Effectiveness of Structured Counseling and Preventive Strategies in Promoting Awareness and Expressed Habitual Practices Toward Prevention of Urinary Tract Infection Among Women of Reproductive Age Group: A Pilot Study

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Abstract

Objectives   Urinary tract infection (UTI) is the most common infection that affects half of all women in their lifetime and one-fourth have recurrent infections. Health behaviors could prevent the recurrence of UTIs and therefore motivation and increasing awareness are necessary for healthy behavior change. This study was done to evaluate the effectiveness of structured counseling and preventive strategies (SCAPS) in promoting awareness and expressed habitual practices among the women of the reproductive age group to prevent UTI.

Materials and Methods   Block randomization with multiple interventions and follow-up were conducted among 60 women (30 in each group, randomly assigned using the SNOSE technique) attending the OBG and urology OPDs of a selected medical college hospital. Purposive sampling was used to select the subjects. Women who were positive for urine culture and experiencing typical symptoms of UTI, as assessed using the symptom score checklist, were recruited for the study. Pre-test awareness was assessed using a structured awareness questionnaire and a rating scale for expressed habitual practice. After the pre-test, on the same day, the experimental group received SCAPS intervention followed by a second session during the third month. At the third (before the second session) and the sixth-month post-tests were conducted by delivering the same tool to determine the post-test level of awareness and expressed habitual practice after the administration of SCAPS.

Keywords
► SCAPS
► urinary tract infection block randomization
► awareness
► expressed habitual practice

Results   The study shows there is a significant difference in the awareness and expressed habitual practice values in the experimental group ($p < 0.005$). The effectiveness of SCAPS showed that the mean $\pm$ standard deviation (SD) pre-test score of women (awareness - $\bar{x}_1 \pm SD = 9.47 \pm 2.57$, hygienic habitual practice - $\bar{x}_1 \pm SD = 20.93$

± 1.91, fluid and dietary practice - $\bar{x}_1 \pm SD = 7.73 \pm 2.18$ and sexual habits - $\bar{x}_1 \pm SD = 8.00 \pm 3.33$) was significantly lower than the mean $\pm$ SD post-test scores (awareness - $\bar{x}_2 \pm SD = 11.37 \pm 1.65$, awareness - $\bar{x}_3 \pm SD = 12.00 \pm 1.05$), (hygienic habitual practice - $\bar{x}_2 \pm SD = 22.57 \pm 2.16$, $\bar{x}_3 \pm SD = 23.90 \pm 1.99$), (fluid and dietary practice - $\bar{x}_2 \pm SD = 10.07 \pm 2.21$, $\bar{x}_3 \pm SD = 11.97 \pm 1.79$) and (sexual habits - $\bar{x}_2 \pm SD = 8.81 \pm 2.51$, $\bar{x}_3 \pm SD = 9.81 \pm 2.26$).

Conclusion   SCAPS was found to be effective on awareness and preventive habitual practices with regard to UTI. SCAPS can be recommended for vulnerable groups such as females so that UTI could be prevented.

Trial Registration   CTRI/2018/10/016064 (Registration on 17/10/2018).

Introduction

Urinary tract infection (UTI) is one of the major problems in developing countries.[1] It is a common infection among females, with a high incidence among women of reproductive age group.[2] UTIs can upset any part of the urinary system and usually causes a significant burden among the individuals and are associated with high health care and social costs.[3,4] UTI has been the major cause of morbidity and mortality among the Indian population.[3] Moreover, annually 150 million people are suffering worldwide along with a rise in health care cost of at least 6 million dollars, making it necessary to divert the attention to this disease.[5]

UTI is more frequently encountered as an outpatient infection, with a lifetime incidence of 50 to 60% in adult women.[6] Due to UTI, every year, nearly 6 to 7 million young women visit physicians, and therefore it is a major concern for healthcare providers.[3] A study conducted in Tamil Nadu revealed the prevalence of UTI to be 20.4% among females of the reproductive age group. It is found that nearly 25 to 30% of women between 20 and 40 years of age will get UTIs.[7] Another study conducted in Mangalore in 2020 revealed that a total of 13.4% of women experienced UTI in their lifetime.[3] The incidence of infection in females increases directly with sexual activity and childbearing. In addition, 50 to 60% of women (15–49 years) have a history of at least a single episode of UTI, and recurrence within 6 months is very common among women.[8] Compared with boys, the recurrence rate is 50% greater in girls.[3] Malnutrition, poor body and personal hygiene, and increased sexual activity are the most common risk factors for UTIs.[4,9] Among adolescent girls, poor hygiene and dysfunctional voiding pattern increase the risk for UTI. Silent UTIs may occur among adolescent girls due to inadequate intake of water and infrequent passage of urine.[3]

