



Psychological Intervention in Prostate Cancer: A Review of The Literature

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Article Info

Received: February 14, 2024

Accepted: February 20, 2024

Published: February 26, 2024

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Citation: Soares L, Castro B. (2024) "Psychological Intervention in Prostate Cancer: A Review of The Literature". Journal of Urology and Nephrology Research, 1(1); DOI: 10.61148/JUNR/002.

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Abstract

The intersection of Psychology and Oncology is being developed exponentially. However, there is still a way to go about psychological intervention in men with Prostate Cancer (PCa) in Portugal. Therefore, this literature review addresses the need to implement a multidisciplinary psychological intervention plan in this target population, focusing on reducing the mortality rate, increasing quality of life and contributing to environmental sustainability. The research was carried out through academic and scientific platforms: b-on, Google Scholar, and PubMed resulting in a final sample of 54 articles after applying the eligibility criteria. Studies reveal that any program's planning and development process is critical to a successful intervention. The data demonstrate that cognitive behavioral therapy (CBT) is the most frequently used approach in conjunction with humanistic methods.

Keywords: prostate cancer; psychological intervention; quality of; environmental sustainability

Introduction

The central theme of this literature review focuses on the need and relevance of implementing a psychological intervention plan for men with PCa. Firstly, the general characterization of the disease will be made and presented in statistical terms at a global level. Secondly, several studies implementing psychological intervention programs for this target audience will be discussed, highlighting their challenges and results. Next, the crucial points to be included in a plan will be reviewed, namely the impact of diagnosis, lifestyle, and palliative care, to contribute to reducing the mortality rate of cancer patients, increasing their level of quality of life and, at the same time, positively influence the environment.

Method

The literature review was carried out through an electronic search for articles available in the b-on, Google Scholar and PubMed databases, where it was possible to collect 54 articles. Descriptors were used such as: "prostate cancer," "health psychology," "well-being and prostate cancer," "erectile dysfunction and mental health," and "psychological intervention plans." The research was composed of scientific articles, chosen after an initial review of abstracts, titles and results, taking into account the following inclusion criteria: 1) year of publication: articles published between 2003 and 2023; 2) language of publication: articles written in Portuguese and English; 3) theme: articles that included the keywords: "prostate cancer," "mental health," "well-being," "quality of life," "mental health" "health psychology," "erectile dysfunction," "intervention plan," "psychological intervention,"

"prostate cancer and palliative care" and "environmental sustainability" and 4) access: free. In this sense, the exclusion criteria were: 1) articles prior to 2003; 2) published in a language other than those mentioned; 3) did not directly focus on the topic of the review or did not address its target population; and 4) had limited or paid access. There are also additional references that were not considered in the research, as they include statistical data referring to the National Statistics Institute (INE), the World Health Organization (WHO), the National Oncological Registry (RON), the Regional Directorate of Statistics of Madeira (DREM), Institute of Health Administration (IASaúde), or even entities, associations or reference organizations such as the Portuguese League Against Cancer (LPCC) and Order of Portuguese Psychologists (OPP) and the World Health Organization (WHO). The research took place between September and October 2023.

Prostate Cancer: An Approach

1.1 – Definition

According to the WHO (2019), cancer is the generic term used for a vast group of diseases that can affect any part of the human body. It is characterized by the rapid growth of abnormal cells that can invade our body and spread throughout the organs. This type of chronic disease is the most significant cause of death worldwide, reaching approximately 10 million deaths in 2020, with 1 million and 41 of the cases corresponding to prostate cancer, the central theme of this review.

This type of malignant tumor manifests itself in the prostate, a gland of the male reproductive system located below the bladder and front of the rectum. It occurs when there is mutation and uncontrolled proliferation of cells in the gland, which, when causing metastases, can affect other parts of the body, such as bones and ganglia (Silva, 2014). It can cause urinary tract problems (e.g., incontinence) and erectile dysfunction. Its detection can be carried out through rectal examination and clinical analyses for the Prostate Specific Antigen (PSA); however, as they are not considered sufficient for diagnosis, other tests, namely trans-rectal, cystoscopy, and biopsy, will be necessary. PCa treatment may involve surgery (e.g., prostatectomy), hormone therapy, radiotherapy, and chemotherapy, or upon medical recommendation, just observation and monitoring (O Cancro, n.d.).

