

Investigation of Health Education Based on Theory of Planned Behavior on Behavioral Promotion of Urinary Infection Prevention in Pregnant Women

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Abstract: Urinary infection is one of the most frequent difficulties in women and pregnant women are more susceptible to it and according to the potential effects on mothers and the fetus, it is considered very important. The aim of this study was to determine the effect of health education based on theory of planned behavior (TPB) on behavioral promotion of urinary infection prevention in pregnant women. This is a quasi-experimental study which has been conducted before and after and in this research 100 pregnant women who approached to the health and treatment centers in Karaj in Iran were chosen as simple sampling. Pregnant women were divided randomly into case and control groups (each of 50 women). Data collected with questionnaire designed according to TPB, knowledge and behavior. Then educational contents in this regard were designed, prepared and executed. 3 months after intervention, the data collected and were analyzed with the use of SPSS 18 software. Finding showed that the average age of case and control groups were 25.9 ± 5.7 and 27.25 ± 4.8 years respectively ($p=0.687$). After intervention finding showed that mean knowledge about urinary tract infection in case and control group was 75.24 ± 8.72 and 41.72 ± 7.65 respectively ($p=0.013$). The mean scores of knowledge and TPB Model variables were significantly increased in the case group compared to the controls after intervention ($p<0.05$). Moreover in this study, between perceived attitude and performance ($r=0.7$, $p=0.001$), knowledge and performance ($r=0.61$, $p=0.001$), positive correlation was observed. Based on results health education program designed according to TPB for advancement in prevention behaviors from urinary infection has been effective. Therefore this model can be used as a framework for designing and execution of educational intervention for prevention of urinary infection. Besides such as programs, follow up education for controlling and monitoring are highly recommended.

Key words: Health Education • Theory of Planned Behavior • Pregnant Women • Urinary Tract Infection

INTRODUCTION

One of the organs of the body which is invaded in different ways by infectious factors is the urinary system. Urinary Tract Infection (UTI) syndrome can be considered like other syndromes in which numerous factors are involved [1]. Prevalence of urinary tract infection in women is considered an important indicator of population health [2]. Also, the urinary tract infection is the second common side effect of pregnancy after anemia and if not

controlled properly, it can have a major impact on pregnancy [3]. Specially, women suffer from recurrent urinary tract infection so that according to some studies 30-20 percent of women suffer from urinary infections two times or more and 5 percent of them suffer from chronic urinary tract infections [4].

Most urinary tract infections in pregnant women begin by bacteria in the urine, having no clear signs before pregnancy [3]. Its rate is 2-7 percent during pregnancy and has a significant relationship with the

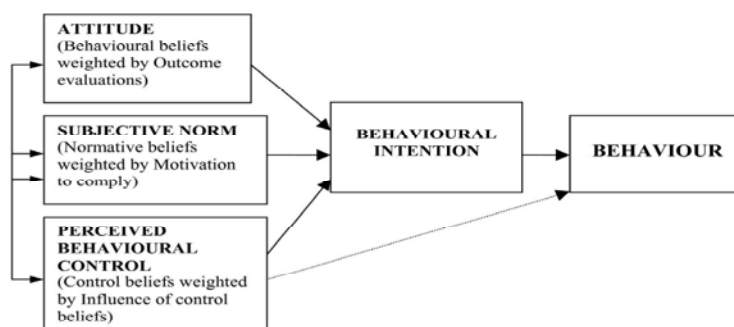


Fig. 1: Theory of Planned Behavior (TPB) (Source of Ajzen 1991)

subject's economic status, race and parity. The percentage of transmittance of tuberculosis cycle in the pregnant woman is doubled and tripled in the diabetics [5]. Also it was observed that the prevalence of urinary tract infection in women with more than three deliveries has increased [6]. Urinary tract infection has been seen with preterm delivery and low birth weight infants. Financial costs required to care for children with low birth weight is one of the unpleasant aspects of prematurity [7]. Studies have shown that premature children and those who are born with the low weight have lower IQ scores and more neurological abnormalities [3]. If the bacteria in the urine of asymptomatic pregnant women in not treated, one third of these women will suffer from acute pyelonephritis which is the most common cause of hospitalizing the women before the delivery [3]. Even if the pregnant women with pyelonephritis are treated immediately, a considerable number of them would have an underweight newborn, high rate of fetal death, anemia, preeclampsia and premature rupture of fetal membranes, risk of respiratory failure and sepsis and shock. In addition, children of the mothers with pyelonephritis disorder would suffer from mental and motor disorders [6].

