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Supportive care interventions and quality of life in advanced disease prostate cancer survivors: An integrative review of the literature

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ABSTRACT

Background: Supportive care interventions can improve quality of life and health outcomes of advanced prostate cancer survivors. Despite the high prevalence of unmet needs, supportive care for this population is sparse.

Methods: The databases PubMed, SCOPUS, CINAHL, and ProQuest were searched for relevant articles. Data were extracted, organized by thematic matrix, and categorized according to the seven domains of the Supportive Care Framework for Cancer Care.

Results: The search yielded 1678 articles, of which 18 were included in the review and critically appraised. Most studies were cross-sectional with small, non-diverse samples. Supportive care interventions reported for advanced prostate cancer survivors are limited with some positive trends. Most outcomes were symptom-focused and patient self-reported (e.g., anxiety, pain, self-efficacy) evaluated by questionnaires or interview. Interventions delivered in group format reported improvements in more outcomes.

Conclusions: Additional supportive care intervention are needed for men with advanced prostate cancer. Because of their crucial position in caring for cancer patients, nurse scientists and clinicians

must partner to research and develop patient-centered, culturally relevant supportive care interventions that improve this population's quality of life and health outcomes. Efforts must concentrate on sampling, domains of needs, theoretical framework, guidelines, and measurement instruments.

Keywords: integrative review, prostate cancer, advanced disease, supportive care interventions

INTRODUCTION

Prostate cancer (PC) is the most commonly diagnosed non-cutaneous malignancy in men, with more than 1.2 million new cases diagnosed every year worldwide. Due to favourable prognoses and advances in treatment, the number of PC survivors has progressively grown, amounting to more than 3.6 million in the United States alone (American Society of Clinical Oncology [ASCO], 2019). At present, there are variations in defining cancer survivors. According to the National Comprehensive Cancer Network, PC survivor refers to any man with a history of PC, from the time of the initial diagnosis until the end of life (Denlinger et al., 2015). While the five-year survival rate for early-stage PC is exceedingly high, once the disease has spread, the survival rate decreases to 30%, with higher illness-related mortality and morbidity than men with early-stage PC (Dickey & Ogunsanya, 2018; National Cancer Institute [NCI], 2015). Most PC survivors receive the diagnosis in earlier stages of the disease, but up to one-third will progress into regionally advanced (stage III) or metastatic (stage IV) disease, remaining treatable but no longer curable (Holm et al., 2018; Prostate Conditions Education Council [PCEC], 2019). Men with stage III or IV PC are identified as "advanced disease survivors."

Men surviving PC report an array of overlapping supportive care needs associated with the debilitating effects of the various treatment modalities. These needs stem from pain, urinary incontinence, bowel and sexual dysfunction, fatigue, hot flashes, depression, and distress (Crawford-Williams et al., 2018). Advanced disease survivors are often treated with chemotherapy, androgen-deprivation therapy (ADT), or participation in clinical trials to slow progression or control disease (Jacobsen et al., 2017). While these treatments prolong life, they are associated with additional physical effects, such as treatment toxicity, deteriorating bone health, increased fat mass, and reduced vitality. Also, the treatment impacts can also increase the susceptibility for certain psychological problems, such as risk for suicide and cognitive decline. Altogether, these challenges affect advanced PC survivors' quality of life (QOL) and functional well-being beyond their physical needs (Chambers et al., 2018; Darwish-Yassine et al., 2014).

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In 2005, the Institute of Medicine recommended consistent, quality survivorship care for all cancer survivors (National Research Council [NRC], 2005). In 2014, the American Cancer Society published a set of PC survivorship guidelines, later endorsed by the American Society of Clinical Oncology to assist clinicians in caring for these survivors. The guidelines ensure uniformity and coordination of care through individualized interventions to meet the specific and often complex needs of PC survivors (Handberg et al., 2018; Noonan & Farrell, 2016; Skolarus et al., 2014). Supportive care is a holistic, patient-centred approach to prevent and manage the side effects of the cancer and its therapies, with the goal of optimizing rehabilitation and QOL (Fitch, 2008). Despite the reported benefits, supportive care is delivered inconsistently due to reduced clinician time, insufficient evidence on optimal care delivery modes, and providers' lack of knowledge about survivors' specific needs (Post & Flanagan, 2016).

