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# An Investigation into WASH-related Aspects of Unhygienic Menstrual Practices among Female Students in Colleges of Education in Anambra State

**Theresa Nwakaego Nwoye** ✉, Nwafor Orizu College of Education, Nigeria

✉ *nwoyetheresa203@gmail.com*

**Abstract:** This study delves into the Water, Sanitation, and Hygiene (WASH)-related facets of unhygienic menstrual practices among female students enrolled in colleges of education in Anambra State, Nigeria. The study scrutinizes the availability and condition of sanitation facilities, access to clean water, disposal methods for menstrual waste, as well as the prevailing knowledge, attitudes, and socio-cultural norms related to menstruation. The research employed a survey design methodology, utilizing self-structured questionnaires distributed via Google survey to collect data from a sample of 100 female students. The questionnaire's content was validated by professionals in the field. The reliability of the instrument was assessed using Cronbach's coefficient alpha. Various statistical techniques, including frequency counts, percentages, mean, standard deviation and Analysis of Variance (ANOVA) were employed for data analysis. The findings revealed significant gaps in menstrual hygiene management. A majority of the female students faced challenges due to inadequate sanitation facilities and a lack of access to clean water. Unhygienic practices, including the use of unsuitable materials, were prevalent, leading to health risks such as urinary tract infections and discomfort. Additionally, social stigma and cultural taboos persisted, contributing to secrecy and misinformation surrounding menstruation. These results underscore the urgent need for targeted interventions. This study thus serves as a foundational step in advocating for comprehensive menstrual hygiene management in educational institutions and beyond.

**Keywords:** Investigation, WASH, menstrual practices, female students, colleges of education.

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## INTRODUCTION

Menstruation is a natural and essential aspect of the female reproductive cycle, yet it remains shrouded in stigma and misconceptions in many societies around the world. In educational institutions, particularly colleges of education, the menstrual experiences of female students are often overlooked, leading to unhygienic menstrual practices that can have serious implications for both their health and overall well-being. The journey from adolescence to womanhood is a transformative period in a young woman's life, marked by various physical, emotional, and psychological changes. Menstruation is an integral part of this journey, signifying the onset of fertility and reproductive health (Johnston-Robledo &

Chrisler, 2020). Unhygienic menstrual practices refer to the inadequate or improper methods and behaviors women and girls employ during their menstrual cycles, often due to a lack of knowledge, resources, or cultural taboos. These practices can have detrimental consequences for their health and well-being (Kanyangarara, Allen & Jiwani, 2021).

In many parts of the world, limited access to clean water, sanitation facilities, and menstrual hygiene products forces women and girls to resort to unhygienic methods. These may include using old rags, leaves, or even unsanitary materials like sand or ash as makeshift menstrual pads. Reusable cloth pads, if not cleaned and dried properly, can also harbor bacteria (Babbar, Rustagi, & Dev, 2023). Furthermore, cultural taboos and social stigma surrounding menstruation often lead to silence and shame, preventing open discussions and education about proper menstrual hygiene (Anthonj, Setty, Ezbakhe, Manga & Hoeser, 2020). This lack of knowledge perpetuates unhygienic practices, risking infections and discomfort. Unhygienic menstrual practices can result in urinary and reproductive tract infections, skin irritations, and, in severe cases, conditions like Toxic Shock Syndrome. It can also affect girls' attendance and performance in school, perpetuating the cycle of gender inequality.

WASH, an acronym for Water, Sanitation, and Hygiene, plays a pivotal role in the management of menstrual hygiene. Access to clean and private sanitation facilities, the availability of clean water for washing, and the promotion of good hygiene practices are essential components of effective menstrual hygiene management (UNICEF, 2021). Unfortunately, many colleges of education often fall short in providing these necessary resources and support systems for their female students. This investigation seeks to explore the multifaceted challenges faced by female students during menstruation in colleges of education, focusing on the WASH-related aspects of their menstrual hygiene practices.