The value of educational health programs depends on their effectiveness which in turn depends on benefiting properly from theories and models in health education. In other words, if proper theoretical supports accompany essential health needs, the educational health programs are more effective [8 - 10]. The first step for each educational program process is to select a model to train about health [11]. In this regard there are various programming models that can be used by those involved in the health field. The parameters necessary to identify health issue require much epidemiologic, demographic, behavioral science and social information along with awareness about the needs and priorities. Different theories can be useful in defining the focus point in such cases [12]. One of these models is theory of planned

behavior the which is a valuable tool in the field of educational evaluation (Figure1). The model is one of the oldest ones derived from behavioral science theories to solve health problems [13, 14]. The most important goal of health education is to change health behavior of people through their participation [15].

The TPB is a model of rational decision-making which proposes that behavior is determined by a number of potentially changeable cognitions. It is therefore a suitable model for helping researchers to identify targets for health interventions [16]. The model proposes that intention is the proximal determinant of behavior. Intentions are indications of how much a person wants to perform a behavior and how hard they are willing to try in order to perform it [17]. Intentions are, in turn, determined by three constructs; attitude, subjective norm and perceived behavioral control. Attitude is an overall positive or negative evaluation about performing the behavior and comprises both an affective (enjoyable vs. unenjoyable) and an instrumental (harmful vs. beneficial) component [18]. Subjective norm also comprises two related components: descriptive norm refers to an individual's perception about how often important social referents (e.g., friends) will perform the behavior; injunctive norm refers to how much an individual thinks that important social referents would want him or her to perform the behavior [19]. Finally, perceived behavioral control reflects a person's perceived ability to perform a behavior. In addition to being an independent predictor of intention it is held to predict behavior directly, along with intention, so long as it reflects the actual control an individual has over their behavior [17, 20]. Perceived behavioral control therefore helps predict behaviors that are not under complete volitional control [17]. This makes the TPB a potentially suitable model for understanding pregnant women behavior, since this behavior is not only likely to be influenced by motivation (e.g., attitudes and normative pressure) but also external constraints (e.g., partner contro) [21].

The purpose of this study is to determine the status of The Effect Of health Education Based On Theory of planned behavior on Behavioral Promotion Of Urinary Infection Prevention In Pregnant Women constructs hoping that the findings would be used in planning health promotion of the pregnant women.

MATERIALS AND MEHTHODS

This is a quasi experimental study which has been conducted before and after and in this research 100 pregnant women who approached to the health and treatment centers in Karaj (a city in Iran) were chosen as simple sampling. Pregnant women were divided randomly into case and control groups. The tool for collection of data was a questionnaire designed according to theory of planned behavior, knowledge and behavior which its validity and reliability was obtained before the study began. All the pregnant women who had referred to the centers for prenatal care and were satisfied with the study became the subjects of the program and the pregnant women referred for emergency medical services were excluded from the study and People with urinary tract infections, chronic diseases such as diabetes, anemia and sickle, immune suppressant drugs and recent antibiotic use were excluded and the data were analyzed.

Data collection tool was questionnaire based on the theory of planned behavior constructs. The questionnaire consisted of three parts. The first part included intermediate factors that of demographic information and knowledge rate in the field of urinary tract infections and the second part included a practice guide construct with 2 questions. The third part contained 17 attitudinal questions and the fourth part included 18 questions about perceived behavioral control (clothing, nutritional habits, urinary habits, cleanness observance, habits related to sexual behavior). In the knowledge part, each correct response has one score and each wrong one has zero score and in the practice guide part 'Yes' has 1 score and 'No' has zero score. The questions about attitudes were based on likert triplet scale (agree, disagree, no opinion). Due to the type of the subject and to enable the pregnant women to judge more quickly and easily to answer these questions, the scale was used in other studies, too. In this section, the 2, 1 and zero scores were considered for 'agree', 'no opinion' and 'disagree' answers, respectively. perceived behavioral control questions were based on a quaternary behavioral control scale (always, sometimes, rarely, never) with the scores of 3, 2, 1 and zero for 'always', 'sometimes', 'rarely' and 'never', respectively.

The content validity of the questionnaire was determined by a panel of reviewers consisting of college professors in health education and promotion, infection specialist and epidemiologist. Prior to conducting the main project, a pilot study was conducted to assess the content validity of the study questionnaires as well as reliability. The pilot study was conducted to obtain feedback about the clarity, length, comprehensiveness and the required time for completion of the questionnaires as well as for data collection in order to estimate the internal consistency of the measures.

