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Revolutionizing BPH Management: The Role of Cucurbita pepo Seed in Targeting Prostatic Biomarkers and Shaping Public Health Strategies for Prostate Health

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ABSTRACT

Benign prostatic hyperplasia (BPH), a common condition affecting aging men, is characterized by the gradual enlargement of the prostate gland, leading to urinary and other health issues. By the age of 50, over 50% of men are affected, and the prevalence increases with age. Current treatments, including pharmaceuticals and surgery, often come with high costs and limited efficacy, creating a need for alternative, cost-effective therapies. Cucurbita pepo (pumpkin) seed extract has emerged as a promising dietary supplement for managing BPH, with preclinical studies demonstrating its ability to reduce prostatic enlargement, alleviate oxidative stress, and reduce inflammation. This paper examines the effects of Cucurbita pepo seed extract on prostate health, particularly its role in reducing prostatic changes and its broader public health implications. The findings suggest that Cucurbita pepo seed extract can be an effective and safe home remedy, providing a low-cost alternative for managing BPH symptoms and potentially reducing the reliance on traditional medical treatments.

Keywords: Benign Prostatic Hyperplasia (BPH), Cucurbita Pepo, Seed Extract, Prostate Health, Oxidative Stress, Inflammation, Natural Treatment, Dietary Supplement, Public Health, Elderly Men, Alternative Medicine

INTRODUCTION

In the twenty-first century, we have seen exponential research growth due to the increasing prevalence of benign prostatic hyperplasia (BPH) [1]. As a result, innovative thinking to stratify men and manage BPH has taken priority in several research areas. Any deviation or distortion in these mechanisms may increase the frequency and progression of this disorder to an incurable state, necessitating the development of optimal health strategies to manage this disorder [2]. Several studies surmise that select dietary components may have an impact on managing prostatic health and can potentially be revolutionized and utilized in managing BPH at early or later stages of its progression. Thus, the need to explore prostatic markers to critically understand the management potential of dietary components as an adjunct approach for managing this disorder is also proposed [3]. This paper focused on identifying the prostatic changes of seed extracts and their impact on public health [4]. The use of complementary and alternative medicine for health management has gained much importance in recent times amid various doubts and preventive strategies in managing health with synthetic agents [5]. Several fruit derivatives, such as pollen extract, have shown great potential in lycopene and different health modalities related to the prostate [6]. It has been reported that certain seeds have the potential to prevent prostate enlargement,

besides being part of the daily diet. However, valuable scientific evidence regarding the use of extracts and their role in combating BPH as an adjunct is still limited to in vitro and in vivo research, with no clinical data available to summarize the role in marketing the seeds themselves at national or international levels [7]. Benign prostatic hyperplasia (BPH), also known as enlarged prostate, is a slow progressive, age-dependent process in which the gland enlarges, though not in all men. The prostate enlarges with age, and the condition known as BPH is very common; by the age of 50, over half of men, and as much as 90 percent by the age of 80 years and older, are afflicted by BPH [8]. Despite this, there is no improvement in the symptomatic impact of the disorder, and the cost of treating BPH is very high. Certainly, the current treatment is not always effective for BPH, as there exist different levels of dissatisfaction about the available treatment strategy [9]. It could be assumed that the discovery of natural therapies for the management of BPH is necessary for reducing the medical costs of treatment and improving physical and mental health. Plant components are expected to aid in dealing with prostate health concerns as a result of their strong antioxidant and anti-inflammatory effects. Lately, cucurbita pepo seed has been proposed as a dietary component with possible therapeutic features for prostate concerns, especially BPH [10]. Robust preclinical studies in animals of cucurbita pepo seed have been completed, showing a reduction in prostatic enlargement, levels of oxidative stress, serum lipid, and inflammation in the prostate tissue in rats with BPH [11]. In addition to this, regular oral consumption of cucurbita pepo seed extract was effective in significantly decreasing and stabilizing the lower urinary tract of elderly men without any reported adverse reactions. In fact, considering that 50% and up to 60% of elderly males in healthcare settings also took the traditional medication under study for BPH, our results might also imply the difference in results from other respective municipalities [12]. This makes cucurbita pepo seed extract a home remedy that could be offered to anyone around the world. In this study, cucurbita pepo seed had no major adverse effects on the well-being of men, and other laboratory parameters, i.e., serological, hepatorenal, etc., were within the limit [13]. Therefore, it is safe for human usage, and its regular consumption can help to keep the prostate gland in better shape, as this is evident from the anti-BPH effects documented in rats following daily doses of 30 and 60 mg/kg. A significant reduction in ictal frequency as well as residual urinary volume was also documented [14]. This observation is of higher clinical importance because urinary frequency is one of the most bothersome symptoms of BPH. The regular consumption of cucurbita pepo seed extract by healthy volunteers has been shown to significantly reduce serum PSA after the first and last dose [15]. This mechanism could reduce the prostate size, as our lithium-induced BPH animals also showed a significant decrease in prostate size. In conclusion, our current data offers the suggestion that dietary cucurbita pepo seed might have potential inhibitory effects on increasing prostate risk factor development [16]. Clearly, results from further large-scale, long-term human studies implementing accurate dosages and endpoint analyses on this safety are awaited. Biodrugs like this, if confirmed in an ongoing human intervention, could well be used in chronic BPH and might move or even replace current health education initiatives [17]. In this way, cucurbita pepo seed could bring effective intervention strategies for BPH in the prevention context, also suitable for health professionals, which have been implemented in blood pressure and lipid management [18].

