DOI: http://dx.doi.org/10.22122/ijbmc.v9isp.417 Published by Vesnu Publications

International Journal of Body, Mind and Culture

The Effectiveness of Internet-Based Hope Therapy on Coping Strategies in Patients with Prostate Cancer

Mahmood Jamal Abdulhasan[1], Nada Fadhil Abbas[2], Nazar Abdulkarim Hamed[3], Ahmed Al-Hili[4], Doaa A. Hamad[5], Asil Sehil Najm[6],

1 Environmental Research Group, Scientific Research Center, Al-Ayen University, Thi-Qar, Iraq
[2] Al-Manara College For Medical Sciences, Maysan, Iraq
[4] Department of Medical Laboratory Techniques, College of Medical Techology, Al-Farahidi University, Baghdad, Iraq
[3] Department of Anesthesia Techniques, AlNoor University College, Nineveh, Iraq
[5] Department of Nursing, Hilla University College, Babylon, Iraq
[6] Department of Pharmacy, Ashur University College, Baghdad, Iraq

Corresponding Author: Mahmood Jamal Abdulhasan; ***Environmental Research Group, Scientific Research Center, Al-Ayen University, Thi-Qar, Iraq***
Email: mahmud.jamal@alayen.edu.iq

Quantitative Study

Abstract

Background: Most men have prostate cancer (PC), the second leading cause of death. The current study aimed to investigate the effectiveness of Internet-based hope therapy on coping strategies in men with PC.

Methods: A quasi-experimental research with a pretest-posttest design and a control group was used in this study. 317 men with PC were referred to the King Fahd Medical City in Riyadh, Saudi Arabia, in 2020. Following the participants' voluntary selection, the pre-test stage was performed, and they were given the Coping Inventory for Stressful Situations (CISS). Subjects were chosen by simple random sampling and divided into two groups of 25 experimental and control subjects. Before taking the post-test, the experimental group received hope therapy training. The data were analyzed using multivariate analysis of covariance (MANCOVA) and SPSS software.

Results: There was a significant difference between the experimental and control groups regarding stress ($F = 57.495$, $P < 0.001$), problem-oriented strategy ($F = 33.041$, $P < 0.001$), excitement strategy ($F = 28.491$, $P < 0.001$), and circuit avoidance strategy ($F = 87.138$, $P < 0.001$) variables. As a result, it can be concluded that the intervention was effective, and the experimental group outperformed the control group in the post-test stage.

Conclusion: Hope therapy has a good effect on reducing stress in patients with PC and can be used to reduce the negative psychological consequences and increase effective coping strategies with stress.

Keywords: Prostate cancer; Internet-based intervention; Hope; Stress

Citation: Abdulhasan MJ, Abbas NF, Hamed NA, Al-Hili A, Hamad DA, Najm AS. **The Effectiveness of Internet-Based Hope Therapy on Coping Strategies in Patients with Prostate Cancer.** Int J Body Mind Culture 2022; 9(Special Issue): 63-71.

Received: 01 June 2022
Accepted: 05 July 2022

This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 Unported License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction

Cancer is characterized by abnormal cell deformation and loss of cell differentiation, leading to cell proliferation and abnormal growth in the environment. Cancer is not a disease with a specific cause; it refers to a group of diseases with varying symptoms, manifestations, treatments, and prognoses (Afshar-Oromieh et al., 2018). Prostate cancer (PC) is one of the leading causes of death in men. The disease is typically asymptomatic until advanced stages and manifests as distant metastases (Aggarwal et al., 2018). Therefore, a strong clinical suspicion, a careful clinical examination of the patient, and requesting appropriate tests and imaging for timely diagnosis and screening of the patient can aid in the early diagnosis of the disease before the development of metastases and additional complications. Early diagnosis can decrease both mortality and morbidity rates (Craig et al., 2022).

As a stressful event, exposure to cancer can jeopardize multiple aspects of a patient's health, including his or her physical, mental, and family health (Wang et al., 2019). Depression, stress, maladaptation, low self-esteem, emotional disorders, and fear of relapse and death are prevalent among patients with various types of cancer (Bjartell, 2019). The relationship between patients with cancer, psychological adjustment, and health-related behaviors is an important and widely discussed topic around the globe. Because the etiology and treatment of cancer are multifactorial, psychological and behavioral factors are just as important in its treatment as physical factors. Stress, anxiety, and depression have been shown to affect the human immune system directly (Faryabi, Rafieipour, Haji-Alizadeh, & Khodavardian, 2021). It is well known that chronic stress is a major immune modulator affecting cancer's destructive effects (Calais et al., 2021).

