Predictability of constructs of theory of planned behavior in adopting urinary tract infection prevention behaviors among pregnant women

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Abstract:

BACKGROUND: Urinary tract infection is a common infection in women during pregnancy, leading to many complications for both mother and fetus if untreated. The present study aimed to investigate the predictability of constructs of the theory of planned behavior (TPB) in adopting urinary tract infection prevention behaviors in pregnant women.

MATERIALS AND METHODS: In the present cross-sectional study, we selected 100 pregnant women who visited the comprehensive health service centers of Zarrinshahr using convenience sampling from July to September 2019. We collected data by a questionnaire designed based on the constructs of the TPB and analyzed data using SPSS 20 and linear regression test and Pearson correlation coefficient. A significant level was considered as $\alpha < 0.05$.

RESULTS: In the study, the Pearson correlation coefficient showed direct relationships between the score of behavior and the scores of knowledge ($P = 0.005$), attitude ($P = 0.02$), perceived behavioral control ($P < 0.001$), and behavioral intention ($P = 0.001$). Linear regression analysis indicated that among the above variables, the perceived behavioral control, knowledge, and behavioral intention were significant predictors of scores of urinary tract infection prevention behaviors, respectively, in terms of their importance.

CONCLUSION: In this study, perceived behavioral control is detected as the main predictor of doing urinary tract infection prevention behaviors in pregnant women and should be considered in designing educational interventions.

Keywords:

Behavior, pregnancy, primary prevention, urinary tract infections

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Introduction

Urinary tract infection is a common gynecological disease as a serious health problem in the world in the 21st century and is caused by the presence and proliferation of microorganisms in the urinary tract.[1,2] Urinary tract infections affect 150 million people worldwide every year,[1-4] and one-third of all women experience urinary tract infections in their lifetime.[5] The disease is more common in pregnant women due to mechanical and hormonal changes of the pregnancy period than nonpregnant women.[6-8] After anemia, urinary tract infection is the second most common problem among pregnant women.[9] *Escherichia coli* is the cause of 80%–90% of urinary tract infections.[10-12] Urinary tract infection occurs asymptomatic and symptomatic as bacteriuria in pregnancy. Asymptomatic bacteriuria is the most common infection during pregnancy.[13]

The prevalence of asymptomatic urinary tract infections is reported to be 2%–15%[14,15]

in pregnant women compared to symptomatic urinary tract infections 6%–11%[16] in Iran.

UTI has various side effects on mother and fetus, such as pyelonephritis, preeclampsia, anemia, septic and endometritis shocks, premature delivery, and subsequently, fetal death, respiratory failure, low birth weight, mental retardation, intrauterine growth restriction, and lower IQ.[16-19]

Some health behaviors, such as not having frequent sexual activity, wearing appropriate underwear, and not delaying urination, are behaviors that can prevent urinary tract infections. Despite the importance of these issues, many women do not have enough information about them, and studies indicate that women have low knowledge about the urinary tract infection prevention behavior.[16,20,21] In addition to knowledge, the individuals' attitudes and way of thinking are also important factors in the possibility of urinary tract infections. For example, the individuals' perceptions that I may also have the urinary tract infection and the belief that urinary tract infections can be prevented by taking preventive behaviors can help prevent urinary tract infections.[13,22]

Subjective norms are other issues that can play important roles in urinary tract infections, reflecting the individuals' perception of whether or not others approve the behaviors. Therefore, if mothers feel that the urinary tract infection prevention behavior is approved and supported by family members, friends, health-care staff, and other important people, they will show a greater desire to exhibit the behaviors that prevent urinary tract infections.[13]

The present study emphasized the role of family, especially the husband, in maintaining sexual health (as informal subjective norms) to prevent urinary tract infections in pregnancy.[13,23,24]

Other studies have considered the effective and useful roles of abstract norms, physician, midwife (as formal norms), and family (as informal norms) in preventing urinary tract infections.[22,23]

The individuals' ability to perform certain behaviors, such as sexual behavior habits and personal hygiene, which play important roles in the development of urinary tract infections during pregnancy, is another factor that can affect the urinary tract infections during pregnancy. This sense of ability is considered as a perceived behavioral control.[10,25]

The theory of planned behavior (TPB) is an important theory of behavioral change as the main framework

of the present research. This theory is applicable to predict and understand behaviors. According to this theory, behavioral intention is the most important determinant of behavior, and other main constructs of this theory (attitude, subjective norms, and perceived behavioral control) affect this theory in special ways.[26]

Given that influential factors such as the individuals' attitudes, presence of others, and the sense of control over the behaviors for preventing urinary tract infections are the main issues in adopting behaviors for preventing urinary tract infections, and they are constructs of the TPB and have different effects, the present study was designed and conducted with an aim to investigate the predictability of constructs of the TPB in adopting urinary tract infection prevention behaviors in pregnant women [Figure 1].