1.1 – Statistical data

It is the second most common form of cancer in men worldwide, with a higher incidence in men from North America and Europe (Globocan, 2020). In Portugal, it is the most relevant malignant tumor in this sex, with 5741 cases representing more than a fifth of the total tumors that occur in a year in men. According to a study carried out by INE, the analysis of the incidence of malignant tumors in Portugal in 2017 refers to prostate cancer as one of those with the highest incidence (65 cases per 100,000 male inhabitants), with an average annual growth of 1.3% from 2012 to 2017. The 50,151 new cases of cancer diagnosed in Portugal in 2018 corresponded to an increase of 3,427 new cases compared to 2010 (INE, 2018). However, it is rare for a man under the age of 40 to be diagnosed with this disease, with its incidence increasing from

the age of 50, indicating that two in every three patients are over 65 years old at the time of diagnosis (RON, 2018). In the Autonomous Region of Madeira (RAM), 130 new cases are registered annually (IASaúde, 2018). Regarding the number of deaths, according to DREM (2020), 38 deaths were recorded due to this malignant neoplasm in men aged between 55 and 94 years, with a higher incidence in the age group from 80 to 89 years, recording a total of 19 deaths, between 65 and 69 years old there was only one single death. In terms of marital status, it is known that more than half of the men were married.

1.2 – Target population

1.3 From a generational point of view, Baby Boomers, born between 1946 and 1964, and Pre-Boomers are the most likely to develop CaP. The first generation considers quality of life an important factor and is more likely to seek health services than previous generations. These differences are due to their higher level of educational qualifications and the fact that their income is higher than that of Pre-Boomers (Scales et al., 2007).

1.4 – Masculinity

In Western culture, there is a tendency to hide signs of susceptibility or personal failure, encouraging the idea that seeking help is still synonymous with vulnerability (Soares, 2023), especially in men, the masculine image is associated with strength, invulnerability and authority, promoting an attitude of independence reflected in their (non) interaction and demand for health services (Galdas, 2005). In particular, with psychological support services in the oncological field, there is a tendency to refrain from resorting to this type of intervention (Forsythe et al., 2013). However, according to scientific evidence, men who display masculine characteristics, such as independence, are likelier to report less positive emotions (Burns & Mahalik, 2007).–

1.5 Risk factors

Several non-modifiable risk factors are identified: age, ethnicity and family history (Gandaglia et al., 2021). Older men are the most likely to be diagnosed, with the risk increasing significantly after age 50 in Caucasians without a family history of the disease and after age 40 in black men with a family history (Harrison et al., 2016). The latter are those most likely to develop it, followed by Caucasians, Latinos, Asians and, lastly, indigenous people (Taitt, 2018).

Finally, having a first-degree family history of having developed PCa is also a risk factor for the diagnosis (Hemminki, 2011).

Regarding modifiable risk factors, the following stand out obesity, smoking, and alcohol consumption (Gandaglia et al., 2021). Obesity, associated with altered metabolic levels (McBride, 2012) and essentially related to unhealthy lifestyle habits, is responsible for the development of certain chronic diseases, high blood pressure, diabetes and even PCa (Harrison et al., 2016). Studies reveal that if the body mass index (BMI) is high, individuals have a greater risk of developing the disease, with faster and more

aggressive growth (Uehara et al., 2018).

Regarding tobacco consumption, there are few studies developed that consider it as a direct risk factor. However, the scenario changes when combined with overweight and obesity (Jochems et al., 2023). Regarding alcohol consumption, according to a Finnish study in which more than 11 thousand male twins participated, it was clear that high and regular alcohol consumption is associated with an increased risk of the disease when compared to light consumption (Dickerman et al., 2017). It is therefore concluded that consuming alcohol in high quantities is a risk factor for prostate cancer (Perdana, 2017).

2. The Need for A Psychological Intervention

The incidence of prostate cancer is growing exponentially, and there is a tendency for more and more men to receive the diagnosis as well (Skwirczyńska et al., 2023).

The emotional and psychological impact of a prostate cancer diagnosis leads to the unknown, doubt and uncertainty in the lives of those who receive it. There is an emergence of questions for this new phase in which patients begin an adaptation process that can give rise to psychological disorders (e.g., depression and anxiety) regardless of the phase they are in: diagnosis, treatment, recovery, or palliative care (Sousa et al., 2012). The biopsychosocial factors associated with depression and anxiety in a patient with prostate cancer involve three variables: biological (e.g., erectile dysfunction and urinary incontinence), psychological (e.g., personality characteristics), and social (e.g., socioeconomic status and family/social support) (Fervaha et al., 2019).

Scientific evidence suggests that a harmonious environment should be cultivated in hospital units to give patients space and a place to express their vulnerabilities, promote psychological self-care strategies, and practice psychological intervention programs focused on improving their quality of life (Pan et al., 2023). In a postmodern context, where reality and the universe can take on multiple meanings, it is crucial to establish connections between different scientific disciplines, promoting the development of science that studies human behavior and the mind (Soares, 2023). In this sense, psychological support is a highly relevant complement to cancer treatment (Skwirczyńska et al., 2023).

