Research Article

Psychological Predictors of Prostate Cancer Screening Behaviors Among Men Over 50 Years of Age in Hamadan: Perceived Threat and Efficacy

Majid Barati,[1,*] Mohammad Ali Amirzargar,[2] Saeed Bashirian,[1] Vahid Kafami,[3] Amir Abbas Mousali,[3] and Babak Moeini[1]

[1]Social Determinants of Health Research Center, Department of Public Health, Hamadan University of Medical Sciences, Hamadan, IR Iran
[2]Urology and Nephrology Research Center, Hamadan University of Medical Sciences, Hamadan, IR Iran
[3]Department of Public Health, School of Health, Hamadan University of Medical Sciences, Hamadan, IR Iran

[*]*Corresponding author*: Majid Barati, Social Determinants of Health Research Center, Department of Public Health, Hamadan University of Medical Sciences, Hamadan, IR Iran. E-mail: barati@umsha.ac.ir

Abstract

Background: Prostate cancer is the fourth most common cancer worldwide and is the second most lethal cancer.

Objectives: The aim of this study was to investigate psychological predictors of prostate cancer screening behaviors among men over 50 years of age in Hamadan.

Materials and Methods: This cross-sectional study was carried out on 200 men over 50 years of age in Hamadan, west of Iran. Participants were recruited with a cluster sampling method. The subjects completed a self-administered questionnaire including demographic characteristics, prostate cancer screening behaviors and psychological factors related to prostate cancer. Data was analyzed by SPSS-18 using chi-square, fisher exact test, and logestic regression.

Results: According to the results, 8.5 and 7.5 percent of participants reported history of digital rectal exam and prostate-specific antigen test, respectively. Also, the subjects reported 18.5%, 49.3% and 50.3% of receivable scores of knowledge, perceived threat, and perceived efficacy of prostate cancer screening behaviors, respectively. There was a significant association between prostate cancer screening behaviors and age groups (P < 0.05).

Conclusions: The results showed that providing analytical studies in this field helps to surface the hidden aspects of this context and the health care providers and administrators will hopefully consider them in planning for identification of psychological factors, such as barriers and facilitators factors.

Keywords: Neoplasms, Prostate, Prostate-Specific Antigen, Fear

1. Bacground

Prostate cancer is the fourth most common cancer worldwide and is the second most lethal cancer (1, 2). The incidences of prostate cancer have been rising recently; for example, in the United States, there are expected to be about 221,000 new prostate cancer diagnoses and about 27,500 prostate cancer deaths in 2015 (3, 4). It has been evident that prostate cancer cases are growing in Iranian men (5). In 2010 there were estimated to be 3856 new cases of prostate cancer, making it the third most commonly diagnosed cancer in Iranian men (6). In this regard, according to the Iranian annual national registration center report, the incidence of prostate cancer in Hamadan province has been reported 6.87 cases per hundred thousand population over 50 years in 2010 (6).

Despite major differences in the incidence of prostate cancer, it can primarily be considered associated with men older than 65 years, since 75% of new cases are diagnosed in men over 65 years (6, 7). It is due to the asymptomatic nature of the disease in the early stages. The symptoms are often implying locally advanced or metastatic disease (6). However, racial differences (3), genetic and environmental factors, family history (1), hormonal changes related to aging (8, 9) infection, poor nutrition (especially unsaturated fats) (10), smoking and alcohol consumption (11), etc. can be mentioned as the other reasons. The four fold increase in the number of men older than 65 years by 2050 (12) and the huge cost imposed on the health care systems due to prostate cancer (2) imply the importance of prostate cancer more (12). Meanwhile, owing to asymptomatic nature of prostate cancer, to reduce mortal-

ity, screening can be used in asymptomatic patients to diagnose the prostate cancer (8). Therefore, American cancer society suggested prostate cancer screening for all men over 50 years (13). There are different screening and diagnostic procedures including urodynamic studies, sonography, laboratory tests, symptoms and physical examinations (14). Serologic test for assessing prostate-specific antigen (PSA) level is the most important method, which is also the most practical one, easiest and most sensitive detection test (97% specificity and 67% sensitivity). It is recommended as the first diagnostic test and its digital rectal exam (DRE) for diagnosis and follow-up for prostate cancer for individuals over 50 years is advised (9, 13). Timely treatment and eradication of prostate cancer before metastasis can be achieved by early diagnosis with the PSA test (13).