Literature on PC survivors covers diverse topics, such as available psychosocial interventions or unmet supportive care needs while undergoing specific treatments (Holm et al., 2018; McIntosh et al., 2019; Parahoo et al., 2013). A systematic review and qualitative synthesis by King et al. (2015) explored men's experiences of and needs for supportive care, and reported that more patient-centred, nurse-led supportive care is required. A separate systematic review by Crawford-Williams et al. (2018) identified that survivorship interventions did not address the real needs of this vulnerable population. Recent studies show that 33% to 81% of PC survivors report inadequate support for their unmet needs (King et al., 2015; Watson et al., 2016).

Due to the high prevalence of unmet needs among PC survivors, an apparent lack of adequate supportive care, and the underrepresentation of the topic in the literature, a synthesis of the available supportive care interventions and their effect on QOL is needed. Thus, the aim of this integrative review was to critically appraise and characterize existing evidence-based supportive care interventions and their effects on QOL for advanced disease PC survivors through the lens of the Supportive Care Framework for Cancer Care (SCFCC) (Fitch, 2008). Results of this review may assist clinicians caring for this population and better inform future intervention development according to the current practice guidelines and recommendations.

METHODS

Theoretical Framework and Application to Population

The SCFCC was initially formulated as a tool to help health-care providers ensure that cancer patients' supportive care needs were being met throughout the various stages of illness, including survivorship (Fitch, 2008). The framework outlines a comprehensive taxonomy of seven domains of needs. The physical domain encompasses an absence of physical symptoms and the ability to carry out normal daily activities (ADL) (Fitch, 2008). Common adverse effects of advanced PC, measured as outcome indicators within this domain, include body composition, physical activity, fatigue, and urinary dysfunction, which can impact QOL negatively (Dickey & Ogunsanya, 2018; Park et al., 2017; Shakeri et al., 2015). For example, up to

38.5% of advanced disease PC survivors report clinically relevant fatigue affecting overall well-being (Antolin et al., 2019).

The emotional domain relates to a sense of reassurance in times of distress (Fitch, 2008). Advanced disease PC survivors face many emotional unmet needs, including depression, anxiety, distress, fear of recurrence, or lifestyle changes due to the illness and the various treatments, which can lead to a lower overall QOL (Paterson et al., 2015). The need for information relates to improving decision-making and decreasing misunderstanding between survivors and providers (Fitch, 2008; Freire et al., 2014).

Cancer affects not only the patient, but also the family and the community, potentially leading to higher levels of social withdrawal, a commonly reported unmet need. Positive social roles and support are indicators of higher health-related QOL in many cancer survivors, including PC (Shakeri et al., 2015). The same is true for the practical domain. Leaving practical needs unattended can reduce the survivors' overall QOL, as they are a supporting vehicle to perform the usual ADL (Fitch, 2008; Park et al., 2017).

Advanced PC can often generate spiritual distress, leading to despair, suffering, and existential crises. The spiritual domain relates to a sense of purpose in life (Fitch, 2008). Unmet spiritual needs could lead to a loss of dignity and values, as the spiritual dimension of QOL is commonly a priority in peoples' lives (Freire et al., 2014). The psychological domain relates to coping with the disease (Fitch, 2008). Past evidence supports the relationship between coping styles and psychological-related QOL (Park et al., 2017).

This multidomain framework has been used successfully in past studies assessing the unmet needs of breast and gynecological cancer survivors (Fitch & Steel, 2010; Fitch, 2012). It has also guided supportive care and educational oncology interventions in the U.S. and abroad (Busolo & Woodgate, 2016; Cheah et al., 2016). In this review, the SCFCC guided criteria for article selection, extraction and organization of data during analysis, and presentation of findings according to the framework domains of needs.

Design and Search Strategy

To ensure the highest rigour, this integrative review followed the five-stage process proposed by Whittemore and Knafl (2005). This process includes problem identification, literature search, data evaluation, data analysis, and presentation. The search strategy was designed after consulting with an expert research reference librarian. A comprehensive literature search was performed in the following electronic databases: PubMed, SCOPUS, CINAHL, and ProQuest, following an identical format. Key words included: (*advanced-disease* OR *advanced-stage* OR *late-disease* OR *late-stage* OR *metastatic* OR *stage III* OR *stage IV*) AND (*prostate cancer* OR *prostate neoplasm* OR *prostate tumor*) AND (*interventions* OR *intervention*). Hand searching of studies' reference lists identified additional records for evaluation.