CBT, a psychological approach without the use of medication, has demonstrated considerable improvements in the quality of life of cancer patients, relieving symptoms such as anxiety, depression, fatigue and sexual problems, promoting patients' confidence during treatment, as well as changing distortions of irrational thinking to a more realistic and optimistic perspective (Yuan et al., 2021).

2.1 – What has been developed and applied

A psychological intervention program to prevent or improve the adverse effects caused by PCa treatment, with multidisciplinary content (nutritional, physical, and psychological), used psychotherapy as a method, offering psychological counseling and emotional support in individual and group sessions. The results were viable and beneficial, revealing that psychological

intervention is a way to improve the well-being of patients immediately after therapy significantly. (Vartolomei et al., 2018) According to the literature, online interventions are a way to offer quickly and continuously accessible, informative content at all stages of the disease (Bartels et al., 2019). It demonstrates its effectiveness, for example, in treating the sexual well-being of both men and their partners, providing adequate support, enhancing the best results, and contributing to an increase in quality of life (O'Connor et al., 2021). Another study developed with patients with PCa presented an online intervention program that addressed topics such as daily life, diet, physical exercise, and relaxation techniques using Person-Centered Therapy as a method based on the experiences and psychosocial context of the public-intervening target. The results demonstrated that planning and development are fundamental for a successful behavioral and psychoeducational intervention (Hughes et al., 2022). A pilot study in which patients with advanced PCa participated focused on a multidisciplinary approach to ensure long-term behavioral changes and adopted various strategies to improve physical resistance and mental flexibility, promoting dialogue and reflection on each participant's health experience in all sessions. The study revealed that participants highly accepted the program (Thederan et al., 2023). In general, interventions that addressed the Cognitive-Behavioral Theory in patients with PCa revealed several advantages in terms of mental and sexual well-being. Developed in person or digitally, they are a vital source of support for dealing with issues that require a more extended look, in addition to improving symptoms of depression and contributing to greater sexual satisfaction (Pieramico et al., 2023).

In this sense, this literature review aims to reinforce the need for the relevance of investing in psychological intervention plans for men with prostate cancer to reduce the mortality rate, increase each person's quality of life, and contribute positively to environmental sustainability.

3. The Impact Of Diagnosis

Receiving a cancer diagnosis triggers several emotions and different reactions that arise, along with stigmas and prejudices. According to a study developed by Porto (2016), participants reported experiencing feelings of anguish and anxiety, associating the diagnosis with death and suffering that was alleviated with family, hospital, and religious support. The data reveal the need to make this moment of vulnerability more welcoming through the development and investment of spaces dedicated to cancer patients and their families or relevant people, such as reflection groups, in which issues such as changes in male identity, for example, can be addressed and discussed. Another example to explore is employment issues, as the treatment chosen impacts the work capacity of men with PCa, changing their career or retirement goals (Ko et al., 2020).

The patient's expectations regarding treatment results, both in terms of efficacy and adverse effects, appear to have more impact on treatment-related regret than factors such as the severity of the disease or the type of treatment itself and its side effects., such as urinary incontinence or erectile dysfunction. However, the diagnosis is considered a source of concern for men, who state that

the adverse effects of the disease have an impact on their masculinity and self-esteem, as there is a feeling of loss of control over their lives (Cockle-Hearne, 2016). Furthermore, studies show that suicide rates increase during the period immediately after diagnosis (Fox et al., 2019)

For this reason, psychological support is central to the patient's decision-making, guiding them toward a better choice. Studies reveal that the more informed the patient is about the treatment and its adverse effects, the better they evaluate their quality of life due to their expectations (Orom et al., 2016).

In this sense, the role of health professionals assumes excellent importance, guiding the patient at the time of diagnosis and before treatment, considering their values and priorities to contribute to conscious decision-making and reduce their suffering and regret. (Wallis et al., 2022).

3.1 - Erectile Dysfunction

According to the literature, the type of treatment chosen can negatively influence a man's sexual function, and it is crucial to ensure that the patient discusses the possibility of this consequence in order to minimize the impact on their quality of life after surgery or another type of treatment. (Nunes et al., 2004). According to a study carried out with 60 men diagnosed with prostate cancer, 37% had erectile dysfunction, 26% reported some dysfunction related to ejaculation and 48% had a decrease in sexual desire (Saitz et al., 2013).

In addition to the fact that receiving a PCa diagnosis generates psychological instability in both the patient and the partner, leading to a decrease in sexual activity (hyun, 2012). It is associated with the presence of stress and depression arising from sexual dysfunction, triggering problems in the couple's relationship. Studies reveal that the higher the levels of anxiety in men with prostate cancer, the greater the incidence of depression and sexual dysfunction (klett, 2014).