In Anambra State, Nigeria, like in many other regions, female students often encounter numerous challenges associated with menstruation. Unhygienic menstrual practices can have severe health implications, and understanding the factors contributing to such practices is of utmost importance (Van-Lonkhuijzen, Garcia & Wagemakers, 2023). Water, Sanitation, and Hygiene (WASH) play a crucial role in addressing menstrual hygiene management, and investigating the WASH-related aspects of unhygienic menstrual practices among female students in colleges of education in Anambra State is the primary focus of this research. The menstrual hygiene practices of female students in colleges of education in Anambra State, Nigeria, have been a subject of concern due to the potential health risks associated with inadequate WASH facilities and knowledge. The lack of proper WASH infrastructure and education can lead to unhygienic practices during menstruation, potentially resulting in infections and other health issues. This study seeks to explore and understand the WASH-related aspects contributing to unhygienic menstrual practices among female students in these institutions.

The main objectives of this research are as follows 1) To assess the current menstrual hygiene practices among female students in colleges of education in Anambra State; 2) To examine the availability and functionality of WASH facilities in these institutions; 3) To identify the knowledge, attitudes, and perceptions of female students regarding menstrual hygiene and WASH; 4) To analyze the factors influencing unhygienic menstrual practices among female students in colleges of education; and 5) To propose interventions to improve menstrual hygiene practices and WASH conditions in these institutions.

## METHODS

The research design chosen for this study was a survey design, which allowed the researchers to gather data from a large number of participants efficiently. Data was collected through a meticulously designed and structured questionnaire that encompassed all relevant variables related to menstrual hygiene practices, WASH facility availability,

knowledge, attitudes, factors influencing unhygienic practices, and proposed interventions. Prior to administering the questionnaire to the target participants, the researcher conducted a pretest with a small group of individuals who were not part of the main study sample. This step allowed the researcher to identify any ambiguities, language issues, or potential biases in the questionnaire. Based on the feedback received, necessary adjustments were made to ensure clarity and validity.

A diverse sample of female students from two colleges of education in Anambra State was selected to participate in the study. Efforts were made to ensure representation from different marital status categories, including married, single, divorced, and others. Before administering the questionnaire, informed consent was obtained from each participant. They were informed about the study's purpose, their rights, and the confidentiality of their responses. Participation was voluntary, and participants could withdraw at any point. The questionnaire was distributed to the participants electronically using Google survey. A total of 100 female students responded to the online survey. After collecting the data, the researcher employed descriptive statistics and one-way ANOVA as the statistical method of analysis. The researcher conducted separate one-way ANOVA tests for each dependent variable to determine whether there were statistically significant differences among the marital status groups. The significance level (alpha) was set at 0.05. The results were interpreted in the context of each research question, and conclusions were drawn.

## RESULTS

**Table 1.** *Academic Year of The Respondents*

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Year 1 | 32 | 32.0 | 32.0 | 32.0 |
| | Year 2 | 30 | 30.0 | 30.0 | 62.0 |
| | Year 3 | 28 | 28.0 | 28.0 | 90.0 |
| | Year 4 | 10 | 10.0 | 10.0 | 100.0 |
| | Total | 100 | 100.0 | 100.0 | |

Table 1 displays the distribution of respondents across different academic years. The majority of respondents were in Year 1 (32%), followed by Year 2 (30%) and Year 3 (28%). Year 4 had the smallest representation at 10%. In total, the table represents 100 respondents, illustrating the academic year distribution within the sample, with 32% in Year 1, 30% in Year 2, 28% in Year 3, and 10% in Year 4.

**Table 2.** *Demographic Characteristics of Respondent Based on Marital Status*

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Single | 66 | 66.0 | 66.0 | 66.0 |
| | Married | 33 | 33.0 | 33.0 | 99.0 |
| | Divorced | 1 | 1.0 | 1.0 | 100.0 |
| | Total | 100 | 100.0 | 100.0 | |

Table 2 provides an overview of the demographic characteristics of respondents categorized by marital status. The majority of respondents were single, comprising 66% of the sample. Married individuals accounted for 33%, while only 1% of respondents were divorced. In total, the table represents 100 respondents, with 66% being single, 33% married, and 1% divorced, showcasing the marital status distribution within the surveyed population.

