

IMPACT OF HEALTH EDUCATION INTERVENTION ON KNOWLEDGE OF MENSTRUAL DISPOSAL AMONG FEMALE ADOLESCENTS IN ILORIN METROPOLIS, KWARA STATE

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Abstract

Menstrual waste management is a critical public health and environmental issue, especially in developing countries where access to adequate sanitation and hygiene facilities is limited. Female adolescents are particularly vulnerable to the negative effects of improper menstrual waste disposal due to limited access to private and safe toilets and menstrual products. Health education interventions can positively influence knowledge of menstrual hygiene and waste disposal among female adolescents, but more research is needed on the effectiveness of various types of interventions in this context. This study examined the impact of a health education intervention on menstrual waste disposal knowledge among female adolescents in Ilorin Metropolis, Kwara State, Nigeria. A quasi-experimental, non-equivalent control group design was employed, with 170 respondents—85 in the control group and 85 in the experimental group—selected from two female-only secondary schools in Ilorin. The experimental group received six weeks of menstrual hygiene health education, while the control group received placebo education on first aid and safety. Pre- and post-tests were administered to both groups to assess changes in their knowledge of menstrual waste disposal methods. The findings from the study shows that in the pretest, burning menstrual waste had the highest mean score for both the experimental (mean: 3.459) and control (mean: 3.341) groups, while disposing of waste into a flowing river received the lowest scores (experimental: mean 2.059; control: mean 1.706) while in the posttest, the experimental group preferred disposing of cotton wool in a water closet (mean: 3.824, ranked 1st), whereas the control group ranked this method 5th (mean: 2.212). Burning menstrual waste remained the top choice for the control group (mean: 3.341, ranked 1st), but it dropped to 3rd place in the experimental group (mean: 2.718). Disposing into a flowing river remained the least preferred method in both groups. In conclusion, while burning menstrual waste was initially preferred in both groups, posttest results revealed a shift in the experimental group towards disposing of cotton wool in a water closet, reflecting improved knowledge of more hygienic practices. It is recommended that educational workshops be conducted, community awareness campaigns launched, sanitation facilities improved, further research pursued, and feedback mechanisms established to enhance knowledge and practices related to menstrual waste disposal.

Introduction

Menstruation is a phenomenon unique to the women folks usually following puberty stage in female adolescents, since the time immemorial, women have been faced with challenges on menstrual hygiene management because of silence and shame on issues relating to sexuality and reproductive health. A female is an individual belonging to the gender or sex which conceives and gives birth to young ones which has an ovary and produces ova, the biological features of a female include but are not limited to ovaries, fallopian tubes, a uterus, and a vagina (Biology Online Dictionary, 2020; Oyebola, 2020). The World Health Organization (WHO, 2014) defines adolescents as those people between 10 and 19 years of age. Puberty is the process of physical changes through which a child's body matures into an adult body capable of sexual reproduction. It is initiated by hormonal signals from the brain to the gonads: the ovaries in a girl, the testes in a boy (Encyclopedia Britannica, 2020). Females begins to menstruate or have menstrual periods often every month; this is initiated when the body starts making hormones to get ready for reproduction. Over time, the body begins to release eggs from the ovaries. This means that the female teen is able to get pregnant. If the egg is not fertilized, the lining of the uterus is shed through the vagina known as menstruation (KidsHealth, 2020). Menstruation is the periodic discharging of blood mixed with pieces of cellular tissue or the flow of blood and cells from the lining of the uterus in unfertilized females of humans and other primates out through the vagina, which occurs roughly every month in uninseminated women (Oyebola, 2020).

Fromm (2020) defines menstrual waste as "blood, uterine tissue, and other menstrual products that are discarded during menstruation." The author further discussed that menstrual waste can be a significant source of environmental pollution and public health hazards, especially in developing countries where access to adequate sanitation and hygiene facilities is limited.

