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Factors influencing the occurrence of urinary tract infections in girls aged 14-19 years attending Wera seed secondary school, Wera sub county Amuria district. A cross-sectional study.

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Abstract

Background

Urinary Tract Infections are more common in females due to their shorter urethra, which allows easier entry of bacteria into the urinary system. This study was to assess factors influencing the occurrence of urinary tract infections among girls aged 14 to 19 years attending Wera Seed Secondary School in Wera Sub-County, Amuria District.

Methods

A descriptive Cross-sectional study design employing a quantitative research method was used to obtain data from a sample size of 40 girls aged 14 to 19 years in a duration of four days, sampled using a simple random sampling technique. A structured questionnaire was used, the data collected was analyzed, and findings were entered into Microsoft Excel 2013, then presented in tables and pie-charts.

Results

Among the 40 participants sampled, more than half (57.5%) of the respondents were aged 14–15 years, and 62.5% lived in rural areas. On adolescent-related factors, most (77%) always delayed urination due to embarrassment, more than half (55%) used homemade hygiene products, nearly half (45%) wore tight clothes, and most (70%) reported that their parents were not involved in guiding them on proper hygiene practices. Concerning School-related factors, almost all (92.5%) delayed urination due to school rules or activities, and (73%) sometimes had access to clean and private toilets at school.

Conclusion

The study found that the majority of the girls frequently delayed urination due to embarrassment and used homemade hygiene products.

Recommendation

There is a need to deploy health workers to regularly sensitize students on proper hygiene and the dangers of reusing sanitary materials or delaying urination.

Keywords: *Urinary Tract Infections, Girls Aged 14-19 Years, Wera Seed Secondary School, Wera Sub County, Amuria District.*
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Background of the study

Urinary tract infections (UTIs) refer to infections that affect any part of the urinary system, including the urethra, bladder, ureters, and kidneys (Mancuso et al., 2023). These infections are primarily caused by bacteria, with Escherichia coli being the most common pathogen, although fungi and viruses can also be responsible in some cases (Ramos et al., 2020).

UTIs are more common in females due to their shorter urethra, which allows easier entry of bacteria into the urinary system. Factors such as poor hygiene, sexual activity, and underlying health conditions can increase the risk of developing a UTI (Storme et al., 2019). These infections, if untreated, lead to complications such as kidney damage, recurrent infections, or systemic infections like sepsis (Ishigami & Matsushita, 2019).

Globally, UTIs account for approximately 30% of bacterial infections in adolescent girls, with an annual

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incidence rate of 15% to 25% in this age group between 14-19 years (Deng et al., 2024). Poor menstrual hygiene, early sexual activity, and limited access to healthcare services are 76% significant contributors to these high rates (Sharma et al., 2022). The consequences of untreated UTIs include chronic kidney disease, recurrent infections, and psychological distress, particularly in adolescent girls whose education and social life are disrupted by the illness (Mohiuddin, 2019).

In Sub-Saharan Africa, UTIs among adolescent girls are even more prevalent, with rates ranging from 35% to 50% depending on the region's demographics (Janoowalla et al., 2020). Factors such as inadequate menstrual hygiene management, limited access to clean water and sanitation facilities, and cultural norms exacerbate the burden (Patel et al., 2022). In Nigeria, girls in rural areas are 40% more likely to experience UTIs compared to their urban counterparts due to the lack of proper hygiene products and facilities. This is leading to school absenteeism, lower academic performance, and long-term health complications (Pham, 2021).

In East Africa, the prevalence of UTIs among adolescent girls is estimated at 28% to 40% with significant variation between urban and rural areas (Maldonado et al., 2024). A study in Kenya revealed that 49.9% girls who lacked access to menstrual hygiene products were 3.5 times more likely to develop UTIs compared to those who had adequate supplies (Mutegi, 2023). These infections often go untreated due to limited healthcare access, resulting in increased risks of chronic kidney disease and infertility in adulthood (Varda & Retik, 2020).