4. Lifestyle And Environmental Sustainability

While some strategies for dealing with the planet's health require exorbitant investments and changes to the political system, others involve simple lifestyle changes. In this sense, choosing to exercise regularly, eating healthily, and promoting psychological well-being provide the best results and the most effective practices to implement among patients with PCa (Zuniga et al., 2019).

4.1 – Physical Activity

Habitat loss and decrease in green areas, often linked to industrial development and urbanization, have been linked to an increased occurrence of prostate cancer (Bodiwala, 2003). According to a study on the relationship between green areas and the development of neoplasms, men living in these areas had a lower risk of developing the disease (Demoury et al., 2017) and contributing positively to your health, promoting the practice of physical activity, such as walking and cycling, which also has beneficial effects on urological issues, such as urinary incontinence and

erectile dysfunction (Zuniga et al., 2019).

Another type of activity that can be carried out outdoors is the practice of yoga, according to an intervention carried out with patients undergoing active radiotherapy treatment, in which they took yoga classes twice a week for a period of between 6 and 9 weeks, encouraging results were presented, indicating levels of stability in fatigue indices, for example. According to the authors, during weeks 4 and 5 of treatment, an increase in fatigue levels was expected, which did not happen; they remained stable (Ben-Josef et al., 2017).

The practice of Pilates is also an excellent alternative to the conventional treatment of urinary incontinence during post-prostatectomy. Two groups were compared during an intervention that lasted ten weeks. The results demonstrated that in both groups, there was a significant improvement in reducing urinary incontinence. This modality showed a reduction in the weight of the diaper, recovery of continence (without a diaper) and, consequently, improved quality of life (Pedriali et al., 2015).

Often called a public health strategy, sport is only sometimes included in clinical intervention plans. In this sense, a study was developed in Denmark in which men suffering from prostate cancer were instructed to practice football weekly in a community club for at least six months. The results revealed that participants showed an increase in bone density, a decrease in the number of hospital visits, a reduction in body mass index (BMI) and an improvement in mental health levels (Bjerre et al., 2019).

Another study reinforces that an increase in BMI throughout life results in excess weight, a risk factor already mentioned, the appearance of neoplasms and possible mortality. In this sense, and although physical activity has not always been consistently associated with the incidence of PCa, the authors highlight the importance of exercise in the intentional decision to lose weight among patients and in preventing the disease (Kruk et al., 2022).

4.2. Food

According to scientific evidence, climate events such as floods and hurricanes increase the contamination of water sources and agricultural spaces, involving substances that are related to the appearance of prostate cancer (Steenland & Winquist, 2021). Ethical issues related to meat production and its excessive consumption also impact the environment, making it possible to adopt more sustainable production practices or explore additional options for its consumption (Font-i-Furnols, 2023). Since meat consumption is associated with a high risk of developing urological cancers (Zuniga et al., 2019).

In the oceans, the fragmentation of discarded plastics results in microplastics that have been identified as a significant factor in decreasing reproductive health and semen quality (D'Angelo & Meccariello, 2021).

For Masko et al. (2013), although there is no consensus on the ideal type of diet to reduce the risk of developing the disease, a plant-based diet offers advantages for both health and the environment.

In this sense, reducing animal protein intake is beneficial for health and positively impacts the environment. Studies indicate that air pollution caused by foods of animal origin contributes to 80% of the 15,900 annual deaths related to food-related material pollution (Domingo et al., 2021).

Currently, several more sustainable options are available on the market, besides several healthier protein sources, such as quinoa, nuts, seeds, lentils, hummus and tofu (Zuniga et al., 2019). Another example is tomatoes containing lycopene, a carotenoid molecule with antioxidant properties. Capurso & Vendemiale (2017) suggest that diets rich in lycopene can help prevent the incidence and progression of prostate cancer, as can soy-based products (Yan & Spitznagel, 2009). Although of animal origin, fish oil and flaxseed supplements as omega three are considered favorable, with fish being associated with a reduction in the mortality rate in individuals with PCa. However, some studies indicate the opposite and suggest that eating fish can increase the risk of developing the disease. Choosing a diet rich in fruits and vegetables, preferably consumed in solid form, is advantageous because of the slower absorption of sugar. When choosing what to eat, it is essential to consider which type of food has a low level of saturated fats and a higher level of vegetable and whole-fat origin (Masko et al., 2013).

In short, the participation of healthcare professionals is crucial to creating effective, safe and sustainable care models. It is essential to drive transformations in the system to empower patients to have more knowledge and control over their daily choices (Monsell et al., 2021).

