

Factors associated with prostate cancer screening behavior among men over 50 in Fasa, Iran, based on the PRECEDE model

Ali Khani Jeihooni¹, Seyyed Mansour Kashfi², Seyyed hannan kashfi³, Akbar Babaei Heydarabadi⁴, Masoumeh Imanzad⁵, Asghar Ashrafi Hafez⁶

¹ Department of Public Health, Fasa University of Medical Sciences, Fasa, Fars, Iran

² Department of Public Health, School of Health, Shiraz University of Medical Sciences, Shiraz, Fars, Iran

³ M.Sc. of Teaching in English, Faculty member of Larestan nursing school, Shiraz University of Medical Sciences, Shiraz, Iran

⁴ Public Health Department, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

⁵ School of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

⁶ Cancer Prevention Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Type of article: Research article

Abstract

Background: Prostate cancer is one of the most common and lethal cancers in the world. The incidence of prostate cancer has been increasing in recent years. The purpose of this study was to investigate factors associated with prostate cancer screening behaviors among men over 50 in Fasa, Iran, based on the PRECEDE model.

Methods: In this cross-sectional study, 400 men over 50 were studied in Fasa, Iran. Data were collected via a questionnaire on demographic characteristics, such as age, number of children, occupation, education, marital status, smoking, and prostate cancer screening behaviors. Data were analyzed using SPSS software, version 16. Independent samples t-test and the Pearson Product Moment correlation coefficient were used for the statistical analyses.

Results: Men in the study had little knowledge (34.11 ± 8.22) and attitude (28.23 ± 7.23) about prostate cancer and screening behavior. Their mean scores about prostate cancer, screening behavior, quality of life, and general health were moderate. The subjects had low self-efficacy and perceived social support. Their mean scores of enabling factors and screening behaviors were at a low level. Pearson correlation scores showed a significant correlation between cancer prostate screening behavior and demographic variables, such as age ($p=0.04$, $r=0.136$), occupation ($p=0.01$, $r=0.121$), educational level ($p=0.02$, $r=0.211$), and marital status of the subjects ($p=0.01$, $r=0.112$), but there were not significant correlations with the number of children ($p=0.12$, $r=0.092$) and smoking ($p=0.09$, $r=0.002$). The T-test results showed significant relationships between age, occupation, and education of the subjects, and the PRECEDE model structures were significant for predisposing factors, enabling factors, and reinforcing factors ($p<0.05$).

Conclusion: The prostate cancer screening behaviors in men over 50 in Fasa, Iran, were at a low level. Due to predisposing factors, such as the knowledge, attitudes, and beliefs of individuals, reinforcing factors can have an important role in the behaviors related to prostate screening, such as their families and health staffs as well as enabling factors, such as health financing, access to medicines and learning self-care. Educational interventions to improve these behaviors and the quality of life of these people seem essential.

Keywords: Prostate cancer, PRECEDE model, Screening behaviors, Fasa

Corresponding author:

Akbar Babaei Heydarabadi, Public Health Department, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. Tel: +98.9139537237. E-mail: babaei.a8946@yahoo.com

Received: June 06, 2014, Accepted: January 27, 2015, Published: June 05, 2015

© 2015 The Authors. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

1. Introduction

Prostate cancer among men is the most common cancer and after lung cancer, and it causes 11% of the fatalities due to cancer (1, 2). The incidence of prostate cancer varies in different parts of the world. The highest rate of occurrence has been reported to be in America (with 8.124 cases per hundred thousand), and the lowest is in Bangladesh (about 3.0 cases per hundred thousand) (3). The incidence rate of prostate cancer in Fasa (A city in Fars province) has been estimated to be per 100,000 men; that shows a significant increase (4). The growing number of patients with prostate cancer has been obvious in Iran during the last 10 years (5). The numbers of deaths from prostate cancer in 2003, 2006, and 2007 were 1309, 2815, and 3164, respectively, resulting in prostate cancer ranking seventh among the most common cancers in Iran (6).