In Uganda, the prevalence of UTIs among adolescent girls is estimated at 25% to 35% with higher rates reported in rural areas (Avuti, 2021). Teenage girls of 14-19 years in rural Uganda face unique challenges such as inadequate menstrual hygiene products, poor sanitation facilities, and limited access to healthcare services (Kemigisha et al., 2020). Cultural beliefs that discourage open discussions about menstrual hygiene at 31% further complicate the issue (Mohammed & Larsen-Reindorf, 2020). In Amuria District, the prevalence of UTIs among adolescent girls aged 14 to 19 years is alarmingly high, estimated at 40% (Amuria District Health Records, 2023). This has caused frequent absenteeism from school, social isolation, and a compromised quality of life.

Methodology

Study Design and Rationale

A descriptive cross-sectional study design employing a quantitative research method was used to obtain data. The study was descriptive because the researcher assessed the factors of the topic and analyzed the data using descriptive statistics. The study was cross-sectional because it was carried out at one point in time without further follow-up.

Study Setting and Rationale

The study was conducted at Wera Seed Secondary School, located in Wera Sub-County, Amuria District, Eastern Uganda. The school is situated approximately 2 kilometers away from the Wera Sub-County Headquarters and about 15 kilometers from Amuria Town. Wera Seed Secondary School is a government-owned institution providing education to a diverse population of students from surrounding villages within the sub-county. The school has approximately 500 students, with around 250 female students aged between 14 and 19 years.

The rationale for selecting this school is based on its relatively high female student population in the specified age range, making it an ideal location to study. The school's geographical coordinates are approximately 01°58′19″N 33°45′12″E (1.9720°N 33.7533°E).

Study Population

The study population consisted of all adolescent girls aged 14-19 years attending Wera Seed Secondary School in Amuria District.

Sample Size Determination

The sample size determination followed the guidelines provided by Krejcie and Morgan's table of 1970. A sample size of 40 respondents was selected, representing a proportionate sample size of adolescent girls aged 14-19 years attending Wera Seed Secondary School. According to Wera Seed Secondary School, there were 250 adolescent girls aged 14-19 years who faced UTIs; however, the researcher took N to be 45 for reasons of efficiency, statistical feasibility, and limited resources, so N=45 and S=40 according to Krejcie and Morgan's table.

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Sampling Procedure

A simple random sampling technique was used. Adolescent girls aged 14-19 years attending Wera Seed Secondary School were selected from the school register. 50 papers were prepared, and Papers with numbers 1-44 were written on, and the other 6 papers were left unwritten on. Then, all these were put in a box, then adolescent girls aged 14-19 years who picked papers bearing numbers 1-40 were selected to participate in the study.

Inclusion Criteria

The study included all adolescent girls aged 14-19 years who had consented to take part in the study.

Those in a healthy situation who could afford a response.

Exclusion Criteria

Adolescent girls aged 14-19 years who had consented but were not present at the time of data collection, and those in an unhealthy situation who could not afford to respond.

Definition of Variables

Dependent Variables

Occurrence of Urinary Tract Infections meant the extent to which adolescent girls aged 14-19 years consistently encountered UTIs.

Independent Variables

Adolescent-related factors and School-related factors influencing Urinary tract infections among adolescent girls aged 14-19 years at Wera Seed Secondary School.

Research Instruments

The researcher used a structured questionnaire. The questionnaire consisted of three sections: socio-demographic data, adolescent-related factors, and school-related factors. Each section contained closed-ended questions to assess caretakers' responses objectively.

Data Collection Procedure

An introductory letter from the Principal of Mildmay Uganda School of Nursing and Midwifery was given to the researcher, which the researcher presented to the Head teacher of Wera Seed Secondary School to carry out the study among adolescent girls aged 14-19 years. Data collection involved a structured questionnaire and was given to adolescent girls in Wera Seed School Secondary. Data was collected by sampling 10 participants over a period of 4 days to achieve a sample size of 40 respondents to ensure the success of the study.