Menstrual waste disposal is a critical aspect of menstrual hygiene management, encompassing the proper handling and elimination of materials associated with menstruation. The implications of menstrual waste disposal extend beyond personal hygiene, with environmental concerns gaining prominence in recent discourse (Fromm, 2020). However, as highlighted by Rios (2019), the existing educational landscape often falls short, narrowly focusing on the biological aspects of the menstrual cycle. Critical aspects, such as anatomy, proper use of sanitary products, and the environmentally responsible disposal of menstrual waste, are frequently overlooked. This dearth of education contributes to a range of challenges, from menstrual hygiene mismanagement to feelings of fear and uncertainty during the first menstruation experience. The silence surrounding reproductive health and menstruation often results in misinformation, myths, and unnecessary stigma (Rios, 2019). Health education becomes crucial to bridge this knowledge gap and empower young girls to manage their menstrual health confidently. Health education is a profession of educating people about health (McKenzie, Neiger, & Thackeray, 2009). Examples of health education activities include: lectures, courses, seminars, webinars, workshops and classes. Health education is defined as any combination of learning experiences designed to predispose, enable and reinforce voluntary adaptation of individual behaviour conducive

to healthy habits. Its goal is improving knowledge and attitude of individual to develop health behaviour (WHO, 2003).

An intervention is a combination of programme elements or strategies designed to produce behaviour changes or improve health status among individuals or an entire population. Interventions may include educational programmes, new or stronger policies, improvements in the environment, or a health promotion campaign. Interventions that include multiple strategies are typically the most effective in producing desired and lasting change (Free Dictionary, 2020). Menstrual hygiene education for female adolescents can be in form of either giving instructions, showing videos, demonstrating menstrual waste disposal practices or by distributing written literature, magazines or handbills. Some studies used a combination of these methods; a study by Mariño, Calache, Wright and Schofield (2004) used lectures as a medium of education. Furthermore, in the study of Friel, Hope, Kelleher, Comer and Sadler (2002), campaigns were done.

In a comprehensive review of the environmental repercussions of menstrual waste, Kaur, Kaur, and Kaur (2018) highlighted critical observations regarding the inadequacies of current sanitation systems in managing such waste. The literature underscores that existing sanitation infrastructure, primarily designed for urine and faeces, struggles to effectively handle menstrual waste. The study reveals that menstrual waste poses a significant challenge to sanitation systems, particularly in terms of sewer pipelines. Menstrual materials, such as tampons, cotton wool, and toilet paper, along with other organic components utilized for menstrual management, prove difficult to decompose in pit latrines and landfills. Notably, commercial sanitary pads, while potentially decomposing over approximately one year, exhibit resilience due to the persistence of their plastic lining, especially in on-site sanitation systems (Kaur et al., 2018).

Sanitary products soaked with blood of an infected women/girl may contain hepatitis and HIV viruses which retain their infectivity in soil and live up to six months in soil. The clogged drainage with napkins has to be unblocked and cleaned manually by conservancy workers with their bare hands without proper protection and tools. This exposes the workers to harmful chemicals and pathogens. Incineration is a better technique to dispose of menstrual waste but burning of pads releases harmful gasses that effects health and environment. Burning of inorganic material at low temperature releases dioxins which are toxic and carcinogenic in nature (Kaur et al., 2018).

Various methods of menstrual wastes include burning, burying, wrapping sanitary pad with paper and dropping it into the dustbin, latrine or into a flowing river. Mehtora, (2018) opined that environmental impact caused by sanitary waste is one of the significant topics in discussions today. A plastic, industrially manufactured, disposable sanitary pad requires about 500–800 years to decompose. Thousands of tons of disposable sanitary waste is generated every month all over the world. 432 million pads/sanitary napkins are generated in India annually, the potential to cover landfills spread over 24 hectares. This is a ridiculous amount of pollution which is hazardous with toxic chemicals leaching the soil, strong and harsh odours emitted by the waste disposed of in landfills or buried in the soil. Moreover, in a study conducted by Pokhrel, Mahantashetti, Angolkar and Devkota, (2014), the results revealed a significant change in menstrual hygiene practices as a result of health education

intervention on menstrual hygiene. It is against this background that this study investigated the impact of health education intervention on knowledge of menstrual waste disposal among female adolescents in Ilorin metropolis, Kwara State, Nigeria.

Research Questions

The following questions were answered:

1. What are the knowledge levels and preferences regarding menstrual waste disposal methods among female adolescents in the experimental and control groups before health education intervention in Ilorin Metropolis, Kwara State?
2. What are the knowledge levels and preferences regarding menstrual waste disposal methods among female adolescents in the experimental and control groups after health education intervention in Ilorin Metropolis, Kwara State?

