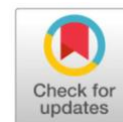




## Original Research



### *Adolescent vaginal hygiene and Trichomonas vaginalis: A Focused study in Balongbendo village, Sidoarjo, East Java, Indonesia*



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**Abstract:** *Trichomonas vaginalis* is a protozoan parasite responsible for leucorrhoea, transmitted primarily through sexual contact, and commonly affecting the lower urogenital tract. According to the World Health Organization (WHO), the global incidence of trichomoniasis is estimated at 180 million cases annually. In the United States, the infection affects around 2-3 million women annually, with the organism also found in 30-40% of male sexual partners. This study aimed to examine the presence of *Trichomonas vaginalis* in adolescent urine samples and assess their vaginal hygiene practices in Balongbendo Village, Sidoarjo, East Java, Indonesia. *Trichomonas vaginalis* is widely prevalent across the globe, including both rural and urban areas. This focused study utilized both experimental and questionnaire-based approaches. Urine samples from 25 adolescents were analyzed directly for *Trichomonas vaginalis* presence, while a questionnaire was administered to assess personal hygiene practices, particularly focusing on genital care. Data were analyzed using One-Way ANOVA and Chi-Square tests to determine statistical significance and percentage distributions. The study identified *Trichomonas vaginalis* in 5 out of 25 urine samples, indicating a 20% prevalence among the participants. The majority of respondents demonstrated a solid understanding and practice of vaginal hygiene. The analysis revealed a statistically significant relationship between genital hygiene practices and the presence of *Trichomonas vaginalis*, with a  $p$ -value of 0.001 ( $p < 0.05$ ). The findings indicate that while *Trichomonas vaginalis* remains present among adolescents in Balongbendo Village, the majority exhibit good vaginal hygiene practices, highlighting the importance of continuous education on genital care in preventing such infections.

**Keywords:** *Trichomonas vaginalis*; Urine; Adolescents; Hygiene

## INTRODUCTION

*Trichomonas vaginalis* is a protozoan parasite that causes trichomoniasis, a sexually transmitted infection that frequently targets the lower urogenital tract<sup>1</sup>. In women, the infection is often asymptomatic, but when symptoms do occur, they typically manifest as profuse, greenish, frothy vaginal discharge<sup>2</sup>. The incidence of *Trichomonas vaginalis* infection is on the rise, with several factors contributing to this increase, including age, education level, genital hygiene, access to clean water, the frequency of changing sexual partners, routine health check-ups, the use of medications or vaginal cleaning products, and knowledge of trichomoniasis<sup>3</sup>.

Taxonomically, *Trichomonas vaginalis* belongs to the Kingdom Animalia, Phylum Protozoa, Class Zoomastigophora, Order Mastigophora, Genus *Trichomonas*, and Species *Trichomonas vaginalis*<sup>4</sup>. Unlike many other protozoa, *Trichomonas vaginalis* does not have a cyst stage and exists only in the trophozoite

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stage <sup>5</sup>. The parasite is characterized by its oval or piriform shape, with four anterior flagella and a fifth flagellum that forms the axoneme and undulating membrane <sup>6</sup>. At its posterior end, the axoneme extends beyond the body, likely aiding in tissue attachment and causing irritation. The trophozoite has a single nucleus and an anterior cytostome for nutrient uptake, and it reproduces through binary fission. In females, *Trichomonas vaginalis* primarily resides in the vaginal mucosa, whereas in males, it is found in the urethra <sup>7</sup>.