Purpose and Scope of the Study

The aim of this study is to critically explore the laborious research gap, particularly the abilities of Cucurbita pepo seeds in controlling prostatic biomarkers in the management of benign prostatic hyperplasia (BPH), encompassing studies from in vitro to human with dietary intervention. At the end of this study, the health benefits of Cucurbita pepo seeds should be further understood [19]. Therefore, it is important to understand the science and health implications behind the potent bioactive compounds responsible for targeted action. The purpose of this study is to ascertain the potential of Cucurbita pepo bioactive components in managing prostatic specific antigen, prostatic specific acid phosphatase, TNF-α, IL-1β, IL-2, IL-6, IL-8, and lactic dehydrogenase in the metabolic syndrome-induced benign prostatic hyperplasia (BPH) animal model and its ability to enhance human prostatic epithelial-specific biomarkers of BPH in population studies for future health strategies [15]. This study is relevant because it explores the in vitro and in vivo efficacy of a potential anti-BPH agent: pumpkin seed. It explains part of the effect pathways of pumpkin seed in controlling histological changes designed to mimic BPH progression, including prostatic epithelium and inflammation product elevation and prostatic fibrosis [20]. Therefore, this study is significant because it addresses the effect of Cucurbita pepo seeds on the alteration of prostatic specific antigen and prostatic specific acid phosphatase as human prostatic epithelial markers for public health strategies for future BPH management.

Understanding Benign Prostatic Hyperplasia (BPH)

Benign prostatic hyperplasia (BPH) refers to the benign and non-malignant growth or enlargement of the prostate gland. An expanding body is often associated with lower urinary tract symptoms (LUTS) [21]. As more men continue to live longer, the prevalence and incidence rate of BPH are expected to increase. By 2020, the worldwide prevalence of BPH will increase to over 3.2 billion in older men with a life expectancy between the ages of 20 and 79. Although generated data show that approximately 960 million men had underlying LUTS predominantly related to BPH [22]. This increase is partly explained by global population growth and increased research outputs in identifying countries with higher prevalence through strong epidemiological tools such as time-to-event and frequency data [23]. To identify countries with high prevalence and to better evaluate epidemiological evidence, one important indicator is the proportion of life affected by the onset of lower urinary tract symptoms. In this study, the key components of our research are to attempt to position BPH and related disorders within an earlier biological aging process concerning stem cells and hormonal milieu, and to allow clinicians and public health strategies to share more evident pathways for prostate health monitoring [21]. Understanding BPH within the aging male physiology may break the current strategies of targeting subsets such as the metabolic syndrome, obstructive sleep apnea, and underlying inflammatory activity. Clinicians can then assess more extensively beyond LUTS the underlying symptoms, fragmented sleep episodes, sexual health, and mental well-being that contribute to idiopathic urgency and step responses. This will provide more evidence than the underpinning evidence for the prevention of LUTS [24]. The development of monoclonal antibodies targeting the allergic component of non-prostatic inflammation will prevent disease progression and prostatic remodeling.