UTI is limited to the lower urinary tract system, which is known as uncomplicated UTI and is the most common who have normal, unobstructed genitourinary tract, and are healthy premenopausal or non-pregnant women.[4] UTI is caused by microbes including bacteria, fungi, and viruses.[4] *Escherichia coli* accounts for ~75 to 95% of all infections.[8] Any delay in the treatment leads to permanent kidney damage, bacterial endocarditis, and infertility.[3]

A study from Chitradurga revealed that the female students confessed an indiscriminate consumption of antibiotics whenever they fell sick or difficulty while micturition is noticed.[10] A study conducted in Bangalore showed that one in seven women given antibiotics returned within 28 days for further treatment.[11] In contrast, studies have shown that the morale and quality of life are affected due to the presence of UTI.[12,13]

Early identification of the disease by proper diagnostic measures and management will help prevent the complications of UTI. Preventive measures such as maintenance of good hygiene during menstruation, intake of more amount of water, also will help reduce the incidence of UTIs.[14] Appropriate education and other promotional measures by health care professionals play a vital role in the prevention of UTI.

Education can change behavior and will encourage and empower women to accept and perform voluntary healthy behaviors. Women just need assistance and training for changing their health behaviors.[4] It is a convenient tool for all health care professionals in helping women obtain beneficial health behaviors and change risky lifestyles in terms of health.[5]

A quasi-experimental study conducted in Saudi Arabia revealed that women showed mean scores of pre-intervention deficient, incorrect knowledge, and unsatisfactory self-care practices regarding their urinary tract infection symptoms. Statistically significant improvements in the total scores were found at the post-test and 3 months later compared with pre-intervention scores ($p < 0.001$). Furthermore, there was an obvious improvement and relief of UTI symptoms as reported by women after the implementation of the instructional program.[15] Some other studies found that 32.3% had recurrent urinary tract infection, 19.5% sample had adequate knowledge about urinary tract infection, 42% had moderate knowledge, and 35.5% had poor knowledge.[1] Reports show that 80 to 95% of health problems could be managed and prevented at home.[16]

The investigator felt that SCAPS will assist increase the self-care abilities of women throughout their life span. This will in turn develop the confidence by increasing the awareness and motivating them to develop healthy habitual practices, thereby reducing the morbidity and mortality due to UTI.

Materials and Methods

Study Design, Setting, Eligibility Criteria, and Participants

A quantitative research approach with education- and counseling-based block randomization control trial with multiple interventions and follow-up was adopted to find the effect of SCAPS on awareness and habitual practices of women belonging to the reproductive age group visiting the OBG and urology OPDs of a selected medical college hospital. Subjects were recruited using the purposive sampling technique.

Inclusion criteria included women between 18 and 45 years, literate (reading and writing ability in Kannada or English), accessible throughout the study, residing within Dakshina Kannada district (Mangalore), and had access to SMS (mobile) and/or WhatsApp. The exclusion criteria included women with hearing/visual impairment, unconscious women, diagnosed with a major mental disorder, congenital defects of the urinary system, pregnancy, menopause, or hysterectomy.

Data were collected from April 2019 to March 2020. Women, who visited the outpatient department of the hospital for a consultation, were routinely sent for urine analysis based on their presenting complaints. Sixty-one women tested positive for urine culture and who met the study criteria were further interviewed using the UTI Symptom score checklist (UTI-SSC) to assess the typical symptoms of UTI (part 1: included 4-point rating scale with the highest score of 27 and the lowest score of 0), its severity (part 2: included 4-point rating scale with the highest score of 27 and the lowest score of 0) and the urine analysis report (part 3). Thereafter, women were randomly assigned into experimental and control groups on a rolling enrolment basis using the SNOSE technique.

The sample size was calculated based on the prevalence of UTI in the study conducted by Das and Banerjee, which was 9.77% in 2014.[17] The formula used for sample size calculation was $n = \frac{Z^2 P (1-P)}{d^2}$ with a precision rate of 5% and an attrition rate of 15%. The sample size of each group was found to be 150. Also, 10% of the actual sample size was taken keeping 15 as the minimum in each group.

Ethical Permission

Ethical clearance was obtained from the Institutional Review Committee (IRC no. IRC/FMCON/2018/FAC – 15) and the Institutional Ethics Committee of Father Muller charitable institutions (FMMCIEC/CCM/479/2018). The study was registered under CTRI with registration number CTRI/2018/10/016064. Prior permission was obtained from the authorities of the medical college hospital to conduct the study.