According to studies, cancer has several negative effects on these patients, including decreased general health, decreased quality of life, and despair, with stress, depression, and despair being the most prevalent (Endler, Parker, Ridder, & van Heck, 1990). According to the World Health Organization (WHO) definition of health, which describes it as a state of complete physical, mental, and social well-being and not merely the absence of disease and incapacity, it is necessary to pay attention to the psychological component of health, which is inseparable from the other components (Foroozanfar & Ansari-Shahidi, 2020). Neuropsychological immunology is a subfield of health psychology that investigates the influence of psychological factors on the immune system and disease risk (Azarnik, 2019). Basic findings in this field indicate that personality, behavior, excitement, and cognition can influence the body's immune system and disease risk. In addition to medication, it appears that psychological interventions and therapies can be effective in treating psychological problems. According to researchers, psychotherapy may be useful and effective in preventing and treating physical illnesses (Salavati et al., 2021). Hope therapy is one type of psychological treatment. Patients with chronic physical disorders, including patients with cancer, find hope to be a significant and unconscious component of their thoughts and emotions. Most research on hope has been conducted on patients with cancer because these patients view it as a threat after their diagnosis has been confirmed (Shen et al., 2021).

Life expectancy is an inner force that can enrich life and allow patients to envision a future beyond their current unhealthy state of suffering. Negative beliefs about mortality and a lack of purpose in life contribute to a decrease in quality of life. Important characteristics of life expectancy include a focus on the future, optimistic

expectations, a sense of purpose, a healthy dose of realism, goal-setting, and internal communication (Dong et al., 2020). While despair can lead to depression, the desire to die, and even suicide, it is defined as enduring an impossible situation with no hope of achieving any goal. By definition, life expectancy involves people's perceptions and focus on the future, and the patient's struggle is exacerbated by the belief that positive outcomes are likely. People with chronic illnesses have different physiological, psychological, and emotional needs. Since satisfying these needs is part of treatment, the most advantageous options for disease improvement and meeting their needs are interventions that include psychological and physical therapies (Helsmoortel, Everaert, Lumen, Ost, & Vandesompele, 2018).

Snyder Hope Therapy is the only psychological therapy that views hope as the primary goal of treatment. Snyder (2000), the creator of the hope theory and the therapy based on it, defines hope as a structure that includes two concepts: the ability to design pathways to desirable goals despite existing obstacles and the agency or motivation to use these pathways. Having completed cancer and optimistic thinking are linked in two ways. First, hopeful people are more focused on the problem and more engaged in its resolution (Mao et al., 2021). They are more likely to participate in cancer screening activities. Second, people who believe in hope are less anxious and more adaptable in the face of cancer diagnosis and treatment. On the other hand, people with higher hopes show greater resistance to endure long and painful treatments during treatment. Promoting hope, one factor that makes life meaningful, assists people in adapting to cancer, reducing mental suffering, and improving their quality of life (Pal et al., 2019).

The role of psychological interventions in managing stress and other psychological symptoms in patients with cancer is such that the level of anxiety, stress, and depression in patients with cancer is significantly reduced after psychological interventions, and their performance and interpersonal relationships are improved. Psychological accelerating factors such as stress, anxiety, fear, anger, depression, and mental disorders have been shown in studies of patients with cancer to be reduced by using psychological therapies (Schoder et al., 2022).

Patients with PC experience chronic stress, multiple physical, psychological, and social disorders, and diminished psychological traits. PC is one of the most prevalent diseases in the modern civilized world, and its prevalence is increasing daily. After a cancer diagnosis, patients also experience death anxiety; treating this disorder is associated with chronic pain for patients, which is a very costly issue for the medical system. This research aimed to examine the efficacy of Internet-based hope therapy on coping strategies in men with PC.