Despite major differences in the incidence rate of prostate cancer, most cases (more than 75%) are diagnosed in men over 65 years old (6, 7), and this is due to the asymptomatic nature of the disease in its early stages. The symptoms are often suggestive of locally advanced or metastatic disease (6). However, the incidence of the disease varies by race (3) and is also affected by genetic and environmental factors, family history (1), hormonal changes related to aging (8, 9), infections, poor nutrition (especially monounsaturated fats) (10), smoking, and alcohol consumption (11). Given that the number of men over 65 is expected to increase four-fold by 2050 (12) and considering the burden of prostate cancer on the healthcare system (2), it is important to assess ways that prostate cancer can be prevented and treated (12). Since prostate cancer is asymptomatic in the early stages, one way to reduce mortality due to this disease is screening asymptomatic individuals for the disease (8). In this regard, the American Cancer Society recommends prostate cancer screening and related training programs at age 50 (13). Methods for screening and diagnosing prostate cancer include urodynamic tests, sonography, laboratory tests, symptoms, and physical examinations (14). One of the most important serological methods is to measure Prostate-Specific Antigen PSA which is the most practical, easiest, and yet the most sensitive test for the disease with a specificity of 97% and sensitivity of 67%. It is the first diagnostic test recommended to be conducted annually beginning at age 50 to diagnose and prevent prostate cancer (9, 13). Early diagnosis of prostate cancer by determining level of PSA in the blood can help ensure early treatment and control of prostate cancer before metastasis (13). The results of studies in this area emphasize the effectiveness of the PSA screening test in the diagnosis of prostate cancer and introduce factors, such as older age, higher income, and better general health status, as predictors of doing screening tests. In these studies, risk knowledge strategies and interventions based on increasing knowledge concerning prostate cancer prevention programs have been emphasized for health educators (12, 15-17). It is worth noting that many patients do not want to know they have been diagnosed with prostate cancer because it makes them worry (13) and causes stress and conflict in their families (18). This shows the importance of paying attention to psychological aspects of men's participation in prostate cancer screening programs. Regarding prostate cancer, researchers have pointed to various factors that may affect whether men are willing to participate in the screening for prostate cancer. However, from a scientific perspective, a conceptual framework for understanding and analyzing health-related behaviors appears to be necessary (13). Health education specialists have used different theories and models, such as the PRECEDE model, to design health education interventions targeted at changing people's behaviors (19-21). Developed by Green et al., PRECEDE is an effective theoretical model to identify needs in health education and health promotion. This model provides a framework whereby the factors that influence behavior in educational diagnosis such as predisposing factors (e.g., knowledge and attitude), reinforcing factors (e.g., influence of family, peers, and other people), and enabling factors (e.g., availability of resources and skills) are determined. PRECEDE starts with the desired final results (causes) and goes backward through seven successive stages of planning, implementation, and advanced evaluation to show how social diagnosis, epidemiology, and behaviors lead to a clear understanding of peoples' needs and aspirations. It investigates those behavioral factors that are closely related to health (22). In several studies of men in other countries, special attention was paid to the importance of prostate cancer screening. These studies also emphasized to the importance of using PROCEED and PRECEDE theories in the prevention of prostate cancer. Given the importance of the issue, the increased incidence of the disease in Iran, the feeling of threat, the need for action to prevent or limit the disease, and the limited number of screening behavior studies, the aim of this study was to investigate the factors associated with prostate cancer screening behavior among men over the age of 50 in Fasa, Iran, based on the PRECEDE model. We hope that the results will help identify training strategies for preventing prostate cancer.

2. Material and Methods

This cross-sectional study conducted in 2013. The sample included 400 men over the age of 50 who lived in Fasa, Iran. Given the number of households covered by health centers in Fasa, a household in every district was selected randomly as the starting point for data collection in that area. All families located on the right side of the selected

household were chosen as the study sample. Data were collected via interviews by trained interviewers. In this study, variables of age, number of children, occupation, education, marital status, smoking, and PRECEDE model structures and their relationship with prostate cancer screening behaviors were examined. Subjects were informed about confidentiality of information and the purpose of the study, and those who were willing participated in the study.

The instrument used for collecting the data was a standardized questionnaire developed by the authors using questionnaires in other studies (25-28). It was completed by the subjects, i.e., men over the age of 50, via self-reports and interviews. To validate the questionnaire, it was reviewed by some health professionals, and their comments were incorporated in the final version that was used by the subjects. The data collection tools included the following:

