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Research Article

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Enhancing Learning Outcomes: A Comprehensive Study on the Impact of a Structured Knowledge Based Teaching Program

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ABSTRACT

Background: Urinary tract infections (UTIs) are the most common infections in young women and cause great stress in the hospital or community. There are many problems associated with urinary tract infections, and they can be prevented with good knowledge and good practices. In child health care, nursing staff or nursing students are often interested in understanding the causes of urinary tract infections, ways to prevent and control such conditions, and teaching those two young girls and women. Education for women, especially young people, by knowledgeable and well-informed caregivers and educators can improve hygiene.

Methods: This qualitative study follows a pre-screening plan, i.e. a pre-test and post-test are written without a control group. The target group of this study is female students of Shri BVVS Nursing Science, Bagalkot. A total of 50 girls were rescued for investigation. Additional information was collected from a closed survey.

Results: Students' knowledge about urinary tract infections, pre-test scores showed that 58% of the sample had moderate knowledge, 40% had poor knowledge about urinary tract infections, and 1% had good knowledge. When test scores are passed, all have good knowledge about UTIs, and 8% have good knowledge about UTIs.

Conclusion: Urinary tract infections are common in young people. Studies have shown that educational programs are effective in helping girls acquire adequate knowledge about urinary tract infections.

Key-words: Urinary tract infection, Structured teaching program, Information, Knowledge, Prevention

INTRODUCTION

Urinary tract infection (UTI) is the most common infection and has life-threatening consequences in a percentage of older women [1]. This statement aims to describe urinary tract infections. The incidence of urinary tract infections increases with age; this probability is approximately twice as high in women over 65 as in all women.

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Being in this age group varies depending on health status, and factors such as catheterization can affect the likelihood of infection and the type of infection that causes it. Sexual activity in young people is a significant risk factor for UTI, and it is common for it to recur within 6 months. In general, the most serious diseases, such as kidney disease, are less common in women but increase the burden of care due to the risk of hospitalization [2-4].

Women have a higher risk of UTI symptoms than men, mainly due to the length of the urethra and the short distance between the urethra and the anus. It is estimated that one in three women will experience a urinary tract infection before the age of 24, and more than 50% of women will experience a urinary tract infection in their lifetime. Forty to fifty percent of

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American women will develop a UTI at some point in their lives, making it one of the most common infections in women [5-8]. Urinary tract infection, also known as cystitis or lower urinary tract infection, is a disease of the bladder and related systems. Urinary tract infections occur rarely in female patients with no abnormalities (E.g. diabetes, old age, pregnancy, or immunodeficiency) [2,9].

It can be a common urinary tract infection for women of all ages. Hormonal changes during puberty cause genital colonization by nephritogenic bacteria, which can move to the periurethral area and cause urinary tract infections. [11-13].

UTI is one of the causes of morbidity and co-morbidities. Patients with the following conditions account for the majority of hospital visits worldwide. A better understanding of the conditions associated with urinary tract infections can help in timely intervention to easily manage the disease. This study aims to determine the prevalence of UTI by isolating and characterizing different pathogens and evaluating their association with UTI. In this cross-sectional study, we collected a total of 267 sterile samples of urine and analyzed those using microbiological methods [14-16]. Data on events associated with UTIs were obtained from questionnaires and laboratory samples for selected underlying conditions. This study revealed the prevalence of urinary tract infection in 86/267 (32.2%) patients admitted to a hospital in Busheni District, Uganda [17-20].

MATERIALS AND METHODS

Research Design- A preliminary experiment using a small group pretest-posttest design to determine the effectiveness of the structured teaching method. Prevention of urinary tract infections among female BVVS Institute of Nursing Sciences, Bagalkot students. Information was collected through surveys regarding demographic information and information samples containing 30 questions. The reliability of the question knowledge model was determined by a test conducted on five selected GNM students by Karl Pearson (α=0.05). The main study was conducted by 50 students opting for BSc and GNM between March 24 and March 30, 2023. After the pre-test, the sample survey was administered, and the post-test was conducted on the 8th day of the sample survey.

Location of the study- Five students were selected to use or self-administer a closed-ended information survey. The pilot study was conducted at BVVS Institute of Nursing Sciences, Bagalkot, India.

Participants- The sample consisted of 50 first-year undergraduate female students and GNM stream from the Institute of Nursing Sciences in Bagalkot, India.