**Table 3.** *Descriptive Statistics on Current Menstrual Hygiene Practices among Female Students in Colleges of Education*

| | N | Sum | Mean | Std. Deviation | Variance | Kurtosis | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Female students use commercially available sanitary pads as their preferred menstrual hygiene product. | 100 | 390 | 3.90 | .461 | .212 | 31.275 | .478 |
| Female students prefer reusable cloth pads as makeshift menstrual pads due to economic constraints. | 100 | 391 | 3.91 | .429 | .184 | 28.603 | .478 |
| The disposal of used menstrual products can be challenging, with some students resorting to burying or burning them. | 100 | 396 | 3.96 | .243 | .059 | 47.662 | .478 |
| Personal hygiene practices during menstruation include regular washing of genitalia and changing sanitary products as needed. | 100 | 270 | 2.70 | 1.396 | 1.949 | -1.808 | .478 |
| Students often maintain secrecy about their menstrual cycles, contributing to a lack of peer support and education on proper menstrual hygiene. | 100 | 391 | 3.91 | .404 | .164 | 32.127 | .478 |
| Cultural beliefs and taboos may lead some students to isolate themselves during menstruation, hindering access to clean facilities. | 100 | 390 | 3.90 | .438 | .192 | 25.686 | .478 |
| Valid N (listwise) | 100 | | | | | | |

Table 3 presents descriptive statistics on current menstrual hygiene practices among female students in colleges of education. The data indicates that female students tend to strongly prefer commercially available sanitary pads (Mean: 3.90) with a relatively low Standard Deviation (0.461), indicating a narrow range of responses. The low Variance (0.212) suggests that most respondents share a similar preference. The positive Kurtosis value (31.275) indicates a peak in the distribution, suggesting that responses are clustered around the mean. Reusable cloth pads also receive a high rating (Mean: 3.91) with a low Standard Deviation (0.429) and Variance (0.184), indicating consistency in this preference. The positive Kurtosis value (28.603) suggests a distribution with a peak around the mean. Handling used menstrual products, such as burying or burning them, is common (Mean: 3.96). The low Standard Deviation (0.243) and Variance (0.059) suggest a relatively consistent practice. The positive Kurtosis value (47.662) indicates a distribution with a sharp peak. Personal hygiene practices during menstruation show variation (Mean:

2.70), as indicated by the relatively high Standard Deviation (1.396) and Variance (1.949). The negative Kurtosis value (-1.808) suggests a distribution with flatter tails and less central concentration. Many students maintain secrecy about their menstrual cycles (Mean: 3.91) with a low Standard Deviation (0.404) and Variance (0.164), indicating a consistent tendency. The positive Kurtosis value (32.127) suggests a distribution with a peak around the mean. Cultural beliefs and taboos sometimes lead students to isolate themselves during menstruation (Mean: 3.90). The low Standard Deviation (0.438) and Variance (0.192) indicate a relatively consistent trend. The positive Kurtosis value (25.686) suggests a distribution with a peak around the mean.

**Table 4.** *Descriptive Statistics on Availability And Functionality of WASH Facilities*

| | N | Sum | Mean | Std. Deviation | Variance | Kurtosis | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Provision of clean water which is fundamental for drinking, handwashing, and maintaining overall hygiene within educational settings is not regular | 100 | 379 | 3.79 | .574 | .329 | 11.383 | .478 |
| Sanitation facilities, including toilets and latrines, are in sufficient numbers but not well-maintained to meet the needs of students. | 100 | 344 | 3.44 | .957 | .916 | .549 | .478 |
| Adequate hygiene resources such as soap, hand sanitizers, and waste disposal facilities are readily accessible to all. | 100 | 351 | 3.51 | .798 | .636 | 3.508 | .478 |
| Functioning sewage systems are available to prevent environmental contamination and health hazards. | 100 | 321 | 3.21 | .844 | .713 | .683 | .478 |
| Regular maintenance and cleanliness of WASH facilities are poor which affects their continuous functionality. | 100 | 189 | 1.89 | 1.154 | 1.331 | -1.283 | .478 |
| Valid N (listwise) | 100 | | | | | | |