Inclusion and Exclusion Criteria

Studies were eligible if they were peer-reviewed, and reported quantitative, qualitative, or mixed methods original

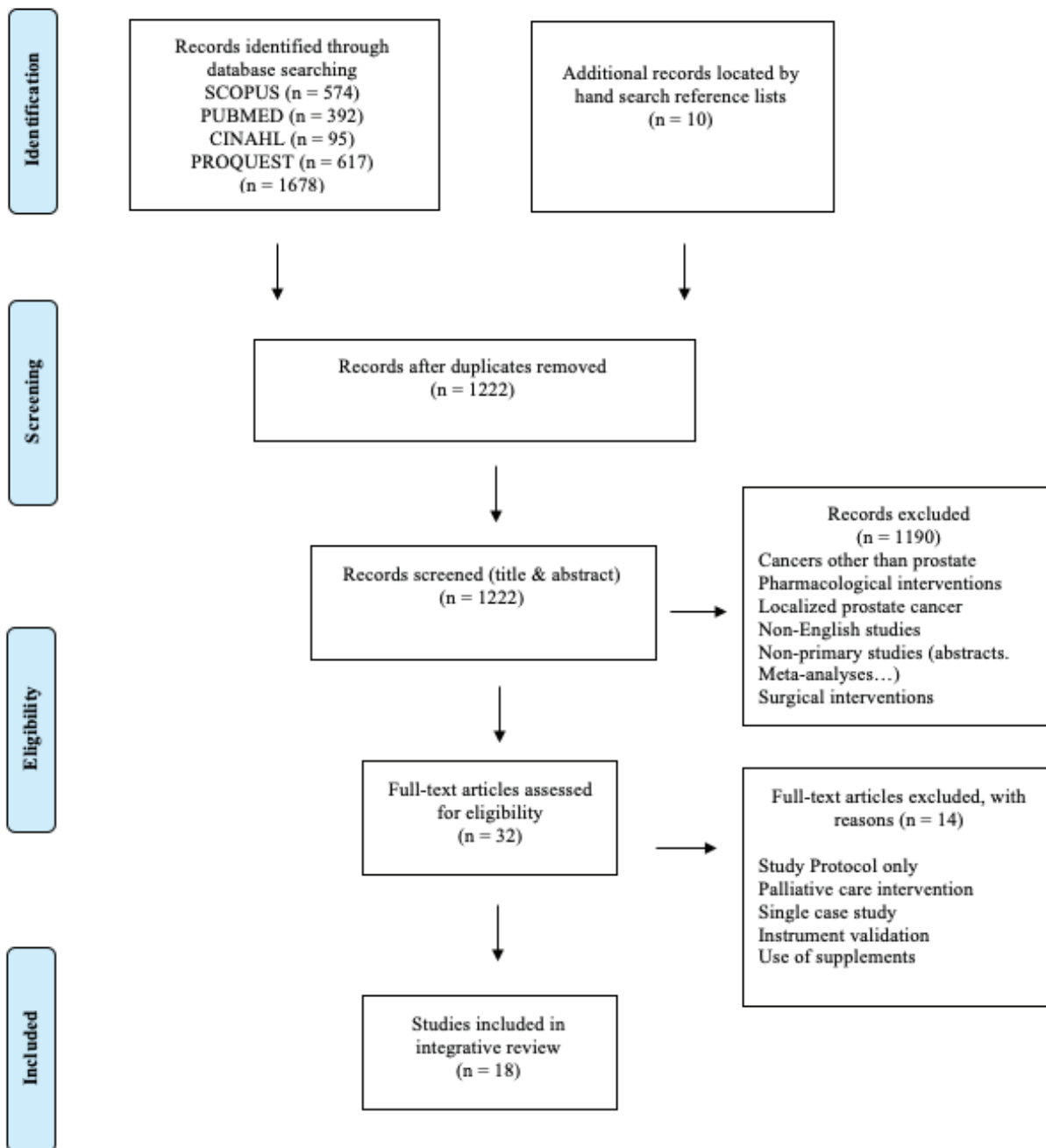
research focused on supportive care interventions for advanced PC, and included reported outcomes corresponding with one or more SCFCC domains. Exclusion criteria were studies targeting other types of neoplasms, solely localized PC, and unrelated subjects such as purely pharmacological or surgical interventions with curative or palliative intent. The search was limited to studies published in English between 2009 to 2019 to capture the most relevant articles. The PRISMA statement and flow chart (2015) guided the screening and selection of the relevant publications (Figure 1).