Data Management and Analysis

Data Management

After each day's data collection, the completed questionnaires were checked for completeness and coded. The questionnaires were then stored in secure files under lock, key, and password for the computer to ensure safety, confidentiality, and for future reference.

Data Analysis

Data was first tallied manually on the tally sheet and calculations made by the calculator, and then entered into Microsoft Excel (version 2010) and analyzed using descriptive statistics and presented in figures, pie charts, graphs, and tables.

Quality Assurance

Validity

This was ensured by setting questions according to the research objectives and working with the supervisor to ensure that the tool has both face and construct validity.

Reliability

The questionnaires were pre-tested at Aten primary school among 12 selected respondents, and necessary corrections were made. Then it was re-tested among 5 adolescents to make the final adjustment before the formal study.

Ethical Considerations

The study proposal was reviewed and approved by the Mildmay Uganda School of Nursing and Midwifery Research Committee, which was presented to the school

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administration of Wera Seed Secondary School for authorization to carry out the study in the school. The Head teacher directed the researcher to the senior woman teacher, where the researcher was allowed to introduce herself to the respondents. Written consent and assent were obtained from adolescent girls. The researcher ensured confidentiality by using numeric codes instead of names, and participants were free to withdraw at any time. All information was handled with strict confidentiality.

Results

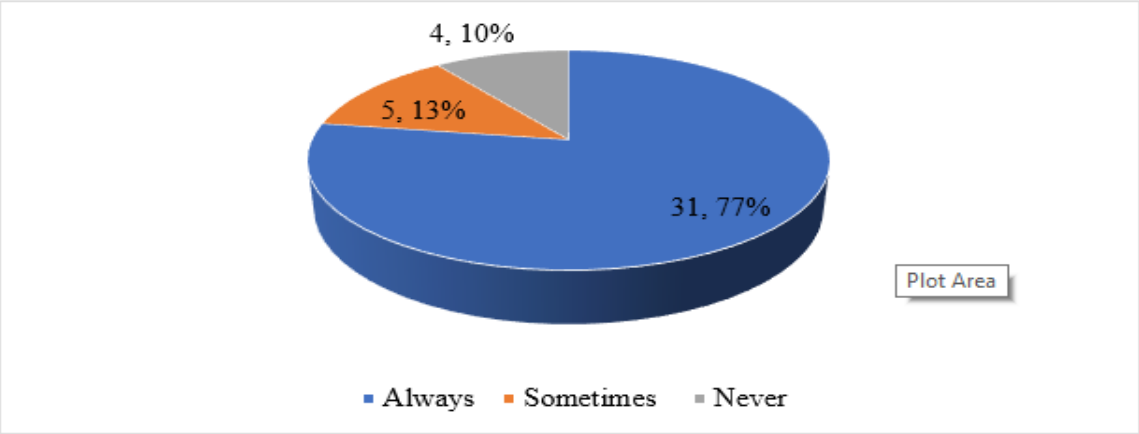
Social demographic data of the respondents.

From table 1, it is indicated that 23 (57.5%) of the respondents were aged 14–15 years, 14 (35%) were aged 16–17 years, and a minority of 3 (7.5%) were 18 years old. A large number, 15 (37.5%), of the respondents were in Form 2, 12 (30%) were in Form 1, fewer than 7 (17.5%) were in Form 4 and above, and the least 6 (15%) were in Form 3. The majority, 25 (62.5%) of the respondents lived in rural areas, 12 (30%) resided in semi-urban areas, and only 3 (7.5%) lived in urban settings.

Table 1 shows the demographic data of the respondents

Variable	Response	Frequency (n=40)	Percentage (%)
Age Group	14–15 years	23	57.5
	16–17 years	14	35.0
	19 years	3	7.5
Class Level	Form 1	12	30.0
	Form 2	15	37.5
	Form 3	6	15.0
	Form 4 and above	7	17.5
Place of Residence	Rural	25	62.5
	Semi-urban	12	30.0
	Urban	3	7.5

Figure 1 shows the frequency of delaying urination due to a lack of privacy



Adolescent-related factors influencing the occurrence of urinary tract infections among girls aged 14 to 19 years attending Wera Seed Secondary School in Wera Sub-County

Figure 1 indicates that 31 (77%) of the respondents always delayed urination due to embarrassment or lack of private toilets at school, 5 (13%) sometimes delayed urination, while the least 4 (10%) never delayed urination.