Tools for Data Collection

UTI symptom score checklist (UTI-SSC) included three sections. Part 1 included nine typical symptoms of UTI, part 2 assessed the severity of the symptoms of UTI, and part 3 included results of urine analysis such as urine characteristics, urine microscopy, and culture.

Others included a socio-demographic questionnaire with 10 items, an awareness questionnaire regarding urinary tract infection (UTI) covering two domains—basics of UTI comprising questions from 1–7 and preventive aspects toward UTI from questions 8 to 14. Total awareness questionnaire comprised 14 multiple-choice questions. The maximum possible score was 14. To assess the expressed habitual practice, a three-point rating scale (with scores 0, 1, and 2) was used that covered three domains–the hygienic practices from question 1–14, fluid and dietary habits from questions 15 to 21, and sexual practices from questions 22 to 28. The maximum possible score was 56.

All tools of data collection, including the SCAPS intervention, were validated by 14 experts from the field of Medicine (two urologists) and Nursing (four from the Department of Medical and Surgical, two from OBG Nursing, and six from the Department of Community Health Nursing).

The content validity index (CVI) was > 0.7 and the scale content validity (SVI) was > 0.9.

The reliability of the tool was done on 20 subjects. Stability (intraclass correlation coefficient, $r > 0.9$) and internal consistency, (Chronbach's α, $r > 0.7$) revealed that the tool was reliable. Face-to-face interview technique was used to assess the UTI symptom score checklist and self-reported techniques were used for the other tools during data collection.

Data Collection Methods and Description of SCAPS

Block randomization with multiple interventions and follow-up was used for the study. The SNOSE technique was adopted for the allocation of subjects to the experimental and control groups. Blocks of 4 (three times) consisting of six possible permutations were taken. A block was chosen randomly (flipping the coin) and the subjects were given randomly selected one opaque envelope from the block available with the investigator. If the paper inside the envelope had a letter written as "E," women were recruited to the experimental group and if written as "C," then women were recruited to the control group. The whole process of permutation and allocation was done by a non-researcher and then handed over one by one to the investigator.

A pre-test was administered to both the groups (30 experimental and 31 control). The experimental group received SCAPS immediately after the pre-test that included face-to-face therapeutic counseling, followed by a goal-setting snake and ladder–an indoor game, designed aiming to help them familiarize themselves with a healthy lifestyle. Other components included education and training using technology (images and content on UTI prevention) and a video designed by the investigator and later the case scenarios were discussed. The follow-up was done in the first, second, fourth, and fifth months through supportive telephonic conversations, reminders, and messages through WhatsApp. The first post-test was collected in the third month, followed by a second set of counseling sessions,
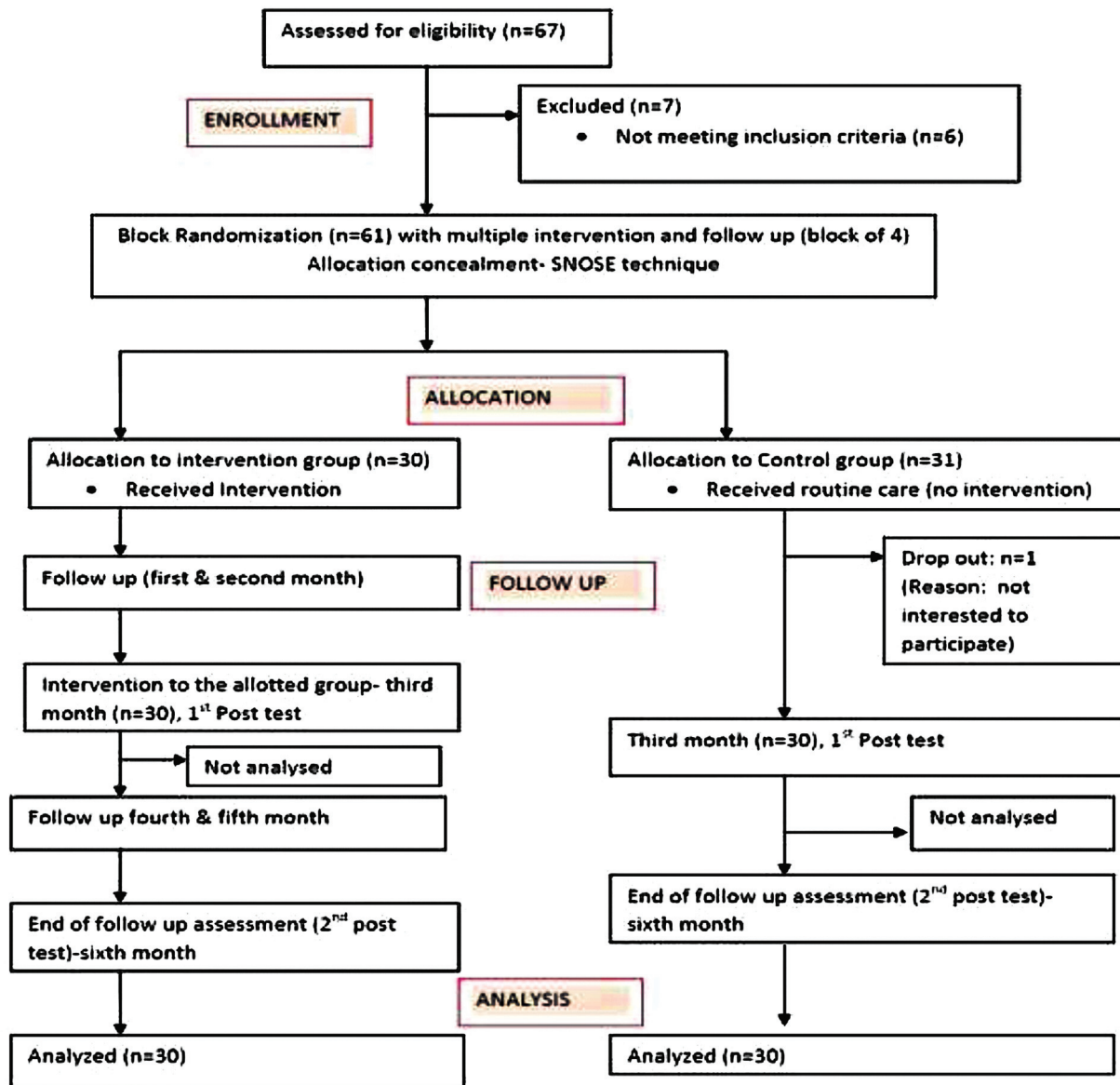
Fig. 1 Consort flow diagram of participants during the study.