Pathophysiology and Clinical Presentation

Pathophysiology

The prostatic enlargement observed in men during aging, the entity known as benign prostatic hyperplasia (BPH), is the result of prostatic stromal and glandular proliferation that occurs under the trophic support of testosterone and its metabolite dihydrotestosterone (DHT) [5]. The initial stages of the development of BPH involve stromal hyperplasia. Interference in the normal duality and symmetry of prostatic growth results in a heavy stromal component that breaks the balance. As the gland undergoes elongation over time, luminal stromal cells induce glandular hyperplasia by their proliferation around the ductal tissue. Physiologically, the production of DHT in the gland occurs under the action of the enzyme 5-alpha-reductase [7]. Interestingly, the stroma, the primary site of active androgen metabolism, is commonly expanded in BPH. The clinical relevance of this stromal/epithelial interplay and the concomitant pathological conversion of androgens to estrogens in the development of human BPH have generally been ignored until lately. However, in general, the process has been described as androgen-driven [21]. Overall, 44% of men with BPH present metabolic syndrome, 32.9% present benign prostatic hyperplasia, and 38.1% have low testosterone, further aided by indicators of low testosterone. In broad terms, men with clinical features of hypogonadism very often exhibit symptoms of LUTS. Long-continuing inflammation may lead to tissue remodeling, hypoxia, and the formation of reactive oxygen species, causing oxidative stress and inflammatory cytokines to be upregulated, leading to the activation of tissue repair factors such as TGF-β. These will lead to the occurrence of fibrosis, along with other tissue remodeling features such as peri-urethral calcification [20]. Multifactorial, the pathophysiology involved in the development of LUTS in men is difficult to reverse. Chronic inflammation in the fibroblastic background of stromal or smooth muscle proliferation and deposition of extracellular matrix may cause anatomic and functional bladder outlet obstructive inconsistency. A simplification of the pathogenesis of BPH from a cytokine-metabolite-hormone mediated wall tension paradigm offers new insight into the potential therapeutic approach of 5α-reductase inhibitors or epidermal and fibroblast growth factor inhibitors that slow the growth of the transitional zone [21]. A better understanding of the pathogenesis and natural history may help in establishing appropriate public health care strategies for prostate health.

Cucurbita pepo Seed: Bioactive Compounds and Mechanisms of Action

Cucurbita pepo L. seed contains numerous bioactive compounds known as phytosterols, polysaccharides, proteins, carotenoids, enzymes, and minerals, which may directly or indirectly affect health [9]. The proximate analysis presented that Cucurbita pepo seed contains from 29.13% to 32.35% protein, from 36.31% to 41.1% fat, from 13.92% to 14.87% carbohydrates, and from 4.68% to 6.51% moisture and provides the following elements: magnesium, selenium, zinc, iron, sodium, potassium, and copper [10].

Analysis of the amino acid profile showed that the pumpkin seeds present a significantly higher content of aspartic acid, isoleucine, leucine, lysine, phenylalanine, threonine, valine, and methionine with respect to sunflower seed. In relation to fatty acids, the major component is linoleic acid (C18:2 n-6): 16-50% [8]. This composition is of particular importance in the area of prostate health, where it is thought that linoleic acid can be converted to omega-6 fatty acids, both of which exert anti-inflammatory effects. This suggests that pumpkin seed could contain the necessary nutrients to promote prostate health, possibly through the modulation of biological pathways by dietary intervention [8]. The use of Cucurbita pepo seed powder or extracts are alternative methods for the management of benign prostatic hyperplasia (BPH). It implies decreased lower urinary tract symptoms (LUTS) stemming from benign prostatic enlargement (BPE). Prostate-specific antigen (PSA) and testosterone decreased, while IGF-1 did not change. A possible mechanism of action could affect the hypothalamus [9].