Data Extraction and Methodological Quality Assessment

During the first electronic database search, a total of 1,678 articles were identified. Hand searching identified 10 additional articles. After duplicates were removed ($n = 466$), the first author (AS) independently screened 1,222 titles and abstracts for eligibility, with 1,190 articles excluded because they did not meet the inclusion criteria. A final count of 32 articles underwent a thorough full-text review by the first author, with 14 studies excluded because they did not report the full study results, were single-case studies, or involved an instrument validation or

Figure 1

PRISMA flow diagram of the study selection process



a palliative care intervention (care for those with a time limiting cancer). Twenty percent of the title, abstracts, and full-texts were reviewed by a second reviewer (SQ) for validity and trustworthiness of the studies selected. All authors agreed the final 18 studies met the criteria for inclusion.

Data analysis proceeded with the development of a comprehensive evidence table, which included authors, year, purpose, design, setting, sample, intervention, outcomes, results, domain, and Mixed Methods Appraisal Tool (MMAT) number of “Yes” (Table 1). Data on the reported intervention components

and outcomes were extracted and categorized according to the domains of the SCFCC framework (Laughery & Woodgate, 2015). The findings were organized from the most to the least prevalent SCFCC domains. The methodological quality of the studies was appraised using the MMAT. The MMAT provides checklists that guide the concurrent appraisal of quantitative, qualitative, and mixed-methods studies in systematically conducted reviews (Hong et al., 2018). It is rooted in an extensive systematic literature review posing seven questions according to the study design: randomized-controlled trial, non-randomized,

Authors (Year)	Study Purpose	Study Design	Setting; Sample Description & Size (N)	Intervention	Primary Outcomes	Results	SCFCC Domain	MMAT (# of YES)
Badger TA, Segrin C, Figueredo AJ, et al. (2011)	To test the effectiveness of two 8-week telephone psychosocial interventions for maintaining and improving QOL	Randomized experimental design	Cancer and Veterans Affairs Centers, Arizona (USA) Prostate cancer survivors (all stages) N = 71 Survivors' caregivers N = 71	TIP-C Arm (n = 36): 8-week telephone interpersonal counselling + cancer education HEAC arm (n = 35): 8-week telephone health education attention condition + written materials (nutrition, exercise, resources, quitting smoking)	At baseline, 12 and 24 weeks - Depression - Positive & negative affect - Stress - Fatigue - Prostate health QOL - Social well-being - Social support - Spiritual well-being	Differences between groups: - Survivors in TIP-C did not exhibit any significant changes on any of the QOL outcomes. - Survivors in the HEAC showed significant changes in 5 outcomes: depression, negative affect, stress, fatigue, spiritual well-being, and in the 4 dimensions of the QOL	Physical Social Informational Emotional Practical Spiritual	4 out of 5
Beydun N, Bucci JA, Chin YS, et al. (2014)	To examine if a community-based centrally managed combined resistance and aerobic exercise + education program can ameliorate the adverse effects of androgen-deprivation therapy	Prospective cohort study	New South Wales (Australia) Survivors with relapsed or metastatic prostate cancer N = 859	Face-to-face (n = 396): 10-week supervised group exercise sessions At-home (n = 255): Video + resistance bands + coach calls for 6 months Man Plan (208): Phone line support, magazines and education on low-intensity exercise, diet and psychosexual function	At baseline and 10-weeks - Height, weight, BMI, waist and hip circumference - BP - Resting HR - Resistance exercises	- Modest reduction in mean weight not statistically significant - Statistically significant reduction of mean waist & hip circumference - No change in BMI - Mean BP reduced from baseline - Not statistically significant lower resting HR - Significant decrease in mean time for the 400-m test - Statistically significant improvements in all measured variables - 98% reported a positive impact on their overall fitness + socialization - No further deterioration from treatment while on intervention	Physical Social Informational	4 out of 5

