Prostate Cancer Screening Behaviors Based on the Health Belief Model in Men Aged 40-70 Years in Fasa City, Fars Province, Iran, in 2019

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Abstract

Background: Prostate cancer (PC) is the fourth most common and the second deadly cancer in the world. Various theories have been proposed to identify the characteristics of individuals and their surrounding environments that somehow affect their behaviors. The health belief model (HBM) is one of the theories that are useful for studying health problems and designing programs to prevent diseases and injuries.

Objectives: The purpose of this study was to determine PC screening behaviors based on HBM in men aged 40-70 years old in Fasa city, Fars province, Iran.

Methods: This was a descriptive, analytical, and cross-sectional study performed on 400 men aged 40-70 years in 2019. The data collection instrument was a standard questionnaire used in Anderson's study, whose validity and reliability have been confirmed. Data were analyzed by SPSS 22 using descriptive (frequency, mean, and standard deviation) and inferential (the Pearson correlation coefficient and linear regression) statistics at the significance level of $p<0.05$.

Results: The mean age of the participants in this study was 54.24 ± 5.46 years. The mean number of children was 2.84 ± 1.84. According to the results, perceived susceptibility, perceived severity, and perceived self-efficacy positively correlated with PC screening behaviors, and there was a significant inverse relationship between perceived barriers and PC screening behaviors.

Conclusion: The use of behavioral models such as HBM can be useful to implement appropriate plans to encourage PC screening behaviors.

Keywords: health belief model, screening, prostate cancer

Introduction

Non-communicable diseases (NCDs) such as cancer, as one of the most common types, are now the most important causes of mortality [1]. Prostate cancer (PC) is the fourth most common and the second deadly cancer in the world [2], and it is the second most frequent malignancy (after lung cancer) in men, especially the elderly (i.e., a positive correlation with age) worldwide [3]. Research shows that 50-year-old men are at a high risk of PC (40%) during their remaining lifetime. The risk of developing clear clinical PC in men over 65 years of age can reach over 75% [4]. In Iran, this disease has the highest mortality rate and has risen steadily over the past 10 years [5]. In this regard, the number of deaths from PC in the country was shown to be 3.5 per 100000 people in 2016 [6].

Therefore, PC screening to diagnose the disease in asymptomatic individuals is an effective way to reduce PC mortality [7]. In the same vein, the American Cancer Society suggests screening programs for PC and boosting knowledge about the disease in all men over the age of 50 years [8]. There are different screening and diagnostic methods for PC, including urodynamic examination, ultrasonography, laboratory testing, and physical examination.

Studies on the effectiveness of the PSA screening test for the early diagnosis of this cancer have emphasized on factors such as advanced age, higher incomes, and a better general health status as the predictors of undergoing PC screening tests. These studies have highlighted that risk awareness strategies as information-based interventions can be applied by health educators as parts of PC prevention programs [9]. Indeed, it should be noted that many patients do not like or want to know if they have PC because of possible ensuing distress and conflicts for themselves 8 and their families [10]. This issue highlights the importance of considering men's psychological aspects in PC screening [8].

Some studies have reported men's poor knowledge and attitudes about PC and screening behaviors so that the mean scores of enabling factors and screening behaviors have been at low levels [11].

Prostate cancer, as a serious health problem in most countries, especially in Iran, can be prevented through timely screening programs and appropriate lifestyle modifications [12]. Theories such as the health belief model play an important role in developing and evaluating comprehensive programs [13]. This model focuses on how to change beliefs, which in turn, leads to behavioral modifications. Based on this model, in order to take preventive actions, people should first become concerned about the disease (perceived susceptibility). Then they should understand the depth of the risk and seriousness of the disease's various physical, psychological, social, and economic implications (perceived severity). Next, based on the positive reminders that they receive from their surroundings (cues to action), people should believe that PC prevention programs are useful and feasible (perceived benefits), and the fact that the threats of such hindering actions are much higher than their benefits (perceived barriers). As a result of these understandings, people may ultimately admit to adhere to PC screening and preventive measures [14]. This model essentially triggers individuals' motivations to perform such an action. In fact, by examining how to motivate, it investigates how to shape a behavior [15]. Therefore, in this study, HBM was used as a reference model. It is essential to investigate the psychological and social dimensions of PC screening behaviors and the factors associated with men's participation in screening programs. Given the prevalence of the disease in Iran and the threat actions taken to prevent the disease, as well as the limited studies carried out in the country, especially in Fasa city, this study was performed based on HBM to investigate PC screening behaviors in men aged 40-70 years old in Fasa, Fars province, Iran. The results of this study can provide appropriate educational strategies to encourage at-risk people to adhere to PC preventive measures.

