

## Predictors of Preventive Behaviors of Urinary Tract Infections Based on Health Belief Model among Pregnant Women in Zahedan

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### ABSTRACT

**Objectives:** Urinary Tract Infection (UTI) is one of the most common infections in women and the second most common complication after anemia during pregnancy that causes many complications in mothers as well as fetuses and since health behaviors have crucial role in development of UTI. This study was performed to determine predictors of preventive behaviors of the UTI in pregnant women in Zahedan based on health belief model (HBM) framework.

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**Methods:** This was descriptive study conducted by a questionnaire based on HBM construct among 140 pregnant women in Zahedan in 2013. The data were analyzed using SPSS16.0 software and statistical test as Pearson correlation test, regression

**Results:** finding showed that there was a low significant positive correlation between awareness, HBM constructs and UTI preventive behaviors. ( $p < 0.05$ ). Also self-efficacy had the greatest impact on the behavior which was statistically significant ( $\beta = 0.547$ ).

**Conclusion:** According to the results, the design of an educational program based on HBM, with an emphasis on the self-efficacy, can be effective in promoting preventive behaviors of UTI.

**Keywords:** pregnancy, Urinary Tract Infection (UTI), Health Belief Model (HBM)

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## Introduction

Urinary tract infection (UTI) is one of the most common infections around the world and considered as one of the major concerns in public health area [1]. UTI is the second

most common infection after respiratory infections [2] and almost 40-50% of women are infected with asymptomatic UTI at least once in a lifetime [3]. Because of the anatomical and physiological changes during pregnancy, pregnant women are more

susceptible to the UTI and UTI impose potential complications on the mother as well as the fetus. If asymptomatic bacteriuria is left untreated in pregnant women, maybe one-third of them will be diagnosed with acute pyelonephritis which is the most common cause of hospitalization for women before delivery [4]. Not only the UTI imposes heavy costs on health care system, but also it causes multiple complications for the mother and the fetus during pregnancy including low birth-weight babies, intrauterine growth restriction, mental retardation and developmental delay in children, increased risk of infant mortality rate, embryonic B Streptococcus infection, maternal anemia, high blood pressure caused by pregnancy, pyelonephritis, sepsis and mother's shock [5-8]. Some individual behaviors such as frequent sexual activity, inappropriate of the type and kind of underwear, inadequate intake of sour liquids and yogurt, lack of adequate washing the spouse's genital area before intercourse, are the predisposing factors of the UTI [2] which reflect the importance of observing sexual behaviors and individual habits preventive to the occurrence of urinary infection [8]. Given the high prevalence of UTI and its complications on mothers and fetuses, the need to reflect and address this problem through appropriate behavior change model such as HBM, TPB, and TTM. Several behavior change models are used in health education to study health behaviors. The HBM, which is the individual model of behavior study focused on secondary prevention of disease, can be pointed out as one of these models. In this model, the theory of behavioral science is used for health-related problems [9]. The HBM includes constructs such as susceptibility (an individual's belief that

may be impaired or get a disease), perceived severity (an individual's belief about the extent of damage as a result of disease), perceived benefits (an individual's belief about the usefulness of the recommended behavior to reduce complications), perceived barriers (an individual's belief about the barriers to the acquisition of recommended behaviors) and cue to action (the accelerating forces that make someone feel the need to do an action. In 1988, the model was expanded and self-efficacy (confidence in its ability to track a person's behavior) was added to it [10]. When a person has a good understanding of his/her susceptibility to get the UTI, is familiar with the complications and consequences of the disease, sees more benefits to do preventive actions and has fewer obstacles on the way of conducting this behavior, s/he is more willing to have this behavior [11]. Studies have shown the HBM has been used by various area and issues in order to design and evaluate behavior change interventions [12]. HBM is a comprehensive model that plays a role in disease prevention. This model is a model individual behavior and the detailed behavior patterns and beliefs about health is an important indicator of behavior. The HBM is used in various fields, such as promoting the use of condoms among women more sexually active, cervical cancer, screening mammography and breast self-examination. The drawbacks of this model are that the influence of subjective norms and peer effects on health behavior decisions not to intervene [13, 14].