5. Demystification Of Palliative Care

Palliative care (pc) focuses on relieving pain and improving the quality of life of the patient and their family from a holistic perspective, integrating at the same level the physical, psychological, social, and spiritual dimensions of the human being (2020). However, although scientific evidence states that this resource significantly improves the quality of life of patients with pca, they are rarely implemented at the beginning of the disease process (sanford et al., 2013) in addition to the fact that the patient's personality traits are associated with specific health care preferences, demonstrating that individuals who present a high level of neuroticism tend to be reluctant towards all forms of treatment at the end of life (lattice et al., 2016).

According to the OPP (2016), the psychologist working in the PC service is assigned the role of alleviating the patient's suffering, cooperating in the construction of meaning for complex situations, as well as helping other health professionals to recognize and identify certain issues inherent to their professional practice, accompanying the patient and family, including the grieving process. Specifically for the patient, it provides support in order to adjust their thoughts about death and dying, supporting the elaboration of pending and difficult-to-deal-with issues, such as goodbyes, to regulate the patient's expectations. moreover, above all, make him see death as a natural process of life (de queiroz ferreira, 2011).

About the family or people relevant to the patient, the psychologist

supports the expression of feelings and emotions, establishing channels of communication between the family, patient, and health professionals (opp, 2016).

Rosenfeld (2016) developed meaning-centered psychotherapy (pcs) in pc, designating it as an intervention to increase meaning at the end of life based on the patient's emotional, psychological, and spiritual needs, which have an impact on quality of life. in general, this intervention appeared to be viable and acceptable, encouraging better adaptation of patients to the challenges inherent in confronting death. however, the sample had a small number of participants, and only two participants had advanced prostate cancer.

Conclusion

The studies covered in this literature review demonstrate that more and more have been invested in multidisciplinary psychological intervention plans for men with PCa, being an effective way of understanding what has worked and what can be improved, reinforcing that the planning process and development are the keys to a successful intervention. CBT is considered the most used approach; however, humanistic methods, such as TCP and PCS, are also considered. However, scientific evidence could be better, given the existence of intervention plans that include palliative care as a topic. Furthermore, according to the literature, psychological intervention plans still need to be implemented for this target audience in Portugal. Finally, this type of intervention should be comprehensive, being implemented not only in hospitals but also in community centers or day centers, considering that in both contexts, purposes come together in the same direction: the well-being of humans.

References

1. Capurso, C., & Vendemiale, G. (2017). The Mediterranean diet reduces the risk and mortality of prostate cancer: A Narrative review. *Frontiers in Nutrition*, 4. <https://doi.org/10.3389/fnut.2017.00038>
2. D'Angelo, S., & Meccariello, R. (2021). Microplastics: a threat for male fertility. *International Journal of Environmental Research and Public Health*, 18(5), 2392. <https://doi.org/10.3390/ijerph18052392>
3. De Queiroz Ferreira, A. P. (2011). O papel do psicólogo na equipe de cuidados paliativos junto ao paciente com câncer. *revistasbph.emnuvens.com.br*. <https://doi.org/10.57167/Rev-SBPH.14.430>
4. Demoury, C., Thierry, B., Richard, H., Sigler, B., Kestens, Y., & Parent, M. (2017). Residential greenness and risk of prostate cancer: A case-control study in Montreal, Canada. *Environment International*, 98, 129–136. <https://doi.org/10.1016/j.envint.2016.10.024>
5. Dickerman, B. A., Ahearn, T. U., Giovannucci, E., Stampfer, M. J., Nguyen, P. L., Mucci, L. A., & Wilson, K. M. (2017). Weight change, obesity and risk of prostate cancer progression among men with clinically localized prostate cancer. *International Journal of Cancer*, 141(5), 933–944. <https://doi.org/10.1002/ijc.30803>
6. Domingo, N. G. G., Balasubramanian, S., Thakrar, S., Clark,

