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An Experimental Study to Evaluate the Effectiveness of Health Education Intervention on Practice Regarding Safe Water and Sanitary Latrine Utilization Among Females in Selected Rural Community of Raichur District, Karnataka

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ABSTRACT:
Safe water and sanitary latrine utilization are essential for improving public health, especially among rural women who play a key role in household hygiene. This study aimed to evaluate the effectiveness of a health education intervention on practice regarding safe water and sanitary latrine utilization among hypertensive females in a selected rural community of Raichur district, Karnataka. Method**:** A pre-experimental one-group pre-test post-test design with an evaluative approach was used. A total of 60 females were selected using non-probability purposive sampling. Data were collected using a structured practice checklist focusing on water purification, toilet use, and hygiene behavior. Results **:** The pre-test mean practice score was 7.40 (49.31%), which significantly increased to 11.83 (78.84%) in the post-test, showing a 29.53% enhancement. The paired *t*-test value of 46.75 was statistically significant at $p < 0.05$. Chi-square analysis showed significant associations between pre-test practice scores and variables such as occupation ($p = 0.037$) and method of water purification ($p = 0.018$), while other socio-demographic variables were not statistically significant. Conclusion **:** The health education intervention was effective in enhancing safe water handling and sanitation practices among rural females. The study supports the need for targeted, community-based education programs to improve hygiene behavior and reduce the risk of waterborne diseases, particularly among vulnerable groups like hypertensive women.

Keywords: Experimental study, health education intervention, Practice, safe water and sanitary latrine, female

INTRODUCTION

Access to safe water and adequate sanitation facilities is a fundamental human right and a critical determinant of health, especially among women and girls. Globally, an estimated 2.2 billion people lack safely managed drinking water services, and approximately 3.6 billion people are without safely managed sanitation (World Health Organization [WHO] & United Nations Children's Fund [UNICEF],

2023). The burden of water collection and sanitation-related responsibilities disproportionately falls on females, particularly in rural and low-income settings, exposing them to numerous health, social, and safety risks. In India, the National Family Health Survey-5 (NFHS-5) reported that only 70% of rural households had access to improved sanitation facilities, and nearly 18% of households continued to practice open defecation (Ministry of Health and Family Welfare [MoHFW], 2021).

Women and adolescent girls often face unique vulnerabilities due to poor water and sanitation infrastructure. Inadequate access to safe water can lead to increased risk of gastrointestinal infections, urinary tract infections (UTIs), and reproductive tract infections (RTIs) (Sommer et al., 2016). Additionally, the absence of sanitary latrines significantly affects the dignity, safety, and menstrual hygiene management (MHM) of females, limiting their participation in education and community life. A study by Caruso et al. (2018) found that lack of access to private and safe sanitation facilities significantly contributed to anxiety, fear, and psychosocial stress among women in rural India.

Poor sanitation practices also contribute to the transmission of waterborne diseases such as cholera, typhoid, and diarrhea, which are among the leading causes of morbidity and mortality in developing countries (UNICEF, 2022). Females, who often manage household hygiene, are directly involved in water handling, storage, and food preparation, making their knowledge and practices crucial in maintaining public health standards at the community level. Moreover, access to safe sanitation impacts maternal and child health outcomes; research shows that households with improved sanitation have lower rates of neonatal mortality and stunting (Spears, 2013).

Despite government initiatives such as the Swachh Bharat Mission (SBM), gaps remain in terms of behavior change, maintenance, and equitable access, particularly for marginalized women (Jadhav, Weitzman, & Smith-Greenaway, 2016). Therefore, empowering females through targeted health education and infrastructure development is essential to enhance safe water and sanitation utilization, thereby promoting gender equity, health, and social wellbeing.

NEED OF THE STUDY :

In India, access to safe drinking water and adequate sanitation remains a critical public health concern, particularly affecting females in rural and underserved communities. Despite significant government initiatives, such as the *Swachh Bharat Mission (SBM)*, gaps in utilization, behavior change, and infrastructure persist. According to the *National Family Health Survey-5* (NFHS-5), 2021, only 65.6% of households in rural India had improved sanitation facilities, and approximately 15.1% of rural households still practiced open defecation (Ministry of Health and Family Welfare [MoHFW], 2021). Moreover, while piped drinking water access has improved, only 61.5% of Indian households reported access to an improved source of drinking water within their premises (NFHS-5, 2021).