- 1) *Demographic variables questionnaire*: Demographic variables studied were age, occupation, education level, marital status, number of children, and smoking.
- 2) *Quality of Life Questionnaire*: The Farsi version of the Medical Outcomes Study-Short Form 20 (MOS-SF-20) quality of life questionnaire was used (25, 26). This questionnaire was a 20-item scale with six subscales for functional status (physical functioning, social functioning, and role functioning) and welfare status (mental health, welfare status, perceived health, and pain). Scores between 0-100 were obtained. The validity and reliability were reported in internal studies on different groups (27).
- 3) *General Health Questionnaire*: Health status: This section contained 28 questions of General Health Questionnaire-28 (GHQ-28) used to measure of the general health of the experimental group. The questionnaire contained four subscales of somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression, with each consisting of seven items. Scores from 0 to 84 were obtained for this scale, with 84 being a sign of poor health, and 0 being a sign of excellent health. The Chronbach's alpha score of this questionnaire was 0.72 in a previous study (28).
- 4) *Prostate Cancer Screening Behaviors Questionnaire*: The prostate cancer screening behavior questionnaire included six specific questions that evaluated the rectal examination and PSA test.
- 5) *Predisposing factors based on the PRECEDE model (22)*: To assess predisposing factors, various components were examined, including knowledge, attitudes, and self-efficacy. In this study, men's knowledge of prostate cancer and screening behaviors, their beliefs related to screening behaviors (sensitivity, sharpness, perceived benefits, and barriers), and their general self-efficacy were measured to evaluate predisposing factors. The score of the predisposing factors was calculated from the sum of the scores of these factors.
- 6) *Questions concerning men's knowledge about prostate cancer screening behaviors*: VinRich and colleagues' Inventory (29) in relation to men's knowledge about prostate cancer screening behaviors consists of 12 questions that measure men's awareness of symptoms, risk factors, side effects of treatment, and signs of screening. The scale consisted of items with answers of 'yes,' 'no,' and 'I don't know' with scores ranging from 0 to 1. Correct answers got a 1 and incorrect answers and 'I don't know' got 0 scores. The reliability and validity of this questionnaire have been reported in other studies (23, 29). In the pilot study, which was conducted on 30 men over the age of 50, the Cronbach's alpha score was 0.72.
- 7) *Perceived self-efficacy questions*: This section contained 10 questions with a scale of 1 to 4 that measured perceived self-efficacy of the study group. The questionnaires were a standard scale, the reliability and validity of which were reported elsewhere (30). *Attitudes Questionnaire*: It evaluated men's attitude about prostate cancer screening behaviors (13, 23), and it included 10 specific questions with an ordinal scale of 1 to 5 choices.
- 8) *Questions of perceived social support (as reinforcing factors)*: Social support scale with standard instruments (27) in two parts assesses overall perceived social support and supportive family behaviors. The overall perceived social support subscale used three items to assess emotional support, instrumental support, and perceived information support from family, peers, and the community. The answers ranged from 0 (not at all) to 5 (very much) on a Likert scale. The score on this structure ranged from 0 to 24. The second part consisted of 11 questions about supportive family behaviors and assessed the subjects' perceptions about the extent to which most members of their families took measures such as going to the doctor with them, encouraging them to get the proper amount of exercise, and following up on their self-care and diet. In the second part, the answers ranged from 0 (not at all) to 5 (very much) on a Likert scale. The score on this structure ranged from 0 to 44. Thus, the sum of the scores obtained from both parts provided the social support scores for participants in the study.
- 9) *Enabling factors questions*: This structure was measured using six questions developed by the authors. Enabling factors assessed subjects' perceptions of the extent to which they thought their income was sufficient for good

health, the extent to which they had access to medicine or medical specialists, and the extent to which they knew about self-care behaviors. The answers ranged from 0 (not at all) to 5 (very much) on a Likert scale. The score on this structure ranged from 0 to 18. All scores except general health factors were calculated from 0 to 100.

The data were entered into SPSS, version 16 (SPSS Inc, Chicago, Illinois, United States of America). The quantitative variables were presented via mean \pm SD, and the qualitative variables were presented as frequencies and percentages. The independent t-test and the Pearson correlation coefficient were used to analyze the data. The significance level was set at 95%.

3. Results

Table 1 provides the frequency distribution of the subjects in the study according to age, occupation, education level, marital status, number of children, and smoking. About 75% of the men were between 50 and 60 years of age. The majority of the subjects (81.25%) were employed, and most of them (91%) smoked cigarettes. Only 5% of the men were married. To measure reliability, the alpha coefficient was used to evaluate the questions (N=30), and table 2 presents the results. The Chronbach's alpha score was above 70% in all cases. The results of the survey showed that men in the study had little knowledge (34.11 \pm 8.22 from 100) and attitudes (28.23 \pm 7.23 from 100) about prostate cancer and screening behavior. The mean scores on quality of life and general health were moderate. The subjects had low self-efficacy and low perception of social support. Mean scores of enabling factors and screening behaviors were at a low level (Table 3).