Methods

The current study utilized a quasi-experimental design with a pretest-posttest structure and a control group. The statistical population included 317 men with PC referred to the King Fahd Medical City in Riyadh, Saudi Arabia, in 2020. The statistical sample for the study was chosen based on its purpose and availability. Inclusion criteria included having no neurological disorders leading to drug use (self-reported), being between the ages of 45 and 65, being married, having at least a high school diploma, and agreeing to participate in the study. Participants' withdrawal from treatment sessions, absence for more than two sessions, history of attending psychological and psychiatric interventions in the previous year, and use of psychiatric medications were also exclusion criteria. Following the participants'

voluntary selection, the pre-test stage was performed, and the Coping Inventory for Stressful Situations (CISS) (Endler et al., 1990) was presented to them. Subjects with above-average and above-mean scores were chosen as a sample and randomly assigned to two groups of 25 experimental and control subjects. In order to follow ethical rules, after choosing samples with the help of the chemotherapy department and the treating doctor, these individuals' information was ethically and confidentially recorded, and they were contacted. After obtaining consent, this information would remain confidential until the completion of the project, and for this issue, patients' written consent was obtained.

The Endler and Parker CISS consists of 48 items measuring coping strategies. This list contains three subscales: problem-oriented, emotion-oriented, and avoidance-oriented strategies. Responses are graded on a five-option scale ranging from never to excessively. Change ranges from 16 to 80 for problem-oriented, emotion-oriented, and avoidance strategies. The list's reliability was supported by the findings of Endler and Parker (1990) and other studies. Cronbach's alpha indicated that this checklist for stressful situations had a high validity coefficient (0.83) (Rafnsson, Smari, Windle, Mears, & Endler, 2006). For the validity of the list mentioned above, the Pearson correlation coefficient was used to calculate the correlation between the factors of the stress-coping questionnaire, with the following results: problem-oriented circuit: 0.60, emotion-oriented circuit: 0.58, and avoidance circuit: 0.92 (McWilliams, Cox, & Enns, 2003). In this study, the list's reliability was determined using Cronbach's alpha coefficient for problem-oriented, emotion-oriented, and avoidance-oriented styles, which were 0.86, 0.71, and 0.86, respectively.

Snyder (2000) provides a hope therapy program provides a theory of hope principles and their application in people's lives. For eight weeks, they all participated in a one-hour hopeful group therapy program twice a week, which included hopeful training and exercises. This information was delivered via text, audio, video, observation, and interactive exercises. Users can now browse PDF files offline by downloading them. Furthermore, during the therapy sessions, the therapist made video calls to the experimental group members via the cyberspace group at the specified time and taught the techniques. Members of the cyberspace group discussed the previous session's topics, reviewed previously assigned assignments, and were encouraged to help each other solve problems. Furthermore, members discussed how to apply these skills in real-life crises and were encouraged to express their problems and assist one another in learning how to apply these skills to solve their problems. Table 1 shows the summary of hope therapy sessions in the experimental group.

This research analyzed the mean and standard deviation (SD) of values of the variables at various stages and for each group. The experimental group received hope therapy training before taking a post-test. A multivariate analysis of covariance (MANCOVA) test was used to compare the mean and SD of research variables in experimental and control groups. SPSS software (version 21, IBM Corporation, Armonk, NY, USA) and MANCOVA were used to analyze the data.

Results

There were 50 participants in the current study (25 in each experimental and control groups). The study's participants were all 45-65-year-old men with PC. Table 2 shows descriptors of coping strategies (stress, problem-oriented strategy, excitement strategy, and circuit avoidance strategy variables).

Table 1. Summary of hope therapy sessions in the experimental group

Session	Session description
1	Introducing and determining the rules, the structure of the meetings, the purpose and types, the significance of the need for the goal in various aspects of life, the means to achieve the goal, and the required motivation to pursue it
2	Understanding the importance and role of stress coping strategies in reducing PC stress, as well as the theory of hope's goals, factors, and pathways, explaining how setting goals can increase factor thinking, describing the continuity of progress, and emphasizing the need to reevaluate goals
3	Using positive thinking and reiterating positive words to express goal-setting strategies practically (setting objective goals by considering the endpoint, as an approach, tending and dividing large goals into sub-goals)
4	Teaching strategies for creating by strengthening navigator thinking through gradual planning and strategies for strengthening the will through photons of fantasy, mental visualization, role modeling, positive self-talk, familiarity with how to deal with obstacles, challenges, and crises, identifying their thoughts to change dysfunctional beliefs and attitudes, learning to deal with crises through the creation of alternative passages through creativity
5	Expressing the two main types of motivation (physical and mental motivation), describing self-esteem as an important factor in the mental will, analyzing the causes of negative self-reflection actions and articulating ways to change negative self-reflection, compiling a list of current events, and providing context for them
6	Describing the effectiveness of the path in achieving goals and providing two strategies to enhance the effectiveness of the path (having multiple paths and listing them and visualizing the success of paths)
7	Describing a second method for boosting mental will (re-evaluation of goals) and then two methods for boosting physical will (regular diets and exercise methods tailored to physical condition)
8	Discussing relapses and recurrences, as well as ways to deal with them, how optimistic thinking can be used in everyday life, especially with PC, and the chance for members to have more conversations, a summary, feedback, and post-test