These inadequacies disproportionately impact women and girls, who are primary caretakers and responsible for water collection and household hygiene. Lack of safe water and sanitation facilities increases their vulnerability to waterborne diseases, such as diarrhea, cholera, and typhoid, and leads to higher incidences of urinary and reproductive tract infections (Sommer et al., 2016). Furthermore, inadequate sanitation compromises menstrual hygiene management and affects female school attendance, especially during menstruation, contributing to higher dropout rates among adolescent girls (Patkar, 2017).

The World Bank (2020) has highlighted that unsafe sanitation and poor hygiene are significant contributors to child malnutrition and stunting in India, issues largely managed at the household level by

women. Although efforts like SBM have shown progress, sustainable behavior change and awareness—particularly among women—are essential to ensure long-term adoption of sanitary practices.

Thus, there is a pressing need to assess and strengthen the knowledge and practices of females regarding safe water use and sanitary latrine utilization. Promoting health education, awareness campaigns, and infrastructural support will empower women to lead hygienic lives and contribute to improved family and community health outcomes.

PROBLEM STATEMENT

"An experimental study to evaluate the effectiveness of health education intervention on practice regarding safe water and sanitary latrine utilization among females in selected rural community of Raichur district, Karnataka."

Purpose of this study : The purpose of this study is to evaluate the effectiveness of a health education intervention in enhancing the practice of safe water usage and sanitary latrine utilization among females in a selected rural community of Raichur district, Karnataka. The study aims to promote positive behavioral changes through structured health education, thereby reducing the risk of waterborne diseases and improving overall community hygiene. It seeks to empower women with knowledge and skills to adopt and sustain healthy sanitation and hygiene practices.

OBJECTIVES

1. To assess the existing practice regarding safe water and sanitary latrine utilization among females in the selected rural community of Raichur district, Karnataka.
2. To evaluate the effectiveness of the health education intervention by comparing pre-test and post-test practice scores among females in the selected rural community.
3. To determine the association between Pre-intervention practice scores with their selected demographic variables (e.g., age, education, socioeconomic status, etc.).

HYPOTHESIS :

H^1 – The mean post-test practice score of the females in selected rural community regarding safe water and sanitary latrine utilization is significantly higher than their mean pre-test knowledge score. .

H^2 - There is significant association of selected socio-demographic variable with the mean differed level of practice on safe water and sanitary latrine utilization among females in selected rural community.

OPERATIONAL DEFINITIONS

1. **Evaluate** : In this study, "evaluate" refers to the process of measuring changes in the practice levels of females regarding safe water and sanitary latrine utilization by comparing their pre-test and post-test scores following the health education intervention program.
2. **Effectiveness** : "Effectiveness" refers to the extent to which the health education intervention positively influences and improves the actual water handling and latrine usage practices of females, as demonstrated by measurable improvements in post-test practice scores compared to pre-test scores.
3. **Health Education Intervention** : A planned, structured set of educational activities including lectures, demonstrations, and discussions designed to improve knowledge and practices of females regarding safe water usage and sanitary latrine utilization, delivered in local language over specified

sessions in the rural community.

4. **Practice** : "Practice" refers to the observable behaviors and routine actions of females concerning the collection, storage, and use of safe drinking water and consistent utilization of sanitary latrines, measured through a structured practice assessment tool before and after the intervention.
5. **Safe Water and Sanitary Latrine Utilization** : This refers to the regular and appropriate use of clean, potable water and hygienic sanitation facilities for defecation by females, avoiding open defecation and unsafe water storage or usage, as assessed during the data collection period of the study.
6. **Females :** In this study, "females" refer to women and adolescent girls aged 15 years and above residing in the selected rural community of Raichur district, Karnataka, who fulfill the inclusion criteria and voluntarily participate in the health education intervention and related assessments.

REVIEW OF LITERATURE

Behera et al ; 2022 ; A study was conducted to assess women's perception of household sanitation and menstrual hygiene management in Balesore district, Odisha, under the Swachh Bharat Mission. Using a cross-sectional design, data were collected from 700 rural women aged 15–45 years through a pretested questionnaire. The findings revealed that while 68.4% of households used improved sanitation, 30% still practiced open defecation. Menstrual absorbent disposal was largely unhygienic, with 64.6% using bushes or fields. Only 22.5% had access to soap and water in menstrual management areas. Despite partial progress, major gaps remain in safe practices. The study emphasizes the need for a bottom-up, gender-focused strategy integrating clean water, sanitation facilities, and behavior change communication to sustain the goals of the "Clean India Mission."