- M., Adams, P. J., Marshall, J., Muller, N. Z., Pandis, S. N., Polasky, S., Robinson, A. L., Tessum, C. W., Tilman, D., Tschofen, P., & Hill, J. (2021). Air quality–related health damages of food. *Proceedings of the National Academy of Sciences of the United States of America*, 118(20). <https://doi.org/10.1073/pnas.2013637118>
7. Fervaha, G., Izard, J., Tripp, D. A., Rajan, S., Leong, D. P., & Siemens, D. R. (2019). Depression and prostate cancer: A focused review for the clinician. *Urologic Oncology: Seminars and Original Investigations*, 37(4), 282–288. <https://doi.org/10.1016/j.urolonc.2018.12.020>
 8. Font-I-Furnols, M. (2023). Meat Consumption, Sustainability and Alternatives: An Overview of Motives and Barriers. *Foods*, 12(11), 2144. <https://doi.org/10.3390/foods12112144>
 9. Forsythe, L. P., Kent, E. E., Weaver, K. E., Buchanan, N., Hawkins, N. A., Rodriguez, J. L., Ryerson, A. B., & Rowland, J. H. (2013). Receipt of psychosocial care among cancer survivors in the United States. *Journal of Clinical Oncology*, 31(16), 1961–1969. <https://doi.org/10.1200/jco.2012.46.2101>
 10. Fox, L., Wiseman, T., Cahill, D., Beyer, K., Peat, N., Rammant, E., & Van Hemelrijck, M. (2019). Barriers and facilitators to physical activity in men with prostate cancer: A qualitative and quantitative systematic review. *Psycho-Oncology*, 28(12), 2270–2285. <https://doi.org/10.1002/pon.5240>
 11. Galdas, P., Cheater, F. M., & Marshall, P. (2005). Men and health help-seeking behavior: a literature review. *Journal of Advanced Nursing*, 49(6), 616–623. <https://doi.org/10.1111/j.1365-2648.2004.03331.x>
 12. Gandaglia, G., Leni, R., Bray, F., Fleshner, N., Freedland, S. J., Kibel, A. S., Stattin, P., Van Poppel, H., & La Vecchia, C. (2021). Epidemiology and prevention of prostate cancer. *European Urology Oncology*, 4(6), 877–892. <https://doi.org/10.1016/j.euo.2021.09.006>
 13. Harrison, S., Tilling, K., Turner, E. L., Lane, J. A., Simpkin, A., Davis, M., Donovan, J., Hamdy, F. C., Neal, D. E., & Martin, R. M. (2016). Investigating the prostate-specific antigen, body mass index, and age relationship: Is an age–BMI-adjusted PSA model clinically useful? *Cancer Causes & Control*, 27(12), 1465–1474. <https://doi.org/10.1007/s10552-016-0827-1>
 14. Hearne, J. C. Supporting Psychological Health for Men Living with and Beyond Prostate Cancer (Doctoral dissertation, University of Surrey).
 15. Hemminki, K. (2011). Familial risk and familial survival in prostate cancer. *World Journal of Urology*, 30(2), 143–148. <https://doi.org/10.1007/s00345-011-0801-1>
 16. Hughes, S., Kassianos, A. P., Everitt, H., Stuart, B., & Band, R. (2022). Planning and developing a web-based intervention for active surveillance in prostate cancer: an integrated self-care program for managing psychological distress. *Pilot and Feasibility Studies*, 8(1). <https://doi.org/10.1186/s40814-022-01124-x>
 17. Hyun, J. S. (2012). Prostate cancer and sexual function. *The World Journal of Men’s Health*, 30(2), 99. <https://doi.org/10.5534/wjmh.2012.30.2.99>
 18. Jochems, S. H., Fritz, J., Häggström, C., Järholm, B., Stattin, P., & Stocks, T. (2023). Smoking and risk of prostate cancer and prostate cancer death: a pooled study. *European Urology*, 83(5), 422–431. <https://doi.org/10.1016/j.eururo.2022.03.033>