Sampling Technique- A simple random sampling technique is used to select the sample. In the first year, there were 80 girls from BSC and GNM. A total of 44 girls from the first class of GNM and 6 girls from the first class of BSC were selected by lottery.

Data collection instructions

Part 1: Sociodemographic factors

Demographic performance includes the females' age, religion, years of education, mother's occupation, father's occupation, family type, place of residence, background UTI-related information, and history of UTI-associated urinary tract infection.

Part 2: Scoring is done by counting correct answers as the total points earned. The maximum score is 30 points, arbitrarily divided into four levels: [0] 30 questions in the Urinary Tract Infection Knowledge Survey. Subjects were instructed to check the signs (–10 (bad)], [11–20 (fair)], [21–30 (good)].

Inclusion Criteria

- ✓ Participants must be first-year female undergraduate students at BVVS Institute of Nursing Sciences, Bagalkot, enrolled in either the BSc or GNM stream.
- ✓ Individuals who willingly consent to participate in the study demonstrate their commitment to engaging in the structured teaching program and provide necessary information.
- ✓ Students residing within Bagalkot and attending regular classes at the BVVS Institute of Nursing Sciences during the study period are included.
- ✓ Participants are eligible for the structured teaching program aimed at preventing urinary tract infections (UTIs) among female students.
- ✓ Selection is based on a simple random sampling technique from the pool of eligible first-year female students (44 from GNM and 6 from BSc).

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Exclusion Criteria

- ✓ Individuals, who do not provide informed consent to participate in the study and the structured teaching program are excluded.
- ✓ Students not regularly attending classes during the study period are excluded to ensure the effectiveness of the educational intervention.
- ✓ Students who are not eligible for or do not meet the criteria for participating in the structured teaching program.
- ✓ Students residing outside Bagalkot are excluded to maintain consistency in the study population.
- ✓ Female students beyond their first year of study are excluded to maintain homogeneity in the sample, ensuring relevance to the structured teaching program for preventing UTIs.

Variables- The dependent variable refers to the level of knowledge about urinary tract infections of girls in BVVS Institute of Nursing College, Bagalkot.

Independent variable- Structured teaching programme.

Data collection- Data collected for the year March 2023, and time and data for the year up to are prepared with the school authorities and communicated to the participants.

Research Methodology- Information was collected through surveys regarding demographic information and information samples containing 30 questions. The reliability of the question knowledge model was determined by a test conducted on five selected GNM students by Karl Pearson (α=0.05). The main study was conducted by 50 students opting for BSc and GNM between 24 March to 30 March, 2023. After the pre-test, the sample survey was administered, and the post-test was conducted on the 8th day of the sample survey.

Statistical Analysis- The study has used SPSS-25 for effective analysis. The data were analyzed using descriptive statistics and inferential statistics. Descriptive statistics were used to describe the participants' demographic characteristics and their knowledge about UTIs at both time points. Inferential statistics were used to compare the knowledge of the intervention and control groups at both time points. MS Excel was used for creating graphs and other calculations. The continuous data were expressed as mean±standard deviation while the discrete data were expressed as frequency and its respective percentage. The study used ANOVA as the statistical tool for comparing the variables. The level of significance was considered to be $p<0.05$.

Ethical approval- The ethical committee of B.V.V.S. Sajjalashree Institute of Nursing Sciences, Navanagar, Bagalkot, India, received and enclosed an ethical clearance certificate.

RESULTS

The study began with selecting 80 girls presented at the BVVS Institute of Nursing Science College in Bagalkot. All the girls were screened for eligibility criteria. The researcher has allocated subjects to the group.

Table 1 summarizes the fundamental features of the patients included in the research. Approximately 92% of the patients are between 17 and 18, while the remaining 8% are under 16. Regarding religious affiliation, 88% of the population identifies as Hindu, 10% as Muslim, and 2% as Christian. With respect to academic standing, 44% of individuals are in their first year, while 56% are in their sophomore year. Family jobs exhibit diversity, as 60% of women are engaged in domestic duties as housewives, while 72% of dads are involved in agricultural pursuits. Every participant (100%) resides in nuclear households, and 92% live in metropolitan settings. Significantly, 96% of individuals had previous knowledge of UTIs, while 8% indicated a past occurrence.