Manas Ranjan Behera et al ; 2024 ; A study was conducted to examine the association between household sanitation and menstrual hygiene practices among rural women in Balasore district, Odisha, India. Using a cross-sectional design, 694 women aged 15–45 years were selected through multi-stage sampling, and data were collected using the PMA 2020 questionnaire. Analysis was performed using multivariate logistic regression in SPSS v25. Findings revealed that 68.4% of households had improved sanitation, while 30% continued open defecation practices. Around 40.6% of women used cloth for menstrual hygiene. Improved sanitation was significantly associated with safer menstrual material changing practices (aOR = 1.56), while use of sleeping areas was lower (aOR = 0.65). The study underscores the need for robust, state-specific WASH policies to enhance menstrual health management in rural Odisha.

Wren Vogel et al ; 2022 ; A study was conducted to explore women's lived experiences of sanitation and menstrual hygiene management across rural regions and urban slums in India, using the sanitation insecurity measure. Without adequate sanitation facilities, women face heightened environmental, social, and health risks. This study highlights how gendered perceptions and stigma around menstruation exacerbate inequalities, positioning sanitation as both a gender and public health issue. Women encounter unique barriers in accessing safe sanitation and managing menstruation with dignity. The analysis reveals that sanitation is not merely an infrastructure concern but a critical component of gender equity, human rights, and social justice. Addressing these disparities requires reframing sanitation as a fundamental right linked to education, empowerment, and inclusive health policy for women and girls.

METHODOLOGY :

Research Design and Approach: A pre-experimental one-group pre-test post-test design with a quantitative evaluative approach was used to assess the effectiveness of a health education intervention.

Study Setting and Population: The study was conducted in a selected rural community of Raichur district, Karnataka, involving females aged 15 years and above.

Sample and Sampling Technique: A total of 60 females were selected using non-probability purposive sampling, based on inclusion criteria such as age, residency, and willingness to participate.

Data Collection Tool: A practice check list was used to assess participants' practices related to safe water and sanitary latrine utilization. The tool was validated and pilot tested for reliability.

Intervention Procedure: A pre-test was administered, followed by a structured health education session using charts and demonstrations. A post-test was conducted after 7–10 days.

Ethical Considerations: Ethical approval was obtained, and informed consent was taken. Participants' privacy and confidentiality were maintained throughout the study.

Data Analysis: Data were analyzed using SPSS v25. Descriptive statistics described demographic and practice variables. Paired t-test was used to evaluate intervention effectiveness, with significance set at $p<0.05$.

RESULTS & DATA ANALYSIS :

TABLE :1 DISTRIBUTION OF THE FEMALES IN THE SELECTED RURAL COMMUNITY ACCORDING TO SOCIO- DEMOGRAPHIC VARIABLES

N=60

Demographic variables		**No. of Samples (n)**	**Percentage %**
Age	18-25 yrs	4	6.66
	26-35 yrs	16	26.66
	36-45 yrs	21	35.00
	46 and above	19	31.66
Educational Status	No formal education	7	11.66
	Primary education	20	33.33
	Secondary education	19	31.66
	Higher Secondary education	9	15.00
	Graduation and above	5	08.33
Occupation	Homemaker	29	48.33
	Self-employed	24	40.00
	Government employee	04	06.66
	Private sector employee	03	06.01
Type of Family	**Nuclear family**	24	41.00
	Joint family	23	38.33

	Extended	13	21.66
Income	Below 10000 Rs	15	25.00
	Between 10001-15000	21	35.00
	Between 15001-20000	13	21.66
	Above 20000 Rs	11	18.33
Marital Status	Married	40	66.66
	Unmarried	15	25.00
	Widow	03	05.00
	Separated/Divorced	02	03.33
Source of Drinking Water	Piped water supply	37	62.65
	Borewell water	12	20.00
	Open well	02	03.33
	River/lake/pond	04	06.66
	Purchased water	05	08.33
Method of Water Purification at Home	Filtering (Cloth/sand filter	12	21.00
	Boiling	30	50.00
	RO/UV Water Purifier	02	03.33
	Chlorination/Alum treatment	06	10.00
	No purification method used	10	16.66
Type of Sanitary Latrine Used	Open defecation	15	26.00
	Pit latrine	17	28.33
	Flush latrine with septic tank	15	25.00
	Community latrine	13	21.66
Handwashing Practice After Toilet Use	Only with water	11	18.33
	With soap and water	32	53.33
	With ash/mud	06	10.00
	No regular handwashing practice	11	18.33
Source of Information	Relatives	27	46.00
	Health professional	07	11.66
	News paper	12	20.00
	Maas media	08	13.33
	Any other source	06	10.00