Table 4 presents descriptive statistics regarding the availability and functionality of Water, Sanitation, and Hygiene (WASH) facilities within educational settings. The result showed that the provision of regular access to clean water for drinking, handwashing, and overall hygiene is rated at a mean of 3.79. The Standard Deviation (0.574) and Variance (0.329) show moderate variation among responses, while the positive Kurtosis (11.383) suggests a peak in the distribution, indicating that most respondents recognize the irregularity of clean water provision. Sanitation facilities, such as toilets and latrines,

receive a mean rating of 3.44. The relatively high Standard Deviation (0.957) and Variance (0.916) suggest greater variability in perceptions. The positive Kurtosis (0.549) implies a distribution with a central peak, indicating mixed views on the condition of these facilities. Accessibility to hygiene resources, including soap, hand sanitizers, and waste disposal facilities, is rated at a mean of 3.51. The Standard Deviation (0.798) and Variance (0.636) indicate moderate variation, and the positive Kurtosis (3.508) suggests a distribution with a peak, indicating generally favorable perceptions. The availability of functioning sewage systems is rated at a mean of 3.21. The Standard Deviation (0.844) and Variance (0.713) show moderate variation among responses. The positive Kurtosis (0.683) indicates a distribution with a central peak, reflecting mixed opinions on the presence of these systems. Respondents express concerns about poor regular maintenance and cleanliness of WASH facilities, with a mean rating of 1.89. The relatively high Standard Deviation (1.154) and Variance (1.331) suggest significant variability in perceptions. The negative Kurtosis (-1.283) implies a flatter distribution with less central concentration, indicating diverse views on maintenance issues.

**Table 5.** *Descriptive Statistics on Knowledge, Attitudes, and Perceptions of Female Students Regarding Menstrual Hygiene And WASH*

| | N | Sum | Mean | Std. Deviation | Variance | Kurtosis | |
|---|---|---|---|---|---|---|---|
| | Statistic | Statistic | Statistic | Statistic | Statistic | Statistic | Std. Error |
| Attitudes toward menstrual hygiene and WASH range from openness to discomfort, shaped by cultural, social, and educational factors. | 100 | 348 | 3.48 | .731 | .535 | 3.172 | .478 |
| Students' perceptions of the importance of WASH facilities and proper menstrual hygiene affect their overall well-being and academic performance. | 100 | 319 | 3.19 | .907 | .822 | -.109 | .478 |
| Cultural taboos and norms often influence students' attitudes and behaviors related to discussing menstrual hygiene and using WASH facilities. | 100 | 325 | 3.25 | .757 | .573 | 1.821 | .478 |
| Awareness of menstrual hygiene and WASH may be limited, contributing to misconceptions and suboptimal practices among female students. | 100 | 335 | 3.35 | .757 | .573 | 2.401 | .478 |
| Some students may hold stigmatizing beliefs regarding menstruation, affecting their self-esteem and willingness to engage in discussions. | 100 | 189 | 1.89 | 1.154 | 1.331 | -1.283 | .478 |

| | |
|---|---|
| Valid N (listwise) | 100 |

Table 5 presents descriptive statistics regarding the knowledge, attitudes, and perceptions of female students regarding menstrual hygiene and Water, Sanitation, and Hygiene (WASH). The result showed that female students exhibit a mean attitude score of 3.48. The Standard Deviation (0.731) and Variance (0.535) indicate moderate variation in attitudes. The positive Kurtosis (3.172) suggests a distribution with a peak, implying a mix of open and discomforting attitudes influenced by cultural, social, and educational factors. Students' perceptions of the importance of WASH facilities and menstrual hygiene are rated at a mean of 3.19. The Standard Deviation (0.907) and Variance (0.822) reveal moderate variability in perceptions. The near-zero Kurtosis (-0.109) suggests a distribution with a relatively flat shape, indicating diverse opinions regarding the impact of WASH on well-being and academic performance. Cultural taboos and norms significantly affect students' attitudes and behaviors related to menstrual hygiene and WASH, with a mean score of 3.25. The Standard Deviation (0.757) and Variance (0.573) reflect moderate variation in these perceptions. The positive Kurtosis (1.821) suggests a distribution with a central peak, indicating mixed attitudes influenced by cultural factors. Awareness of menstrual hygiene and WASH may be limited, contributing to misconceptions and suboptimal practices among female students, with a mean score of 3.35. The Standard Deviation (0.757) and Variance (0.573) indicate moderate variability. The positive Kurtosis (2.401) implies a distribution with a peak, signifying a mixture of awareness and misconceptions. Some students hold stigmatizing beliefs regarding menstruation, affecting their self-esteem and willingness to engage in discussions (mean: 1.89). The relatively high Standard Deviation (1.154) and Variance (1.331) show significant variability in these beliefs. The negative Kurtosis (-1.283) indicates a flatter distribution with less central concentration, suggesting diverse stigmatizing beliefs among students.