and strategies to improve problem-solving skills and prevent UTIs were also used. The second post-test was collected in the 6th month.

The control group received routine care such as antibiotics and analgesics, and basic preventive techniques were advised by the consultant. After the study, an education video was shown to the control group along with information on the prevention of UTI (►**Fig. 1**).

Statistical Analysis

Data were analyzed using IBM SPSS Statistics for version 23. Data that followed normality, parametric tests such as "*t*" test, repeated measures of analysis of variance (ANOVA), Bonferroni post hoc test, analysis of covariance (ANCOVA), and Karl Pearson correlation were used. For the data without normality, Mann–Whitney *U* test was used to compare between the groups. The level of significance was considered at 0.05.

Results

Baseline Information

The mean age of women was 28.43 ± 5.1 years in the experimental group and 27.76 ± 4.6 years in the control group $(p = 0.114$-homogeneity).

Other specifications of the units under study are presented in ►**Table 1**.

The mean and standard deviation score of typical symptoms of UTI was 10.80 ± 4.26 (in the experimental group) and 13.60 ± 6.14 (in the control group).

In the experimental group, 29 (96.7%) experienced burning micturition, 17 (56.7%) had fever, 17 (56.7%) had no bladder control, 4 (13.3%) experienced hematuria. In the control group, 30 (100%) experienced burning micturition, 16 (53.3%) had fever, 21 (70%) experienced no bladder control, and 9 (30%) experienced hematuria.

Table 1 Baseline characteristics of the subjects $n = 30 + 30$

Variable		Group		p-Value
		Experimental group (n = 30)	Control group (n = 30)	
		f (%)	f (%)	
Education	Postgraduate	2 (6.7)	2 (6.7)	0.497 (NS) Fisher's exact test
	Graduate	17 (56.7)	13 (43.3)	
	PUC/diploma	8 (26.7)	7 (23.3)	
	High school	2 (6.7)	7 (23.3)	
	Primary	1 (3.3)	1 (3.3)	
Marital status	Married	16 (53.3)	16 (53.3)	0.341 (NS) Fisher's exact test
	Single	14 (46.7)	12 (40.0)	
	Separated	0 (0.0)	0 (0.0)	
	Widow/widower	0 (0.0)	2 (6.7)	
Number of times experienced UTI	Only once	14 (46.7)	9 (30.0)	$\chi^2 = 2.059$, $p = 0.357$ d.f-2 (NS)
	2–3 times	12 (40.0)	14 (46.7)	
	>3 times	4 (13.3)	7 (23.3)	
Source of information	Media	1 (3.3)	2 (6.7)	0.807 (NS) Fisher's exact test
	Relatives/friends	4 (13.3)	6 (20.0)	
	Health personnel	21(70.0)	19 (63.3)	
	Magazines	0(0.0)	0 (0.0)	
	Never received information	4(13.3)	3 (10.0)	

The characteristics of urine in women having UTI in the experimental and control groups are shown in ►**Table 2**.