Authors (Year)	Study Purpose	Study Design	Setting; Sample Description & Size (N)	Intervention	Primary Outcomes	Results	SCFCC Domain	MMAT (# of YES)
Bourke L, Gilbert S, Hooper R, et al. (2014)	To assess the effects of a combined tapered supervised exercise training program with healthy eating advice on improving and sustaining changes in disease-specific QOL, BP and fatigue	2-armed, single-blind randomized controlled trial	London & Sheffield, U.K. Survivors with locally advanced (n = 20) or metastatic (n = 80) prostate cancer N = 100	Complex arm (n = 50): Supervised aerobic & resistance exercise twice/ week + behavioural component (barriers to exercise, goal setting, social support) + nutrition advice seminars Usual care arm (n = 50): Care by oncology nurse	At baseline, 12 weeks and 6 months - Exercise behavior, adherence & biochemical safety - Disease-specific QOL - Fatigue - BP - BMI - Weight - Biomarkers: PSA, testosterone, free androgen index, & hormone-binding globulin - Dietary behaviour:	-Significant improvements in total exercise behaviour maintained at 6 months -No differences in biochemical safety markers -Adherence 94% and 82% in supervised and independent exercise respectively -Significant, clinically relevant improvement in disease-specific QOL but not maintained after supervision -No changes in BP, weight or PSA -Significant clinically relevant improvements in fatigue at 12 weeks & 6 months -Reduction of fats intake, non-statistically significant	Physical Social Informational	5 out of 5
Chambers SK, Newton RU. (2012)	To investigate feasibility and effectiveness of an 8-week intensive mindfulness-based cognitive therapy	Mixed-methods pilot study	Rural and urban healthcare centres, Queensland, Australia Advanced stage prostate cancer survivors N = 19	2-hour teleconference group session - weekly session handbook + self-help materials + meditation CD (daily 35-min session minimum)	At baseline, after completion, and 3 months after - Psychological distress - Cancer-specific distress - QOL - Perceived global QOL - Mindfulness skills - Program Evaluation: acceptability & frequency - Qualitative assessment: overall experience	- Improved anxiety, avoidance & fear of recurrence - No changes in QOL - Increased mindfulness over time - Ideal quotas in urban centres - 80% attended all 8-week sessions - At 3 months, 54% reported regular mindfulness meditation - Majority found it very helpful - Thematic analysis Group identification (belong); Diversity acceptance; Peer learning (new ways of dealing with challenges); Acceptance of disease progression	Social Emotional	5 out of 5
Chambers SK, Occhipinti S, Foley S, et al. (2017)	To assess the effectiveness of MBCT in reducing psychological distress	2-armed randomized controlled trial	Griffn University, several hospitals Queensland, Australia Men with metastatic or castration-resistant prostate cancer N = 189	MBCT arm (n = 94): 8 group MBCT sessions at weekly intervals via teleconference Enhanced care arm (n = 35): Education on advanced PC, relaxation CD, nutrition, support services	At baseline, 3, 6, and 9 months - Psychological distress - Cancer-specific distress - Anxiety - QOL - Post-traumatic Growth Inventory - Mindfulness skills	- No significant changes or improvements in any of the measured outcomes - 72% rated the intervention as extremely helpful - No improvements in emotional distress over time - Intervention not efficacious	Social Emotional Practical	5 out of 5