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Table 2 shows that the majority, 26 (65%) of the respondents had received comprehensive sexual health education about risks like unprotected sex or multiple partners, 10 (25%) had not received such education, and a few, 4 (10%) were unsure. More than half, 22 (55%) of the respondents used homemade or reusable feminine hygiene products, 12 (30%) used no products at all, and a minority, 6 (15%) used plain sanitary pads or tampons. Nearly half 18 (45%) of the respondents wore tight, synthetic underwear a few times a week, 12 (30%) wore them daily, 7 (17.5%) wore them rarely, and only 3 (7.5%) never wore them. A majority, 26 (65%) of the respondents reported reusing sanitary materials, while 14 (35%) did not reuse them. Most 31 (77.5%) of the respondents frequently came into contact with potentially contaminated water sources, 8 (20%) did so occasionally, and only 1 (2.5%) never came into contact with such sources.

The majority, 28 (70%) of the respondents reported that their parents or guardians were not involved at all in guiding them on proper hygiene practices, 9 (22.5%) said they were somewhat involved, and only 3 (7.5%) indicated they were very involved

Table 2 shows reception of comprehensive sexual health education, type of feminine hygiene product used, wearing of tight underwear, reuse of sanitary materials, and contact with contaminated water.

Variable	Response	Frequency (n=40)	Percentage (%)
Received Comprehensive Sexual Health Education	Yes	26	65.0
	No	10	25.0
	Am unsure	4	10.0
Type of Feminine Hygiene Products Commonly Used	Homemade or reusable products	22	55.0
	None	12	30.0
	Plain sanitary pads or tampons	6	15.0
Wearing Tight, Synthetic Underwear	A few times a week	18	45.0
	Daily	12	30.0
	Rarely	7	17.5
	Never	3	7.5
Reuse of Sanitary Materials	Yes	26	65.0
	No	14	35.0
Parental / guardian involvement in hygiene guidance	Very involved	3	7.5
	Somewhat involved	9	22.5
	Not involved at all	28	70
Came into contact with potentially contaminated water sources	Frequently	31	77.5
	Occasionally	8	20.0
	Never	1	2.5

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Figure 2 shows access to clean and private toilets.

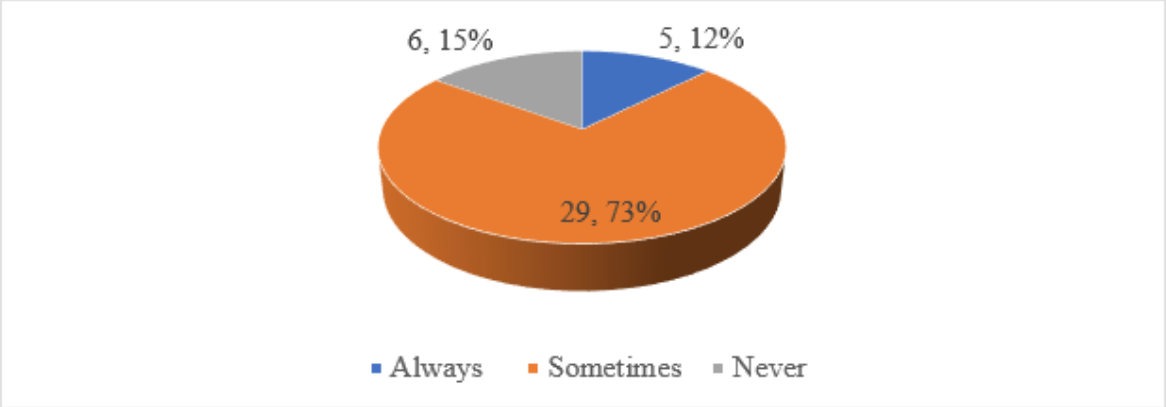

Figure 3 demonstrates that the majority, 29 (73%) of the respondents sometimes had access to clean and private toilets at school, 6 (15%) never had access, and the least 5 (12%) always had access.