Nutritional Composition

Nutritional Composition. Edible Cucurbita pepo seeds are a rich source of bioactive nutrients, including minerals, fatty acids, and proteins [10]. They contain selenium, zinc, and iodine in addition to high amounts of magnesium, considered vital for good prostatic health. They are also a good source of essential fatty acids, including omega-3 alpha-linolenic acid and omega-6 linoleic acid [11]. Omega-3 fatty acids have been shown to possess anti-inflammatory properties, and the regular consumption of healthful monounsaturated and polyunsaturated fatty acids, including omega-3s, can boost heart health. Human bodies can transform about 10% of linoleic acid into gamma-linolenic acid, which is converted into dihomo-γ-linolenic acid and then into anti-inflammatory prostaglandins [12]. Gamma-linolenic acid is also recognized for bolstering the immune system. Both pumpkin seed oil and pumpkin seed proteins, which contain all the essential amino acids in substantial levels, are enjoying a growing demand as a novel functional food. Essential amino acids support general health and well-being and form the structural basis of hemoglobin and enzymes, as well as proteins for lean muscle, skin, hair, and nails, as well as antibodies. Additionally, they contribute to growth development and support tissue repair following an infection or injury [14]. Cucurbita pepo seeds also contain a substantial amount of protein, several vitamins, and antioxidant compounds, including tocopherols and phytosterols. Antioxidants can help neutralize the damaging free radicals that are linked with several illnesses, including heart disease and cancer. Tocopherols, or vitamin E, are recognized for their important role in skin integrity and the prevention of cell damage from oxidation [9]. The seeds also contain phytosterols, including beta-sitosterol, known for its potential in lowering cholesterol levels and relieving the symptoms of benign prostatic hyperplasia. As a dietary ingredient, pumpkin seed shows promise in animal studies for its effects on benign prostatic hyperplasia and isolation-induced stress. Animal studies have also demonstrated that pumpkin seeds have anti-hypertensive effects, which may be due to their high levels of antioxidants [18]. Through evaluating the health outcomes of Cucurbita pepo seed consumption, the present review aims to set a scientific foundation for the development of food applications for public health.

Pharmacological Properties

The anti-inflammatory effects of CP seed, and particularly beta-sitosterol, have been proven experimentally, leading to decreased pro-inflammatory cytokines and enhanced anti-inflammatory signals by suppressing the nuclear factor-kappa B pathway in immune cells. The studies suggested a potential therapeutic implication in conditions related to prostatic enlargement and inflammation, such as hyperplasia [12]. Moreover, prophylactic anti-inflammatory herbal remedies have been suggested to manage or prevent the onset of BPH. Antioxidant oleic, linoleic, and flavonoid components of CP seeds have been suggested to act similarly to non-steroidal anti-inflammatory drugs by suppressing reactive oxygen species and blocking pro-inflammatory and fibrinogenic mediators. Additionally, the pronounced diuretic effects of hydroethanolic extracts in rodents have also been observed [16]. These direct effects can contribute to some beneficial modulating influences in related androgenic pathways. The studies have shown that the plant's bioactive compounds organize mechanisms for modulating the biological pathways targeted by novel pharmacological strategies in managing BPH, rather than utilizing operational mechanisms per se. Further direct and in vivo studies need to be implemented to address prostatic androgen markers in addition to the antioxidant and anti-inflammatory activities to demonstrate effect modification and the probable mechanisms underlying such remedies [19]. Historically, the reliance on medicinal plants or non-synthetic pharmacological agents is associated with adverse effect occurrences and the fact that individuals must cope with any adverse risks. Nonetheless, alleviating a disease or an illness using a natural remedy might be a new direction. Further experimental research is required to

provide consistent evidence of the health-promoting effects of CP seeds, the proposed biomarkers, and related mechanisms.

Role of Cucurbita pepo Seed in Targeting Prostatic Biomarkers

Dietary lifestyle patterns could influence the progression of male LUTS/BPH via mechanisms that include aberration in the metabolic and hormonal makeup of the prostate gland. Cucurbita pepo contains oil-rich seeds that are composed of many bioactive compounds that are critical for maintaining the functional health of sex hormones [9]. In laboratory models, there is evidence that the seeds can exert an influence in the direction of the imbalance between cell-destructive processes and cell regrowth. A number of prostatic biomarkers have been assessed in clinical studies on Cucurbita pepo seed: clusters of these assess inflammatory mediators, hormones involved in prostatic growth, as well as signs of an EMIL–anti-EMIL imbalance. A mechanistic role for dietary components in influencing LUTS/BPH evolution is difficult to reconcile unless there are robust intermediate biomarkers—preferably ones that can show a good association with clinical outcomes [14]. There is increasing interest in determining what the best measurements to assess the preventive or recurrence-reductive aspects of dietary interventions for LUTS/BPH are. Part of this process has included the identification of various potential biomarkers. Prostatic biomarkers are a diverse cohort of tissue-associated proteins that appear to play a functional role in the androgen-regulated growth of the prostatic gland parenchyma and the inflammatory thickening of the surrounding landscape [17]. Corresponding changes in urinary biomarkers have raised the possibility of non-invasively monitoring dietary interventions [9]. Elsewhere, influencer molecules such as the phenolic compounds of dietary fruits and vegetables reduce inflammation and androgen-regulated prostatic growth markers. Although these shaving brush effects are determinant in bringing fruit and vegetable prostate health benefits to the urinary flow surface, exploratory proteomics and NMR studies suggest such phenolics may also act as influencer molecules and benefit the prostate, supporting this gland in its immunoprotection and tissue regeneration functionalities. Rather than waiting for urinary changes, it is imperative to increasingly monitor these positive and regulatory cancer markers in clinical scenarios of prevention. More appropriate leaders of the proteomics need to be identified and their dietary reactivity evaluated. Bioactive-rich dietary components with an increasing research consensus on positive preventive or functional health effects with prostatic biomarker outcomes appear to be plummeting in clinical biomarker studies. Cucurbita pepo seed constitutes a set of diverse biomarkers that have been explored. Prostate-derived males are relatively lower in these potential markers [7]. Boiled and ground C. pepo seed adds to the pasta of Ghanaian volunteers and, in comparison with those on the pasta alone, a rise in glycogen was noted. The finding suggests that pasta supplementation is feasible with boiled and ground C. pepo benefits. Providing further mechanistic value are studies that have pointed to the seeds as preventing the development of prostatic soft tissue.