*Trichomonas vaginalis* is pathogenic and typically inhabits the genitourinary tract of infected individuals. The infection is transmitted through sexual contact and can lead to vaginitis in women and non-gonococcal urethritis in men. The parasite is widely distributed globally, affecting both rural and urban populations. In 2002, the World Health Organization (WHO) estimated the global incidence of trichomoniasis at 180 million cases. In the United States alone, the parasite infects approximately 2-3 million women annually and is present in 30-40% of their male sexual partners. According to WHO data from 2007, the prevalence of trichomoniasis ranged from 25% to 50%, bacterial vaginosis from 20% to 40%, and candidiasis from 5% to 15%. In Indonesia, approximately 75% of women have experienced vaginal discharge at least once in their lives, with 45% experiencing it twice or more <sup>8</sup>. Data from the Ministry of Health indicates that 5.2 million adolescent girls in Indonesia report symptoms post-menstruation, primarily due to poor hygiene practices. Additionally, of the 69.4 million people in Indonesia, 63 million adolescents reportedly engage in unhealthy hygiene behaviors, particularly regarding reproductive organ cleanliness during menstruation. <sup>9</sup>

This lack of hygiene is linked to increased cases of vaginal infections, including trichomoniasis. A study conducted in 2012 at MA Al-Hikmah Aengdake Bluto found a significant relationship between personal hygiene and the incidence of vaginal discharge. The study revealed that all respondents had experienced menarche, with 95% having suffered from vaginal discharge, and the majority demonstrating poor personal hygiene practices. Given the significant public health implications of trichomoniasis and the observed deficiencies in adolescent hygiene practices, this study aims to investigate the presence of *Trichomonas vaginalis* among adolescents in Balongbendo Village, Sidoarjo, East Java, and to assess the cleanliness of their intimate organs<sup>10</sup>.

## MATERIAL AND METHOD

### Study Design

This research employed an observational design with both survey and laboratory components. The study was conducted in Balongbendo Village, Sidoarjo Regency, East Java, with urine examinations performed at the Anwar Medika University Integrated Biology Laboratory during April-May 2022.

### Study Population

The population for this study comprised all adolescents aged 11-25 years residing in Balongbendo Village. A purposive sampling technique was used to select 25 respondents based on specific criteria. The inclusion criteria in this study are: Young women in Balongbendo Hamlet with an age range of 11-25 years, willing to fill out informed consent, willing to fill out the questionnaire, can hear and read well. Exclusion criteria are criteria outside the inclusion criteria, which are included in the exclusion criteria for this study are Adult women aged >25 years, woman aged <11 years, not willing to fill out informed consent, and Cannot hear and read well. determined by the researcher.

### Study Type and Data Collection Methods

This research is classified as observational analytic with a cross-sectional approach. Data collection involved distributing questionnaires to the respondents and collecting urine samples. The questionnaires focused on intimate organ hygiene, while the sample pots were used for urine collection. Both the questionnaires and urine samples were then analyzed.

### Research Procedures

1. **Urine Sample Preparation:** The collected urine samples were transferred into centrifuge tubes and centrifuged at low speed for 5 minutes. The supernatant was then carefully removed, and the remaining precipitate was homogenized.
2. **Microscopic Examination:** A drop of the homogenized precipitate was placed on a microscope slide and covered with a cover slip. The slide was examined under a microscope at 10x magnification to identify potential organisms, followed by 40x magnification to confirm the presence of *Trichomonas vaginalis*.

### Data Processing and Analysis

Data from the questionnaires and urine examinations were analyzed quantitatively. The results were presented in tables and graphs for interpretation. Data analysis using One-Way ANOVA Chi-Square the calculation of the amount and percentage.

## RESULTS AND DISCUSSION

The study involved 25 adolescent female respondents from Balongbendo Village, Sidoarjo Regency. The age distribution of the respondents is shown in Table 1.

Table 1: Age Distribution of Respondents in Balongbendo Village, Sidoarjo Regency

Age Range	Number of Respondent	Percentage %
16-20	4	16%
21-25	21	84%
<b>Total</b>	<b>25</b>	<b>100%</b>

From Table 1, it is evident that the majority of respondents (84%) were aged 21-25 years, while the remaining 16% were aged 16-20 years.