Table 3 shows delaying of urination, access to sanitary pads, changing facilities and water, reception of lessons on personal hygiene, and the influence of friends on hygiene habits.

Variable	Response	Frequency (n=40)	Percentage (%)
Frequency of Urination Delay Due to School Rules/Activities	Almost always	37	92.5
	Frequently	3	7.5
	Never	0	0.0
Access to Sanitary Pads and Changing Facilities at School	Hard to access when needed	38	95.0
	Sometimes available	2	5.0
	Easily accessible anytime	0	0.0
	Not available at all	0	0.0
Frequency of Receiving Hygiene & UTI Prevention Lessons	At least once per term	26	65.0
	Only in special programs	10	25.0
	Once a year or less	4	10.0
	The last week of the month	0	0.0
Availability of Clean Water for Hygiene at School	Available but inconsistent	28	70.0
	Not available at all	9	22.5
	Always available	3	7.5
Influence of Friends on Hygiene Habits	Encourage good hygiene	28	70.0
	No influence on my habits	7	17.5
	Discourage proper hygiene	5	12.5

Table 3 indicates that 37 (92.5%) of the respondents almost always delayed urination due to school rules or activities, while a few 3 (7.5%) did so frequently, and none reported never delaying urination. An overwhelming majority, 38 (95%) of the respondents found sanitary pads and changing facilities hard to access when needed, while only 2 (5%) reported they were sometimes available. A majority, 26 (65%) of the respondents received lessons on personal hygiene and UTI prevention at least once per term, 10 (25%) learned only through special programs, and 4 (10%) received such lessons once a year or less. Most 28 (70%) of the respondents reported that clean water was available but inconsistent at school, 9 (22.5%) said it was not available at all, and only 3 (25%) found it always available. The majority, 28 (70%) of the respondents said their friends encouraged good hygiene habits, 7 (17.5%) reported no influence from friends,

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while 5 (12.5%) were discouraged from proper hygiene by their peers.

Discussion

Social demographic data of the respondents

A greater proportion (57.5%) of participants were aged between 14–15 years. This was because this age group forms the majority of lower secondary students in Ugandan schools. This implies that interventions targeting UTI prevention should be age-appropriate and focused on younger adolescents who may lack full awareness of personal hygiene practices.

Most respondents (37.5%) were in Form 2. This was because Form 2 often has higher enrollment rates and retention compared to other classes. This implies that educational programs on hygiene and UTI prevention should be integrated into the curriculum at this level, where most girls are concentrated.

A significant proportion (62.5%) came from rural areas. This was because Wera Sub-County is predominantly rural, and the school serves a large rural population. This implies that rural-related challenges like access to water, hygiene facilities, and health education may influence UTI occurrences among adolescent girls.

Adolescent-related factors influencing the occurrence of urinary tract infections among girls aged 14 to 19 years attending Wera Seed Secondary School in Wera Sub-County

A high percentage (77%) of frequent delayed urination is due to embarrassment or lack of private toilets. This may be because inadequate school sanitation infrastructure may discourage girls from using available facilities. This implies that a lack of private, clean toilets increases the risk of UTIs among adolescent girls and highlights the need for gender-sensitive WASH facilities. This is in line with a study carried out by Hughes et al. (2024), which showed that 38% of the participants had experienced UTIs due to a lack of private latrines in schools which led to embarrassment and reluctance to use shared school facilities.

Most girls (65%) had received sexual health education. This could be due to the fact that schools or NGOs may have included reproductive health in their programs. This implies that awareness of UTI risk factors like unprotected sex exists but may not fully translate into behavioral change without continuous reinforcement. This study result is contrary to a study carried out by Janoowalla et al. (2020), which indicated that 57% of the participants had poor hygiene knowledge, which contributed to UTI occurrence.