 19. Ko, W. F. Y., Oliffe, J. L., & Botorff, J. L. (2020). Prostate Cancer Treatment and Work: A scoping review. *American Journal of Men’s Health*, 14(6), 155798832097925. <https://doi.org/10.1177/1557988320979257>
 20. Klett, D. E. (2014). A review of the psychological and emotional issues in men with prostate cancer and their partners. *Medical Student Research Journal*, pp. 4, 4–7.
 21. Kruk, J., Bernstein, J., & Aboul-Enein, B. H. (2022). Obesity, Physical Activity, and Prostate Cancer: An overview. *Central European Journal of Sport Sciences and Medicine*, 38, 71–91. <https://doi.org/10.18276/cej.2022.2-07>
 22. Klett, D. E. (2014). A review of the psychological and emotional issues in men with prostate cancer and their partners. *Medical Student Research Journal*, pp. 4, 4–7.
 23. Lattie, E. G., Asvat, Y., Shivpuri, S., Gerhart, J., O’Mahony, S., Duberstein, P. R., & Hoerger, M. (2016). Associations between Personality and End-of-Life Care Preferences among Men with Prostate Cancer: A Clustering approach. *Journal of Pain and Symptom Management*, 51(1), 52–59. <https://doi.org/10.1016/j.jpainsymman.2015.08.005>
 24. Masko, E. M., Allott, E. H., & Freedland, S. J. (2013). The relationship between Nutrition and prostate cancer: Is more always better? *European Urology*, 63(5), 810–820. <https://doi.org/10.1016/j.eururo.2012.11.012>
 25. McBride, R. (2012). Obesity and Aggressive Prostate Cancer: Bias and Biology. Columbia University. <https://doi.org/10.7916/d83n29g8>
 26. Monsell, A., Krzanowski, J., Page, L., Cuthbert, S., & Harvey, G. (2021). What mental health professionals and organizations should do to address climate change. *BJPsych Bulletin*, 45(4), 215–221. <https://doi.org/10.1192/bjb.2021.17>
 27. Nunes, P., Rolo, F., & Mota, A. (2004). Prostatectomia radical e actividade sexual. *Acta Urológica*, 21(1), 15-31.
 - Cancro, L. P. C. (n.d.-a). Liga Portuguesa Contra o Cancro. [ligacontracancro.pt](https://www.ligacontracancro.pt). <https://www.ligacontracancro.pt/>
 - Cancro, L. P. C. (n.d.-b). O que é o Cancro? : Liga Portuguesa Contra o Cancro. [ligacontracancro.pt](https://www.ligacontracancro.pt). <https://www.ligacontracancro.pt/o-que-e-o-cancro/>
 28. O’Connor, S., Flannagan, C., Parahoo, K., Steele, M., Thompson, S., Jain, S., Kirby, M., Brady, N., Maguire, R., Connaghan, J., & McCaughan, E. (2021). Efficacy, use, and acceptability of a Web-Based self-management intervention designed to maximize sexual well-being in men living with prostate cancer: Single-Arm experimental study. *Journal of Medical Internet Research*, 23(7), e21502. <https://doi.org/10.2196/21502>
 29. Orom, H., Biddle, C., Underwood, W., Nelson, C. J., & Homish, D. L. (2016). What Is a “Good” Treatment Decision? Decisional Control, Knowledge, Treatment Decision Making, and Quality of Life in Men with Clinically Localized Prostate Cancer. *Medical Decision Making*, 36(6), 714–725. <https://doi.org/10.1177/0272989x16635633>
 30. Ordem dos Psicólogos Portugueses (2016). Linhas de Orientação para a Prática Profissional OPP. Cuidados Paliativos.
 31. Pan, S., Wang, L., Zheng, L., Luo, J., Mao, J., Qiao, W., Zhu, B., & Wang, W. (2023). Effects of stigma, anxiety and depression, and uncertainty in illness on quality of life in