Materials and Methods

Study design

The present study was cross sectional, and its subjects consisted of pregnant women who visited the comprehensive health service centers of Zarrinshahr (Isfahan province in Central Iran) in 2019.

Being in the first trimester of pregnancy, not having a urinary tract infection based on a laboratory test, not having chronic diseases such as diabetes, and not taking antibiotics and immunosuppressive drugs are considered as inclusion criteria.

Exclusion criterion was noncompletion of the questionnaire.

Sampling method and calculation of sample size

Zarrinshahr has 5 comprehensive health service centers. We selected samples from these 5 centers according to the pregnant women covered by each center using the convenience sampling method. To this end, we selected 100 pregnant women, who visited the centers to receive prenatal care, and those who were eligible for the study from September to December 2019. We calculated the sample size to be at least 96 according to the following equation:
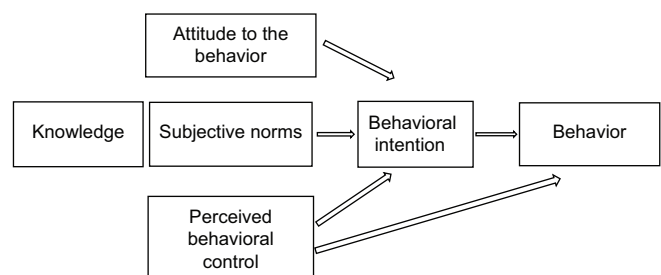

Figure 1: Schematic figure of the theory of planned behavior

$$n = \frac{z^2_{1\_\alpha/2\times} S^2}{d^2}$$

α: Significance level of 0.05; hence, $1\_\alpha/2$ was equal to 1.96.

S: Estimation of the mean standard deviation of each variable (scores of behavior, knowledge, etc.).

d: The maximum error that was considered to be 0.2 s.

$$n = \frac{1/96^2_{\times} S^2}{0/04 S^2} = 96$$

Data collection method

In the study, the data collection method included a questionnaire based on the constructs of TPB. The questionnaire consisted of three parts: the first part included demographic questions, the second part included questions about knowledge, and the third part included questions about constructs of the TPB and included questions about attitude, perceived behavioral control, and behavioral intention and behavior. There were 29 questions about knowledge, designed in yes and no, and multi-choice questions. The correct option received score 1, and the wrong option was given score 0. The knowledge scores ranged from 0 to 29. For example, "Which one of the cases are symptoms of the bladder infection?" About the attitude, 17 questions were designed in the questionnaire on a 5-point Likert scale from strongly agree to strongly disagree, and the scores ranged from 0 to 68. For example, "I may also have a urinary tract infection." The perceived behavioral control contained 18 questions which were scored similar to the attitude, and the scores ranged from 0 to 72. For example, "I never hold urinating, even if the frequent urination is tiresome."

There were 7 questions for assessing the behavioral intention, and they were designed based on a 5-point Likert scale with scores ranging from 0 to 28. For example, "I am going to drink 8 glasses of water per day."

Twenty-two questions were considered to measure the behavior in a yes/no design; the correct answer was scored 1, and the wrong answer was scored 0, and the scores ranged from 0 to 22. For example, "I always wear cotton underwear." Finally, all scores were calculated based on 100 for ease of comparison.

Validity and reliability of data collection tools

The validity and reliability of the questionnaire were proven in a study by Shamsi *et al.*[22] The content validity ratio (0.86) and index (0.83) were used to assess the validity of the study, and the questionnaire validity was confirmed. The internal consistency method was used to determine

the reliability so that Cronbach's alpha coefficients were 0.79 for knowledge, 0.86 for attitude, 0.71 for perceived behavioral control, 0.76 for behavioral intention, and 0.81 for behavior that confirmed the reliability.

Procedure

The researcher first provided the necessary explanations about the research purpose and the confidentiality of information to the women and gave questionnaires to them after obtaining the written consent forms. A member of the research team was with the pregnant women to give them more information in completing the questionnaires if needed. Finally, 100 questionnaires were completed and the relevant information was extracted.

Data analysis

We used SPSS 20 (SPSS Inc., Chicago, Illinois, USA, Ver 20) and descriptive statistical method (mean, standard deviation, frequency, and percentage) and analytical statistical method (linear regression and Pearson correlation coefficient) to analyze data.

Ethical considerations

The present research received a code of ethics (IR.MUI.RESEARCH.REC.1398.294) from the National Ethics Committee in the Iranian Biomedical Research (file:///C:/Users/DRshahnazi1/Downloads/4ed93 mdxvizfn%20 (2).pdf). The questionnaires were designed anonymously, and participants were informed that participation in the study is optional.