The socio-demographic profile of 60 females from the selected rural community reveals that the majority (35%) were aged 36–45 years, followed by 31.66% aged 46 years and above. A significant portion had primary (33.33%) and secondary (31.66%) education, though 11.66% had no formal education. Most participants were homemakers (48.33%) or self-employed (40%), indicating limited formal employment. Nearly equal numbers belonged to nuclear (41%) and joint families (38.33%). About 35% of the participants had a monthly income between ₹10,001–₹15,000, and two-thirds (66.66%) were married. Regarding water sources, 62.65% accessed piped water, while 50% used boiling for purification. Alarmingly, 26% still practiced open defecation, and only 25% used flush latrines. More than half (53.33%) used soap and water for handwashing, though 18.33% used only water or had no regular practice. The primary source of health information was relatives (46%), with only 11.66% receiving it from health professionals, highlighting gaps in formal awareness outreach.

TABLE-2: ASPECT WISE AND OVERALL MEAN, MEAN %, SD, AND CV OF PRE-TEST PRACTICE SCORES AMONG FEMALES IN RURAL COMMUNITY. (N=60)

PRACTICE ASPECTS	No. of Items	Minimum	Maximum	Range	Mean	Mean%	SD	COV
OVERALL	15	3	11	8	7.40	49.31%	1.73	23.45%

Table-2 shows the overall pre-test practice scores of 60 rural females regarding safe water and sanitary latrine utilization. The mean score was 7.40**, with a** mean percentage of 49.31%**,** indicating moderate practice levels before intervention. The standard deviation (1.73) **and** coefficient of variation (23.45%) reflect moderate variability in practices, suggesting the need for improved health education and awareness.

TABLE-3: OVERALL MEAN, MEAN %, SD, AND CV OF POST-TEST PRACTICE SCORES AMONG FEMALES IN RURAL COMMUNITY.
(N=60)

PRACTICE ASPECTS	No. of Items	Minimum	Maximum	Range	Mean	Mean%	SD	COV
OVERALL	15	9	14	5	11.83	78.84%	1.09	9.24%

Table-3 presents the overall post-test practice scores of 60 females in the rural community regarding safe water and sanitary latrine utilization. The mean score was 11.83 out of 15, with a mean percentage of 78.84%**,** indicating a significant improvement in practice after the intervention. The standard deviation (1.09) and coefficient of variation (9.24%) reflect high consistency and reduced variation in post-test practices among participants.

TABLE-4: MEAN, MEAN%, SD AND CV OF OVERALL PRE-TEST, POST-TEST AND ENHANCEMENT PRACTICE SCORES AMONG FEMALES IN RURAL COMMUNITY. (N=60).

	Mini.	Max.	Range	Mean	Mean %	SD	co-efficient of variance	Paired t Test Value
PRE-TEST	3	11	8	7.40	49.31%	1.73	23.45%	**46.75 (S) df=299**
POST-TEST	9	14	5	11.83	78.84%	1.09	9.24%	
ENHANCEMENT	1	10	9	4.43	29.53%	1.64	37.05%	

Table-4 compares the overall pre-test and post-test practice scores among 60 rural females regarding safe water and sanitary latrine utilization. The mean pre-test score was 7.40 (49.31%)**,** which increased to 11.83 (78.84%) in the post-test, showing a mean enhancement of 4.43 (29.53%)**.** The paired t-test value of 46.75 is statistically significant at $p < 0.05$, indicating the effectiveness of the health education intervention. A notable reduction in coefficient of variation from 23.45% **(pre-test)** to 9.24% (post-test) reflects improved consistency in practice.

H_2: There is a significant different between the pre and post-test Practice score of females in rural community regarding safe water and sanitary latrine utilization.

Hence the null hypothesis is,

H_{02}: Table 4 shows a significant increase in mean practice scores from 7.40 (49.31%) pre-test **to** 11.83 (78.84%) post-test, with a mean enhancement of 4.43 points (29.53%)**.** The paired t-test value 46.75 (df = 299) is statistically significant at $p < 0.05$. Thus, the null hypothesis is rejected, confirming that the health education intervention significantly improved practices related to safe water and sanitary latrine use among rural females.