This study aimed to determine the predictors of behavior. Prevention of UTI in pregnant women in Zahedan in 2013 was based on HBM.

## Material and Methods

This study was a descriptive study that was conducted on pregnant women in 2013 in zahedan city.

The population of this study were pregnant women in zahedan city. The sample size was calculated 140 women using the formula sample mean. "Use the following formula"

$$n = \frac{\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)^2 2s^2}{d^2}$$

From the list of health centers in Zahedan, 4 center were selected (2 central regional center, 2 center margin). In each center all pregnant women (chosen sequence) given the inclusion criteria (being pregnant and personal fulfillment) were enrolled and in the absence of consent are excluded.

A questionnaire designed based on the HBM was used to collect data by interview method. This questionnaire was based on the construct of the HBM and consisted of six parts.

The first part consisted of demographic data such as age, education level, employment status and the number of deliveries and the second part contained questions including awareness (8 items), for each correct answer score of 2, incorrect answer score of 0 and "I do not know" answer score of 1 were considered (the minimum score of 0 and the maximum score of 62). The next part contained 3 questions about the data source that each person got score 1 for "Yes" option and score zero for "No" option.

Part three of the questions was about construct of the HBM. Perceived susceptibility was measured with 5 items as the range of response was from 0 to 10.

Perceived severity was measured by 4 items. (a minimum score of 0 and a maximum score of 8). Perceived barriers had 4 questions (a minimum score of 0 and a maximum score of 8), perceived benefits had 5 questions (a minimum score of 0 and a maximum score of 10). The questions were considered based on the 3-item Likert scale ranking ("agree" with the score of 2, and "disagree" with the score 0 and "no idea" with the score of 1). The next section contains 19 questions of efficacy, with a minimum of 0 and a maximum of 57 points. Another part consisted of 23 behavior questions with a minimum score of 0 and the maximum score of 69. It should be noted that the 4-step Likert scale ranking with the options of always (3 points), sometimes (2 points), rarely (1 point) and never (0 points) was used for self-efficacy and behavior questions and in the part related to "awareness and behavior", the distance between the highest and lowest scores was classified into the 3 categories of poor (the first one third), medium (the second one third), and good (the final on third).

Source questionnaire design, similar research was done by Breedtrue and Sanctified in the Behbahan, and changes were made. To assess the validity of the experts about the content coordinate measurement too land aims of the study were used. For this purpose, both quantitative and qualitative methods were used. The qualitative content of the experts were asked to cease the qualitative evaluation tool, provide feedback and make necessary corrections were made. To search for as little validity, content validity of the relative factor Content Validity Ratio (CVR) and content validity index Content Validity Index (CVI), was used. To determine the CVR experts were

asked to each item based on the whole three-part "essential", "useful but not necessary" and "unnecessary" review. Items that more than 62 percent of content validity was accepted for the content validity index score above 79% were approved. To confirm the validity of the questionnaire, the experts panel (10 professors of health and women education) were used. The total validity of the questionnaire was 0.81 and its reliabilities with the calculation of Cronbach's alpha coefficient for Awareness, perceived susceptibility, perceived severity, perceived barriers, perceived benefits, behavior and self-efficacy questions were 0.70, 0.71, 0.72, 0.73, 0.66, 0.68, and 0.67, respectively. Ask questions in the areas of self-treatment (dietary habits, urinary habits, sexual habits, how to dress, and hygiene) with 4 Likert, was measured to be able to better assess treatment efficacy. The reason for using a Likert 4 option, choose the easier option for respondents. Before starting to collect information, a questionnaire was

used to test the pregnant woman and the resolutions of questions of them were polled. The data collection process lasted 2 months. Completing the questionnaire took an average of 7 minutes and interviews were held separately at each center training room. Before the samples were assured of their confidentiality and informed consent form was completed by the subjects.

The data were analyzed using SPSS version 16.0 software, to determine the relationship between the components of the Pearson correlation test and ANOVA were used to assess the significance of various variables.

## Results

Mean age of the participants was  $22.55 \pm 4.00$  years old. 64.3% had less than 9 years of education, 85.7% were house wives, mean number of births was  $1.12 \pm 0.97$  and 62.9 percent of samples had history of the UTI.