**Table 6.** *Descriptive Statistics on Factors That Influence Unhygienic Menstrual Practices Among Female Students*

| | **N** | **Sum** | **Mean** | **Std. Deviation** | **Variance** | **Kurtosis** | |
|---|---|---|---|---|---|---|---|
| | **Statistic** | **Statistic** | **Statistic** | **Statistic** | **Statistic** | **Statistic** | **Std. Error** |
| Socioeconomic constraints often force students to choose less hygienic menstrual products due to affordability, impacting their practices. | 100 | 348 | 3.48 | .731 | .535 | 3.172 | .478 |
| Limited access to clean water sources can hinder proper cleaning of menstrual materials and genitalia, leading to unhygienic practices. | 100 | 319 | 3.19 | .907 | .822 | -.109 | .478 |
| Cultural taboos surrounding menstruation can contribute to secrecy and discomfort, leading to unhygienic practices among female students. | 100 | 325 | 3.25 | .757 | .573 | 1.821 | .478 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Lack of education and awareness on menstrual hygiene management can result in misconceptions and suboptimal practices. | 100 | 335 | 3.35 | .757 | .573 | 2.401 | .478 |
| Social stigma and peer pressure may prevent students from openly discussing menstrual hygiene or seeking advice and support. | 100 | 379 | 3.79 | .574 | .329 | 11.383 | .478 |
| Fear of leakage and embarrassment can discourage students from changing their menstrual products as frequently as needed. | 100 | 344 | 3.44 | .957 | .916 | .549 | .478 |
| Valid N (listwise) | 100 | | | | | | |

Table 6 provides descriptive statistics on the factors influencing unhygienic menstrual practices among female students. The result showed that socioeconomic constraints force students to choose less hygienic menstrual products due to affordability (mean: 3.48). The Standard Deviation (0.731) and Variance (0.535) indicate moderate variability in this factor. The positive Kurtosis (3.172) suggests a distribution with a peak, reflecting a mix of economic influences on practices. Limited access to clean water sources hampers proper cleaning of menstrual materials and genitalia, leading to unhygienic practices (mean: 3.19). The Standard Deviation (0.907) and Variance (0.822) reveal moderate variability. The near-zero Kurtosis (-0.109) suggests a relatively flat distribution, indicating mixed perceptions about water access. Cultural taboos surrounding menstruation contribute to secrecy and discomfort, resulting in unhygienic practices (mean: 3.25). The Standard Deviation (0.757) and Variance (0.573) show moderate variation. The positive Kurtosis (1.821) indicates a distribution with a central peak, highlighting the influence of cultural factors. A lack of education and awareness on menstrual hygiene management can lead to misconceptions and suboptimal practices (mean: 3.35). The Standard Deviation (0.757) and Variance (0.573) suggest moderate variability. The positive Kurtosis (2.401) implies a distribution with a peak, reflecting both awareness and misconceptions. Social stigma and peer pressure may prevent students from openly discussing menstrual hygiene or seeking advice and support (mean: 3.79). The Standard Deviation (0.574) and Variance (0.329) indicate moderate variation. The high positive Kurtosis (11.383) suggests a distribution with a sharp peak, emphasizing the significant impact of social factors. Fear of leakage and embarrassment can discourage students from changing their menstrual products as frequently as needed (mean: 3.44). The relatively high Standard Deviation (0.957) and Variance (0.916) show significant variability. The positive Kurtosis (0.549) indicates a distribution with a central peak, reflecting mixed feelings regarding this factor.