The results of various studies are emphasized on the effectiveness of PSA screening test in the diagnosis of cancer. They also introduce factors such as aging, higher income and better general health, as predictors of screening tests. These studies have emphasized risk-awareness strategies and intervention based on the increased information in prostate cancer prevention programs for health educators (12, 15-17).

2. Objectives

Several researchers have discovered various factors that affect participation in the screening. This study aimed to evaluate prostate cancer screening behavior and the related factors and was done on men over 50 years in Hamadan.

3. Materials and Methods

3.1. Participants

This analytical study was performed cross-sectionally on 200 men over 50 years in Hamadan city, west of Iran in 2014. Hamadan has four geographical regions in the municipality divisions. Two geographic regions were selected by clustering method. In each cluster, three health centers were selected. The sample size was indicated in terms of the number of households in each health center. Next, in each urban area, one household was randomly selected. The selected household was considered as a starting point to collect data in that area. Then, referring to the address of the selected households, all households locating on the right side were considered as the study population.

Data was collected using anonymous questionnaires by 2 well-trained interviewers. The interviewers received the necessary guidance to complete the questionnaires

equally participating in the briefing. The researchers introduced themselves to the participants and stated the aim of research. They informed the participants that all questionnaires are confidential and they are collected for statistical analysis. The participants were enrolled with desire and the informed consent was obtained.

3.2. Measure

The questionnaire was designed in three sections: (a) demographic characteristics: including age, educational level, marital status, economic status and having history of cancer in family; (b) prostate cancer screening behaviors: cancer screening behaviors included PSA blood test and DRE in 4 questions, replying with "no" and "yes". The point 1 was given to Yes answer, and zero was given to No answer; and (c) psychological factors: psychological scales were measured in relation to prostate cancer screening behaviors. 26 items were composed under three major constructs: knowledge, perceived threat, and perceived efficacy. Content validity of questionnaire was confirmed by 10 health education and promotion experts through calculating the content validity index (CVI) and content validity ratio (CVR).

Knowledge, 11 items were designed to measure knowledge of prostate cancer and benefits of screening behaviors (e.g., "With increasing age, the risk of prostate cancer increases."). The items were rated on a 3-point scale ranging from 1 (yes) to 3 (no). Higher scores indicate high level of knowledge toward prostate cancer and benefits of screening behaviors. An estimated reliability coefficient for knowledge scale was 0.75 which demonstrated internal consistency of this questionnaire.

3.2.1. Perceived Threat Toward Consequences of Prostate Cancer

These were measured in relation to perceived susceptibility (3 items) and perceived severity (8 items). A sample item is "It is likely to get prostate cancer in the future." The items were rated on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). These items were multiplicatively combined and averaged. An estimated reliability coefficient for perceived threat scale was 0.88 which reveals internal consistency of this questionnaire.

3.2.2. Perceived efficacy

4 items were designed to measure perceived efficacy of prostate cancer screening behaviors (e.g., "How confident are you that you can regularly do blood tests related to prostate cancer?"). The items were rated on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). An estimated reliability coefficient for perceived efficacy was 0.79 which demonstrated internal consistency of this questionnaire.

3.3. Data Analysis

All statistical analyses were performed using version 18.0 of the statistical software package SPSS (SPSS Inc., Chicago, IL, USA). Chi-square, Fisher's exact tests and logistic regression were used to investigate the predictors of prostate cancer screening behaviors. The P value was set 0.05.

4. Results

The participants were aged between 50 and 81 years with a mean age of 57.9 ± 6.7 years. 66.5% of participants were aged 50 to 60 years. 36.5% were illiterate or could only read and write, and 80% of the participants were married. Only 5.1% of the participants assessed the economic status of their families "good" and 4% of the participants pointed out the history of prostate cancer in their first degree family members.