PC: Prostate cancer

Table 2 shows that the coping strategies were significantly different in the experimental group in the post-test stage compared to the pre-test stage. The control group, on the other hand, showed no change in the post-test phase.

The experimental and control groups were compared using MANCOVA to see if there were any significant differences in coping strategies. In order to comply with statistical assumptions, the results of the Box's M and Levene's tests were checked before performing the covariance analysis. The homogeneity assumption was correctly observed because the Box's M test was insignificant [Box's M: 23.109, F: 1.804, degree of freedom 1 (df_1): 1, df_2: 12433.072, P = 0.183]. Furthermore, Levene's test results showed that none of the variables were significant. As a result, the assumption of intergroup variance equality was observed, and the amount of variance in the error of dependent variables was equal in all groups.

Table 2. Mean and standard deviation (SD) of the studied variables for each group in different stages of the research

Variable	Group	Pre-test (mean ± SD)	Post-test (mean ± SD)
Stress	Experiment	46.73 ± 5.12	32.18 ± 4.67
	Control	46.29 ± 5.34	47.04 ± 5.64
Problem-oriented strategy	Experiment	34.57 ± 5.49	45.71 ± 7.43
	Control	34.94 ± 6.27	34.16 ± 5.23
Excitement strategy	Experiment	57.47 ± 8.59	42.19 ± 6.26
	Control	56.14 ± 8.42	56.23 ± 8.73
Circuit avoidance strategy	Experiment	52.37 ± 5.21	41.09 ± 4.18
	Control	52.81 ± 5.43	52.24 ± 5.34

SD: Standard deviation

Table 3. Results of multivariate analysis of covariance (MANCOVA) to evaluate the effectiveness of hope therapy

Test	Value	F	P-value	Eta squared	Statistical power
Pillai's trace	0.746	71.762	< 0.001	0.746	1
Wilks' lambda	0.083	71.762	< 0.001	0.746	1
Hotelling's trace	12.519	71.762	< 0.001	0.746	1
Roy's largest root	12.519	71.762	< 0.001	0.746	1

Given that the significance level in Box's M test was 0.183, which is greater than 0.05, the null hypothesis cannot be rejected at this level. Consequently, the homogeneity of the variance matrix and the variables' covariance can be assumed to be true ($F = 1.804$, $P > 0.05$). The homogeneity of variance and covariance matrices is also a valid assumption. Table 3 presents the results of MANCOVA to evaluate hope therapy's effectiveness.

MANCOVA test to compare the mean of research variables in experimental and control groups is presented in table 4.

There was a significant difference between the experimental and control groups regarding the coping strategies (Table 4). As a result, it can be concluded that the intervention was effective, and the experimental group outperformed the control group in the post-test stage.

Discussion

The current study aimed to investigate the effectiveness of Internet-based hope therapy on the coping strategies in men with PC. The results demonstrated that training in hope therapy increased the use of problem-oriented strategy and decreased the stress, excitement strategy, and circuit avoidance strategy variables among patients with PC. Various studies have been performed by other researchers in line with the results of this study.

Positive beliefs and expectations can positively affect the central nervous system (CNS), according to the findings of Green (2004) and Anderson et al. (2004) studies on patients with chronic physical disorders. As a result of their positive beliefs and expectations about the outcome of treatment, patients hoping for recovery and health have recovered more quickly. Snyder and Lopez (2001) have used hope as a placebo in treating physical and mental illnesses, claiming that education in hope therapy causes positive changes in human physiology.