TABLE-5: ASSOCIATION BETWEEN PRE-TEST LEVEL OF PRACTICE REGARDING SAFE WATER AND SANITARY LATRINE UTILIZATION AMONG HYPERTENSIVE FEMALES IN RURAL COMMUNITY AND THEIR SELECTED SOCIO-DEMOGRAPHIC VARIABLES (N=60)

Sl. No	Socio demographic variables	Categories	Pre-test level of Practice		Calculated chi square value	df	P value
			Inadequate	Moderate			
1	Age	18-25 yrs	02	02	4.476 **(NS)**	3	0.214
		26-35 yrs	08	09			
		36-45 yrs	15	06			
		46 and above	11	08			
2	Educational Status	No formal education	04	03	0.278 **(NS)**	4	0.991
		Primary education	12	08			
		Secondary education	11	08			
		Higher Secondary education	05	04			

		Graduation and above	03	02			
3	Occupation	Homemaker	16	13	**8.514 (S)**	**3**	**0.037**
		Self-employed	09	15			
		Government employee	02	02			
		Private sector employee	02	01			
4	Type of Family	Nuclear family	15	9	2.018 **(NS)**	2	0.365
		Joint family	16	7			
		Extended	07	06			
5	Income	Below 10000 Rs	05	10	3.678 **(NS)**	3	0.298
		Between 10001-15000	13	08			
		Between 15001-20000	07	06			
		Above 20000 Rs	08	03			
6	Marital Status	Married	25	15	1.974 **(NS)**	3	0.578
		Unmarried	09	06			
		Widow	02	01			
		Separated/Divorced	01	01			
7	Source of Drinking Water	Piped water supply	20	17	3.131 **(NS)**	4	0.536
		Borewell water	08	04			
		Open well	0	02			
		River/lake/pond	02	02			
		Purchased water	03	02			
8	Method of Water Purification at Home	Filtering (Cloth/sand filter	05	07	11.932 (S)	4	0.018
		Boiling	18	12			
		RO/UV Water Purifier	01	01			
		Chlorination/Alum treatment	04	02			
		No purification method used	06	04			
9	Type of Sanitary Latrine Used	Open defecation	09	06	2.608 (NS)	3	0.456
		Pit latrine	10	07			
		Flush latrine with septic tank	09	06			
		Community latrine	09	04			
10	Hand washing Practice After Toilet Use	Only with water	08	03	0.474 (NS)	3	0.925
		With soap and water	18	14			
		With ash/mud	04	02			
		No regular hand washing practice	07	04			

11	Source of Information	Relatives	15	12	3.579 (NS)	4	0.466
		Health professional	02	05			
		News paper	08	04			
		Mas media	06	02			
		Any other source	03	03			

Table-5 presents the association between pre-test practice levels regarding safe water and sanitary latrine utilization and selected socio-demographic variables among 60 hypertensive females in a rural community. The findings reveal that occupation ($\chi^2 = 8.514$, $p = 0.037$) and method of water purification ($\chi^2 = 11.932$, $p = 0.018$) showed a statistically significant association with pre-test practice levels, indicating that these variables influence hygiene behaviors. Other variables such as age, education, income, type of family, marital status, source of drinking water, latrine type, handwashing practice, and source of information were not significantly associated ($p > 0.05$) with practice levels. This suggests that while most demographic factors did not affect pre-intervention practices, occupation and water treatment methods played a key role in determining existing hygiene practices.

NURSING IMPLICATION :

1. Nursing Practice: The study highlights the critical role of nurses in promoting safe water use and hygienic sanitation behaviors among rural women. Nurses can implement regular health education sessions during home visits and community outreach programs. They should identify high-risk groups, such as hypertensive females, and reinforce proper water purification methods and sanitary practices to prevent infections and complications.

2. Nursing Research: This study provides a foundation for further research exploring the link between health education and behavior change in sanitation practices. Future nursing research can focus on evaluating long-term outcomes, identifying barriers to behavior adoption, and assessing the effectiveness of various educational strategies in diverse community settings.

3. Nursing Administration: Nursing administrators should integrate structured sanitation and hygiene education programs into routine community health services. They must allocate resources for training nurses in communication skills, provide IEC materials, and ensure regular monitoring and evaluation. Encouraging collaboration with local health departments and NGOs can enhance program reach and sustainability.

4. Nursing Education: The findings emphasize the need to strengthen nursing curricula with community-based health promotion, WASH (Water, Sanitation, and Hygiene), and behavior change communication. Nursing students should be trained in assessing rural health needs and delivering context-based education to empower communities, particularly vulnerable groups like women with chronic health conditions.

CONCLUSION

The study concluded that the health education intervention significantly improved the practice of safe water and sanitary latrine utilization among hypertensive females in the rural community. The marked rise in post-test scores and statistically significant results confirm its effectiveness. Occupation and water purification methods were significantly associated with pre-test practices. These findings emphasize the importance of targeted community-based education to promote sustainable hygiene behaviors and improve women's health outcomes.

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