Table 1: Baseline characteristics of the patients in this study

Variables		Frequency	Percentage (%)
Age	Below and 16	4	8
	17-18	46	92

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	19 and above	0	0
Religion	Hindu	44	88
	Muslim	5	10
	Christian	1	2
Year of study	First year	22	44
	Second year	28	56
Mother Occupation	Housewife	30	60
	Self employed	5	10
	Health professional	1	2
	Agriculture	14	28
Father occupation	Agriculture	36	72
	Self employed	8	16
	Health professional	1	2
	Unemployed	5	10
Type of family	Yes	0	0
	No	50	100
Area of living	Yes	46	92
	No	4	8
Previous information about UTI	Yes	48	96
	No	2	4
Previous history of UTI	Yes	4	8
	No	46	92

Table 2 displays the evaluation of pre-test knowledge of UTIs among female individuals in Bagalkot. Among the whole sample size (N=50), a mere 2% showed a high level of knowledge, while the rest, comprising 58%, showed an average level of knowledge. Furthermore, 40% of the participants exhibited inadequate knowledge of UTIs. The distribution of this data highlights the need for educational activities aimed at improving knowledge and comprehension of UTIs within the examined population. The findings demonstrate a substantial number of individuals who have the potential to enhance their knowledge levels, underscoring the need for focused educational campaigns to enhance awareness of urinary health among females in Bagalkot.

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Table 2: Assessment of pre-test knowledge regarding urinary tract infection among Girls at Bagalkot

	Level of knowledge	Number (f)	N=50 (%)
Pre-test knowledge	Good	1	2
	Average	29	58
	Poor	20	40
Total		50	100

The percentage of the girls in the pre-test reveals that out of 50 girls, the highest percentage (58%) of girls had average knowledge, followed by 40% of girls having average knowledge, and 1% of the girls having poor knowledge regarding urinary tract infection. The pre-test showed 2% high knowledge, 58% moderate knowledge, and 40% bad knowledge. Post-test scores improved significantly after the intervention, with 92% having high knowledge, 8% average, and none bad. The systematic training programme improved UTI awareness and comprehension among Bagalkot females, as shown by the large increase in excellent knowledge.

Table 3: Comparison of pre-and post-test knowledge levels of girls

Level of knowledge	Pre-test		Post-test	
	Number of respondents	Percentage (%)	Number of respondents	Percentage (%)
Good	1	2	46	92
Average	29	58	4	8
Poor	20	40	0	0
Total	50	100	50	100

A comparison of knowledge in the pre-test showed that most 50 girls (58%) had average knowledge, 40% had poor knowledge, and 1% had good knowledge. However, after following the teaching model, it turned out that 92% of the girls had good knowledge, 8% had average knowledge, and none of the girls had poor knowledge. The pre-test mean score of 12.06±5.47 (40.2% of the maximum score) indicates modest baseline comprehension in assessing the efficacy of UTI teaching techniques among 50 participants. Following the educational intervention, the post-test mean score increased to 25.92±2.01 (86.4% of the maximum score), indicating considerable knowledge growth. The mean efficacy, measured as the difference between post-test and pre-test scores, was 13.86±3.47 (46.2%). According to these findings, the UTI prevention training module improved participants' knowledge (Table 4).

Table 4: Regional effectiveness of urinary tract infection teaching methods

Information Area	Max. score	Pre-Test (O_1)		Post-Test (O_2)		Effectiveness (O_2- O_1)	
		Mean ±SD	Mean (%)	Mean ±SD	Mean (%)	Mean ±SD	Mean (%)
E	30	12.06±5.47	40.2	25.92±2.01	86.4	13.86 ±3.47	46.2

E= Effectiveness of educational module on prevention of urinary tract infection

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The overall results show that the post-knowledge test score (25.92±2.01) accounts for 86.4% of the total score; this is higher than the prior knowledge test score (12.06±5.47), which accounted for 40.2% of the total score. Total score. The effectiveness of teaching methods in this area was measured with a knowledge score of 13.86 and SD±1.23, accounting for 46.2% of the total score. Hence, the teaching program's structure effectively enhanced girls' knowledge levels. Table 5 shows that BVVS Institute of Nursing College girls' pre- and post-test knowledge scores differed significantly. The post-test mean score was 25.92, up from the 12.06 pre-test. The mean pre-post-test score difference was 13.86, with a standard deviation of 3.42. The 16.82 paired t-value surpasses the table value of 1.96, indicating a statistically significant improvement. This suggests that the educational intervention improved participants' knowledge, as seen by their significantly higher post-test scores than baseline.