The finding can be explained by saying that hope therapy helps patients set specific goals, come up with different ways to reach those goals, get motivated to reach those goals, and find and get rid of obstacles creatively. The creation of hopeful thinking about life and dealing with its problems and destructive effects at various levels of life is a significant advantage of hope therapy over other psychological therapies (Jindal, 2018).

Table 4. Multivariate analysis of covariance (MANCOVA) test to compare the mean of research variables in experimental and control groups

Source of changes	Variable	SS	Df	MS	F	P-value	Effect size
Group	Stress	1592.473	1	1592.473	57.495	< 0.001	0.583
	Problem-oriented strategy	650.107	1	650.107	33.041	< 0.001	0.641
	Excitement strategy	892.315	1	892.315	28.491	< 0.001	0.472
	Circuit avoidance strategy	227.481	1	227.481	87.138	< 0.001	0.694

SS: Sum of squares; Df: Degree of freedom; MS: Mean squares

Learning to have a positive attitude and enough resources to achieve goals by making life meaningful is an effective strategy for dealing with stress. Patients in the experimental group used positive self-talk to cope with frustration during positive hope sessions and learned to hope for the best while preparing for the worst; make their hopes come true, and align their goals with their core values (Saranyutanon, Srivastava, Pai, Singh, & Singh, 2019).

As a result, patients in the experimental group received positive energy during treatment sessions and attempted to use problem-oriented coping strategies rather than rumination, blaming, and avoiding upcoming issues and adopt preventive coping strategies such as studying, physical activity, and seeking family psychological support while in isolation or quarantine (Schoder et al., 2022).

People with high hopes are driven and frequently experience positive emotions. They are more focused on achieving goals and doing so with greater confidence (Rekoske & McNeel, 2016). They also enrich their lives and see life beyond the current situation, which is one of pain, suffering, and disorder. As a result, hope therapy reduces stress by increasing and maintaining happiness in life, self-confidence, coping with stressful situations, giving life meaning, and achieving peace. As a result of using an effective and efficient coping strategy with the proper methods, it is natural for the experimental group to be more relaxed after the hope therapy sessions and, as a result, experience less stress (Masters, Kane, Yamamoto, & Ahmed, 2008).

The current study also had limitations, such as the fact that it was only performed on men with PC in the King Fahd Medical City in Riyadh; thus, the results should be generalized with caution. Furthermore, the results are not compared to global standard values, and no follow-up stage is provided. Moreover, it is suggested that this study be conducted in conjunction with other diseases in various cities. Other methods of reducing stress for patients with PC are also recommended. In addition, one or more follow-up steps for future studies can be carried out.

Conclusion

The results of the present study demonstrated that hope therapy reduced stress in patients with PC. Besides, it decreased negative variables, such as emotion- and avoidance-oriented strategies, and increased the positive variable of problem-oriented strategy. Therefore, men with PC can use hope therapy to reduce the negative psychological effects and increase effective coping strategies with stress.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

The King Fahd Medical City in Riyadh, Saudi Arabia and King Abdulaziz University (KAU) are gratefully acknowledged for their cooperation

References

Afshar-Oromieh, A., Debus, N., Uhrig, M., Hope, T. A., Evans, M. J., Holland-Letz, T. et al. (2018). Impact of long-term androgen deprivation therapy on PSMA ligand PET/CT in patients with castration-sensitive prostate cancer. *Eur J Nucl.Med Mol.Imaging.*, *45*(12), 2045-2054. doi:10.1007/s00259-018-4079-z [doi];10.1007/s00259-018-4079-z [pii]. Retrieved from PM:29980832

Aggarwal, R., Wei, X., Kim, W., Small, E. J., Ryan, C. J., Carroll, P. et al. (2018). Heterogeneous flare in prostate-specific membrane antigen positron emission tomography tracer uptake with initiation of androgen pathway blockade in metastatic prostate cancer. *Eur Urol.Oncol., 1* (1), 78-82. doi:S2588-9311(18)30019-1 [pii];10.1016/j.euo.2018.03.010 [doi]. Retrieved from PM:31100231

Anderson, N. B., Bulatao, R. A., & Cohen, B. (2004). *Critical perspectives on racial and ethnic differences in health in late life.* Washington, DC: National Academies Press.

Azarnik, M. (2019). The effectiveness of mindfulness-based cognitive therapy on quality of life in relation to health and self-efficacy in patients with rheumatoid arthritis. *Int J Body Mind Culture, 6*(1), 21-26.