Results

We studied 100 individuals in the age range of 17–43 years. Most of the participants had diploma (37%), were homemakers (93%), and were living in rented houses (52%) [Table 1]. The mean scores of constructs of the TPB indicated that the highest score was related to behavioral intention and the lowest score was related to knowledge [Table 2]. Pearson correlation coefficient indicated that there were direct relationships between the score of behavior and the scores of knowledge ($P = 0.005$), attitude ($P = 0.02$), perceived behavioral control ($P < 0.001$), and behavioral intention ($P = 0.001$) [Table 3]. Linear regression analysis indicated that the scores of perceived behavioral control, knowledge, and behavioral intention were, respectively, significant predictors of behavior score in terms of importance, and other variables were not significant predictors of behavior score in the presence of these three variables [Table 4].

Discussion

The present study aimed to investigate the predictability of constructs of the TPB in adopting urinary tract

Table 1: Frequency distribution of demographic variables in the participants

Variable	n (%)
Education level	
Illiterate	1 (1)
Elementary school	6 (6)
Secondary school degree	9 (9)
High school diploma	37 (37)
Associate degree	13 (13)
Bachelor	34 (34)
Job	
Homemaker	93 (93)
Employee	7 (7)
Type of place of residence	
Personal	48 (48)
Rental	52 (52)
Total	100 (100)

Table 2: Mean scores of theory of planned behavior constructs in the participants (out of 100)

Score	Mean	Standard deviation	Minimum	Maximum
Knowledge	50.4	15.4	7	83
Attitude	71.1	11.8	41	100
Perceived behavioral control	76.1	12.4	42	100
Behavioral intention	80.3	14.4	46	100
Behavior	73.4	14.3	36	100

Table 3: Pearson correlation coefficients between the score of behavior and the scores of theory of planned behavior constructs

Score	Score of behavior	
	r	P
Knowledge	0.253	0.005
Attitude	0.203	0.02
Perceived behavioral control	0.412	<0.001
Behavioral intention	0.334	0.001

Table 4: Linear regression analysis for predicting the behavior score based on scores of theory of planned behavior constructs and demographic variables

Variable	Unstandardized coefficients	Standardized coefficients	P
Score of knowledge	0.129	0.139	0.03
Score of attitude	0.034	0.028	0.80
Score of perceived behavioral control	0.332	0.289	0.02
Score of behavioral intention	0.084	0.084	0.04
Age	0.043	0.017	0.88
Number of deliveries	0.157	0.177	0.48
Number of children	0.041	0.002	0.99

infection prevention behaviors in pregnant women. In the study, the knowledge score was low in half of the women, indicating that pregnant mothers needed more education in this field, and since according to the results of the present study, there was a correlation between knowledge and constructs of the TPB, making an effort to increase the knowledge of pregnant mothers through educational booklets and pamphlets could improve the behavior. The research finding was consistent with studies by Gonzalez *et al.*,[27] Haider *et al.*,[8] and Indhumol *et al.*[28] but inconsistent with a study by Heshmati *et al.*[29] In the study, we examined the attitudes of pregnant mothers about urinary tract infection prevention behaviors, indicating a direct relationship between attitudes and behaviors. Therefore, it is possible to use training techniques such as group discussions in the trainings held in comprehensive health service centers to change or strengthen the attitudes of participants. The result was consistent with a study by Ahmed and Khresheh.[20] According to the findings, the perceived behavioral control was the strongest predictor of behavior; hence, the appropriate educational strategies such as role-playing by creating thinking, active participation, and increasing self-confidence could be effective steps toward improving urinary tract infection prevention behaviors. The finding was consistent with a study by Song.[30] Since family support is an important factor in adopting the urinary tract infection prevention behavior such as hygiene, the husbands can be asked to attend one of the training sessions with their wives in training sessions to attract the family support. Since they are important subjective norms for their wives, their support can be attracted properly. Therefore, it seems that the guidance of health personnel through the TPB in training classes will be very valuable and useful to prevent urinary tract infections. The result was consistent with results of studies by Abd El Aziz *et al.*[7] and Nezhad Sadeghi and Solhi.[13] Based on the findings, the behavioral intention was another strong predictor of behavior, so that we can strengthen the intention to perform urinary tract infection prevention behaviors such as proper eating or wearing habits using appropriate educational techniques based on the TPB like a practical demonstration by showcasing nutrients that are effective in preventing urinary tract infections. The result was consistent with a study by Conner and Higgins[31] and Shamsi *et al.*[22]

Study limitations

Since the present study was conducted as a pilot in a city of Iran, the necessary precautions should be taken in generalizing the results to other regions of Iran. Data collection by a self-report method can be also considered as another limitation of the present study.

Conclusion

The results of the present study indicated that there was a significant relationship between knowledge and constructs of the TPB. Therefore, all health-care providers are suggested using appropriate educational

strategies based on the TPB in order to increase the pregnant mothers' knowledge. Given that the perceived behavioral control is known as the strongest predictor of behavior in the study, it is possible to use perceived behavioral control, perceived behavioral control, and self-confidence to perform urinary tract infection prevention behaviors. Therefore, the theory can be an appropriate intervention framework for implementing educational programs to prevent urinary tract infections in women.

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Conflicts of interest
There are no conflicts of interest.

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