Table 5: Significant difference between the pre-post knowledge scores of girls

Test (Knowledge)	Mean	Mean Diff	SD Diff	Paired t-value	Table value
Pre-test ($O_{1)}$	12.06	13.86	3.42	16.82	1.96
Post-test (O_2)	25.92				

Table 6 shows the study hypothesis analysis of learning and socio-demographic characteristics in 50 participants. Age, religion, mother and father education, kind of family, location of living, prior UTI information, and history were tested using Chi-square testing. All variables had Chi-square values of 0, suggesting no knowledge relationship. The p-values topped 0.05, indicating non-significant relationships (NS) between knowledge levels and socio-demographic characteristics. This implies that socio-demographic variables did not substantially affect research participants' urinary tract infection knowledge. The calculated "t"-value (16.82) was higher than the table value (1.96) for the degree of freedom (49) and had a 5% level of significance.

There was a significant positive difference (16.82) between pre-post knowledge scores; hence, the null hypothesis H1 is accepted.

Table 6: Investigation to the relationship between knowledge and socio-demographic variables

Socio demographic variables	Df	Chi-square-value	Table value	p-value*
Age	3	0	3.84	1
Religion	2	0	3.84	1
Mother education	3	0	3.84	1
Father education	3	0	3.84	1
Type of family	1	0.04	3.84	0.8
Area of living	1	0.04	3.84	0.8
Previous information about UTI	1	0.04	3.84	1
Previous history of UTI	1	0.1	3.84	0.7

*All the values are statistically non-significant

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DISCUSSION

An extensive examination of the fundamental attributes of the study participants was conducted. Significantly, 92% of the patients are aged 17-18, indicating a notable focus on the latter adolescent years. The religious breakdown indicates a prevailing Hindu affiliation of 88%, with Muslims accounting for 10% and Christians comprising 2%. The academic distribution demonstrates an equilibrium between first-year students (44%) and second-year students (56%) [8]. Family jobs show a combination, with 60% of moms working as homemakers and 72% of dads involved in agriculture. The 100% incidence of nuclear families and the 92% prevalence of metropolitan living are significant urbanization indicators. The substantial proportion (96%) of persons possessing previous information about UTIs indicates a fundamental level of awareness, although 8% disclosed a past occurrence of UTIs, necessitating further scrutiny or action. Similar to other studies, the findings of this study showed that 58.4% of the participants were in the 21-30 age group, followed by 26% in the 31-40 age group [9]. 48.4% of educated people are illiterate, 27.3% are secondary school graduates, and 24.3% are university or undergraduate graduates. The majority of women (70.2%) are housewives. The overall prevalence of urinary tract infections was 27.3%. Urinary tract infections are highest in pregnant women (43%). The majority of women with UTI were housewives (65.9%), from rural areas (72.4%), and illiterate (62.6%) [10]. The results of this study are comparable to studies of young women. This shows that 2 (3%) of the students have good knowledge, 4 (7%) have very good knowledge, and 12 (20%) have good knowledge [11]. The results of the present inquiry on preventing UTIs revealed that a substantial fraction of the participants, accounting for 40.2% of the study cohort, had moderate knowledge of the subject [11]. In addition, a smaller, nevertheless significant proportion demonstrated a commendable level of expertise, accounting for 28% of the participants. The results of this research are similar to those of a similar study done among nursing students living in the Sri Guru Ram Das Institute (SGRD) Nursing dormitory in Vallah, Amritsar. The concurrent investigation conducted in Amritsar revealed that 83.3% of nursing students had a moderate degree of knowledge about preventing UTIs [12]. Moreover, a study revealed that 9.3% of the participants had insufficient information, while 7.7% demonstrated a satisfactory comprehension of preventative measures [3]. The consistency of these findings indicates a regular pattern in how knowledge levels are distributed across people in different environments, highlighting the need for specific educational initiatives. The study's hypothesis showed that age, religion, parental education, family type, living location, and previous UTI awareness did not substantially affect participants' UTI knowledge [13]. Chi-square values of 0 and p-values over 0.05 imply non-significant (NS) connections between these factors and knowledge levels. This shows that the educational intervention improves UTI knowledge across socio-demographic categories. Structured instruction programme efficacy is confirmed by the considerable positive difference (16.82) between pre-and post-test scores, supporting the alternative hypothesis (H1) [14]. Bagalkot women's pre-test awareness of UTIs is alarming. Only 2% of the group had high UTI knowledge, 58% had moderate, and 40% had low. This shows a large public awareness and knowledge gap. The results emphasize the need for focused educational activities to improve urinary health awareness among Bagalkot women. Focused community UTI awareness and prevention efforts are based on the findings [15].