Methodology

Quasi-experimental research design of pre-test and post-test was adopted for this study. The sample was selected through multi-stage sampling procedure of purposive sampling technique and simple random sampling in six stages as follows: Stage I: Purposive sampling technique was used to select two local government areas in Ilorin metropolis though there were three Local Government Areas that cut across the metropolis but there is no availability of female (single sex) senior secondary school in the third Local Government (i.e. Ilorin East Local Government) and that is why it was exempted. Therefore, Ilorin West Local Government and Ilorin South Local Government Areas were used for the study.

Stage II: Simple random sampling technique was used to select one female (single sex) government secondary school out of the three single sex (girls only) schools that are situated in the Ilorin West Local Government; Government Girls Day Secondary School, Oko – Erin, Ilorin was selected for the study.

Stage III: Purposive sampling technique was used to select only one female (single sex) government secondary school situated in Ilorin South Local Government Area which is Government Girls Day Secondary School, Oke – Suna, Ilorin. **Stage IV:** Simple random sampling was used to place the two selected schools into experimental and control groups. **Stage V:** Only female students in SSSII and SSSIII were chosen using a purposeful sample strategy because they are more likely than students in lower classes to have been menstruation for a longer length of time like SSSI.

Stage VI: simple random sampling of fishbowl technique was used to select 85 students from SS II and SS III classes, consent of the students was sought for voluntary participation and those who declined were left out.

The students were informed to write their names in small piece of paper which were rolled and shuffled in a fishbowl/container, then the research assistant who were their teachers helped to pick eighty five (85) names from the fishbowl and these were the sample/respondents that participated in the study. According to Krejcie and Morgan (1970),

a minimum sample of 169 is sufficient for any population less than 320. (see appendix viii). The researcher, on the other hand, chose 170 female teenagers to be part of the study's sample. Eighty five (85) volunteer students were selected from school A (Government Girls Day Secondary School, Oko – Erin), which formed the experimental group, while another Eighty five (85) volunteer students were selected from school B (Government Girls Day Secondary School, Oke Suna), which formed the control group. Experimental Group had menstrual hygiene health education based intervention treatment while the control group was given safety education and first aid topics.

Inclusion Criteria: only female adolescents who have started menstruating were included in the study. Exclusion Criteria: female adolescents who have not started menstruating were excluded from the study. Experimental group had menstrual hygiene health education based intervention treatment while the control group was given safety education and first aid topics. Researcher developed questionnaire was used to elicit information from the respondents. Research instrument was validated by experts in the field of Public Health Education, the reliability of the instrument was confirmed through the utilization of the Cronbach Alpha, the data was separated into even and odd integers for correlational analysis using Spearman Rank Order Correlation revealing a robust coefficient of 0.86. This high coefficient attests to the instrument's reliability for the study, indicating a strong internal consistency and consistency in measurement across its components.

The instrument was administered to both the control and the experimental groups, then health education intervention was given for six weeks to the experimental group on menstrual waste disposal practices while health education also took place for the control group on safety education and first aid for same six weeks. Thereafter, the same instrument was administered to both the control and experimental groups. The exercise lasted for six (6) weeks. **Cumulative Mean and Rank order** were used to answer the research questions.

Results

S/N	I am knowledgeable about the following menstrual waste disposal methods:	N	Experimental Group Mean		Control Group Mean	
			Pretest	Rank	Pretest	Ran
1.	Dispose menstrual waste by burning	85	3.459	1 st	3.341	1 st
2.	Dispose cotton wool in the used pad by flushing it in the water closet and discard the nylon inside dustbin	85	1.824	5 th	2.212	5 th
3.	Dispose menstrual waste by burying	85	2.847	2 nd	2.412	3 rd
4.	Dispose menstrual waste by dropping it into latrine	85	2.553	3 rd	3.188	2 nd
5.	Dispose menstrual waste in the dustbin	85	1.776	7 th	2.282	4 th
6.	Dispose menstrual waste in incinerator	85	1.812	6 th	2.200	6 th
7.	Dispose menstrual waste into flowing river	85	2.059	4 th	1.706	7 th

Table 1: Cumulative Mean and Rank order Showing Menstrual waste Disposal Practice among Female Adolescents in the Control and Experimental Groups before Health Education intervention in Ilorin, Kwara State

Table 1 presents the mean rankings on knowledge of menstrual waste disposal methods among female adolescents in the control and experimental groups prior to the health education intervention in Ilorin Metropolis, Kwara State. In the experimental group, it was found that only 1 out of 7 items had a mean score greater than the average mean score of 2.5. The data indicate that mean scores above this threshold are significant, while those below are not, suggesting these items reflect the respondents' knowledge of menstrual waste disposal methods. Specifically, items 1, 3, and 4, with mean scores of 3.459, 2.847, and 2.553, respectively, were ranked 1st, 2nd, and 3rd.