Table 1. Frequency distribution of study subjects according to age, occupation, educational level, marital status, number of children, and smoking

Variable		n (%)
Age (years)	50-60	295 (73.75)
	Over 60	105 (26.25)
Education	Less than a high school diploma	260 (65)
	High school diploma and above	140 (35)
Occupation	Employed	325 (81.25)
	Unemployed	75 (18.75)
Marital Status	Single	380 (95)
	Married	20 (5)
Number of children	3 or less	125 (31.25)
	More than 3	275 (68.75)
Smoking	Yes	364 (91)
	No	36 (9)

Table 2. Reliability of the questions in the pilot study (N = 30)

Variable	Number of questions	Alpha coefficient
Quality of Life	20	0.74
Public Health	28	0.72
Questions on knowledge about prostate cancer in men	12	0.72
Questions on attitude about prostate cancer in men	10	0.71
Perceived general self-efficacy	10	0.75
Perceived social support	14	0.78
Enabling factors	6	0.72

The Pearson correlation scores showed a significant correlation between prostate cancer screening behavior and demographic variables, such as age ($p=0.04$, $r=0.136$), occupation ($p=0.01$, $r=0.121$), educational level ($p=0.02$, $r=0.211$), and marital status of the subjects ($p=0.01$, $r=0.112$), but it did not have a significant correlation with the number of children ($p=0.12$, $r=0.092$) or smoking ($p=0.09$, $r=0.002$). The results of the t-test showed significant relationships between age, occupation, and education of the subjects with the PRECEDE model structures, and the PRECEDE model showed such relationships between predisposing factors, enabling factors, and reinforcing factors ($p<0.05$).

Table 3. Mean scores of knowledge, attitude, quality of life, general health, overall self-efficacy, perceived social support, enabling factors and prostate cancer screening behavior.

Variables	Mean±SD ^a
Knowledge score	34.11 ± 8.22
Attitude score	28.23±7.23
Quality of life score	58.2±6.79
General health score	2.13±4.24
General perceived self-efficacy score	29.43±6.87
Perceived social support score	27.56±8.65
Enabling factors score	29.10±5.78
Screening behaviors score	21.12±4.31

^a Standard deviation

4. Discussion

The results of this study showed that there was a significant relationship between prostate cancer screening behaviors and age, occupation, educational level, and marital status. The overall incidence of prostate cancer increases faster with age than other malignant cancers. Hosseini's studies in Mazandaran Province (5), Winterich Julie (31), McFall (32), Parker (33) and Kenerson (24) showed that prostate cancer screening behaviors are significantly associated with age. The results in our study regarding employment status were consistent with the results of studies by Judith (34), Hosseini (5), Namdar (35) and Friedenreich (36). Marital status also was studied by Chan (37), Walsh (34), and Kenerson (24). We found that an increase in educational level leads to an increase in mean score for prostate cancer screening behaviors, and this results was consistent with the findings of Winterich (31), Consedine (38), and Walsh (34). Hosseini's study (5) introduced smoking as a risk factor for prostate cancer. However, in this study, there was no significant relationship between the score of prostate cancer screening behaviors with smoking. The results of this study showed that men in this study had a little knowledge and attitudes about prostate cancer and screening behavior. This was consistent with results of studies by Forrester-Anderson (39), Woods (40), Abbott (41), and Parker (33). According to the PRECEDE model, knowledge and attitudes as predisposing factors can lead to appropriate health behavior, but the formation of appropriate behavior requires other factors, such as enabling factors and reinforcing factors, which are influential and decisive. Also, we should consider individual behavior changes, and we should take into account environmental and individual factors (42). As can be seen in the present study, subjects had a fairly favorable quality of life. Based on findings of similar studies on different domains of these patients' quality of life, their poor perception of health resulting from their views about their health status is much more pronounced (43, 44). These patients' chronic disease is likely to have a strong negative effect on their perceptions of their health status. This is consistent with results of the study by Morovika and colleagues (44). Based on the results, the scores of subjects' health status were lower than the maximum score of 84, which showed that their view of their health status was positive. This is consistent with results of Nagiwa et al. and Carroll et al. in European countries (Slovakia, France, The Netherlands, Norway, and Sweden) on patients with rheumatoid arthritis (45, 46).