The high occurrence of average knowledge in both studies highlights the need to improve awareness and education on UTI prevention among the general population and nursing students. After the organized instruction programme, girls' urinary tract infection prevention awareness improved significantly. A post-test score of 25.92 (86.4% of the total score) considerably exceeded the pre-test score of 12.06 (40.2%), demonstrating the program's effectiveness [16]. A calculated knowledge score of 13.86 (46.2% of the total score) highlights the training approaches' efficacy. At BVVS Institute of Nursing College, a paired t-value of 16.82 exceeded the table value of 1.96, indicating a statistically significant improvement in pre- and post-test scores. This shows that the educational programme improved participants' knowledge. To decrease the risk of UTIs and enhance overall urinary health, it is crucial to address the observed knowledge gaps, particularly among those with insufficient understanding. Comparing pre-test and post-test knowledge levels in 50 females shows that the training strategy significantly increases UTI awareness [17].

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Average (58%) or poor (40%) understanding was initially present, with just 1% excellent. After the intervention, 92% had strong knowledge, 8% average, and none bad. The higher post-test mean score (25.92±2.008) compared to the pre-test mean (12.06±5.47) indicates the efficiency of UTI prevention training [18]. The mean effectiveness of 46.2% supports educational intervention knowledge improvement. Pre-test percentages showed that 58% of the 50 females had average urinary tract infection knowledge, 40% had bad knowledge, and 1% had strong knowledge. In Section I, assessing the structured training programme, the pre-test showed 2% strong knowledge, 58% moderate knowledge, and 40% low knowledge. After the intervention, 92% had good knowledge, 8% ordinary, and none low.

The systematic training programme significantly increased Bagalkot females' UTI awareness and comprehension, producing good knowledge [19]. Efforts should focus on establishing specific educational programmes and interventions designed to enhance the comprehension of measures for preventing UTIs. By customizing educational activities based on the unique requirements revealed in this research, healthcare practitioners and educators may substantially contribute to lowering the occurrence of UTIs and promoting a population with improved awareness and understanding of urinary health. These results emphasize the need for continuous research and teaching in preventive healthcare, especially in relation to prevalent illnesses like UTIs [20]. Maternal psychological state negatively impacts pregnancy outcomes in several studies. During pregnancy, trait anxiety may be common and comes from perceived threats. Excessive anxiety may become a mental health issue if it disrupts everyday living despite being a typical reaction to threat or danger. Infectious agents during pregnancy pose a significant hazard to both fetal and maternal health in underdeveloped nations. Physiological changes during pregnancy may reduce immunity and increase vulnerability to pathogenic pathogens [21]. Toxoplasmosis, a preventable illness, is a global health issue affecting 30% to 50% of the population. It is generally known that toxoplasmosis is important owing to its global dissemination and a wide variety of disorders. Both men and women have negative effects from toxoplasmosis on their reproductive capability. Long-term studies show that up to 85% of newborns with congenital toxoplasmosis acquire sequelae, such as chorioretinitis, resulting in severe visual, hearing, or psychological damage [22].

CONCLUSIONS

The study concluded that most teenage girls lack knowledge about preventing urinary tract infections. It can increase young women's knowledge, education, and communication regarding preventing urinary tract infections. Adolescent girls and women are more susceptible to urinary tract infections. This study will help the public become aware of urinary tract infections. With this in mind, we conducted this survey to assess girls' knowledge and attitudes about UTI. Women under the age of 20 were included in this study. Only the cognitive questionnaire was used to measure the effectiveness of STP. The intervention was used for 24 days only. The researchers themselves conducted STP.

We can provide the necessary information and health to young women in the future. It will reduce the risk of infections such as kidney disease, bladder, and other things that can cause problems in the future, such as pregnancy.

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CONTRIBUTION OF AUTHORS

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