Methods

This was a descriptive-analytical cross-sectional study performed on 400 men aged 40-70 years in Fasa city, Fars province, Iran, in 2019. The sample size was calculated based on Anderson's study [16].

Considering the number of the households covered by each urban health center in Fasa, one household in each urban area was randomly selected to start data collection. Then the researchers referred to the selected district and collected the data via interviews or the questionnaires which were filled by all the households in that area. In this study, variables such as age, the number of children, occupation, education, marital status, smoking habits, health beliefs, and attitude towards PC screening behaviors were recorded.

The data collection instrument was a standard questionnaire used in the Anderson's study where the validity and reliability of the questionnaire were confirmed [16].

The content validity was evaluated considering an effect size of higher than 0.15 and a content validity ratio (CVR) of higher than 0.79. In order to determine the face validity of the questionnaire, a list of items was checked by 40 men with similar demographic, economic, and social characteristics to the target population. In order to determine the content validity, we consulted with 12 specialists and professionals (outside the research team) in the fields of health education and promotion (n = 9), pathology (n = 1), oncology (n = 1), and biostatistics (n = 1) on the items. According to the Lawshe table, items with a CVR of higher than 0.56 were considered acceptable and retained for the subsequent analysis.

The overall reliability of the tool based on the Cronbach's alpha coefficient was calculated 0.89. The consistency values were obtained 0.82 for perceived susceptibility, 0.81 for perceived severity, 0.82 for perceived benefits, 0.88 for perceived barriers, 0.83 for self-efficacy, and 0.80 for PC preventive behaviors.

The questionnaire consisted of four sections. The first section contained items on demographic characteristics (six items). The second part included the items related to perceived susceptibility with five questions (e.g. "I have a higher chance of getting PC than other men."), perceived severity with five questions (e.g. "The physical complications of PC can be painful and unbearable to me."), perceived benefits with five questions (e.g. "Early diagnosis of cancer increases the chance of treatment."), perceived barriers with five questions (e.g. "I do not want to do screening because DRE is embarrassing."), and self-efficacy on PC preventive behaviors with five questions (e.g. "I'm sure I can avoid smoking or consuming similar harmful substances."). A total of 25 items were scored based on a 5-point Likert scale (strongly agree (5), agree (4), no idea (3), disagree (2), and strongly disagree) (1).

The third part included the cues to act (spouse, friends, radio and television, books and magazines, physicians, health care workers, and the Internet). The fourth part included the items assessing the subjects' performance in adopting proper PC preventive behaviors (17 questions). A 4-point Likert scale was used to score the performance (never (0), rarely (1), often (2), and always (3)).

The present research was approved by the Ethical Committee of Fasa University of Medical Sciences (IR.FUMS.REC.1395.154). A consent letter was signed by the subjects regarding their participation in this investigation. Also, the aims, importance, and demands of this research were explained to them, and they were ensured that their information would remain confidential.

Data were analyzed by SPSS 22 using descriptive (frequency, mean, and standard deviation) and inferential (Pearson correlation and linear regression) statistics at the significance level of $p<0.05$. The normality of the data was checked by the Kolmogorov-Smirnov test which confirmed the normality of all variables.

Results

The mean age of the participants in this study was 54.24 ± 5.46 years. The mean number of children was 2.84 ± 1.84. The subjects' demographic information have been shown in Table 1.