Authors (Year)	Study Purpose	Study Design	Setting; Sample Description & Size (N)	Intervention	Primary Outcomes	Results	SCFCC Domain	MMAT (# of YES)
Cipolla BG, Havouis R, Moulinoux JP. (2010)	To present results of observance, safety, and effect of PRD on QOL (performance status and pain control) To compare survival between PRD and control patients on normal diet	Prospective cohort study	Centre Hospitalier de Saint-Gregoire, France Consecutive metastatic HRPC patients N = 42	PA reduced diet (n = 26): 5-day/week meals from food tables given to patients + partial intermittent intestinal tract cleansing Usual diet controls (n = 16)	At baseline and regularly until 36 months - Toxicity - Performance - Pain - Weight - Biomarkers: PSA, Hb, WBC, platelets, serum proteins, and red blood count - Survival: assessment & comparison early versus late PRD initiation	Observance: no patient stopped the diet - No adverse effects - No significant differences in weight, performance, pain, or blood counts - Significant median cancer-specific survival time of PRD patients was 36 months versus 17 months in controls - PRD is safe and well-observed as nutritional therapy	Physical Informational	4 out of 5
Cormie P, Newton RU, Spry N et al. (2013)	To provide initial experimental data on safety and efficacy of resistant exercise in metastatic prostate cancer survivors	Pilot single-blinded, 2-armed prospective randomized controlled trial	Perth, Western Australia Men with metastatic prostate cancer N = 20	Exercise arm (n = 10): 12-week, twice/week supervised group resistance exercise sessions Usual care (n = 10): offer of exercise program after intervention was finished	At baseline and 12 weeks - Incidence & severity of adverse events - Pain - Compliance, tolerance and rating of perceived exertion - Muscle strength - Ambulation - Exercise capacity - Muscle power - Balance - Falls - Physical activity - Regional & whole-body lean and fat mass - QOL - Distress - Fatigue	- No adverse events - No change in pain medication use - High attendance (70%) - Exercise sessions well tolerated - Trends toward improvement in physical function in exercise arm - No difference in balance - Significant favourable change in whole body and appendicular lean mass in exercise arm - No differences in fat mass - No significant differences in QOL, fatigue or distress	Physical Social	5 out of 5
Galvão DA, Spry N, Denham J, et al. (2014)	Effectiveness of exercise training (resistance and aerobic) in cardio-respiratory fitness, physical functioning, patient-reported outcomes, biomarkers and body composition	Multicentre, 2-armed, prospective randomized controlled trial	Three Health centres Australia and New Zealand Men at stages II, III, IV prostate cancer N= 100	EX arm (n = 50): progressive resistance and aerobic training with a 6-month supervision PA arm (n = 50): PA-modified educational booklet + pedometer	At baseline, 6 and 12 months - Cardiovascular fitness: 400-m walk - Physical activity - QOL - Muscle strength - Biomarkers: testosterone, PSA, insulin, lipids panel, glucose, BP - Waist circumference	- EX arm exhibited improvement in fitness, muscle strength and physical function - EX arm showed improved QOL, social functioning at 6 months, role emotional at 12 months, & mental health index at 6 months - EX arm showed appendicular skeletal muscle gain but no differences on weight and waist circumference - EX arm showed increased HDL at 12 months - No differences in PSA, testosterone or BP	Physical Social	4 out of 5