In this study, the mean scores of self-efficacy and self-management behaviors were low, indicating a lack of attention and activity in line with self-care behaviors to prevent prostate cancer. Therefore, when designing educational programs for these individuals, nurses and health professionals should provide information regarding methods and tools for better self-management and their correct implementation. In their educational programs, they should take advantage of opinions provided by experts as well as patients who have been successful in self-management of their diseases. Hansen and colleagues also found that the use of self-care strategies were associated with improved quality of life (47). Kenerson pointed to the role of perceived behavioral control in prostate cancer screening behaviors (24). Studies by Alidousti et al. (48), Namdar et al. (35), and Consedine (49) showed that self-efficacy has an important role in promoting cancer prevention behaviors. Kessler's study on Indian women stressed the importance of techniques to increase self-efficacy for improving screening behaviors (50). Keshavarz et al.'s qualitative study of Iranian female workers showed that most subjects did not have self-efficacy and intention to receive breast and uterine cancer screening (51). The subjects' perceived that social support was poor. Regarding the relationship between self-management behaviors and reinforcing factors, we can say that increasing social support improves patients' self-management behaviors. Chen conducted a study in this area (52). Orem suggested that social support can provide messages and information that help satisfy social interaction needs and strengthen motivation

and self-care behavior (53). These findings support the views that social support through social interaction affects participation in self-management behaviors and that adequate social support facilitates actions and thoughts of a person (in order to perform self-management behaviors) (54). Therefore, performing multiple treatments beginning in the early stages of the disease improves self-management behaviors and the health status of patients. Such treatments include educational programs, such as telephone counseling, participating in social activities, providing exercise therapy and group therapy, and teaching coping skills to prevent avoidance behaviors regarding self-management.

The input of doctors is one of the factors that affect patients' decisions about their personal lifestyles (55). Several studies have shown that doctors' recommendations are a major contributing factor in accessing preventive care and adjusting to health promotion behaviors. Doctors' attention and their recommendations related to self-management behaviors can have a significant effect on patients' performances (40). Yavari stressed the effects of doctors and healthcare personnel (56), and Randy (57) pointed to the effects that family and friends can have as sources of information and support. Duggleby studied the effectiveness of psychosocial and social support in enhancing the quality of life of cancer patients (58). The mean score of enabling factors was low. Factors such as subjects' perceptions of the extent to which they think their income is sufficient for good health, the extent to which they have access to medicine or medical specialists, and the extent to which they know self-care behaviors were considered as enabling factors for screening behaviors. Enabling factors of prostate cancer screening behaviors in other studies include cost of screening, time and access to physicians (24), insurance (33), and the cost and availability of healthcare (41). Lavist and colleagues showed that structural factors, such as having private insurance and the availability of health services (enabling factors), have an important role in determining the rate of use of prenatal services for women and improvement of their health status. In fact, these enabling factors were more important than cultural and behavioral differences (59). Tudior and colleagues posited that the lack of access to doctors and not having enough time were identified as barriers to prevent men seeking medical care (55).

The men in this study underperformed on prostate cancer screening behaviors. This finding was not unexpected, because the results of this survey based on the PRECEDE model showed that men had little knowledge and attitudes about prostate cancer and screening behavior and that they had low levels of perceived self-efficacy, social support, and enabling factors. These results are consistent with those of Nnodimele (60), Jones (57), Lee (61), and Rezayian (62). In order to promote prostate cancer screening behaviors, the participation of various related parties is necessary. The involvement of families in developing and holding training programs, publication of books and pamphlets in this regard, the use of educational media, and the revision of TV and radio programs are important and effective steps in improving people's quality of life and their prostate cancer screening behaviors.

5. Conclusions

The results of this study showed that prostate cancer screening behaviors were at a low level in men over 50 years of age in Fasa. Intervention efforts to improve their screening behaviors and quality of life seem important. These findings can be used most effectively in educational planning. Authorities should develop educational and interventional programs to enhance self-management behaviors and health status in hospitals and health centers. To this end, the cooperation of health education professionals, specialists, nurses, and the families of the men involved or their caregivers is necessary for developing appropriate programs.

Acknowledgments:

The authors sincerely appreciate the financial support for this study provided by the Deputy of Research and Technology at Fasa University of Medical Sciences, and we also appreciate the staff of the health centers in Fasa, Iran, for their cooperation and assistance.

Conflict of Interest:

There is no conflict of interest to be declared.

Authors' contributions:

All authors contributed to this project and article equally. All authors read and approved the final manuscript.