Table 1: The Distribution of the Subjects' Demographic Characteristics

Variables		Number	Percent
Education	Illiterate	7	1.75
	Primary school	41	10.25
	Junior high school	166	41.50
	High School	150	37.50
	Academic	36	9
Employment Status	Employed	275	68.75
	Unemployed	125	31.25
Marital Status	Single	13	3.25
	Married	387	96.75
Tobacco use	Yes	86	21.50
	No	314	78.50

As Table 2 shows, most of the subjects studied had a moderate or low score on HBM constructs. According to Table 3, perceived susceptibility, perceived severity, and perceived self-efficacy positively correlated with PC screening behaviors, and there was a significant inverse relationship between perceived barriers and PC screening behaviors.

Table 2: The Means and Standard deviations of HBM Constructs

Variables	Mean	SD	Minimum	Maximum
Perceived susceptibility	10.24	4.42	5	25
Perceived severity	12.34	4.25	5	25
Perceived benefits	21/9	3.12	5	25
Perceived barriers	10.11	3.27	5	25
Self-efficacy	10.36	3.14	5	25

Table 3: Correlations of the Variables Studied with Prostate Cancer Screening Behaviors Among a Population of Iranian Men

Variables	Perceived susceptibility	Perceived severity	Perceived benefits	Perceived barriers	Perceived self-efficacy	Prostate cancer screening behaviors
Perceived susceptibility	1	0.17[*]	0.15[*]	0.08	0.31	0.18[*]
Perceived severity	0.80	1	0.42[*]	0.14	0.28	0.32[*]
Perceived benefits	0.24	0.31	1	0.27	-0.22	0.24
Perceived barriers	0.34[*]	0.22	0.26	1		-0.24[*]
Perceived self-efficacy	0.25	0.21	0.23	0.45	1	0.22[*]
Prostate cancer screening behaviors	0.21[*]	0.23[*]	0.28	-0.40[*]	0.19[*]	1

[*]$p < 0.05$

Regarding the frequency of various types of cues to action, physicians had the highest frequency followed by the radio/television and Internet.

Table 4 provides detailed information on the distribution of various cues to action.

Table 4: The Frequencies of Cues to Action About Adopting Prostate Cancer Screening Behaviors

Types of cues to action	Frequency	Percentage
Spouse	78	19.5
Friends	95	23.75
Radio and television	124	31
Books and magazines	96	24
Physicians	148	37
Health care workers	121	30.25
Internet	102	25.50

According to Table 5, linear regression showed that perceived susceptibility, perceived severity, and perceived self-efficacy predicted PC

screening behaviors among the participants. In general, these variables predicted 42.8% of the variance in PC screening behaviors.

Table 5: The Analysis of the Factors Related to Prostate Cancer Screening Behaviors

Variables	Beta	S.E	B	p	Change
Perceived susceptibility	0.220	0.78	0.112	0.024	Prostate cancer screening behaviors
Perceived severity	0.208	0.84	0.176	0.026	
Perceived benefits	0.174	0.52	0.132	0.125	$R^2 = 0.428$
Perceived barriers	0.216-	0.96	0.134-	0.035	Adjusted=0.173R^2
Perceived self-efficacy	0.215	0.81	0.126	0.041	

Discussion

Prostate cancer is one of the major health problems in the world and has a great impact on

the quality of lives of patients. Screening for this disease reduces its mortality rate; therefore, determining the factors affecting PC screening