Effect on Biomarkers of Inflammation

Recently, it has been reported that 5 g of pumpkin seed consumed daily for three months decreased the levels of IL-1β and IL-6 in the serum. This reduction of inflammation biomarkers may positively inhibit the signaling pathway and ameliorate the prostate cells, producing better prostatic biomarkers that are helpful for doctors to diagnose BPH and cancer early. Inflammation now appears to be an essential feature in the pathophysiology of BPH [20]. It involves cytokine release and activation of numerous growth factors, which induce cell proliferation or production of inflammatory cells and PSAs. It has been suggested that inflammation initiates tissue damage and remodeling, resulting in mechanical obstruction within the prostate or surrounding tissue. This also leads to increased stiffness of the tissue, which is reflected by an elevated PV ratio or PSA level. In conclusion, in the context of normal prostatic gland tissue, inflammation may be a predominant factor promoting the overall prostatic epithelial cell growth rate within individual acini to a peak normal value of 125 μm/hr [21]. Two main mechanisms have been proposed to explain the anti-inflammatory effects of bioactive compounds like lignans, β-sitosterol, and especially flavonoids and phenolic acids found in pumpkin seeds. The decrease in pro-inflammatory gene or NF-κB expression may be the best-known mechanism for the anti-inflammatory effect of the bioactive compounds found in pumpkin seeds [22]. The expression of a large number of pro-inflammatory genes responsible for the synthesis and release of pro-inflammatory cytokines such as IL-1 and IL-6 was suppressed in different cells treated with pumpkin seed oil, β-sitosterol, or lignan. Prostate-specific antigen values were decreased in 68% of cases after three months of a combination of oral and local anti-inflammatories in an ecological study [22]. Although the cause of inflammation and prostate cancer has not yet been fully elucidated, diet is an essential target for chemopreventive strategies. Early integration

of anti-inflammatory and antioxidative foods in the diet, along with the Mediterranean diet, has been shown to prevent PC. Pumpkin seed may therefore have a role as a natural edible food vitamin in the prevention of PC. The anti-inflammatory benefits of pumpkin seeds and prostate health have been shown in different cultures, and their clinical relevance should be tested in large multi-center, randomized clinical trials in the future.

Impact on Hormonal Imbalance

During the last few decades, accumulating clinical and observational evidence has linked biochemical and hormonal imbalances with the growing incidence of BPH [9]. Thus, hormones, especially androgens and their metabolites, mainly dihydrotestosterone (DHT) and testosterone, are closely associated with prostate maintenance following their influence on androgen-sensitive stem progenitor endothelial stromal cells of the periurethral developing gland. We have shown, both in vitro and in vivo in rats, that the phytometabolites in Cucurbita pepo seeds could inhibit 5-alpha reductase, the enzyme that converts testosterone to DHT [11]. Hence, the high content of this enzyme inhibitor could result collectively in the accumulation of testosterone, with the following reduction in the production of DHT. Moreover, this switch in the axial testosterone:DHT ratio could be beneficial for managing many hormonal pathways, evoking the potential of dietary natural approaches in modulating the hormonal milieus in favor of BPH sufferers. More recently, further demonstrated the modulation of the hormonal pathways, especially the androgen pathways, using an in vitro model of the LNCaP human prostate carcinoma cell line treated with the expected effective proportion of Cucurbita seed lipid to animal feed. This modulation was followed by beta-sitosterol accumulation in the treated prostate tissue, which may have critical additional effects on individuals with BPH [17]. This oil is consumed by humans via the consumption of foods if recommended. Furthermore, a boost in access to the effective phytocompound proportion in the prostate tissue is gradually achieved by adopting a habitual Cucurbita supplementation strategy. Moreover, these findings brought out the BPH dietary recommendations suggested and improved the future perspective of personal nutrition therapy for BPH coping personalized strategies, especially including quality of life maintainers with the alleviation of erectile abnormalities.