According to Table 1, DRE and PSA test were reported 8.5% and 7.5%, respectively. The participants achieved 18.5%, 49.3% and 50.3%, of a maximum score for knowledge, perceived threat and effectiveness of prostate screening behaviors (Table 2).

There is a significant difference in prostate cancer screening behavior (DRE and PSA test) between different age groups ($P < 0.05$). The DRE and PSA test increased with ageing (Table 3).

Table 4 shows the results of logistic regression analysis, the odds ratio (OR) and 95% confidence intervals for the variables. According to the results, knowledge and perceived threat consequences of prostate cancer were psychological predictors of prostate cancer screening behaviors among men over 50 years of age.

5. Discussion

This study aimed to assess factors associated with prostate cancer screening behavior among men over 50 years in Hamadan. Frequency of DRE and PSA test in the participants were reported 8.5% and 7.5%, respectively for evaluation of prostate cancer screening behavior. The prostate cancer screening behavior was reported 6.8% by Rezaeian et al. (18) in Rafsanjan among retried men a stable and regular behavior which is consistent with this study results. However, the rate of prostate cancer screening behavior in some non-Iranian studies has been reported equal or equal to 50% (15, 19, 20). Since the PSA test is considered as one of the most effective practices for prostate cancer screening in prevention and early diagnosis, it is regarded essential during life. Therefore, in educational programs the severity and seriousness and the advantages of

these kinds of behavior must be emphasized. Paying attention to the barriers for this behavior, such as financial difficulties, access to services and insurance as well as information support tool by the health centers is very important. The health centers should play a positive role in screening which should be considered in health planning and strategies.

It must be noted that participants' age had significant association with prostate cancer screening behavior among the demographic variables; in other words, people are thinking about taking care of themselves by aging and the increased risk of prostate cancer leading to perceived severity of the prostate cancer. Other studies presented similar results: Khani-Jeihooni and Kashfi (21), Parker et al. (22), and Winterich (23) showed that prostate cancer screening behaviors are significantly associated with age. Also, the results in this section are consistent with the findings of other similar studies (5, 15, 24).

In this study, knowledge of prostate cancer and benefits of screening behaviors were at the lowest level. Results of studies by Khani-Jeihooni and Kashfi (21), Atulomah et al. (25) and Ukoli et al. (26) are consistent with the findings in this section. Also, knowledge predicts prostate cancer screening behaviors, this means that by increasing the knowledge level, prostate cancer screening behaviors also increase. Other studies stress this too (25). It seems that knowledge has a determinant role in men's performance regarding screening behaviors. Thus, implementation of educational programs toward benefits of screening behaviors will have significant role in promoting prostate cancer screening behaviors.

Generally, perceived threat is not desirable compared with risk of prostate cancer in psychological factors associated with prostate cancer screening behavior, and further training is needed for men. Only 49.3% of the maximum score was observed. It may be due to the fact that participants do not expect to have prostate cancer or an intense fear of having painful consequences of this disease prevents them to think about prostate cancer. Therefore, perceived threat is not sufficiently considered. But adverse effects are expected in case of non-timely diagnosis almost in all men. These findings are consistent with the few other studies (14, 27, 28).

The participants' belief in their efficacy and ability for prostate cancer screening behavior were moderate (50.3% of the maximum score). It seems that perception higher efficiency of screening behaviors will increase the likelihood of these behaviors. The results in this section are consistent with the findings of other similar studies. For example, Studies by Khani-Jeihooni and Kashfi (21), Alidosti et al. (29), and Consedine et al. (30) showed that self-efficacy has an important role in promoting cancer prevention behav-

Table 1. Frequency of Prostate Cancer Screening Behaviors Among Participants[a]

Screening Behavior	Yes	No
DRA	17 (8.5)	183 (91.5)
PSA	15 (7.5)	185 (92.5)

Abbreviations: DRE, digital rectal exam; PSA, prostate-specific antigen.
[a]Values are expressed s No. (%).