behaviors is important. Our results showed that the subjects studied had medium or low scores on HBM constructs (i.e., perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and self-efficacy). In a study by Ghodsbin et al., the majority of subjects attained high scores on perceived benefits, but low scores regarding perceived barriers. Similarly, in the present study, the subjects had low perceived susceptibility and perceived severity [17]. In Lee et al.'s study, perceived severity level was high while that of perceived barriers was low [18]. Also, Aflakseir found that perceived severity and perceived benefits were at high levels, and perceived susceptibility and perceived barriers were at low levels [19]. In the report of Bynum et al., adhering to PC preventive behaviors was considered to be lifesaving [20]. In line with the results of this study, Didarlou et al. found that their participants had low self-efficacy levels [21]. In another study by Saleh et al., the levels of knowledge, health beliefs, and intent to screen for PC were at low levels [22]. In a qualitative study conducted by Mincey et al., the perceived severity level was high while that of perceived susceptibility was low [23]. Odedina et al. in their study on men aged 40 to 70 years described that the subjects had positive beliefs about PC screening [24]. The reason for the subjects' low scores on HBM in relation to PC screening behaviors can be attributed to the lack of training programs in this area, lack of information about screening behaviors, ignoring preventive issues, and a higher focus on treatment by health authorities and professionals. Appropriate interventions are needed to encourage preventive measures for PC and eliminate barriers such as the high costs of PC preventive foods (fish, seafood, fruits, and vegetables). It is also recommended to persuade people to consume animal oils and red meat, ignore the embarrassment of undergoing DRE, and avoid smoking and other unhealthy habits (alcohol consumption, etc.).

The most important cues to action in this study were physicians, radio and television, health care workers and the Internet, which should be strengthened and included in educational interventions. In a study by Ghodsbin et al., the most important guideline was mass media such as television, radio, and magazines [17]. According to Didarlou et al., the Internet and TV were the most important cues to action [21]. In a study by Anderson on 392 men aged 40-70 years, cues to action had direct impacts on PC screening and preventive behaviors [16]. Nakandi et al. also reported that the largest source of information on PC included mass media, and people received less information from health care workers [25]. In another study by Lee et al., individuals gathered most of their information through mass media (newspapers, radio, and television) [18]. On the other hand, Louis reported that health care workers and family carers were the most important cues to action for PC screening [26].

The results of this study showed a significant positive correlation between PC screening behaviors and the constructs of perceived susceptibility, perceived severity, and perceived self-efficacy. There was also a significant inverse correlation between perceived barriers and PC screening behaviors. Moreover, perceived susceptibility, severity, and self-efficacy were the predictors of PC screening behaviors.

In the Didarlou et al.'s study, performance was found to be significantly associated with perceived susceptibility, perceived benefits, perceived barriers, and self-efficacy, but there was no significant relationship between perceived severity and performance. The most important predictors of PC screening behaviors were perceived benefits, perceived barriers, and perceived self-efficacy [21]. In the study by Aflakseir, the perceived severity and perceived benefits constructs were described as predictors [19].

In another study on men aged 40-72 years, perceived barriers and perceived benefits were linked with PC screening behaviors, and the perceived benefits construct was a predictor of males' intention to be screened for PC [26]. In Namdar et al.'s study, self-efficacy, perceived barriers, and perceived severity predicted 16.1% of the variance in PC screening behaviors [27]. Also, perceived susceptibility predicted PC screening behaviors in another study [24]. Likewise, perceived benefits had a significant relationship with PC screening in another report [28].

In Andersen's study, the constructs of HBM predicted 16.7% of the variance of the intention to refer for PC screening [26]. Given the predictive value of these constructs in this study, it is

recommended to apply HBM constructs to guide the health behaviors of people with PC. In order to promote and direct good health behaviors, educational interventions should elaborate on PC and its consequences, as well as upon the fact that the people who are at risk of the disease should adhere to screening behaviors as an important step in improving their health. Behavioral models such as HBM can be useful to design and implement appropriate plans to persuade PC screening behaviors in the society and boost individuals' awareness (through health care providers, mass media, etc.).

The limitations of this study included the self-reporting nature of the data and the fact that some people felt embarrassed to complete the questionnaire. Considering the goals of the study and the importance of the subject, we tried to encourage these individuals to participate in the study.

Conclusion

Due to the increasing prevalence of PC in Iran, there is a need to study the PC screening behaviors of Iranian men in different communities. It is necessary to design appropriate interventional programs to increase the levels of the knowledge, perceived susceptibility, perceived severity, and perceived benefits and obviate the barriers of PC screening behaviors.

Conflict of interest
The authors declare that there is no conflict of interest.

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