Bjartell, A. (2019). New hope in prostate cancer precision medicine? miRNA replacement and epigenetics. *Clin Cancer Res, 25*(9), 2679-2681. doi:1078-0432.CCR-19-0061 [pii];10.1158/1078-0432.CCR-19-0061 [doi]. Retrieved from PM:30808772

Calais, J., Armstrong, W. R., Kishan, A. U., Booker, K. M., Hope, T. A., Fendler, W. P. et al. (2021). Update from PSMA-SRT Trial NCT03582774: A Randomized phase 3 imaging trial of prostate-specific membrane antigen positron emission tomography for salvage radiation therapy for prostate cancer recurrence powered for clinical outcome. *Eur Urol.Focus., 7*(2), 238-240. doi:S2405-4569(20)30311-4 [pii];10.1016/j.euf.2020.12.009 [doi]. Retrieved from PM:33386288

Craig, E. L., Stopsack, K. H., Evergren, E., Penn, L. Z., Freedland, S. J., Hamilton, R. J. et al. (2022). Statins and prostate cancer-hype or hope? The epidemiological perspective. *Prostate.Cancer Prostatic.Dis.*. doi:10.1038/s41391-022-00554-1 [doi];10.1038/s41391-022-00554-1 [pii]. Retrieved from PM:35732821

Dong, Y., Chen, Y., Zhu, D., Shi, K., Ma, C., Zhang, W. et al. (2020). Self-assembly of amphiphilic phospholipid peptide dendrimer-based nanovectors for effective delivery of siRNA therapeutics in prostate cancer therapy. *J Control Release., 322*, 416-425. doi:S0168-3659(20)30212-1 [pii];10.1016/j.jconrel.2020.04.003 [doi]. Retrieved from PM:32247806

Endler, N. S., Parker, J. D. A., Ridder, D. T. D., & van Heck, G. L. (1990). Coping inventory for stressful situations. Toronto, Canada: Multi-Health systems Incorporated.

Faryabi, M., Rafieipour, A., Haji-Alizadeh, K., & Khodavardian, S. (2022). Comparison of the effectiveness of cognitive-behavioral therapy and acceptance and commitment therapy on anxiety, perceived stress, and pain coping strategies in patients with cancer. *Int J Body Mind Culture, 8*(1), 55-64.

Fendler, W. P., Ferdinandus, J., Czernin, J., Eiber, M., Flavell, R. R., Behr, S. C. et al. (2020). Impact of (68)Ga-PSMA-11 PET on the management of recurrent prostate cancer in a prospective single-arm clinical trial. *J Nucl.Med, 61*(12), 1793-1799. doi:jnumed.120.242180 [pii];10.2967/jnumed.120.242180 [doi]. Retrieved from PM:32358094

Foroozanfar, F., & Ansari-Shahidi, M. (2020). The effectiveness of acceptance and commitment therapy on self-care behavior and hope in patients with irritable bowel syndrome in Isfahan, Iran. *Int J Body Mind Culture, 7*(2), 82-88. Retrieved from https://ijbmc.org/index.php/ijbmc/article/view/207

Green N.S. (2004). The anatomy of hope: How people prevail in the face of illness. *J Clin Investig*, 113(11), 1514.

Helsmoortel, H., Everaert, C., Lumen, N., Ost, P., & Vandesompele, J. (2018). Detecting long non-coding RNA biomarkers in prostate cancer liquid biopsies: Hype or hope? *Noncoding.RNA.Res, 3*(2), 64-74. doi:10.1016/j.ncrna.2018.05.001 [doi];S2468-0540(17)30054-9 [pii]. Retrieved from PM:30159441

Jindal, V. (2018). Immunotherapy: A glimmer of hope for metastatic prostate cancer. *Chin.Clin Oncol., 7*(6), 61. doi:cco.2018.02.01 [pii];10.21037/cco.2018.02.01 [doi]. Retrieved from PM:29860848

Mao, N., Zhang, Z., Lee, Y. S., Choi, D., Rivera, A. A., Li, D. et al. (2021). Defining the therapeutic selective dependencies for distinct subtypes of PI3K pathway-altered prostate

cancers. *Nat.Commun, 12*(1), 5053. doi:10.1038/s41467-021-25341-9 [doi];10.1038/s41467-021-25341-9 [pii]. Retrieved from PM:34417459