**Table 1.** Constructs of HBM among the samples –who participated in current study.

Variables	Roof score	Mean and SD
Awareness	62	22.89±4.12
Perceived susceptibility	10	5.38±2.26
Perceived severity	8	4.26±1.15
Perceived benefits	10	5.33±1.63
Perceived barriers	8	5.03±1.43
Self-efficacy	57	25.64±4.59
UTI related preventive behavior	69	30.98±5.61

Table 2 shows that in the studied population, mean score of each variable is compared

with the least favorable score for that variable which is the mean score using

means comparison test with a fixed number .The mean scores of perceived susceptibility, perceived severity, perceived benefits and perceived barriers were above the mean and the mean scores of awareness, self-efficacy and practice were lower than the average that provides the need for an educational intervention in the target group and there was a meaningful significance in all cases ( $P < 0.0001$ ). (This table will help to better understand the contents). Survey of the subjects the study showed that the greatest sources of information (guide to practice) were related to the wife (66.2) and internal stimuli, such as the history of the UTI (50.7).

**Table 2.** Model summary of regression.

Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error
1	0.547	0.299	0.288	6.482

**Predictors: self- efficacy**

Summary output of table 2 shows the regression model, the only remaining variable in the model, efficacy variable is the amount of this account is based on the adjustment factor equal to 0.288.

**Table 3.** The power of predictive efficacy variables in behavior.

model	unstandardized coefficients		Standard coefficients		
	$\beta$	Std. Error	$\beta$	t	sig
Self-efficacy	0.486	0.093	0.547	5.225	0.000

Table 3 showed the effect of each variable indicates that efficacy had the greatest impact on behavior, so that for everyone unit

increase inefficacy variable of 0.547unit increase in the variable will be created.

**Table4.** The correlation test Variables stud

Model	Beta in	t	sig	Partial correlation
Awareness	0.192	1.710	0.092	0.211
Perceived susceptibility	0.216	1.859	0.068	0.228
Perceived severity	0.227	1.836	0.071	0.225
Perceived benefits	0.030	0.245	0.807	0.031
Perceived barriers	0.195	1.631	0.108	0.201

Pearson correlation test showed that the changes in the score of behavior were meaningfully correlated with the changes in the score of the structures of susceptibility, intensity, and perceived benefits, perceived barriers, and self-efficacy. We can conclude based on this analysis that behavior had a relationship with structures of susceptibility ( $R = 0.424$  and  $0.001 > p$ ), intensity ( $R = 0.461$  and  $0.001 > p$ ) and perceived barriers ( $R = 0.420$  and  $0.001 > p$ ), perceived benefits ( $R = 0.310$  and  $0.011 > p$ ) and self-efficacy ( $R = 0.547$  and  $0.001 > p$ ). The results showed that the regression model of dependent variable: behavior, and the independent variables (predictors): awareness, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy was significant ( $0.001 > p$ ) and its amount based on adjustment coefficient was equal to 0.288. Investigating the absolute effect of each variable indicated that self-efficacy had the greatest impact on behavior, as per one unit increase in efficacy variable, 0.547 unit increase occurred in the behavior variable (Table 3). Table 4 shows the variables removed from the model. All variables except for the efficacy of prognostic models have been removed.

## Discussion and Conclusion

This study showed that the mean scores of practice, awareness and structures of the models in terms of education and in different age groups had statistically no significant differences. In line with the present study, no significant difference was observed between education status and the UTI in the study of Taghdisi and NejadSadeghi. (15) The awareness of more

than half of the women surveyed (62/7 percent) was evaluated weak and as noted in the findings section, there was a correlation between awareness and model components. This means that directed efforts to raise awareness in people, as an adjusting factor, can increase the scores obtained from the model structures and eventually lead to improvement of behavior. Low scores of awareness have been proven in many studies performed on women. In addition, low awareness scores of housewives compared to the employed women shows the importance of the need of housewives for more training. Similar results were confirmed in the study of Taghdisi and Nejad-Sadeghi on the impact of health education on the promotion of preventive behavior of the UTI among women [15] and also in the study of Moshiri et al. in the field of sexual health awareness for women about to marriage [16].