Over half (55%) used homemade or reusable hygiene products. This could be because such products are more affordable and accessible in rural areas. This implies that the use of potentially unhygienic materials could be a contributing factor to UTI prevalence among adolescent girls. The findings are contrary to those of a study carried out by Kessler et al. (2019), which indicated that 44% of participants used scented products such as douches and sprays.

Nearly half (45%) wore tight underwear a few times a week. This was because synthetic undergarments are commonly sold and may be preferred for style or affordability. This implies that synthetic fabrics may promote moisture retention, creating an environment conducive to UTIs. This agrees with a study carried out by Fathy Mahmoud et al. (2019), which showed that 48% the prevalence of UTIs among participants who frequently wore tight, synthetic underwear.

A large proportion (65%) reported reusing sanitary materials. This could be because of limited access to disposable pads and a lack of awareness about hygiene risks. This implies that repeated use without proper sanitation significantly increases UTI risk. The findings agree with a study carried out by Janoowalla et al. (2020), which indicated a 40% prevalence of UTIs among participants who reused sanitary materials due to financial constraints.

The majority (77.5%) had frequent contact with potentially contaminated water. This can be because rural areas often rely on unprotected water sources for domestic activities. This implies that waterborne bacteria can increase UTI susceptibility among these girls. This is in line with a report by Paumier et al. (2022), which showed that UTIs were linked to frequent swimming in contaminated water sources.

A significant number (70%) reported no involvement from their parents. This was because cultural taboos and busy schedules limit parental guidance on personal hygiene. This implies that a lack of home support for hygiene may leave girls uninformed and vulnerable to

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UTIs. This is similar to a study conducted by Mangal (2020), which revealed that girls who lacked parental involvement in promoting proper hygiene practices suffered from UTIs.

School-related factors influencing the occurrence of urinary tract infections among girls aged 14 to 19 years attending Wera Seed Secondary School in Wera Sub-County

Most respondents (73%) had only occasional access to clean private toilets. This might be because many schools in rural areas lack sufficient sanitation infrastructure. This implies that limited access to clean toilets can lead to unhealthy urinary habits and increased UTI risk. This is in line with a study carried out by Nabwera et al. (2021), which demonstrated that 42% of adolescent girls experienced recurrent UTIs due to poor access to clean toilets and hand-washing stations.

A very high percentage (92.5%) of frequently delayed urination is due to school routines. This could be because school programs may limit students' freedom to visit the toilets. This implies that rigid school schedules without allowances for bathroom breaks contribute significantly to UTI occurrence. The findings are in agreement with a study conducted by Mbiti (2021), which showed that 30% of adolescent girls delayed urination due to strict school policies, increasing their susceptibility to infections.

Almost all respondents (95%) reported difficulty in accessing sanitary pads and changing areas.

This might be due to schools often lacking resources to provide menstrual products or facilities. This implies that poor menstrual hygiene management in schools is a major risk factor for UTIs. The findings are similar to those of a study done by Ademas et al. (2020), which showed that 38% of adolescent girls lacked access to sanitary pads or clean changing facilities and experienced a higher incidence of UTIs.

A majority (65%) received lessons at least once per term. This could be because hygiene education is occasionally incorporated into the curriculum. This implies that although some awareness exists, irregular education may not be sufficient to drive consistent behavioral change. This is in disagreement with a study done by Jelly et al. (2022), which suggested that only 25% of adolescent girls had received formal education on proper hygiene practices and UTI prevention strategies.

A large proportion (70%) said water was available, but inconsistent. This could be because rural schools depend on unreliable water sources like boreholes and rainwater tanks. This implies that inconsistency in water supply hinders proper hygiene maintenance, thus promoting UTI risk. This is in line with a study done by Sarkar et al. (2024), which showed that 33% of adolescent girls lacked access to clean water for personal hygiene, increasing their risk of infections.