Evaluation of Intervention

Section 1: Awareness of UTI

The effectiveness of SCAPS showed that the mean ± SD of a pre-test awareness score of women ($\bar{x}_1 \pm SD = 9.47 \pm 2.57$) was significantly lower than the mean ± SD of post-test awareness scores ($\bar{x}_2 \pm SD = 11.37 \pm 1.65$, $\bar{x}_3 \pm SD = 12.00 \pm 1.05$).

In the awareness of UTI, a significant difference in the pre-test and post-test values was found in the experimental group (F = 32.05, df = 2,58) $p < 0.05$, whereas, no difference was found in the control group at various time points (F = 0.70, df = 2,58) $p > 0.05$. Paired eta square showed (η^2 value-0.525) a moderate effect of the SCAPS on overall awareness toward UTI prevention (►**Table 3**).

Post hoc analysis was further done and the Bonferroni correction showed a statistically significant difference at 0.05 level of significance. In the total awareness of UTI among the experimental group, significant difference was found between pre-test and post-test 1 ($p = 0.0001$), pre-test and post-test 2 ($p = 0.0001$), and post-test 1 and post-test 2 ($p = 0.032$). The result stated that the SCAPS intervention was effective.

Results using MANOVA also showed that there was a significant association between the education ($p < 0.451$),

occupation ($p < 0.000$), and type of family ($p < 0.010$) with a level of awareness of women with UTI.

Section 2: Expressed Habitual Practice toward UTI Prevention

The study shows there was a significant difference in the expressed habitual practice values in the experimental group ($p < 0.005$). The effectiveness of SCAPS showed that the mean ± SD of the pre-test score of women (hygienic habitual practice - $\bar{x}_1 \pm SD = 20.93 \pm 1.91$, fluid and dietary practice - $\bar{x}_1 \pm SD = 7.73 \pm 2.18$, and sexual habits - $\bar{x}_1 \pm SD = 8.00 \pm 3.33$) was significantly lower than the mean ± SD of the post-test scores (hygienic habitual practice - $\bar{x}_2 \pm SD = 22.57 \pm 2.16$, $\bar{x}_3 \pm SD = 23.90 \pm 1.99$), (fluid and dietary practice - $\bar{x}_2 \pm SD = 10.07 \pm 2.21$, $\bar{x}_3 \pm SD = 11.97 \pm 1.79$, and (sexual habits - $\bar{x}_2 \pm SD = 8.81 \pm 2.51$, $\bar{x}_3 \pm SD = 9.81 \pm 2.26$).

►**Table 4** shows there was a significant difference in the pre-test and post-test values of expressed habitual practices in the intervention group (domain 1: F = 51.77, df-2,28, $p < 0.05$), (domain 2: F = 54.74, df = 2,58, $p < 0.05$), (domain 3: F = 13.98, df = 2,30, $p < 0.05$). The paired eta square showed (η^2 value-0.641, 0.654, and 0.482) moderate effect of SCAPS on expressed habitual practices (three domains such as hygienic practice, fluid, and dietary practices and sexual practices, respectively).

In post hoc analysis, a significant difference was seen in the pre-test and post-test 1 ($p = 0.000$), pre-test and post-test 2 ($p = 0.000$) and post-test 1 and post-test 2 ($p = 0.0001$) in

Table 2 Characteristics of Urine of women with UTI in frequency and percentage $n = 30 + 30$

		Group			
		Experimental group		Control group	
		f	%	f	%
Cloudy urine	yes	26	86.7	20	66.7
	No	4	13.3	10	33.3
Smell of urine	yes	18	60.0	15	50.0
	No	12	40.0	15	50.0
Urine microscopy (pus cells)	Yes	25	83.3	28	93.3
	No	5	16.7	2	6.7
Leukocytes	yes	16	53.3	27	90.0
	No	14	46.7	3	10.0
Nitrates in urine	yes	15	50.0	9	30.0
	No	15	50.0	21	70.0
Urine culture report: Organisms	E-coli	23	76.6	27	90
	Klebshilla	7	23.4	3	10

Table 3 Comparison of awareness scores within the group at various time points (ANOVA) $n = 30 + 30$

Group		Mean $\pm$ SD	F-value	D.F	p-Value	Effect size
Experimental	Pre-test	9.47 $\pm$ 2.57	32.05	2 and 58	0.000[a]	0.525
	Post-test 1	11.37 $\pm$ 1.65				
	Post-test 2	12.00 $\pm$ 1.05				
Control	Pre-test	8.57 $\pm$ 2.81	0.70	2 and 58	0.502	0.024
	Post-test 1	8.93 $\pm$ 2.32				
	Post-test 2	8.77 $\pm$ 2.50				