This study showed that there was a significant correlation between awareness and all the HBM structures with practice. And efficacy had the greatest significant impact on behavior. This means that the model can predict the dependent variable of behavior and in other word sit is capable of explaining almost 28% of the variance of the changes of behavior as the dependent variable of the model.

In the study of Taghdisi and NejadSadeghi [15] and also Nikpour and Javaheri Tehrani [17] both on the effect of education on the improvement of preventive behaviors of the UTI in women, structures of perceived barriers and perceived benefits formed the greatest predictors of behavior, respectively. In the study of Griffin (2011) in the United States in the field of colorectal cancer screening, the results showed that perceived

severity was the most powerful behavior predictive and perceived susceptibility, perceived benefits and efficacy had a poor predictability [18]. Carmal concluded that perceived susceptibility plays the most important role in predicting the behavior by examining 46 studies using the HBM [19]. Rahimi and Seyed Rasoul conducted a study to examine the awareness and practice of pregnant women to exercise during pregnancy based on the HBM and found that perceived benefits had the greatest impact on the prediction of exercise behavior during pregnancy [20].

A study done by Rosario et al. based on the HBM to predict the behavior of women in the breast cancer screening x-ray in Spain in 2007 showed that only structural predictor was perceived barriers. But in the study of Shamsi et al. on determining the behavior of brushing [21], the study of Hassani et al. on the predictors of BSE [22], the study of Swaim with the aim of taking calcium in osteoporosis [23], the study of Goonewardene in predicting cervical cancer testing [24], and the present study, self-efficacy was the most powerful predictor. It seems that, the reasons for higher impact of self-efficacy are self-confidence and awareness of the women about the effectiveness of simple behaviors and actions to control urinary tract infection as they acknowledged in their group discussions on the issue. "Self-efficacy" is a term introduced by Albert Bandura, a prominent Canadian psychologist. The summary of his view is that self-efficacy refers to: beliefs or judgments of an individual about his/her abilities. The more are the beliefs and judgments, the more capable is the person in performing tasks and activities. Beliefs and judgments can actuate one's cognitive and

social skills, mobilize the emotional skills, and operate the human behavior to the achievement of the desires and realization of the objectives. Bandura, like other theorists, does not explain his theory merely in the circle of words and phrases. He uses a model to explain "self-efficacy" in the form of a coherent system. Bandura believes that there are four ways to increase self-efficacy: practical skill, indirect modeling, verbal persuasion, and arousal [25], that according to the theme and purpose each study is following, a particular method should be used to improve the self-efficacy of the target population.

The results of this study showed that education based on health belief model which involves attitudes and beliefs of the participants can be useful and effective in order to promote preventive behaviors of the UTI. The effect of the present training program may be due to the reason that it was attempted to identify the weaknesses and accordingly appropriate educational content and design strategies through the evaluation before the intervention. This study also showed that some training should be done in order to flourish the mother's minds. In this field, doctors, health personnel, and TV programs on health issues were the most important sources of information for mothers. Primary prevention of the UTI can be considered as a good cost-effective solution. It can be concluded that consistent training program based on the needs of the audience at any time is the main weapon for the prevention and since education is a key element of health care, in our country, it is necessary to pay more attention to educational designing and programming based on the models and theories of behavioral and social sciences for different diseases and health issues. The importance

of increased attention to maternal and child health is obvious; therefore, all experts in the medical and health field should put their interventions based on this principle and consider education as the guiding of their efforts. Moreover, achievement of this objective must lead us to seek practical solutions to control and prevent the UTI. In the meantime, increased level of self-efficacy in pregnant women through education is obvious and requires extensive programming and measures at the community level. Thus, according to the results of the study, designing an educational program based on the HBM with an emphasis on self-efficacy structure can improve preventive behaviors of the UTI in the pregnant women. The most important limitation of the study of urinary

tract infections in women, the lack of sufficient studies with different models of education. The researchers suggested that Mr. Cham and thorough evaluation of different educational models in this area to identify the most effective educational model on which the plan is applied.

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