To determine the internal consistency of the instrument items a Chronbach's Alpha formula was applied to measure the reliability of the questionnaire. The results reveal the reliability rates, which are in an acceptable level ($\alpha=0.7$).

The women completed the questionnaires on two separate occasions (pre intervention and three month after intervention) to evaluate the effectiveness of the educational interventional program. Data was analyzed (pre-test) then an educational program planed based on the results and Health Belief Model elements.

Urine Collection and Analysis: Laboratory for routine examination, urin analysis and culture of urine. Mid-stream urine were collected on the same day of enrolment using sterile container (HIMedia laboratories Pvt. Limited, Mumbai, India). Most of the specimens were analyzed within an hour of collection. Urinalysis using urine dipstick (Mannheim GmbH, Germany) was done following manufacturer's instructions.

3 month after intervention, the pregnant women of different trimester who came for antenatal checkup were sent to the pathology and microbiology Departman of kamalshahr central.

Urine analysis demonstrated white blood cell (pus cell) too numerous to count with presence of red blood cells. Blood agar, neutrient agar and Mac Con-Key's agar media were used for culture of urine. The presence of neutrophils and $> 10^5$ organisms per milliter in mid stream sample of urine taken as a case of UTI. The organisms were identified by their growth character, colony morphology, gram staining, motility test and other biochemical characteristic.

Intervention: During a one month period, women in case group received educational intervention sessions based on the HBM conceptual framework process (Figure 1). According to this model, the health education planning included goals and objectives based on individual perceptions (perceived susceptibility and severity),

Modifying factors (perceived threat and cues to action) and Likelihood of action (perceived benefits, barriers and taking health action) that influenced preventive behavior among the women. The educational methods used included lectures, demonstration, focus group, discussion, role playing activities. Educational material such as film of health behavior about prevention of UTI education, picture and slid show, pamphlet and booklet designed by the investigators. The teaching materials (a poster, a booklet and a pamphlet) were based on the pre-test data analysis of the women.

In order to create a teachable moment and a "perceived threat", a women volunteer with UTI an experienced pain as a result of the disease, participated in the group discussion. She described experienced in people to urinary tract infection.

Women in the traditional education group, received the traditional, mostly didactic health education curriculum on UTI routinely offered to women in this region. Researchers were present at these educational sessions to document the use of the routine pedagogical methods. Three months after educational program administration, in all groups (case and control) data gathered and analyzed again. This interval time enough for asses a urinary tract infection behavior in women.

The study was conducted after human subject approval was obtained. Participants were assured that their responses would be kept confidential all questionnaire administrators and women were blinded to the conditions of this study. Control women received UTI preventive education, physician recommendations at the end of research.

Statistical: The Statistical Package for the Social Sciences (SPSS20) was used to analyze the data. Data were analyzed using chi-square, t-test and paired t-test. A value of $P < 0.05$ was considered to indicate statistical significance.

Ethical Considerations: This study was approved by Arak University of Medical Sciences. Ethics Review Board. An informed consent was obtained before collection of urine specimens and results were used in the prevent of UTI in pregnant women's.

RESULTS

A total of 100 pregnant women were recruited in this study. The average age of case and control groups were 25.9 ± 5.7 and 27.25 ± 4.8 years respectively and don't

significant difference ($p = .687$). The mean gestation age was 26 ± 5.8 week and 50% of the women was primipara. More than 90% of the pregnant women were housekeepers. The situation of case and control groups had been equal in their demographic characterization (ex. age, level of education, status of job and so on). Other demographic variable showed in Table 1.

Table 2 compares the 2 groups' mean scores in knowledge and TPB domains before and three month after the intervention. Before intervention finding showed that mean knowledge about urinary tract infection in case and control group was 42.41 ± 16 and 41.51 ± 17.1 respectively.

The mean scores of knowledge and TPB Model variables were significantly increased in the case group compared to the controls after intervention. (Table 2).

The results showed no significant differences between the mean grades score of variables (knowledge, attitude, individual perception about element of theory planed behavior model, health behavior about urinary tract infection) in the case and control groups before intervention, (Table 2); the t-test however showed, a significant difference between all variables mentioned, in the case and control groups after intervention ($p < 0.05$); there was significant difference between mean grades score of all of variables in case group, before and after intervention. The mean scores of the case group women improved significantly on post-test across all domains, compared with pretest scores. For the control group, no significant changes were found between testing times.