The relevant items state, "I am knowledgeable about the following menstrual waste disposal methods": "dispose menstrual waste by burning," "dispose menstrual waste by dropping it into the latrine," and "dispose menstrual waste by burying." Therefore, it can be concluded that the knowledge of menstrual waste disposal among female adolescents in the experimental group before the health education intervention predominantly involved "disposing menstrual waste by burning," "by dropping it into the latrine," and "by burying." In the control group, 3 out of 7 items were found to have mean scores above the average mean score of 2.5. Similar to the experimental group, the results show that mean scores exceeding this average are significant, indicating that these items represent the knowledge of menstrual waste disposal methods among the respondents. Items 1, 4, and 3 had mean scores of 3.459, 3.188, and 2.412, respectively, ranking them 1st, 2nd, and 3rd.

The items reflect the statement, "I am knowledgeable about the following menstrual waste disposal methods": "dispose menstrual waste by burning," "by burying," and "by dropping it into the latrine." Thus, it can be inferred that the knowledge of menstrual waste disposal methods among female adolescents in the control group prior to the health education intervention primarily encompassed "disposing menstrual waste by burning," "disposing menstrual waste by burying," and "disposing menstrual waste by dropping it into the latrine."

Table 2: Cumulative Mean and Rank Order Showing Knowledge of Menstrual Waste Disposal Methods among Female Adolescents in the Control and Experimental Groups after Health Education intervention in Ilorin, Kwara State

S/N	I am knowledgeable about the following menstrual waste disposal methods:	N	Experimental Group		Control Group	
			Mean Posttest	Rank	Mean Posttest	Rank
1.	Dispose menstrual waste by burning	85	2.718	3 rd	3.341	1 st
2.	Dispose cotton wool in the used pad by flushing it in the water closet and discard the nylon inside dustbin	85	3.824	1 st	2.212	5 th
3.	Dispose menstrual waste by burying	85	2.565	4 th	2.412	3 rd
4.	Dispose menstrual waste by dropping it into latrine	85	2.859	2 nd	3.188	2 nd
5.	Dispose menstrual waste in the dustbin	85	2.353	5 th	2.282	4 th
6.	Dispose menstrual waste in incinerator	85	2.565	4 th	2.200	6 th
7.	Dispose menstrual waste into flowing river	85	1.871	7 th	1.706	7 th

Table 2 presents the mean rankings of knowledge regarding menstrual waste disposal methods among female adolescents in the control and experimental groups after the health education intervention in Ilorin Metropolis, Kwara State. The relevant items state, "I am knowledgeable about the following menstrual waste disposal methods": "dispose of cotton wool in the used pad by flushing it in the water closet and discarding the nylon in the dustbin," "dispose menstrual waste by dropping it into the latrine," and "dispose of menstrual waste by burning." The findings indicate that the knowledge of menstrual waste disposal methods among female adolescents in the experimental group, as observed in the posttest following the health education intervention, included methods such as disposing of used cotton wool in a sanitary pad and flushing it in the water closet, discarding the nylon component into a dustbin, depositing menstrual waste in a latrine, and using burning as a disposal method.

In contrast, the knowledge of menstrual waste disposal methods in the control group remained unchanged following the health education intervention.

Discussion of Findings

The findings from this study highlight significant insights into the knowledge of menstrual waste disposal methods among female adolescents in both the control and experimental groups before and after the health education intervention.

Pre-Intervention Knowledge: Before the health education intervention, both groups demonstrated knowledge primarily focused on three main disposal methods: burning menstrual waste, dropping it into the latrine, and burying it. This indicates a limited understanding of more sanitary and environmentally friendly disposal methods, as supported by Wagh and Mahajan (2018), who noted that inadequate knowledge about menstrual hygiene often leads to harmful practices. The experimental group showed slightly better awareness, particularly regarding burning, which was ranked highest among their practices, echoing findings from Adinma and Adinma (2008) that emphasized the prevalence of burning as a disposal method in certain populations.