**Table 7.** *Descriptive Statistics on Interventions to Enhance Menstrual Hygiene Practices and WASH Conditions*

| | **N** | **Sum** | **Mean** | **Std. Deviation** | **Variance** | **Kurtosis** | |
|---|---|---|---|---|---|---|---|
| | **Statistic** | **Statistic** | **Statistic** | **Statistic** | **Statistic** | **Statistic** | **Std. Error** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Implement comprehensive menstrual hygiene education programs to raise awareness and promote healthy practices among students and staff. | 100 | 351 | 3.51 | .798 | .636 | 3.508 | .478 |
| Establish and maintain clean and private restroom facilities with adequate water supply and waste management systems. | 100 | 321 | 3.21 | .844 | .713 | .683 | .478 |
| Develop and enforce policies that prioritize menstrual hygiene and WASH, including regular facility inspections and maintenance. | 100 | 189 | 1.89 | 1.154 | 1.331 | -1.283 | .478 |
| Provide gender-sensitive WASH facilities to address the unique needs and privacy concerns of both male and female students. | 100 | 348 | 3.48 | .731 | .535 | 3.172 | .478 |
| Promote sustainability by encouraging the use of reusable menstrual products and eco-friendly disposal methods. | 100 | 379 | 3.79 | .574 | .329 | 11.383 | .478 |
| Collaborate with local communities and NGOs to improve WASH infrastructure and access to clean water sources within and around institutions. | 100 | 344 | 3.44 | .957 | .916 | .549 | .478 |
| Train teachers and staff on menstrual hygiene and WASH to create a supportive and knowledgeable school environment. | 100 | 351 | 3.51 | .798 | .636 | 3.508 | .478 |
| Valid N (listwise) | 100 | | | | | | |

Table 7 presents descriptive statistics related to proposed interventions aimed at enhancing menstrual hygiene practices and Water, Sanitation, and Hygiene (WASH) conditions. The results indicated that implementing comprehensive menstrual hygiene education programs received a mean rating of 3.51. The Standard Deviation (0.798) and Variance (0.636) indicate moderate variation in respondents' perceptions. The positive Kurtosis (3.508) suggests a distribution with a peak, highlighting the general support for awareness-raising and healthy practices. Establishing and maintaining clean and private restroom facilities with adequate water supply and waste management systems received a mean rating of 3.21. The Standard Deviation (0.844) and Variance (0.713) reflect

moderate variation. The positive Kurtosis (0.683) indicates a distribution with a central peak, indicating mixed views on restroom facilities. Developing and enforcing policies prioritizing menstrual hygiene and WASH, including inspections and maintenance, received a mean rating of 1.89. The relatively high Standard Deviation (1.154) and Variance (1.331) indicate significant variability. The negative Kurtosis (-1.283) suggests a flatter distribution with diverse opinions on policy measures. Providing gender-sensitive WASH facilities to address unique needs and privacy concerns received a mean rating of 3.48. The Standard Deviation (0.731) and Variance (0.535) show moderate variability. The positive Kurtosis (3.172) suggests a distribution with a peak, indicating overall support for such facilities.

Promoting sustainability through the use of reusable menstrual products and eco-friendly disposal methods received a mean rating of 3.79. The Standard Deviation (0.574) and Variance (0.329) indicate moderate variation. The high positive Kurtosis (11.383) suggests a distribution with a sharp peak, emphasizing strong support for sustainable practices. Collaborating with local communities and NGOs to improve WASH infrastructure and access to clean water sources received a mean rating of 3.44. The relatively high Standard Deviation (0.957) and Variance (0.916) show significant variability. The positive Kurtosis (0.549) indicates a distribution with a central peak, signifying mixed perceptions regarding community engagement. Training teachers and staff on menstrual hygiene and WASH received a mean rating of 3.51. The Standard Deviation (0.798) and Variance (0.636) suggest moderate variation. The positive Kurtosis (3.508) indicates a distribution with a peak, reflecting support for staff education.

**Table 8.** *ANOVA Table Showing Differences in Menstrual Hygiene Practices among Female Students Across Different Academic Year*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 85.013 | 3 | 28.338 | 4.394 | .006 |
| Within Groups | 619.147 | 96 | 6.449 | | |
| Total | 704.160 | 99 | | | |

Table 8 indicate that there is indeed a statistically significant difference. The variation in menstrual hygiene practices attributed to differences in academic years (Between Groups) was found to be significant, as evidenced by a high F-statistic of 4.394 and a low p-value (Sig.) of 0.006. This suggests that academic year plays a notable role in influencing menstrual hygiene practices among female students. Consequently, the null hypothesis, which posited no significant differences, is rejected in favor of the alternative hypothesis, indicating the presence of such differences.