Table 2: Prevalence of *Trichomonas vaginalis* in Urine Samples by Age Group

Age Range	Negative for <i>Trichomonas vaginalis</i>	Positive for <i>Trichomonas vaginalis</i>
16-20	4 (16%)	0 (0%)
21-25	16 (64%)	5 (20%)
Total	20 (80%)	5 (20%)

In Table 2, out of the 25 urine samples analyzed, *Trichomonas vaginalis* was detected in 5 samples (20%), all within the 21-25 years age group. The remaining 20 samples (80%) tested negative for *Trichomonas vaginalis*.

### Vaginal Hygiene Questionnaire Results

The study also included a questionnaire assessing various aspects of vaginal hygiene among the respondents. The key findings are summarized, **76%** of respondents recognized the importance of maintaining genital hygiene; **68%** changed their underwear at least twice a day; Only **32%** washed their vagina from front to back after urinating or defecating; **92%** changed sanitary pads after 4 hours of use; **84%** washed their hands after changing sanitary pads; **76%** maintained vaginal hygiene after sexual intercourse; **72%** dried the vagina before reapplying

pads; **80%** understood the relationship between genital health and overall female organ health; and **80%** changed their underwear twice a day, while only **12%** changed it only after bathing in the morning.

Table 3: Statistical Analysis of the Relationship Between Vaginal Hygiene Practices and *Trichomonas vaginalis* Presence

NO	Statement	P-value
1.	Genital hygiene is important to maintain	0.001
2.	I change my underwear at least twice a day	0.000
3.	I wash my female organs from the back to the front after defecating and urinating	0.000
4.	I change sanitary napkins after 4 hours of use	0.003
5.	I will wash my hands before and after changing pads	0.102
6.	The vagina needs to be washed after sexual intercourse	0.349
7.	The vagina must be dried before using pads again	0.075
8.	Genital health is health related to the health of the female organ system according to its function	0.000
9.	Good underwear is one that is changed 2 times a day	0.012
10.	I change my underwear when I take a shower in the morning	0.538

The study primarily focused on assessing the prevalence of *Trichomonas vaginalis* among adolescent females in Balongbendo Village, Sidoarjo Regency, and its association with vaginal hygiene practices. The findings indicate a noteworthy presence of *Trichomonas vaginalis* (20%) among the respondents, particularly in the 21-25 age group, highlighting the relevance of sexual health education in this demographic. The higher prevalence of *Trichomonas vaginalis* among respondents aged 21-25 years aligns with existing research indicating that sexually active individuals within this age range are at increased risk for trichomoniasis. This age group often represents a period of increased sexual activity, and the presence of the parasite can be linked to sexual transmission, which is the most common route of infection <sup>11</sup>. The absence of *Trichomonas vaginalis* in the 16-20 age group may suggest lower sexual activity or better hygiene practices in this subset, although this cannot be conclusively determined without additional data on sexual behavior <sup>12</sup>.

The questionnaire results revealed varying levels of awareness and adherence to proper vaginal hygiene practices <sup>13</sup>. While a majority of respondents recognized the importance of maintaining genital hygiene (76%) and changing underwear regularly (68%), a significant gap was noted in specific practices that are critical for preventing infections. Only 32% of respondents were aware that washing the vagina from front to back is essential to prevent the introduction of fecal bacteria into the vaginal area, a practice that, when done incorrectly, can increase susceptibility to infections like trichomoniasis <sup>14</sup>.

The strong statistical associations observed between certain hygiene practices and the presence of *Trichomonas vaginalis* further underscore the importance of proper genital hygiene. For instance, the significant p-values obtained for statements related to genital hygiene ( $p = 0.001$ ), regular changing of underwear ( $p = 0.000$ ), and timely changing of sanitary pads ( $p = 0.003$ ) suggest that these practices are closely linked to reducing the risk of infection. Conversely, practices such as washing the vagina from back to front ( $p = 0.000$ ) were significantly associated with a higher risk, reinforcing the need for education on correct hygiene techniques <sup>15</sup>.