Most girls (70%) said their friends encouraged good hygiene. This could be because peer education and social behavior modeling influence adolescent hygiene decisions. This implies that peer-led hygiene promotion could be an effective strategy for reducing UTIs. This is in contrast with a study carried out by Chung et al. (2021), which indicated that 28% of adolescent girls adopted poor hygiene habits due to a lack of positive peer reinforcement, contributing to higher UTI cases.

Conclusion

Concerning the adolescent-related factors, the study found that the majority of girls frequently delayed urination due to embarrassment or lack of private toilets, reused sanitary materials, and used homemade or reusable hygiene products. Many also had frequent contacts with contaminated water sources, wore tight synthetic underwear, and lacked parental guidance on personal hygiene.

Regarding the school-related factors, the findings revealed that most girls lacked regular access to clean and private toilets, often experienced delayed urination due to strict school routines, and experienced difficulties accessing sanitary pads and appropriate changing areas. Inconsistent availability of clean water and limited hygiene education at school further compounded the problem. However, peer support in hygiene practices somehow solved the problem.

Generalizability

Wera Secondary School findings could not be generalized to other secondary schools due to the limited setting of the study area.

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Recommendations

To the Ministry of Health

The Ministry should develop and strengthen adolescent health programs that focus on menstrual hygiene management, personal hygiene, and UTI prevention, especially in rural school settings.

There is a need to deploy health workers or school health visitors to regularly sensitize students on proper feminine hygiene and the dangers of reusing sanitary materials or delaying urination.

The Ministry should consider including reusable but medically safe sanitary products in the free health kits distributed to school-going girls in low-resource areas.

To the Ministry of Education and Sports

The Ministry should enforce the construction and maintenance of gender-sensitive sanitation facilities (private toilets, clean water, and changing areas) in all government-aided schools, especially in rural regions like Wera Sub-County.

Hygiene education, including UTI prevention, should be incorporated into the school curriculum and delivered regularly as part of life skills or health education lessons.

The Ministry should facilitate regular monitoring and supervision of school sanitation and hygiene standards to ensure compliance with national school health policies.

To the School Management (Wera Seed Secondary School)

The school administration should ensure consistent availability of clean water, private toilets, and designated areas for girls to change sanitary pads with dignity and privacy.

There is a need to establish and support health clubs where education and discussion about hygiene, peer and UTIs can be encouraged among girls.

The school should allocate part of its resources or mobilize support from stakeholders to ensure every girl has access to safe and adequate sanitary materials during their menstruation.

To the Adolescent Girls

The girls should be encouraged to avoid delaying urination, wear breathable underwear, and refrain from using scented products or reusing sanitary pads, as these practices increase the risk of UTIs.

Participants are encouraged to seek guidance from parents, teachers, and health workers on matters related to menstrual hygiene and urinary health.

They should also take initiative to promote hygiene among peers and make use of the available school health programs and facilities responsibly.

Acknowledgement

I thank the Almighty God from my heart for his endless grace in enabling me to accomplish this research and this course.

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I also thank the management of Mildmay Uganda School of Nursing and Midwifery, tutors, and non-teaching staff, and I appreciate the management of Wera Seed Secondary School, Wera, Sub County, Amuria District, for allowing me to conduct my study at the facility.

May God richly bless them all.

List of Abbreviations

HIMS: Health Information Management System
MOH: Ministry of Health
STIs: Sexually Transmitted Infections
UDHS: United Nations Children's Fund
UHPAB: Uganda Health Professions Assessment Board
UTIs: Urinary Tract Infections
WHO: World Health Organization

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Source of funding

The study was not funded.

Conflict of interest

The author declares no conflict of interest.

Author contributions

Hope Apenyo was the principal investigator.

Hasifa Nansereko supervised the research.

Data availability

Data is available upon request.

Informed consent

All the participants consented to this study.

Author Biography

Hope Apenyo holds a diploma in Nursing Extension from Mildmay Uganda School of Nursing and Midwifery.

Hasifa Nansereko is a tutor at Mildmay Uganda School of Nursing and Midwifery.

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