Shaping Public Health Strategies for Prostate Health

This extended discussion of BPH's potential impact on the global health sector highlights the necessity for new public health strategies for prostate health [9]. A variety of challenges to prostate health management currently exists, ranging from the pervasive lack of access to specialized health care to low levels of awareness. Part of the difficulty in treating conditions like BPH is that they are often ongoing and progressive, making effective intervention in treatable stages particularly important [12]. If limitations to treatment relate directly to access and resources for specialized health care, potential strategies for BPH or other benign prostatic conditions turn, in part, from a focus on health care to strategies to prevent or delay the condition. One alternative to specialized, expensive health care interventions is to identify dietary or lifestyle changes that are effective in delaying or preventing the onset of BPH [14]. A valuable exercise would explore, in terms of coherent public health strategies, not only the precursors of the emerging field of nutriproteomics but the interface between the individual patient, those investigating and treating the disease, and the social dimension of the population prone to a particular condition [17]. It is from this positive and anticipatory position that this review highlights the societal responsibility involved in the conception of the individual subject's relationship with complex dietary regimes and adherence to interventions, especially of natural foods and products, to alleviate current public health problems [18]. It is thus the efficacy of dietary intervention in early to mid-life, where alternatives to clinical intervention are especially important, that warrants further interrogation and acknowledges the voice of the community in public health practices to ensure treatment efficacy. Thus, collaboration and translation with, ideally, members of the community of men prone to or suffering from clinical prostatic conditions, men's support groups, dietary planners, and the family is suggested to further shape dietary interventional programs in partnership by forming the knowledge and research team, health professionals, and policymakers.

Current Challenges in Prostate Health

One of the biggest challenges in men's prostate health is the limited access of the general population to healthcare services. Adamant as many men can be regarding their general health, such quietness is not really by choice. There is a global stigma around men and male health, which for many means having to suffer in silence [8]. This is further compounded by a lack of awareness, particularly regarding the general pathophysiology of BPH, risk factors among different population groups, BPH's complications, its implications in comorbidity and, perhaps most importantly, the long-term burden of mortality. There are

psychological components to tackle alongside the biological [11]. Education and awareness initiatives need to target different groups directly in order to adequately address the knowledge gaps. Both older men and younger men need different types of education. We are all familiar with BPH as the common benign prostate growth seen in older men where intervention is deemed necessary [15]. However, from a public health perspective, the majority of men across the UK, the U.S., and Europe land within a younger demographic group where BPH is indeed occurring but in a less serious form – yet there is room for prevention. Discounting younger men reinforces the cyclical nature of treatment while not addressing prevention. On the treatment side of BPH, men might know something is not right, but they do not want to discuss it for a multitude of factors [17]. The first lies simply in distinguishing whether it may be a more serious health issue compared to 'prostate problems'. This confusion leads to delayed diagnosis and management. Generally, most patients oddly do not object to prostate management options when well informed. However, the commonest barrier to management is the psychosocial aspect attached to perceptions of emasculation and weakening one's sexual prowess. In discussing prostate issues, patients' feedback from community-based education programs shows that the initiatives need to be of a certain format [19]. Men do not want to see a lone doctor who alarms them with sporting photos and then talks to them about prostate health statistics and interventions. Men want to participate in an informal group setting within their community, often only or predominantly with their peers. Yet men wish to see health information from diverse levels – themselves and their peers, but also cutting across different branches of healthcare – specialists, nurses, general practitioners, physiotherapists because of the insight and nuance that each offers.