[a]$p < 0.05 =$ significant.

the domain 1 of experimental group. Significant difference was also found between pre-test and post-test 1 ($p = 0.0000$) and pre-test and post-test 2 ($p = 0.000$), post-test 1 and post-test 2 ($p = 0.000$) in the domain 2 of the experimental group. In the domain 3 of experimental group, significant difference is found between pre-test and post-test 1 ($p = 0.022$), pre-test and post-test 2 ($p = 0.004$), and post-test 1 and post-test 2 ($p = 0.007$). SCAPS intervention was effective in improving the expressed habitual practice of women in preventing UTI.

Results using MANOVA also showed a significant association between the occupation ($p < 0.055$), marital status ($p < 0.014$), and history of diseases ($p < 0.004$) with the expressed habitual practice (domain 3) of women with UTI.

►**Table 5** shows a comparison of awareness and habitual practice scores between the experimental and control groups using Mann–Whitney's test.

►**Table 5** shows that there was a highly significant difference between the experimental and control group scores ($p < 0.05$). The differences occurred in all domains of awareness and expressed habitual practice scores and in favor of the experimental group. This reflects that SCAPS was effective in increasing awareness and expressed habitual practice.

Furthermore, Pearson correlation coefficient results showed no significant relationship between awareness and expressed habitual practice ($p > 0.005$).

Discussion

One of the very common health conditions that affect many women in their reproductive age group is UTI. Self-care is an important tool and the use of healthy habitual practices and coping skills for promoting their own health helps in preventing or limiting disease and maintaining well-being.[15]

The present study throws light on the effectiveness of SCAPS on awareness and expressed habitual practices of women toward preventing UTI. The results confirmed the positive effect of SCAPS; however, the durability of their awareness and practice remained the same over a period of time.

In the present study, the mean age of women was 28.43 ± 5.1 years. This result is consistent with a study conducted by Ahmed et al in Saudi Arabia that reported that the mean age of the study sample was 29 ± 9.89, where about half of women's age ranged between 20 and 30 years.[15]

Table 4 Comparison of expressed habitual practice scores within the group at various time points (ANOVA) $n = 30 + 30$

Parameters	Group		Mean ± SD	F value	D.F	p-Value	Effect size
(Hygienic practices in prevention of UTI) Domain 1	Experimental $n = 30$	Pre-test	20.93 ± 1.91	51.77	2 and 58	0.000[a]	0.641
		Post-test 1	22.57 ± 2.16				
		Post-test 2	23.90 ± 1.99				
	Control $n = 30$	Pre-test	22.00 ± 2.30	0.72	2 and 58	0.493	0.024
		Post-test 1	21.53 ± 2.06				
		Post-test 2	21.73 ± 1.76				
(Fluid intake and dietary practices in UTI prevention) Domain 2	Experimental $n = 30$	Pre-test	7.73 ± 2.18	54.74	2 and 58	0.000[a]	0.654
		Post-test 1	10.07 ± 2.21				
		Post-test 2	11.97 ± 1.79				
	Control $n = 30$	Pre-test	8.93 ± 2.10	1.29	2 and 58	0.282	0.043
		Post-test 1	8.73 ± 2.08				
		Post-test 2	8.37 ± 2.62				
(Sexual habits) Domain 3 Experimental ($n_1 = 16$) Control ($n_1 = 13$)	Experimental ($n_1 = 16$)	Pre-test	8.00 ± 3.33	13.98	2 and 30	0.000[a]	0.482
		Post-test 1	8.81 ± 2.51				
		Post-test 2	9.81 ± 2.26				
	Control ($n_1 = 13$)	Pre-test	9.69 ± 2.72	1.55	2 and 24	0.233	0.114
		Post-test 1	9.38 ± 2.50				
		Post-test 2	9.00 ± 1.47				

[a]$p < 0.05$ = significant.

This result is also supported by Kodikara et al who reported that of women diagnosed with UTI, 60% belonged to the age group of 20 to 30 years.[18] This result is consistent with a study by Millar et al who reported that a higher percentage of UTI among women was found within the age group of 20 to 29 years.[19]

In this study, of women in the experimental group, (12) 40% experienced UTI, 2 to 3 times, and (4) 13.3% women experienced UTI more than thrice. In the control group, (14) 46.7% of women experienced UTI 2 to 3 times, and 7 (23.3%) experienced UTI more than thrice. This result is supported by a study conducted by Sequera et al, which reported that a total of 13.4% experienced UTI in their lifetime. Out of 11, 1 (9.1%) experienced UTI more than thrice, 6 (54.5%) experienced 2 to 3 times UTI, and 4 (36.4%) experienced UTI only once.[3] A similar study was conducted at the medical university of Jos (Nigeria) among the 185 female students residing in the hostel, and the results revealed that 34.9% experienced UTI at some point in their lifetime.[20] Another study by Ahmed et al showed congruent results that reported that 36 (85.71%) had a previous history of UTI.[15] This shows that UTI is commonly found in the women of reproductive age group.

