

2. Discussion

Characteristics of Respondents

Most respondents were aged 16 years (49.3%), which falls with middle adolescence. During this stage, adolescents begin to develop greater cognitive abilities and curiosity toward issues, including reproductive health issues (WHO, 2014). In addition, adolescents in this age group tend to have a greater need for reproductive health information as part of their developmental stage. The majority of respondents' fathers were self-employed or traders (46.5%), while most mothers were housewives (90.1%). These characteristics provide a general respondents' family background and may describe the sources of reproductive health information received by adolescents outside the school environment.

Knowledge Regarding Vulva Hygiene in the Prevention of Fluor Albus Before and After Health Education

This study showed an improvement in adolescent girls' knowledge regarding vulva hygiene in the prevention of fluor albus after health education. The mean knowledge score increased from 67.96 before the intervention to 84.15 after the intervention. Prior to health education, 26.7% of respondents were still categorized as having poor knowledge, indicating that some adolescents still had limited understanding regarding reproductive health and appropriate vulva hygiene practices. The pre-test result also revealed that some respondents considered the use of feminine cleansing products as a recommended vulva hygiene practice. However, according to the American College of Obstetricians and Gynecologist (ACOG, 2020), the vagina is a self-cleaning organ and does not require special cleansing products. Inappropriate use of feminine cleansing products may disrupt the balance of normal vaginal flora and increase the risk of irritation. After the educational intervention, the number of respondents with this misconception decreased, indicating improved understanding regarding proper vulva hygiene practices.

The improvement in knowledge after health education suggests that reproductive health education may help adolescents better understand vulva hygiene and reproductive health issues. According to Notoatmodjo (2020), health education plays an important role in improving individual knowledge through the delivery of information and learning experiences. These findings are in line with previous adolescents' understanding regarding vulva hygiene. For instance, Kasim (2024) reported that health education on vulva hygiene significantly increased senior high school students' knowledge regarding reproductive health. Similarly, Hiola et al. (2025) found that reproductive health education tailored to adolescents' needs was able to improve adolescent girls' understanding of proper vulva hygiene practices.

Attitude Regarding Vulva Hygiene in the Prevention of Fluor Albus Before and After Health Education

This study showed an improvement in adolescent girls' attitudes regarding vulva hygiene in the prevention of fluor albus after health education. Prior to the intervention, 57.7% of respondents were categorized as having negative attitudes, indicating that some adolescents still had inappropriate perceptions regarding vulva hygiene practices. These findings are consistent with a study by Sumiati et al. (2024), which reported that most

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adolescent girls demonstrated negative attitudes toward genital hygiene before receiving health education interventions.

The pre-test results also showed that some respondents still had inappropriate attitudes regarding vulva hygiene practices, particularly related to the use of pantyliners and feminine cleansing products. Several respondents agreed that pantyliners should be used to prevent fluor albus, while some respondents disagreed that feminine cleansing products could disrupt the balance of normal vaginal bacteria. These findings indicate that some adolescents still had misconceptions regarding daily vulva hygiene practices. Lakaoni and Gunawan (2024) reported that pantyliner use was associated with pathological vaginal discharge among adolescent girls. This finding is supported by Acye Nir et al. (2021), who found that poor personal hygiene practices, including inappropriate pantyliner use, were associated with vaginal discharge among adolescent girls. In addition, Apriani (2023) stated that inappropriate use of feminine cleansing products may disrupt the balance of normal vaginal flora, particularly *Lactobacillus* bacteria that help maintain normal vaginal pH. Disruption of the normal vaginal flora may increase the risk of irritation and vaginal infections.

After health education, the proportion of respondents with negative attitudes decreased to 2.8%, and the mean attitude score increased from 69.42 to 80.51. The number of respondents who agreed that pantyliners should be used to prevent fluor albus also decreased after the intervention, indicating improved attitudes regarding proper vulva hygiene practices. According to Notoatmodjo (2018), attitudes may change through the process of receiving information and learning experiences. These findings are in line with previous studies showing that reproductive health education contributes to the development of positive attitudes regarding vulva hygiene. For instance, Ulum et al. (2023) reported that health education improved adolescent girls' attitudes toward fluor albus prevention. Similarly, Fitriah and Diastuti (2025) found that reproductive health education played an important role in developing positive attitudes toward maintaining reproductive organ hygiene among adolescent girls.

Difference in Knowledge and Attitude Before and After Health Education

The study found that health education was associated with improvements in adolescent girls' knowledge and attitudes regarding vulva hygiene in the prevention of fluor albus. The Wilcoxon Signed Rank Test showed significant differences were observed between pre-test and post-test scores ($p < 0.001$). The mean knowledge score increased from 67.96 during the pre-test to 84.15 during the post-test, while the mean attitude score increased from 69.42 to 80.51 after the intervention. These findings indicate improvements in knowledge and more positive attitudes regarding vulva hygiene practices among adolescent girls after receiving health education. These findings are in line with Notoatmodjo (2018), who stated that health education is a learning process aimed at improving individuals' knowledge and abilities in maintaining their health.

In this study, health education was delivered using PowerPoint and leaflet media containing information about vulva hygiene and the prevention of fluor albus. Hanifah (2023) stated that the use of visual media in health education could help adolescents understand reproductive health information more easily and attractively. In addition, Edgar Dale (1969), through the Cone of Experience theory, explained that combination of visual and verbal information delivery could improve individual understanding compared to verbal explanation alone. The findings of this study are also consistent with Bloom's behavioral theory (1956), which states that behavioral changes occur through

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the stages of knowledge, attitude, and action. These findings are also supported by previous studies showing that reproductive health education effectively improves adolescent girls' knowledge and attitudes. Larasati et al. (2024) reported that health education regarding vulva hygiene using leaflet media improved adolescent girls' knowledge after the intervention. Furthermore, Yultiria et al. (2022) also found that reproductive health education programs among adolescents improved knowledge and promoted positive attitudes toward reproductive health behaviors.

Conclusion

This study concludes that health education regarding vulva hygiene was associated with improvements in adolescent girls' knowledge and attitudes toward the prevention of *fluor albus*. Significant differences were found between pre-test and post-test scores, indicating increased understanding and more positive attitudes regarding vulva hygiene practices after the intervention. Reproductive health education may help improve adolescent girls' knowledge and awareness regarding reproductive health maintenance.

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