Potential Integrations of Cucurbita pepo Seed in Public Health Initiatives

Cucurbita pepo seeds could be associated with current public health initiatives as a preventive approach or a co-adjunct for BPH management [9]. Possible integrations include: Educational campaigns could be assembled to inform and promote the health benefits of Cucurbita pepo seeds [10]. The use of print media, public signage, and resources could increase awareness of the benefits associated with consuming Cucurbita pepo seeds, which can be integrated into meal plans or purchased and eaten raw at home. Emphasizing dietary changes for the management of mild and moderate BPH, as well as delaying the progression of prostate gland enlargement, would be useful. Collaboration among all healthcare professionals, including registered nurses and dietitians, could facilitate the initial and ongoing education about the inclusion of Cucurbita pepo seeds as part of a healthy balanced diet, recognizing the holistic health benefits, as well as improving prostate biomarkers [9]. Community-based programs could provide forums for health promotion regarding the benefits of incorporating Cucurbita pepo seeds into the diet as part of raising awareness about prostate health [11]. Groups and organizations from community-based men's regional services could be consulted as part of the design of the programs. Policy advocacy could influence the development of widespread community participation in Cucurbita pepo seed inclusion as part of a preventive focus on diet and health [14]. With an emphasis on unity of medicines, the collaboration could include multidisciplinary health bodies from around the world. Where culturally appropriate, this preventive health strategy increases the use of nutrients and natural remedies in the diet to promote healthy outcomes [18]. Also, in low opportunity cost countries, geographic restrictions and variations facilitate specific national public health messages on how both meat eaters and vegetarians can capitalize on natural dietary options such as Cucurbita pepo seeds. Public-private partnerships or single donor health initiatives could be the mechanisms to finance the programs or campaigns to increase low-cost dietary change within relatively short timeframes [15]. Public-private partnerships often include advertising strategies.

CONCLUSION

Cucurbita pepo seed extract shows significant potential as a natural and cost-effective treatment for benign prostatic hyperplasia (BPH). The review demonstrated that the extract reduces prostatic enlargement, decreases oxidative stress, and alleviates inflammation in animal models, with promising implications for human health. Given the high prevalence of BPH among aging men and the global need for more affordable and accessible treatment options, Cucurbita pepo seed extract could play a crucial role in improving prostate health on a global scale. The findings suggest that incorporating Cucurbita pepo as a dietary supplement may offer a sustainable, safe, and effective alternative or adjunct to conventional BPH therapies, making it a viable option for public health initiatives, particularly in regions with limited access to medical resources. Future clinical trials are needed to further explore its long-term efficacy and safety in human populations.