In the present study, the mean and standard deviation of typical symptoms of UTI was 10.80 ± 4.26 (in the intervention group) and 13.60 ± 6.14 (in the control group). In the experimental group, 29 (96.7%) women experienced burning micturition, 17 (56.7%) had a fever, 17 (56.7%) had no bladder control, 4 (13.3%) experienced hematuria. In the control group, 30 (100%) women experienced burning micturition,

16 (53.3%) had a fever, 21 (70%) experienced no bladder control, and 9 (30%) experienced hematuria. This study is congruent to the study conducted at Saudi Arabia that showed that 15 (35.7%), women experienced fever, 39 (92.8%) experienced dysuria, 37 (88.09%) experienced urgency, and 28 (66.6%) experienced incontinence.[15]

In this study, there was a significant difference in the pretest and post-test awareness values in the experimental group (F = 32.05, df = 2,58) $p < 0.05$, whereas, no difference was found in the control group at various time points (F = 0.70, df = 2,58) $p > 0.05$. Paired eta square shows 0.525, which is a moderate effect of the SCAPS on overall awareness toward UTI prevention. Significant difference was also found in the pre-test and post-test values of expressed habitual practices in the intervention group (domain 1: F = 51.77, df-2,28, $p < 0.05$), (domain 2: F = 54.74, df = 2,58, $p < 0.05$), (domain 3: F = 13.98, df = 2,30, $p < 0.05$). The paired eta square shows 0.641, 0.654, and 0.482 which is a moderate effect of SCAPS on expressed habitual practices (three domains such as hygienic practice, fluid, and dietary practices and sexual practices, respectively).

In a similar study conducted in Saudi Arabia, there was a significant improvement in the knowledge of women immediately after the intervention and 3 months later ($p < 0.001$). Significant improvements were shown in women's total scores of knowledge from poor or weak score levels to good levels regarding most of the studied items. The items that demonstrated significant improvements after implementation of the intervention were related to causes, signs, and symptoms, risk factors of UTI, problems associated with

Table 5 Comparison of awareness and expressed habitual practice scores between the experimental and control group $n = 30 + 30$

		Group	Mean difference	S.D of difference	MW test Z value	p-Value	
Awareness of UTI (total)	Pre- test – Post-test 1	Experimental	−1.900	1.900	3.387	0.001	HS
		Control	−0.367	1.033			
	Pre-test - Post -test 2	Experimental	−2.533	2.129	4.338	0.000	HS
		Control	−0.200	1.990			
	Post- test 1-Post- test 2	Experimental	−0.633	1.273	2.274	0.023	sig
		Control	0.167	1.913			
Awareness of UTI (basics of urinary tract infection) Domain 1	Pre- test – Post-test 1	Experimental	−1.133	1.279	2.465	0.014	sig
		Control	−0.300	0.952			
	Pre-test - Post- test 2	Experimental	−1.600	1.499	4.066	0.000	HS
		Control	−0.167	1.053			
	Post- test 1-Post- test 2	Experimental	−0.467	0.937	1.998	0.046	sig
		Control	0.133	1.332			
Awareness of UTI (remedial measures toward UTI prevention) Domain 2	Pre- test – Post -test 1	Experimental	−0.767	1.478	2.348	0.019	sig
		Control	−0.067	0.691			
	Pre-test - Post-test 2	Experimental	−0.933	1.552	2.621	0.009	HS
		Control	−0.033	1.299			
	Post-test 1-Post-test 2	Experimental	−0.167	0.648	1.070	0.285	NS
		Control	0.033	1.129			
Expressed habitual practice (hygienic practices in prevention of UTI) Domain 1	Pre-test - Post-test 1	Experimental	−1.633	1.790	4.888	0.000	HS
		Control	0.467	1.137			
	Pre-test - Post-test 2	Experimental	−2.967	1.752	4.949	0.000	HS
		Control	0.267	2.664			
	Post-test 1-Post-test 2	Experimental	−1.333	1.184	3.136	0.002	HS
		Control	−0.200	2.325			
Expressed habitual practice (fluid intake and dietary practices in UTI prevention) Domain 2	Pre-test - Post-test 1	Experimental	−2.333	2.412	4.648	0.000	HS
		Control	0.200	0.484			
	Pre -test - Post -test 2	Experimental	−4.233	2.473	5.744	0.000	HS
		Control	0.567	2.431			
	Post- test 1-Post- test 2	Experimental	−1.900	1.689	4.655	0.000	HS
		Control	0.367	2.312			
Expressed habitual practice (sexual habits) Domain 3 Experimental ($n_1 = 16$) Control ($n_1 = 13$)	Pre-test- Post-test 1	Experimental	−0.813	1.047	3.415	0.001	HS
		Control	0.308	0.630			
	Pre-test- Post-test 2	Experimental	−1.813	1.834	3.121	0.002	HS
		Control	0.692	1.750			
	Post-test 1-Post-test 2	Experimental	−1.000	1.095	2.491	0.013	sig
		Control	0.385	1.609			