References

- 1) Jemal A, Murray T, Ward E, Samuels A, Tiwari RC, Ghafoor A, et al. Cancer Statistics: American Cancer Society. *CA Cancer J Clin.* 2005; 55: 10-30. DOI: 10.3322/canjclin.55.1.10

- 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: 303-13. doi: 10.1016/S1470-2045(04)01468-8
- 3) Cokkinides V, Albano J, Samuels A, Ward ME, Thum JM. American cancer society: Cancer facts and figures. Atlanta, American Cancer Society, 2005.
- 4) Turini M, Redaelli A, Gramegna P, Radice D. Quality of life and economic considerations in the management of prostate cancer. *Pharmaco economics.* 2003; 21(8):527-41. doi: 10.2165/00019053-200321080-00001
- 5) Hosseini M, Jahani Y, Mahmoodi M, Eshraghian MR, Yahyapour Y, Keshtkar AA. The assessment of risk factors for prostate cancer in Mazandaran province, Iran. *J Gorgan Uni Med Sci.* 2009; 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, Lianes 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. PMID: 12497032
- 8) Wilkinson S, List M, Sinnir M, Dai L, Chodak G. Educating African-American men about prostate cancer: impact on awareness and knowledge. *Urology.* 2003; 61(2):308-13. doi: 10.1016/S0090-4295(02)02144-1
- 9) Stamey TA, Cldwell M, McNeal JE, Nolley R, Hemensz M, Down J. The prostate specific antigen era in the United State is over for prostate cancer: what happened in the last 20 years? *J Urol.* 2004; 172: 1297-301. doi: 10.1097/01.ju.0000139993.51181.5d
- 10) George Alan, Fleming Paul. Factors affecting men's help-seeking in the early detection of prostate cancer: implications for health promotion. WPMH GmbH. Published by Elsevier Ireland Ltd, 2004; 1(4): 345-52. doi: 10.1016/j.jmhg.2004.10.009
- 11) Simforoosh N, Nouralizadeh A. [Iranian text book of Urology]. 1th ed. Tehran, Behineh Publisher; 2007, PP: 903-38.
- 12) Lunenfeld B. The ageing male: demographics and challenges. *World J Urol.* 2002; 20: 11-6. doi: 10.1007/s00345-002-0250-y
- 13) Capik C, Gozum S. Development and validation of Health Beliefs Model Scale for Prostate Cancer Screenings (HBM-PCS): Evidence from exploratory and confirmatory. *Eur J Oncol Nurs.* 2011; 15(5): 478-85. doi: 10.1016/j.ejon.2010.12.003
- 14) Dehghan V, Moein M. New treatment of benign prostatic hyperplasia. *JSSU.* 2000; 9(1): 97-101.
- 15) Chiu BCH, Andersonc JR, Corbind D. Predictors of prostate cancer screening among health fair participants. *Public Health.* 2005; 119: 686-93. doi: 10.1016/j.puhe.2004.08.021
- 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 Mens Health.* 2009; 6(3): 183-90. doi: 10.1016/j.jomh.2009.05.004
- 17) Haghghi F. Epidemiological study of prostate neoplasm in Birjand. *Journal of Birjand University of Medical Sciences.* 2005; 12(1): 9-15.
- 18) Sherman DW, Haber J, Hoskins CN, Budin WC, Maislin G, Cater J, et al. Differences in physical, emotional, and social adjustment of intimate, family, and no family patient-partner dyads based on a breast cancer intervention study. *Oncol Nurs Forum.* 2009; 36: 185-97. doi: 10.1188/09.ONF.E185-E197
- 19) Shojaezadeh D. [Health Education Model]. 1st, Communication and Health Education Center Publisher, Ministry of Health and Medical Education 2000: 1-25.
- 20) Mitchell TD. Applications of the RRECEDE Model to the Evaluation of Cervical Cancer Screening Behavior among College Women. Dissertation presented for the degree of doctor of philosophy, University of Florida, 2004.
- 21) Menon U, Champion VL, Larkin GN, Zollinger TW, Gerde PM, Vernon SW. Beliefs Associated With Fecal Occult Blood Test and Colonoscopy Use at a Worksite Colon Cancer Screening Program. *J Occup Environ Med.* 2003; 45(8): 891-8. doi: 10.1097/01.jom.0000083038.56116.30. PMID: PMC3042891
- 22) Green LW, Kreuter MW. Health promotion planning: An educational and environmental approach. 2nd ed. Palo Alto: Mayfield Publishing Co; 1991, 478-507.
- 23) Oliver JS. Prostate Cancer Screening Patterns among African American Men in the Rural South. (Dissertations) PhD, Nursing, School of Nursing. Georgia State University Digital Archive, 2008.
- 24) Kenerson Donna. Use of the theory of Planned Behavior to assess Prostate cancer screening intent among African American men. (Dissertations) PhD, Nursing science, School of Vanderbilt University, 2010.
- 25) Stewart AL, Hays RD, Ware JE Jr. The MOS short-form general health survey: Reliability and validity in a patient population. *Med Care.* 1988; 26:724-35.