Before intervention the mean of practice about urinary tract infection were moderate range in two groups. Three month after intervention a correlation observed between the performance of health behavior about prevention of urinary tract infection in case group ($P = 0.05$).

This study showed that 91% of the studied pregnant women had been guided to prevent urinary tract infections by the healthy cares.

After of intervention among 100 pregnant women, 14% were found to have significant bacteriuria and urine culture most of the organisms identified were *Escherichia coli* about 78.5% of infection (Table 3).

In this study there was no association between maternal age, parity, gestational age, occupation, marital status and education with bacteriuria. They have a good knowledge score was 6.1%. Between knowledge and the incidence of infection was significant difference observed ($p < 0.05$).

Table 1: Absolute and relative frequency distribution of the participant in case and control group

		Groups			
		Case group		Control group	
		No	Percent	No	Percent
Demographic characteristics					
Age of mother (Mean ±SD)		25.9± 5.7		27.2±5.48	
P				0.687	
Number of Parity(Mean ±SD)		0.69±0.079		0.60±0.068	
P				0.082	
Number of children(Mean ±SD)		0.67±0.071		0.68±0.06	
P				0.141	
Maternal age	<25	32	64	27	54
	25-35	14	28	19	38
	>35	4	8	4	8
P				0.560	
Level of education	under diploma	25	50	18	36
	diploma	24	48	23	46
	University education	1	2	9	18
P				0.233	
Status of job	Yes	2	3.6	1	1.8
	No	53	96.4	54	98.2
P				0.315	
Income monthly	Low	25	45.5	22	40
	Medium	27	49.1	29	52.7
	High	3	5.5	4	7.3
P				0.816	
Location of habitant	City	54	98.2	55	100
	Rural	1	1.8	0	0
P				0.237	

Table 2: Comparison of means scorers of the women knowledge, construct of TPB, practice for prevention of UTI before and 3 month after intervention

Variables	Groups	Before intervention		After intervention		T-Paired
		Mean	SD	Mean	SD	
Knowledge	Case	42.41	8.57	75.24	8.72	0.013
	Control	41.51	8.36	41.72	7.65	0.472
T-test		P=.472		P=.001		
Attitude	Case	73.12	12.9	86.25	7.07	0.001
	Control	74.07	9.9	74.21	9.48	0.479
T-test		P=.479		P=.001		
Behavior intention	Case	79.14	11.4	96.00	9.3	0.001
	Control	84.45	9.6	84.05	10.53	0.500
T-test		P=.500		P=.001		
Perceived behavioral control	Case	82.86	9.9	90.95	14.72	0.001
	Control	81.40	11.51	81.33	10.84	0.783
T-test		P=.783		P=.001		
Practice	Case	66.54	17.56	83.63	12.35	0.001
	Control	68.63	14.5	69.09	13.52	0.058
T-test		P=.058		P=.001		

Table 3: Frequency result of culture and type of bacteria in women with pregnancy

		Groups		
		Case (N)	Control(N)	Total
Results culture	Negative culture	47	39	86
	Positive culture	3	11	14
Type of bacteria (In positive culture)	E. coli	3	8	11
	Estafilococcus aureus	0	1	1
	Enterococcus	0	1	1
	Proteus	0	1	1

In this study, between perceived attitude and performance ($r=0.7$, $p=0.001$), knowledge and performance ($r=0.61$, $p=0.001$), positive correlation was observed. Moreover perceived behavior control to most, predictor of UTI in women based on theory planned behavior.

DISCUSSION

Applying the TPB model is very effective for developing an educational program for UTI prevention in women. Besides such programs, follow up education on controlling and monitoring is highly recommended.

Urinary tract infection are the commonest infections seen in hospital setting and the second commonest infections seen in general population [22]. UTI is a serious problem for women and up to a third of all women experience UTI at some point in their life [23]. If left untreated it may lead to pyelonephritis, preterm labor or group B streptococcal infection in the newborn [23].

In the present study, pregnancy related changes in the urinary system as well as urinary infections were the causative factors for the occurrence of lower urinary tract.

Urinary tract infection in pregnancy is a common clinical problem in rural areas. This study provided some important features of the pregnant women, especially of their socioeconomic condition and nutritional status. Different studies showed that early and intensive sex, ignorance of sex hygiene, repeated pregnancies and deliveries, abortions, bacterial vaginosis and anogenital infections are associated with urinary tract infections [22-24]. One study showed that 11.8% bacteriuric women develop symptoms of UTI during pregnancy, whereas only 3.2% of women white sterile urine an initial screening did so and suggested that the 16th week is the optimal time for a single screen of bacteriuria [25].