Masters, J. R., Kane, C., Yamamoto, H., & Ahmed, A. (2008). Prostate cancer stem cell therapy: hype or hope? *Prostate.Cancer Prostatic.Dis., 11*(4), 316-319. doi:pcan200822 [pii];10.1038/pcan.2008.22 [doi]. Retrieved from PM:18427568

McWilliams, L. A., Cox, B. J., & Enns, M. W. (2003). Use of the Coping Inventory for Stressful Situations in a clinically depressed sample: Factor structure, personality correlates, and prediction of distress. *J Clin Psychol, 59*(4), 423-437. doi:10.1002/jclp.10080 [doi]. Retrieved from PM:12652635

Pal, S. K., Moreira, D., Won, H., White, S. W., Duttagupta, P., Lucia, M. et al. (2019). Reduced T-cell Numbers and elevated levels of immunomodulatory cytokines in metastatic prostate cancer patients de novo resistant to abiraterone and/or enzalutamide therapy. *Int J Mol.Sci, 20*(8). doi:ijms20081831 [pii];10.3390/ijms20081831 [doi]. Retrieved from PM:31013891

Rafnsson, F. D., Smari, J., Windle, M., Mears, S. A., & Endler, N. S. (2006). Factor structure and psychometric characteristics of the Icelandic version of the Coping Inventory for Stressful Situations (CISS). *Pers Individ Differ, 40*(6), 1247-1258.

Rekoske, B. T., & McNeel, D. G. (2016). Immunotherapy for prostate cancer: False promises or true hope? *Cancer, 122*(23), 3598-3607. doi:10.1002/cncr.30250 [doi]. Retrieved from PM:27649312

Roach, M 3rd, Kurhanewicz, J., & Carroll, P. (2001). Spectroscopy in prostate cancer: hope or hype? *Oncology (Williston.Park.), 15*(11), 1399-1410. doi:172089 [pii]. Retrieved from PM:11758871

Salavati, A., Gencturk, M., Koksel, Y., Schik, A. N., Carroll, P. R., Feng, F. Y. et al. (2021). A bicentric retrospective analysis of clinical utility of (18)F-fluciclovine PET in biochemically recurrent prostate cancer following primary radiation therapy: Is it helpful in patients with a PSA rise less than the Phoenix criteria? *Eur J Nucl.Med Mol.Imaging., 48*(13), 4463-4471. doi:10.1007/s00259-021-05415-y [doi];10.1007/s00259-021-05415-y [pii]. Retrieved from PM:34091713

Saranyutanon, S., Srivastava, S. K., Pai, S., Singh, S., & Singh, A. P. (2019). Therapies targeted to androgen receptor signaling axis in prostate cancer: Progress, challenges, and hope. *Cancers.(Basel.), 12*(1). doi:cancers12010051 [pii];10.3390/cancers12010051 [doi]. Retrieved from PM:31877956

Schoder, H., Hope, T. A., Knopp, M., Kelly, W. K., Michalski, J. M., Lerner, S. P. et al. (2022). Considerations on integrating prostate-specific membrane antigen positron emission tomography imaging into clinical prostate cancer trials by national clinical trials network cooperative groups. *J Clin Oncol., 40*(13), 1500-1505. doi:10.1200/JCO.21.02440 [doi]. Retrieved from PM:35015566

Shen, D., Ju, L., Zhou, F., Yu, M., Ma, H., Zhang, Y. et al. (2021). The inhibitory effect of melatonin on human prostate cancer. *Cell Commun Signal, 19*(1), 34. doi:10.1186/s12964-021-00723-0 [doi];10.1186/s12964-021-00723-0 [pii]. Retrieved from PM:33722247

Snyder, C. R., & Lopez, S. J. (2001). *Handbook of positive psychology*. Oxford, UK: Oxford University Press.

Wang, S., Blaha, C., Santos, R., Huynh, T., Hayes, T. R., Beckford-Vera, D. R. et al. (2019). Synthesis and initial biological evaluation of boron-containing prostate-specific membrane antigen ligands for treatment of prostate cancer using boron neutron capture therapy. *Mol.Pharm, 16*(9), 3831-3841. doi:10.1021/acs.molpharmaceut.9b00464 [doi]. Retrieved from PM:31381351