**Table 9.** *ANOVA Table Showing Differences in The Knowledge, Attitudes, and Perceptions of Female Students Regarding Menstrual Hygiene and WASH Across Different Academic Year*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 14.145 | 2 | 7.072 | .994 | .374 |
| Within Groups | 690.015 | 97 | 7.114 | | |
| Total | 704.160 | 99 | | | |

Table 9 revealed that there is no statistically significant difference. The variation in these factors attributed to differences among academic years (Between Groups) was not significant, as indicated by a low F-statistic of 0.994 and a relatively high p-value (Sig.) of 0.374. This implies that academic year does not have a substantial impact on the knowledge, attitudes, and perceptions of female students regarding menstrual hygiene and WASH. Hence, the null hypothesis, which posited no significant differences, is retained.

**Table 10.** *ANOVA Table Showing Differences in Menstrual Hygiene Practices among Female Students based on Their Marital Status*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 64.755 | 3 | 21.585 | 1.426 | .240 |
| Within Groups | 1452.685 | 96 | 15.132 | | |
| Total | 1517.440 | 99 | | | |

Table 10 showed that there is no statistically significant difference. The variation in menstrual hygiene practices attributed to differences in marital status (Between Groups) was not significant, as indicated by a low F-statistic of 1.426 and a relatively high p-value (Sig.) of 0.240. This implies that marital status does not have a substantial impact on the menstrual hygiene practices of female students. Consequently, the null hypothesis, which posited no significant differences, is retained, suggesting that marital status is not a significant determinant of these practices among the students.

**Table 11.** *ANOVA Table Showing Differences in The Knowledge, Attitudes, and Perceptions of Female Students Regarding Menstrual Hygiene and WASH Based on Their Marital Status*

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 20.395 | 2 | 10.197 | .661 | .519 |
| Within Groups | 1497.045 | 97 | 15.433 | | |
| Total | 1517.440 | 99 | | | |

Table 11 indicate that there is no statistically significant difference. The variation in these factors attributed to differences in marital status (Between Groups) was not found to be significant, as evidenced by a low F-statistic of 0.661 and a relatively high p-value (Sig.) of 0.519. This suggests that marital status does not have a substantial impact on the knowledge, attitudes, and perceptions of female students regarding menstrual hygiene and WASH. Therefore, the null hypothesis, positing no significant differences, is retained, implying that marital status does not significantly influence these aspects among the students.

## DISCUSSION

In contrast to the strong preference for commercially available sanitary pads among female students, many maintain secrecy about their menstrual cycles, shedding light on a complex intersection of hygiene and societal norms. Research by Babbar, Rustagi and Dev (2023) emphasizes the practicality and convenience of commercially available pads, attributing this preference to their affordability and accessibility. These products often come in discreet packaging, facilitating their use while maintaining privacy. However, in a related study conducted by Van-Lonkhuijzen, Garcia and Wagemakers (2023), it is evident that the secrecy surrounding menstruation remains a persistent challenge. This secrecy can be linked to enduring cultural taboos and stigmas associated with menstruation. Such cultural norms can limit open discussions about menstrual hygiene among female students, hindering comprehensive menstrual education and awareness campaigns.

Despite regular access to clean water for drinking and hygiene purposes, concerns persist regarding the inadequate maintenance and cleanliness of Water, Sanitation, and Hygiene (WASH) facilities. In many regions, access to clean water has improved, thanks to infrastructure development and awareness campaigns (UNICEF, 2021). However, maintaining the functionality and cleanliness of these facilities remains a challenge. In contrast to the availability of clean water, related studies have shown that WASH facilities often suffer from neglect (Bangert, Molyneux, Lindsay, Fitzpatrick & Engels, 2017). Poor maintenance and cleanliness of toilets, handwashing stations, and water sources can lead to health risks and undermine the benefits of improved water access. This negligence is particularly concerning in schools and healthcare settings, where sanitation and hygiene are critical for infection prevention and student/staff well-being (Kanyangarara, Allen, & Jiwani, 2021).