Table 2. Mean, Standard Deviation, Range of Scores and Percent of Mean From Maximum Obtainable Score for Psychological Factors Related With Prostate Cancer Screening Behavior (N = 200)

Variables	Mean ± SD	Range of Scores	Percent of mean From Maximum Obtainable Score, %
Knowledge	2.04 ± 2.4	0 - 11	18.5
Perceived threat	32.70 ± 8.4	11 - 55	49.3
Perceived efficacy	12.06 ± 2.7	4 - 20	50.3

Table 3. Association Between Prostate Cancer Screening Behaviors and Demographic Characteristics (N = 200)[a]

Variables	DRA		PSA	
	Yes	No	Yes	No
History of cancer				
Yes	1 (12.5)	7 (87.5)	1 (12.5)	7 (87.5)
No	16 (8.3)	176 (91.7)	14 (7.3)	178 (92.7)
P value	0.515		0.470	
Educational Level				
Illiterate	4 (25)	12 (75)	4 (25)	12 (75)
Primary	5 (8.8)	52 (91.2)	4 (7)	53 (93)
Secondary	2 (3.8)	50 (96.2)	2 (3.8)	50 (96.2)
High school	2 (5.9)	32 (94.1)	1 (2.9)	33 (97.1)
Academic	4 (9.8)	37 (90.2)	4 (9.8)	37 (90.2)
P value	0.115		0.052	
Marital Status				
Marriage	16 (10)	144 (90)	14 (8.8)	146 (91.2)
Single	1 (2.5)	39 (97.5)	1 (2.5)	39 (97.5)
P value	0.204		0.179	
Age, y				
50 - 59	5 (3.8)	128 (96.2)	3 (2.3)	130 (97.7)
60 - 69	10 (18.2)	45 (81.8)	10 (18.2)	45 (81.8)
70 - 79	1 (10)	9 (90)	1 (10)	9 (90)
80 - 89	1 (50)	1 (50)	1 (50)	1 (50)
P value	0.002		0.001	
Economic Status				
Good	3 (14.3)	18 (85.7)	3 (14.3)	18 (85.7)
Moderate	7 (7.5)	86 (92.5)	6 (6.5)	87 (93.5)
Weak	7 (8.1)	79 (91.9)	6 (7)	80 (93)
P value	0.597		0.445	

Abbreviations: DRE, digital rectal exam; PSA, prostate-specific antigen.
[a]Values are expressed s No. (%).

iors.

The results show that the participants' perceived threat is not desirable so the participants' perceived efficacy was relatively favorable. It is notable that initially individuals are assessed the risk threat for seriousness and eligibility, who are more motivated by increasing the per-

Table 4. Predicting Prostate Cancer Screening Behaviors Using Logistic Regression (N =200)

Step/Variables	B	S.E	OR	95% CI		P Value
				Lower	Upper	
Step 1						
Knowledge	-0.317	0.099	0.729	0.600	0.885	0.001
Perceived threat	-0.050	0.026	0.941	0.903	0.998	0.049
Perceived efficacy	-0.025	0.092	0.976	0.815	1.168	0.787
Constant	-	-	-	-	-	< 0.001

Abbreviations: B, unstandardized regression coefficient; SE, standard error; CI, confidence interval.

ceived threat to start second assessment (evaluation of the effectiveness of the recommended solution). In this stage, people in addition to evaluating the effectiveness of recommended solutions, assess their efficacy (31). When a threat is not considered seriously a (low perceived severity) lower incentive is observed for attention to this issue leading to superficially evaluation of the effectiveness of the recommended solutions. If people do not feel threatened and do not understand the severity, they easily will ignore available information regarding the threat. It should be noted that in case of both increased perceived threat and the perceived efficacy, people are motivated to control the risk and compliance of the recommended solution. The people who believe the threat is serious and are at risk to experience its negative consequences, are scared and are motivated to protect themselves. Moreover, they believe that they can effectively stop the threat and they deal with that risk wisely (31, 32).

In this study, the lower perceived threat of prostate cancer also made men either with no attention to the threat and its impact on public health due to lack of knowledge threat (with no reply or reaction) or to show the little protective actions due to their lower motivation. It is obvious in the results, since only a limited number of participants have done the recommended solutions regularly.