- 26) Robb JC, Young LT, Cooke RG, Joffe RT. Gender differences in patients with bipolar disorder influence outcome in the medical outcomes survey (SF-20) subscale scores. *J Affect Disord.* 1998; 49:189-93. doi: 10.1016/S0165-0327(98)00003-2
- 27) Nadrian H, Morowati Sharifabad MA, Soleimani Salehabadi H. Paradims of rheumatoid arthritis patients quality of life predictors based on path analysis of the Precede model. *Hormozgan Med J.* 2010; 14(1): 32-44.
- 28) Goldberg DP, Hillier VF. A Scaled Version of the General Health Questionnaire. *Psychol Med.* 1979; 9(8): 139-45. doi: <http://dx.doi.org/10.1017/S0033291700021644>
- 29) Weinrich S P, Seger R, Miller B.L, Davis, C, Kim S, Wheeler C, et al. Knowledge of the limitations associated with prostate cancer screening among low-income men. *Cancer Nursing.* 2004; 27(6): 442-50.
- 30) Rajabi GR. Reliability and validity of the general self-efficacy beliefs scale (gse-10) comparing the psychology students of Shahid Chamrin University and Azad University of Marvdasht. *New thoughts on education.* 2006; 2(1-2): 111-22.
- 31) Winterich Julie A, Grzywacz Joseph G, Quandt Sara A, Clark Peter E, Miller David P, Acuña Joshua. Men's Knowledge and Beliefs about Prostate Cancer: Education, Race, and Screening Status. *Ethn Dis.* 2009; 19(2): 199–203. PMID: PMC2699598
- 32) McFall SL, Hamm RM, Volk RJ. Exploring beliefs about prostate cancer and early detection in men and women of three ethnic groups. *Patient Educ Couns.* 2006; 61(1):109-16. doi: 10.1016/j.pec.2005.02.016
- 33) 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
- 34) Walsh Judith ME, Kim Sue E, Sawaya George. Colorectal Cancer Screening: What Do Women From Diverse Ethnic Groups Want?. *J Gen Intern Med.* 2012; 28(2): 239–46. doi: 10.1007/s11606-012-2210-6
- 35) Namdar A, Bigzadeh Sh, Naghizadeh M M. Measuring Health Belief Model Components in Adopting Preventive Behaviors towards Cervical Cancer. *JFUMS.* 2012; 2(1): 34-44.
- 36) Friedenreich CM, McGregor SE, Courneya KS, Angyalfi SJ, Elliott FG. Case-control study of lifetime total physical activity and prostate cancer risk. *Am J Epidemiol.* 2004; 159(8):740-9. doi: 10.1093/aje/kwh106
- 37) Chan Evelyn C Y, Vernon Sally W. Informed Consent for Cancer Screening With Prostate- Specific Antigen: How Well Are Men Getting the Message?. *Am J Public Health.* 2003; 93: 779–85. doi: 10.2105/AJPH.93.5.779
- 38) Consedine Nathan S, Morgenstern Amy H, Kudadjie-Gyamfi E. Prostate Cancer Screening Behavior in Men from Seven Ethnic Groups: the Fear Factor. *Cancer Epidemiol Biomarkers Prev.* 2006; 15: 228-37. doi: 10.1158/1055-9965.EPI-05-0019
- 39) Forrester-Anderson IT. Prostate cancer screening perceptions, knowledge and behaviors among African American men: focus group findings. *J Health Care Poor Underserved.* 2005; 16(4): 22-30. PMID: 16327094
- 40) Woods V, Diane, Montgomery Susanne B, Herring R, Patti. Social Ecological Predictors of Prostate- Specific Antigen Blood Test and Digital Rectal Examination in Black American Men. *J Natl Med Assoc.* 2006; 98(4): 492-504. PMID: PMC2569227
- 41) Abbott RR, Taylor DK, Barber K. A comparison of prostate knowledge of African-American and Caucasian men: changes from prescreening baseline to post intervention. *Cancer J Sci Am.* 1998; 4(3): 175-7. PMID:9612599
- 42) Jackson C. Behavioral science theory and principles for practice in health education. *Health Educ Res.* 1997; 12(1): 143-50. Doi: 10.1093/her/12.1.143
- 43) Revicki DA, Wood M, Maton PN, Sorensen S. The Impact of gastro esophageal reflux disease on health-related quality of life. *Am J Med.* 1998; 104(16): 252-8. doi: 10.1016/S0002-9343(97)00354-9
- 44) Mokrowiecka A, Jurek K, Pińkowski D, Małecka-Panas E. The Comparison of Health-Related Quality of Life (HRQL) in patients with GERD, peptic ulcer disease and ulcerative colitis. *Adv Med Sci.* 2006; 51(4): 142-7. PMID: 17357295
- 45) Nagyova I, Krol B, Szilasiova A, Stewart RE, Van Dijk JP, Van den H, etal. General Health Questionnaire-28: psychometric evaluation of the Slovak version. *Studia Psychologica.* 2000; 42(4): 351-61.
- 46) Krol B, Sanderman R, Moum T, Suurmeijer T, Doeglas D, Krijnen, et al. A comparison of the General Health Questionnaire-28 between patients with rheumatoid arthritis from The Netherlands, France, Sweden, and Norway. *Eur J Psychol Assess.* 1994; 10(6): 93-101.
- 47) Hansson A, Hilleras P, Forsell Y. What Kind of Self-Care Strategies Do People Report using and is there an Association with Well-Being. *Soc Indic Res.* 2005; 73(1): 133-9. DOI: 10.1007/s11205-004-0995-3