The results of this study are consistent with findings from other studies that emphasize the importance of proper vaginal hygiene in preventing sexually transmitted infections (STIs) <sup>16</sup>. For instance, research conducted by [Hubaedah]

(2019) in [Bangkalan] found that inadequate genital hygiene was a significant risk factor for trichomoniasis, with similar age-related patterns in prevalence <sup>17</sup>. This study's finding that only 32% of respondents practiced correct vaginal washing mirrors the results of previous studies, such as [Zubaedah] (2021), which reported that a majority of women (73.5%) did not know the correct technique for cleaning their genital area <sup>18</sup>.

Moreover, studies have shown that educational interventions focusing on personal hygiene can significantly reduce the incidence of genital infections. For example, [Pamuji] (2019) demonstrated that targeted health education in [SMA student] led to a marked improvement in hygiene practices and a corresponding decrease in infection rates <sup>19</sup>. This suggests that implementing similar educational programs in Balongbendo Village could potentially reduce the prevalence of *Trichomonas vaginalis* and other STIs among adolescent females <sup>20</sup>.

The findings from this study highlight the need for increased awareness and education on proper vaginal hygiene, especially among adolescents in rural areas <sup>21</sup>. Given the significant relationship between hygiene practices and the presence of *Trichomonas vaginalis*, public health interventions should focus on correcting misconceptions and promoting accurate information regarding genital care <sup>22</sup>. Educational campaigns should emphasize the importance of practices such as washing the genital area from front to back, changing sanitary pads regularly, and maintaining overall cleanliness, particularly during menstruation and after sexual activity <sup>23</sup>.

Furthermore, the study suggests that sexual health education should be integrated into broader public health strategies targeting young women in this community <sup>24</sup>. This could include workshops, informational sessions, and distribution of educational materials that address both general hygiene and specific practices to prevent STIs. Collaboration with local health authorities, schools, and community leaders could enhance the effectiveness of these initiatives <sup>25</sup>.

While this study provides valuable insights into the relationship between vaginal hygiene practices and the prevalence of *Trichomonas vaginalis*, several limitations should be considered <sup>26</sup>. The sample size was relatively small (n=25), which may limit the generalizability of the findings to the broader population. Additionally, the study relied on self-reported data for hygiene practices, which may be subject to reporting bias or inaccuracies <sup>27</sup>. Future research should aim to include larger and more diverse samples to validate these findings <sup>28</sup>. Longitudinal studies could also provide more comprehensive data on how changes in hygiene practices over time influence the prevalence of trichomoniasis and other STIs <sup>29</sup>. Moreover, investigating the role of sexual behavior, socioeconomic factors, and access to healthcare in conjunction with hygiene practices could offer a more holistic understanding of the determinants of trichomoniasis in this population <sup>30</sup>.

## CONCLUSION

In conclusion, this study underscores the critical role of proper vaginal hygiene in preventing *Trichomonas vaginalis* infections among adolescent females. The significant associations found between hygiene practices and the presence of *Trichomonas vaginalis* highlight the need for targeted educational interventions to improve hygiene behaviors. By addressing the gaps in knowledge and promoting correct hygiene practices, it may be possible to reduce the prevalence of trichomoniasis and improve the overall sexual health of young women in Balongbendo Village.

## AUTHORS' CONTRIBUTIONS

Acivrida Mega Charisma: Corresponding authors, prepared the samples, designed the protocols, executed the protocols. Farida Anwari: wrote the manuscript, submit and revision and review the manuscript. Bagus Nuzul Maulana: collection. data analytic and visualization statistically. All authors have read and approved the final manuscript

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## DATA AVAILABILITY STATEMENT

The utilized data to contribute in this research are available from the corresponding author on reasonable request.

## DISCLOSURE STATEMENT

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors. The data is the result of the author's research and has never been published in other journals.

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