5.1. Conclusions

The results of this study showed that the prostate cancer screening behaviors in men over 50 years in Hamadan are not desirable. There are statistically significant differences in some demographic variables such as age. The findings have provided the precise awareness of the effective psychological factors which can be used for designing educational interventions. Further related studies are essential due to few available studies.

References

1. Jemal A, Murray T, Ward E, Samuels A, Tiwari RC, Ghafoor A, et al. Cancer statistics, 2005. *CA Cancer J Clin.* 2005;**55**(1):10–30. [PubMed: 15661684].
2. Deutsch E, Maggiorella L, Eschwege P, Bourhis J, Soria JC, Abdulkarim B. Environmental, genetic, and molecular features of prostate cancer. *Lancet Oncol.* 2004;**5**(5):303–13. doi: 10.1016/S1470-2045(04)01468-8. [PubMed: 15120667].
3. Cokkinides V, Albano J, Samuels A, Ward ME, Thum JM. American cancer society: Cancer facts and figures. Atlanta: American Cancer Society; 2005.
4. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2015. *CA Cancer J Clin.* 2015;**65**(1):5–29. doi: 10.3322/caac.21254. [PubMed: 25559415].
5. Hosseini M, Jahani Y, Mahmoudi M, Eshraghian MR, Yahyapour Y, Keshtkar AA. The assessment of risk factors for prostate cancer in Mazandaran province, Iran. *J Gorgan Univ Med Sci.* 2008;**10**(3):58–64.

6. Center for disease control Non communicable Deputy Cancer Control Office . Iranian Annual of National Cancer Registration Report. Ministry of Health and Medical Education; 2007.

7. Lujan M, Paez A, Llanes L, Miravalles E, Berenguer A. Prostate specific antigen density. Is there a role for this parameter when screening for prostate cancer?. *Prostate Cancer Prostatic Dis.* 2001;**4**(3):146–9. doi: 10.1038/sj.pcan.4500509. [PubMed: 12497032].

8. Wilkinson S, List M, Sinner M, Dai L, Chodak G. Educating African-American men about prostate cancer: impact on awareness and knowledge. *Urology.* 2003;**61**(2):308–13. [PubMed: 12597936].

9. Stamey TA, Caldwell M, McNeal JE, Nolley R, Hemenez M, Downs J. The prostate specific antigen era in the United States is over for prostate cancer: what happened in the last 20 years?. *J Urol.* 2004;**172**(4 Pt 1):1297–301. [PubMed: 15371827].

10. George A, Fleming P. Factors affecting men's help-seeking in the early detection of prostate cancer: implications for health promotion. *J Men's Health Gender.* 2004;**1**(4):345–52.

11. Simforoosh N, Nouralizadeh A. Iranian text book of Urology. Tehran: Behineh Publishe; 2007. pp. 903–38.

12. Lunenfeld B. The ageing male: demographics and challenges. *World J Urol.* 2002;**20**(1):11–6. [PubMed: 12088183].

13. Smith RA, Manassaram-Baptiste D, Brooks D, Doroshenk M, Fedewa S, Saslow D, et al. Cancer screening in the United States, 2015: a review of current American cancer society guidelines and current issues in cancer screening. *CA Cancer J Clin.* 2015;**65**(1):30–54. doi: 10.3322/caac.21261. [PubMed: 25581023].

14. Capik C, Gozum S. Development and validation of health beliefs model scale for prostate cancer screenings (HBM-PCS): evidence from exploratory and confirmatory factor analyses. *Eur J Oncol Nurs.* 2011;**15**(5):478–85. doi: 10.1016/j.ejon.2010.12.003. [PubMed: 21256080].

15. Chiu BC, Anderson JR, Corbin D. Predictors of prostate cancer screening among health fair participants. *Public Health.* 2005;**119**(8):686–93. doi: 10.1016/j.puhe.2004.08.021. [PubMed: 15949522].

16. Lu HY, Andrews JE, Hou HY. Optimistic bias, information seeking and intention to undergo prostate cancer screening: A Taiwan study on male adults. *J Men's Health.* 2009;**6**(3):183–90.