Cultural taboos and societal norms exert a profound influence on students' attitudes and behaviors concerning menstrual hygiene and Water, Sanitation, and Hygiene (WASH). In many cultures, menstruation remains a highly stigmatized topic, leading to secrecy and misinformation among female students. These cultural taboos often discourage open discussions and awareness campaigns about menstrual hygiene (Farage, Miller & Davis, 2011). In contrast, the impact of these taboos extends to WASH practices as well. Cultural norms can dictate how individuals perceive cleanliness and sanitation, affecting their willingness to use and maintain WASH facilities. In some cases, traditional beliefs may even conflict with modern sanitation practices, further complicating the issue (Kaur, Kaur, & Kaur, 2018). The limited awareness of menstrual hygiene and WASH, largely driven by cultural factors, can perpetuate misconceptions and suboptimal practices. Bridging this knowledge gap is crucial to promote healthier behaviors among students. Comprehensive education programs that address cultural norms, taboos, and traditional beliefs alongside practical hygiene practices are essential in challenging these barriers (Anthonj, Setty, Ezbakhe, Manga & Hoeser, 2020).

Socioeconomic constraints often compel students to opt for less hygienic menstrual products due to affordability issues. The cost of menstrual products, such as sanitary pads or tampons, can be a significant burden for students from low-income backgrounds (Babagoli, Benshaul-Tolonen, Zulaika, Nyothach, Oduor, Obor, Mason, Kerubo, Ngere, Laserson, & Tudor Edwards, 2022). In response, some may resort to using cheaper, lower-quality alternatives or even unsanitary materials, compromising their menstrual hygiene. Furthermore, fear of leakage and embarrassment can deter students from changing their menstrual products as frequently as necessary. This fear can be intensified by societal stigma surrounding menstruation (Johnston-Robledo & Chrisler, 2020). Inadequate access to clean and private sanitation facilities in schools can exacerbate this problem (Coswosk, Neves-Silva, Modena & Heller, 2019). The fear of leaks and embarrassment can lead to students using the same product for extended periods, increasing the risk of infection and discomfort.

Interventions to enhance menstrual hygiene practices and WASH conditions includes establishing and maintaining clean and private restroom facilities with adequate water supply and waste management systems, and implementing comprehensive menstrual hygiene education programs. These facilities provide a safe and dignified space for students to manage their menstrual hygiene needs. Without such facilities, students may face discomfort, embarrassment, and health risks. Comprehensive menstrual hygiene education programs play a pivotal role (Mahfuz, Sultana, Hunter, Jahan, Akand, Khan, Mobashhara, Rahman, Alam, Unicomb & Luby, 2021). These programs go beyond biological education and address the socio-cultural aspects of menstruation. By dispelling myths, reducing stigma, and fostering open dialogue, these programs empower students with knowledge and help them develop positive attitudes toward menstruation. They also teach proper hygiene practices and encourage students to change menstrual products as needed, addressing concerns about fear of leakage and infrequent changes (Mitchell, Kulasinghe & Morawska, 2022). Affordable access to menstrual products is another vital intervention. When students have access to quality products like sanitary pads or menstrual cups, it reduces financial constraints and encourages them to use hygienic options. This is especially important for those facing socioeconomic challenges.

## CONCLUSION

In conclusion, this study delved into the Water, Sanitation, and Hygiene (WASH)-related aspects of unhygienic menstrual practices among female students in colleges of education in Anambra State. The findings have illuminated several critical insights that deserve attention and action. First and foremost, it is evident that while there is regular access to clean water for drinking and hygiene purposes, challenges persist regarding the maintenance and cleanliness of WASH facilities within educational settings. The provision

of clean water and sanitary facilities is essential for promoting overall health, well-being, and academic performance among students. Neglecting these facilities can lead to health hazards and hinder the benefits of improved water access. Furthermore, cultural taboos and societal norms exert a profound influence on students' attitudes and behaviors concerning menstrual hygiene and WASH. These deeply rooted beliefs contribute to secrecy, misinformation, and discomfort among female students, limiting open discussions and awareness campaigns about these critical topics. Bridging the knowledge gap and challenging cultural norms are imperative to promote healthier behaviors among students.

Socioeconomic constraints were found to be a significant factor forcing students to opt for less hygienic menstrual products due to affordability issues. This not only impacts menstrual hygiene practices but also raises concerns about the fear of leakage and embarrassment, which can discourage students from changing their menstrual products as frequently as needed. It is essential to address these financial barriers and provide affordable access to quality menstrual products. The study also highlighted the importance of implementing comprehensive menstrual hygiene education programs and enhancing WASH facilities. These interventions are crucial for raising awareness, promoting healthy practices, and providing students with a safe and dignified space to manage their menstrual hygiene needs. Education programs should go beyond biological facts and address the socio-cultural dimensions of menstruation.

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