- 48) 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. *Scientific-Research Journal of Shahed University*. 2011; 18(94): 1-11.
- 49) 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
- 50) Kessler TA. Increasing mammography and cervical cancer knowledge and screening behaviors with an educational program. *Oncol Nurs Forum*. 2012; 39(1):61-8. doi: 10.1188/12.ONF.61-68
- 51) Keshavarz Z, Simbar M, Ramezankhani A. Factors for performing breast and cervix cancer screening by Iranian female workers: a qualitative-model study. *Asian Pac J Cancer Prev*. 2011; 12(6): 1517-22. PMID: 22126491
- 52) Chen SY, Wang HH. The Relationship between Physical Function, Knowledge of Disease, Social Support and Self-care behavior in Patients With Rheumatoid Arthritis. *Journal of Nursing Research*. 2007; 15(3): 183-91. doi: 10.1097/01.JNR.0000387614.87683.5a
- 53) Orem DE. *Nursing: Concepts of practice*. 4th ed. USA: MO: Mosby; 1991: 251.
- 54) Lee I, Wang HH. Menopausal experiences and self-care behaviors among mid-life women. *Nursing Research*. 2000; 8(1): 71-84.
- 55) Tudiver F, Talbot Y. Why don't men seek help? Family physicians' perspectives on help-seeking behavior in men. *J Fam Pract*. 1999; 48(3): 147-52. PMID: 9934383
- 56) Yavari P MY, Aminpour Hoseingholi M. Knowledge and practice of women regarding BSE: a case-control study. *J Ardabil Univ Med Sci*. 2005; 5(4): 371-9.
- 57) Jones Randy A, Steeves Richard, Williams Ishan. How African American Men decide Whether or Not to Get Prostate Cancer Screening. *Cancer Nurs*. 2009; 32(2): 166–172. doi: 10.1097/NCC.0b013e3181982c6e. PMID: PMC2709174
- 58) Duggleby WD, Degner L, Williams A, Wright K, Cooper D, Popkin D, Holtslander L. Living with hope: initial evaluation of a psychosocial hope intervention for older palliative home care patients: *J Pain Symptom Manage*. 2007; 33(7):247-57. doi: 10.1016/j.jpainsymman.2006.09.013
- 59) Laveist TA, Keith VM, Gutierrez ML. Black/White differences in Prenatal Care Utilization: An assessment of predisposing and enabling factors. *Health Service Research*. 1995; 30(1): 43- 58. PMID: PMC1070350
- 60) Atulomah Nnodimele O, Olanrewaju Motunrayo F, Amosu Ademola M, Adedeji Omotoyosi. Level of Awareness, Perception and Screening Behavior Regarding Prostate Cancer among Men in a Rural Community of Ikenne Local Government Area, Nigeria. *Primary Prevention Insights*. 2010; 2: 11–20. doi: 10.4137/PPRI.S5955
- 61) Lee Daniel, Consedine Nathan S, Spencer Benjamin A. Barriers and Facilitators to Digital Rectal Examination Screening among African-American and Afro-Caribbean Men. *Urology*. 2011; 77(4): 891–8. doi: 10.1016/j.urology.2010.11.056
- 62) 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. *Ofoogh-Danesh*. 2007; 12(4): 19-26.