17. Haghghi F. Epidemiological study of prostate neoplasm in Birjand. *J Birjand Univ Med Sci.* 2005;**12**(1):9–15.

18. Rezaeian M, Tabatabaei Z, Naeimi R, Esmaeili A, Jamali M, VaziriNejad R, et al. Knowledge, attitude and practice of Rafsanjan male pensioners towards prevention of prostate cancer in the year 2006. *Q Horizo Med Sci.* 2007;**12**:19–25.

19. Gorin SS, Heck JE. Cancer screening among Latino subgroups in the United States. *Prev Med.* 2005;**40**(5):515–26. doi: 10.1016/j.ypmed.2004.09.031. [PubMed: 15749133].

20. van Leeuwen PJ, Connolly D, Gavin A, Roobol MJ, Black A, Bangma CH, et al. Prostate cancer mortality in screen and clinically detected prostate cancer: estimating the screening benefit. *Eur J Cancer.* 2010;**46**(2):377–83. doi: 10.1016/j.ejca.2009.09.008. [PubMed: 19804966].

21. Khani-Jeihooni A, Kashfi SM. Factors associated with prostate cancer screening behavior among men over 50 in Fasa, Iran, based on the PRECEDE model. *Electronic Phys.* 2015;**7**(2):1054.

22. Parker PA, Cohen L, Bhadkamkar VA, Babaian RJ, Smith MA, Gritz ER, et al. Demographic and past screening behaviors of men attending a free community screening program for prostate cancer. *Health Promot Pract.* 2006;**7**(2):213–20. doi: 10.1177/1524839905278881. [PubMed: 16585144].

23. Winterich JA, Grzywacz JG, Quandt SA, Clark PE, Miller DP, Acuna J, et al. Men's knowledge and beliefs about prostate cancer: education, race, and screening status. *Ethn Dis.* 2009;**19**(2):199–203. [PubMed: 19537233].

24. Habibi A. Evaluation of prostate specific antigen (PSA) level in healthy Birjandi males aged 40 to 80 years. *J Birjand Univ Med Sci.* 2008;**15**(1):0.

25. Atulomah NO, Olanrewaju MF, Amosu AM, Adedeji O. Level of awareness, perception and screening behavior regarding prostate cancer among men in a rural community of Ikenne Local Government Area, Nigeria. *Primary Prevent Insights.* 2010;**2**:11.

26. Ukoli F, Osime U, Akereyeni F, Okunzuwa O, Kittles R, Adams-Campbell L. Prevalence of elevated serum prostate-specific antigen in rural Nigeria. *Int J Urol.* 2003;**10**(6):315–22. [PubMed: 12757603].

27. Oliver JS. Prostate Cancer Screening Patterns among African American Men in the Rural South. Georgia State University; .

28. Bashirian S, Fathi Y, Barati M. Comparison of efficacy and threat perception processes in predicting smoking among university students based on extended parallel process model. *Sci J Hamadan Univ Med Sci.* 2014;**21**(1):58–65.

29. Alidosti M, Sharifirad GR, Hemate Z, Delaram M, Najimi A, Tavassoli E. The effect of education based on health belief model of nutritional behaviors associated with gastric cancer in housewives of Isfahan city. *Sci Res J Shahed Univ.* 2011;**18**(94):1–11.

30. Consedine NS, Horton D, Ungar T, Joe AK, Ramirez P, Borrell L. Fear, knowledge, and efficacy beliefs differentially predict the frequency of digital rectal examination versus prostate specific antigen screening in ethnically diverse samples of older men. *Am J Mens Health.* 2007;**1**(1):29–43. doi: 10.1177/1557988306293495. [PubMed: 19482781].

31. Witte K. Putting the fear back into fear appeals: The extended parallel process model. *Commun Monographs.* 1992;**59**(4):329–49.

32. Allahverdipour H, Heidarnia AR, Kazemnezhad A, Witte K, Shafiee F, Azad Fallah P. Applying fear appeals theory for preventing drug abuse among male high school students in Tehran. *Sci J Hamadan Univ Med Sci.* 2006;**13**(3):43–50.