Post-Intervention Changes: After the intervention, the experimental group displayed a marked improvement in knowledge regarding menstrual waste disposal methods. Notably, the introduction of the method of disposing of cotton wool from used pads by flushing it in the water closet and discarding the nylon in the dustbin became prominent. This shift indicates that the health education intervention was effective in enhancing the participants' knowledge and understanding of safe menstrual waste disposal practices.

The focus on separating cotton wool from the nylon component was particularly significant, as it reflects a deeper understanding of hygiene and the practical steps required to maintain it. This change not only aligns with public health recommendations but also addresses cultural concerns about menstrual waste, including fears of ritualistic exploitation associated with disposed menstrual products, as highlighted by Akinyemi et al. (2019).

Comparison Between Groups: The control group showed no significant change in their knowledge post-intervention, emphasizing the critical role of targeted health education in promoting better practices. Their unchanged knowledge indicates that without educational interventions, misconceptions and outdated disposal methods may persist among adolescents, which is consistent with findings from Eze et al. (2021), who reported that educational interventions are vital for altering health behaviors in young populations.

Implications for Future Interventions: The findings highlight the importance of implementing structured health education programs aimed at female adolescents, focusing on proper menstrual hygiene management and waste disposal practices. Such programs should include practical demonstrations and culturally sensitive approaches to ensure that participants feel empowered and informed about their choices, as suggested by Dey et al. (2020).

Moreover, as the experimental group's knowledge transitioned from basic disposal methods to more effective and hygienic practices, future interventions could build upon this foundation by introducing additional topics, such as the environmental impacts of menstrual waste and the benefits of using sustainable menstrual products, in line with recommendations by Sommers et al. (2018).

In summary, the study demonstrates that targeted health education interventions can significantly enhance knowledge and change disposal behaviours among female adolescents, thereby improving public health outcomes and fostering more environmentally responsible practices. Further research is needed to explore long-term retention of this knowledge and its impact on menstrual hygiene practices in broader populations. The traditional method for disposing of sanitary pads involves wrapping them in paper and placing them in a dustbin for proper incineration. This aligns with Nisman, Mutiawati, Nugraheni, and Milasari (2019), who argue that incineration is an effective technique for menstrual waste disposal. However, recent trends of theft associated with menstrual pads for ritualistic purposes have led female adolescents to adopt alternative disposal methods, such as burning, burying, or disposing of pads in latrines or flowing rivers, to prevent their pads from being misused.

During the intervention, the researcher actively discouraged the practice of burning, which had the highest pre-intervention mean score of 3.459, due to its detrimental environmental effects. Kaur et al. (2018) highlight that burning menstrual pads releases harmful gases that adversely affect both health and the environment. Specifically, the combustion of inorganic materials at low temperatures generates dioxins, which are toxic and carcinogenic in nature.

Another disposal method, burying, poses additional environmental hazards. This aligns with Mehrotra (2018), who emphasizes that the environmental impact of sanitary waste is a pressing concern. Disposable sanitary pads, primarily made from plastic, take approximately 500–800 years to decompose. The staggering volume of disposable sanitary waste generated globally every month contributes to significant pollution, with toxic chemicals leaching into the soil. Additionally, the strong odors emitted from waste in landfills or buried in the ground pose further health risks. The chemicals found in these pads,

particularly those used for bleaching, such as organochlorines, can disrupt soil microflora when buried, thereby extending the decomposition process (Nisman et al., 2019). This situation underscores the urgent need for awareness and education about safer and more sustainable menstrual waste disposal methods, particularly in light of the findings from this study, which indicate that improved knowledge among adolescents can lead to better practices.

Conclusion

Prior to the health education intervention, both the experimental and control groups demonstrated comparable levels of knowledge regarding menstrual waste disposal methods. After the intervention, the experimental group showed significant improvements in their knowledge of menstrual waste disposal, highlighting the positive impact of health education on female adolescents in Ilorin Metropolis, Kwara State. Based on the conclusions of this study, the following recommendations were made:

- i. It is recommended that schools and community organizations in Ilorin Metropolis develop and implement comprehensive health education programs focused on menstrual hygiene management and waste disposal methods. These programs should aim to enhance knowledge and change attitudes toward safe disposal practices among female adolescents.
- i. Efforts should be made to improve access to proper sanitary disposal facilities, such as designated bins and incinerators, in schools and public places. This will encourage adolescents to adopt environmentally friendly disposal methods and minimize the health and environmental risks associated with improper menstrual waste disposal.

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