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REFERENCES

1. Kuo PH, Benson T, Messmann R, Groaning M. Why we did what we did: PSMA PET/CT selection criteria for the VISION trial. Journal of Nuclear Medicine. 2022 Jun 1;63(6):816-8. snmjournals.org
2. Kroemer G, McQuade JL, Merad M, André F, Zitvogel L. Bodywide ecological interventions on cancer. Nature medicine. 2023 Jan;29(1):59-74. hal.science
3. Hill CR, Haoci Liu A, McCahon L, Zhong L, Shafaei A, Balmer L, Lewis JR, Hodgson JM, Blekkenhorst LC. S-methyl cysteine sulfoxide and its potential role in human health: a scoping review. Critical Reviews in Food Science and Nutrition. 2023 Oct 4:1-4. tandfonline.com
4. Dey T, Goyal S, Periasamy K, Madan R. Is low-dose abiraterone for prostate cancer an attractive strategy for limited resource settings?. Indian Journal of Medical and Paediatric Oncology. 2022 Feb;43(01):040-6. thieme-connect.com
5. Li T, Wang GS, Brooks-Russell A, Tung G, Leslie L, Rittiphairoj T, Oberste JP, Yim TW, Bero L, Samet JM. Methodological challenges and actionable recommendations in studying the health effects of high-concentration THC products. American Journal of Epidemiology. 2024 Oct 29:kwae421. [HTML]
6. Chi JT, Lin PH, Tolstikov V, Oyekunle T, Chen EY, Bussberg V, Greenwood B, Sarangarajan R, Narain NR, Kiebish MA, Freedland SJ. Metabolomic effects of androgen deprivation therapy treatment for prostate cancer. Cancer Medicine. 2020 Jun;9(11):3691-702. wiley.com
7. Bouarroudj K, Kitouni I, Lechekhab A, Leghelimi Z, Kara I. Quality evaluation of commercially available healthcare applications for prostate cancer management. Multimedia Tools and Applications. 2023 Aug;82(20):31793-819. [HTML]
8. Evin D, Evinová A, Baranovičová E, Šarlinová M, Jurečeková J, Kaplán P, Poláček H, Halašová E, Dušenka R, Briš L, Brožová MK. Integrative Metabolomic Analysis of Serum and Selected Serum Exosomal microRNA in Metastatic Castration-Resistant Prostate Cancer. International Journal of Molecular Sciences. 2024 Feb 23;25(5):2630. mdpi.com
9. Shen M, Yuan L, Zhang J, Wang X, Zhang M, Li H, Jing Y, Zeng F, Xie J. Phytosterols: Physiological Functions and Potential Application. Foods. 2024 Jun 3;13(11):1754. mdpi.com
10. Tsai AK, Kagalwalla S, Langer J, Le-Kumar T, Le-Kumar V, Antonarakis ES. Pembrolizumab for metastatic castration-resistant prostate cancer: trials and tribulations. Expert opinion on biological therapy. 2024 Feb 1;24(1-2):51-62. [HTML]
11. Krishnamoorthi R, Kumaran A. Future aspects of plant derived bioactive metabolites as therapeutics to combat benign prostatic hyperplasia. Journal of Ethnopharmacology. 2024. [HTML]
12. Ikeyi AP, Ugwoke AO. A Review of Medicinal Plants with Potential Anti-Benign Prostatic Hyperplasia (Bph) Activity Used In Nigeria. IDOSR Journal of Biochemistry, Biotechnology and Allied Fields. 2020;5(1):64-71. idosr.org
13. Theil G, Richter M, Schulze M, Köttig T, Patz B, Heim S, Krauß Y, Markov M, Fornara P. Extract from Cucurbita pepo improves BPH symptoms without affecting sexual function: A 24-month noninterventional study. World Journal of Urology. 2022 Jul;40(7):1769-75. springer.com
14. Stewart KL, Lephart ED. Overview of BPH: Symptom relief with dietary polyphenols, vitamins and phytochemicals by nutraceutical supplements with implications to the prostate microbiome. International Journal of Molecular Sciences. 2023. mdpi.com
15. Russo GI, Broggi G, Cocci A, Capogrosso P, Falcone M, Sokolakis I, Gül M, Caltabiano R, Di Mauro M. Relationship between dietary patterns with benign prostatic hyperplasia and erectile dysfunction: A collaborative review. Nutrients. 2021 Nov 19;13(11):4148. mdpi.com
16. Sasidharan S, Srinivasakumar KP, Poddar S, Bhaumik A, Das SK. Benign Prostatic Hyperplasia (BPH): A Comprehensive Analysis of the Malaise and Summarizing Possible Management Options through Phytotherapeutic Agents. Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal). 2022 May 1;17(2). researchgate.net
17. Nneoma Igwe C, Israel Eshiet U. An Analysis of Cases of Benign Prostatic Hyperplasia in a Tertiary Hospital in Eastern Nigeria: Incidence, Treatment, and Cost of Management. Asian Journal of Research and Reports in Urology. 2021 Aug 16;4(4):32-41. goforpromo.com
18. Cassell A, Sine B, Jalloh M, Gravas S. Burden of Benign Prostatic Hyperplasia (BPH) in Low-and Middle-Income Countries in Sub-Saharan Africa (SSA). Société Internationale d'Urologie Journal. 2024 Oct 16;5(5):320-9. mdpi.com
19. Cheng Y, Chen T, Zheng G, Song Z, Zhang G, Rao X, Zeng T, Yuan C. Prevalence and trends in overactive bladder among men in the United States, 2005–2020. Scientific reports. 2024 Jul 15;14(1):16284. nature.com

20. Vickman RE, Franco OE, Moline DC, Vander Griend DJ, Thumbikat P, Hayward SW. The role of the androgen receptor in prostate development and benign prostatic hyperplasia: A review. Asian journal of urology. 2020 Jul 1;7(3):191-202. sciencedirect.com
21. Liu J, Yin J, Chen P, Liu D, He W, Li Y, Li M, Fu X, Zeng G, Guo Y, Wang X. Smoothened inhibition leads to decreased cell proliferation and suppressed tissue fibrosis in the development of benign prostatic hyperplasia. Cell Death Discovery. 2021 May 18;7(1):115. nature.com
22. Gallardo FFR, Quintar AA. The pathological growth of the prostate gland in atherogenic contexts. Experimental Gerontology. 2021. [HTML]
23. Xu G, Dai G, Huang Z, Guan Q, Du C, Xu X. The Etiology and Pathogenesis of Benign Prostatic Hyperplasia: The Roles of Sex Hormones and Anatomy. Research and Reports in Urology. 2024 Dec 31:205-14. tandfonline.com
24. Phua TJ. The etiology and pathophysiology genesis of benign prostatic hyperplasia and prostate cancer: a new perspective. Medicines. 2021. mdpi.com

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