- patients with prostate cancer: a cross-sectional analysis. *BMC Psychology*, 11(1). <https://doi.org/10.1186/s40359-023-01159-6>
32. Pedriali, F. R., Gomes, C. S., De Oliveira Soares, L., Urbano, M. R., Moreira, E. C. H., Averbek, M. A., & De Almeida, S. H. M. (2015). Is Pilates as effective as conventional pelvic floor muscle exercises in the conservative treatment of post-prostatectomy urinary incontinence? A randomized controlled trial. *Neurourology and Urodynamics*, 35(5), 615–621. <https://doi.org/10.1002/nau.22761>
33. Perdana, N. R. (2017, May 10). The Risk Factors of Prostate Cancer and Its Prevention: A Literature Review. *Perdana | Acta Medica Indonesiana*. <https://www.actamedindones.org/index.php/ijim/article/view/201>
34. Porto, S. M., Carvalho, G. B., Fernandes, M. J. M., & Ferreira, C. B. (2016). Vivências de homens frente ao diagnóstico de câncer de próstata. *Ciência & Saúde*, 9(2), 83. <https://doi.org/10.15448/1983-652x.2016.2.22225>
35. RON. (n.d.). <https://ron.min-saude.pt/tumor/top5/prostata/epidemiologia/>
36. Rosenfeld, B., Saracino, R. M., Tobias, K. G., Masterson, M., Pessin, H., Applebaum, A. J., Brescia, R., & Breitbart, W. (2016). Adapting Meaning-Centered Psychotherapy for the palliative care setting: Results of a pilot study. *Palliative Medicine*, 31(2), 140–146. <https://doi.org/10.1177/0269216316651570>
37. Saitz, T. R., Şerefoglu, E. C., Trost, L., Thomas, R., & Hellstrom, W. J. (2013). The pre-treatment prevalence and types of sexual dysfunction among patients diagnosed with prostate cancer. *Andrology*, 1(6), 859–863. <https://doi.org/10.1111/j.2047-2927.2013.00137.x>
38. Sanford, M. T., Greene, K. L., & Carroll, P. R. (2013). The argument for palliative care in prostate cancer. *PubMed*, 2(4), 278–280. <https://doi.org/10.3978/j.issn.2223-4683.2013.09.13>
39. Scales, C. D., Moul, J. W., Curtis, L. H., Elkin, E. P., Hughes, M. E., & Carroll, P. R. (2007). Prostate Cancer in the Baby Boomer Generation: Results from CaPSURE. *Urology*, 70(6), 1162–1167. <https://doi.org/10.1016/j.urology.2007.08.011>
40. Silva, D. H. F. (2015). Estudo da incidência do cancro da próstata na RAM e avaliação da sua deteção precoce, através da associação do marcador [-2] proPSA ao PSA e PSA livre (Doctoral dissertation, Universidade da Madeira (Portugal)).
41. Skwirczyńska, E., Chudecka-Głaz, A., Wróblewski, O., Tejchman, K., Skonieczna-Żydecka, K., Piotrowiak, M., Michalczyk, K., & Karakiewicz, B. (2023). Age Matters: The Moderating Effect of Age on Styles and Strategies of Coping with Stress and Self-Esteem in Patients with Neoplastic Prostate Hyperplasia. *Cancers*, 15(5), 1450. <https://doi.org/10.3390/cancers15051450>
42. Soares, L. (2023). Psychology: the science of human behavior. *Diversitas Journal*, 8(3). <https://doi.org/10.48017/dj.v8i3.2567>
43. Sousa, A., Sonavane, S., & Mehta, J. (2012). Psychological aspects of prostate cancer: a clinical review. *Prostate Cancer and Prostatic Diseases*, 15(2), 120–127. <https://doi.org/10.1038/pcan.2011.66>
44. Statistics Portugal - web portal. (n.d.). <https://www.ine.pt/xurl/pub/257793024>
45. Steenland, K., & Winquist, A. (2021). PFAS and cancer, a scoping review of the epidemiologic evidence. *Environmental Research*, p. 194, 110690. <https://doi.org/10.1016/j.envres.2020.110690>
46. Taitt, H. E. (2018). Global Trends and Prostate Cancer: A review of incidence, detection, and mortality as influenced by race, ethnicity, and geographic location. *American Journal of Men's Health*, 12(6), 1807–1823. <https://doi.org/10.1177/1557988318798279>
47. The International Agency for Research on Cancer (IARC). (n.d.). Global Cancer Observatory. <https://gco.iarc.fr/>
48. Thederan, I., Pott, A., Krueger, A., Chandrasekar, T., Tennstedt, P., Knipper, S., Tilki, D., Heinzer, H., Schulz, K., Makarova, N., & Zyriax, B. (2023). Feasibility, acceptability, and behavioral outcomes of a multimodal intervention for prostate cancer patients: Experience from the MARTINI lifestyle program. *The Prostate*, 83(10), 929–935. <https://doi.org/10.1002/pros.24534>
49. Uehara, H., Kobayashi, T., Matsumoto, M., Watanabe, S., Yoneda, A., & Bando, Y. (2018). Adipose tissue: Critical contributor to the development of prostate cancer. *The Journal of Medical Investigation*, 65(1.2), 9–17. <https://doi.org/10.2152/jmi.65.9>
50. Vartolomei, L., Shariat, S. F., & Vartolomei, M. D. (2018). Psychotherapeutic Interventions Targeting Prostate Cancer Patients: A Systematic Review of the literature. *European Urology Oncology*, 1(4), 283–291. <https://doi.org/10.1016/j.euo.2018.04.011>
51. Wallis, C. J., Zhao, Z., Huang, L., Penson, D. F., Koyama, T., Kaplan, S. H., Greenfield, S., Luckenbaugh, A. N., Klaassen, Z., Conwill, R., Goodman, M., Hamilton, A. S., Wu, X., Paddock, L. E., Stroup, A. M., Cooperberg, M. R., Hashibe, M., O'Neil, B., Hoffman, K. E., & Barocas, D. A. (2022). Association of treatment modality, functional outcomes, and baseline Characteristics with Treatment-Related Regret among men with Localized Prostate Cancer. *JAMA Oncology*, 8(1), 50. <https://doi.org/10.1001/jamaoncol.2021.5160>
52. World Health Organization: WHO. (2019, July 12). Cancer. https://www.who.int/health-topics/cancer#tab=tab_1
53. World Health Organization: WHO. (2020, August 5). Palliative care. <https://www.who.int/news-room/fact-sheets/detail/palliative-care>
54. Yan, L., & Spitznagel, E. L. (2009). Soy consumption and prostate cancer risk in men: a revisit of a meta-analysis. *The American Journal of Clinical Nutrition*, 89(4), 1155–1163. <https://doi.org/10.3945/ajcn.2008.27029>
55. Yuan, F., Chang, D., Jing, M., Zhu, B., & You, Y. (2021). Effectiveness of cognitive behavioral therapy on quality of life in patients with prostate cancer after androgen deprivation therapy: a protocol for systematic review and meta-analysis. *BMJ Open*, 11(11), e049314. <https://doi.org/10.1136/bmjopen-2021-049314>
56. Zuniga, K. B., Chan, J. M., Ryan, C. J., & Kenfield, S. A. (2020). Diet and lifestyle considerations for patients with prostate cancer. *Urologic Oncology: Seminars and Original Investigations*, 38(3), 105–117. <https://doi.org/10.1016/j.urolonc.2019.06.018>