UTI, and also the preventive and management self-care measures to relieve UTI symptoms.[15] Another study conducted by Heydari et al showed that the mean scores in all aspects of behavior in the intervention group were significantly increased ($p < 0.05$).[5] These findings were congruent with the present study.

In this study, there was a highly significant difference in the awareness and expressed habitual practice scores between experimental and control groups ($p < 0.05$). These findings are in congruent to the study conducted in Iran where a significant increase in the intervention groups' behavior was found compared with the control group. This

showed a positive impact of education on the mean scores of behavior.[5]

The improvement in the present study refers to the effect of SCAPS given to the women to improve their awareness and change their behavior, enhance and upgrade their self-care practices to relieve their UTI symptoms. UTI can be reduced by following healthy measures such as developing a habit of urinating as soon as the need is felt and emptying the bladder completely when you urinate.

Urinating before and after intercourse, avoiding intercourse while being treated for a UTI, after urinating keeping the genital area clean, avoid using strong soaps, antiseptic creams, feminine hygiene sprays, and powders. The findings of the present study are in line with a supporting study conducted by Hill et al who noted that the measures that reduced the risk of UTI were the use of condoms, voiding after sexual contact, and the type of underwear used, personal hygiene methods used after voiding or defecating, and whether one takes a bath or shower.[21]

In this study, improvement in awareness and habitual practice in the experimental group was due to the SCAPS intervention that sensitized the women toward the prevention of UTI. The program includes various components such as therapeutic counseling at the initial opening and throughout the process to build rapport and trust, open communication, and mutual understanding. Snake and ladder game as a motivational factor to change lifestyle, educational video on UTI, and its prevention to deliver instructions effectively, case scenarios, and discussion to learn with a real-life situation.

After the intervention along with the instructed guidelines for women regarding the awareness and healthy self-care practices, a significant positive effect on their habitual practices was evident by study findings. This study recognized the need to raise awareness regarding UTI and motivate women for healthy habitual practices in the prevention of UTI. Counseling, as well as motivational sessions, help to inculcate healthy self-care practices to prevent UTI.

Also, a similar study conducted by Heydari et al recommended and advised the importance of education on the health behaviors of women. The use of this method is useful to change their behaviors in preventing UTI.[5] This study highlighted that there was a lack of women's awareness regarding the concept of self-care practice as well as basic health practices. However, the need to raise awareness regarding UTIs and expand services for prevention and treatment for women as well as health education to learn about self-care practices during UTIs are crucial.

The strength of this study is that the design of the SCAPS for the prevention of UTI among women of the reproductive age group was based on need-based assessment (pre-test) and scientific reviews. The intervention was given at two points, with a gap of 3 months interval.

The study had some limitations. The most obvious limitation was the collection of information using self-report. This study was delimited to a hospital-based study. There was one drop out of the subject in the control group by the end of the second month.

Furthermore, to generalize the result to a wider extent, the efficiency and effectiveness of intervention could be assessed in other settings (clinics, offices, hostels, and colleges, etc.), among women, and the follow-up could be extended for 1 year.

Conclusion

To conclude, although this study is not uncommon, it yielded enough and very useful information to initiate and develop health intervention measures for the prevention and control of UTI and also showed a positive impact of structured counseling and preventive strategies (SCAPS) on the awareness and expressed habitual practices in women of reproductive age group.

Therefore, due to the high incidence of UTI in women and the positive impact of such interventions, the need to hold SCAPS in meetings, such as women's self-help group, Sthree Shakthi, and other social gathering places of women is emphasized to change their health behaviors. SCAPS proved to be the need of the hour among the women. Appropriate problem-solving skills will empower women to take corrective and preventive steps toward UTI prevention. SCAPS would also act as a barrier to prevent the recurrence of UTI.

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