The overall prevalence of bacteriuria among pregnant women in this study was 14%. This is similar to the prevalence of UTI (16.4%) among pregnant women in northern Tanzania [26].

Different factors have been documented to contribute to UTI among pregnant women. These include age, parity, gestation age, level of education [27-30].

In this study there was no significant association between these factors and bacteriuria. Similar findings have been reported elsewhere [30-31]. *E. coli* strains were the most common isolate. Similar findings have been reported in northern Tanzania [32] and elsewhere [27-33].

Esch. coli comprised 55.5% of uropathogens isolated by Gupta *et al* in a large study of 1410 patients of UTI [34].

The prevalence of *Staphylococcus aureus* was also high (7.14%) in this study. This agrees with previous studies [35, 36] which observed an increasing trend in the prevalence of *Staphylococcus aureus* infection among asymptomatic pregnant women. The other organisms isolated included *Enterococcus* species, *Proteus* species. They are less common organisms causing UTI [37].

The results of the study showed that prior to the intervention, most elements of TPB were moderate in the two groups. After the intervention, women in case group showed significant improvement for behavior assessed, while women in control group showed no improvement. This supports our hypothesis that a health education program based on the TPB combined with non-traditional methods for teaching, can be effective in promoting the adoption of behaviors by women to prevent UTI problem.

Attitude of participants increased in the case group, suggesting that education may have influenced women behavior. In this study revealed that increasing the attitude in subject, helps to prevent and control their UTI problem.

Finally knowledge and attitude to UTI are considered to be motivating factors for behavior change. In this study there was no significant difference between the mean grade scores of attitude in the case and control groups, before intervention, results which show that there is average attitude among women about complication of UTI in all groups.

This study showed that 91percent of the studied pregnant women had been guided to prevent urinary tract infections by the healthy cares. Therefore, the theory of planned behavior is recommended to be used to design training programs in regular health education, specially increasing knowledge and changing the opinions by the healthy care to guide more pregnant women in order to prevent urinary tract infections but in other study on the knowledge and performance of pregnant women in relation to exercise during pregnancy, they suggested the women to benefit from the mass media to increase their awareness and improve their exercise performance during pregnancy [33, 34].

In the study indicated that in most areas of attitude, difference was observed between the two groups, which could indicate the influence of techniques employed including: films, group discussion, brain storming and printed materials and their impact on attitude change [38].

According to results obtained, in comparison between the case and the control groups in the entire case group, a more desirable attitude toward UTI was maintained until after intervention. In the present study,

the attitudes of participants in the case group did not change, but in the control group it was considerably reduced. There have been some studies reporting the effect of education on attitude [39, 40]. The present investigation is somewhat similar to both studies, as it managed to stabilize attitudes while showing a difference between the two groups.

Although the difference in attitudes between case and control groups was seen at the end of intervention, the general attitude in the case group was moderate to favorable. It is important to pay attention to this point in employing change of attitude methods. When people lack attitude and somehow they cannot use their accessible attitude from memory, it is more likely for them to be influenced by other subjects that may not be a true reflection of their own attitudes.

The results of this study identified several basic educational needs of participants which increase their knowledge and motivate change in their practices for prevention of UTI.

Findings indicate application of theory planned behavior model in education of women is appropriate. Modification the perceptions in this model caused prevention of behavior for urinary tract infection. In addition, the corrected health behavior are affected by individual perceptions. The powerful factor in this model for the two behaviors, is perceived behavior control and attitude. Findings have shown workers in the field of health, should try for changing these perceptions more because increasing such perceptions can be effective in behaviors, which prevent UTI.

CONCLUSION

Overall the results of this study showed that, the mean grade scores of, knowledge, constructs of TPB of participants were average and practice to prevention of UTI was low. Furthermore, the findings of this study showed that, with increasing the mean grades scores of knowledge and constructs of TPB of women, resulted in better practice for prevention of UTI by women themselves. Hence our results and results of many other studies carried out on TPB, reveal that TPB constructs may initiate the changes and improve the behavior of subject. Our results and other studies revealed that TPB has the potential for establishing educational programs for individuals and communities. It is recommended that the application of this model may be effectively used to prevent different diseases and complications including UTI problem.

Applying the TPB Model proved is very effective in developing an educational program for women, to take health behavior about UTI. Besides such programs, follow up education monitoring are highly recommended.

This study indicated that health education program designed for advancement in prevention behaviors from urinary infection has been effective.

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