Authors (Year)	Study Purpose	Study Design	Setting; Sample Description & Size (N)	Intervention	Primary Outcomes	Results	SCFCC Domain	MMAT (# of YES)
Huri M, Huri E, Kayihan H, et al. (2015)	To identify the effect of cognitive-behavioural based occupational therapy (OT-CBSM) on occupational participation and QOL To explore which areas of daily life are most affected and in need of support	2-armed randomized controlled trial	Faculty of Health Sciences, Hacettepe University, Ankara, Turkey Men with localized, locally advanced or metastatic prostate cancer N = 34	OT-CBSM arm (n = 19): 12-week intervention: individualized daily living training + group recreational activity + CBSM education/ in-formation about prostate cancer & relaxation Control arm (n = 15): printed home program + instruction on effects of activity training, recreation, stress management and relaxation	One week before and after the intervention - Occupational performance - Self-perception & identify issues in self-care, productivity & leisure - QOL - Prostate-specific QOL (urinary, bowel, sexual & hormonal symptoms)	- 94.7% of participants experienced improvement - Affected areas: self-care (grooming, driving, bathing, dressing), productivity (stairs, typing, storing groceries, home repair, watching grandchildren), leisure (playing, walking pet, going to café, moving after rest, using phone, reading newspaper in bed) - OT-CBSM group reported a significant increase in physical, role & emotional & social functioning compared to controls in QOL - Urinary, bowel, sexual & hormonal symptoms were decreased in OT group	Physical Social Informational Emotional Practical	4 out of 5
Mina DS, Connor MK, Alibhai SMH, et al. (2013)	To examine if 6-months of home-based aerobic and/ or resistance exercise training can beneficially increase adiponectin, leptin, and IGF-axis protein levels	2-group, randomized controlled trial	Several urban health centres, Ontario, Canada Men with all stages of prostate cancer N = 26	EAT arm (n = 13): Preferred modality of exercise at moderate/ vigorous intensity-60 mins, 5/week for 6 months; heart monitor provided Resistance arm (n = 13): 10 exercises targeting major muscle groups	At baseline, 3 and 6 months - BMI - Body fat % - Waist circumference - VO ₂ peak - Changes in physical activity - Biomarkers: Insulin-growth factor-1, IGF binding protein 3, leptin & adiponectin	- At 6 months, AET group showed significant decrease in IGFBP-3 while RET group showed significant increase - At 3 months, RET group showed significant reduction of IGF-1 - Reductions in weight, BMI & waist circumference associated with reductions in leptin - Increases in VO ₂ peak associated with reductions in leptin - Home-based exercise intervention (RET) may have beneficial effects on adipokines and IGF axis, maybe due to improvements in body composition because of the exercise.	Physical	4 out of 5
Paterson C, Primeau C, Nabi G. (2018)	To test the hypothesis that the ThriverCare intervention would improve supportive care needs, psychological outcomes, health related QOL and self-efficacy	Pilot randomized controlled trial	Four hospitals in Scotland, U.K. Men with metastatic prostate cancer (n = 38) Survivor's caregivers (n = 10) N = 48	ThriverCare arm (n = 19): 4-component intervention: informational self-management booklet + holistic needs assessment + individual self-care plan + group-based seminar Standard care (n = 28): usual care by clinicians	At baseline and 3 months - Supportive care needs - Anxiety - Depression - QOL - Confidence in self-management	- Less prevalence of unmet needs in ThriverCare arm (fatigue, pain, fear, worries, sexuality, information) - No significant differences in anxiety and depression - No significant differences in QOL - No significant differences in self-efficacy	Physical Informational Emotional	4 out of 5

Authors (Year)	Study Purpose	Study Design	Setting; Sample Description & Size (N)	Intervention	Primary Outcomes	Results	SCFCC Domain	MMAT (# of YES)
Primeau C, Paterson C, Nabi G. (2017)	To gain understanding of a multimodal supportive care intervention (ThriverCare) compared to standard care	Qualitative	Two cancer hospitals in Scotland, U.K. Men with localized, locally advanced and metastatic prostate cancer (n = 19) Caregivers (n = 7) Interprofessional team members (n = 7) N = 33	4-component intervention: holistic care assessment at baseline + individualized self-management care plan + group seminar + educational materials	At 3 months after the intervention - Exploratory semi-structured interviews - Field notes	Themes: - Physical needs: managing the side-effects of treatment, lack of self-management support - Psychological needs: uncertainty on cancer progression, lack of compassion from care team - Practical needs: lack of motivation, financial burdens - Sexual needs: change in sexual function - Patient-clinician communication: limited time, lack information Intervention group: - Emotional support: enough time to share, received info about their process, additional emotional support - Informational support: no unmet needs identified - Evidenced-based self-management plans & seminar: perceived benefit - Multimodal supportive care intervention improves care and decreases unmet needs over time	Social Informational Emotional	4 out of 5
Serda BC, Vesa J, Del Valle A, et al. (2010)	To share a design and implementation of a progressive rehabilitation program with the purpose of reducing the urinary incontinence symptom and improving QOL	Cohort quasi-experimental	Hospital of Figueres, Girona, Spain Men with localized, locally advanced, and metastatic prostate cancer N= 33	24-week progressive strength program: 3 consecutive ordered levels based on the recognition, control, & tonifying the pelvic floor musculature	At baseline and 24-weeks: - Type of urinary incontinence - Leakage & frequency - UI Volume - QOL - Fatigue - Hip-waist index, waist perimeter & fat percentage - BP - Treatment toxicity - Exercise habits	- 66.66% had UI; 33.33% presented with lower urinary tract symptoms only - Significant decrease in intensity - Significant reduction of constipation, difficulty, frequency, limitation of activities & nocturia - Non-significant decrease in fatigue and pain - Non-significant improvement in QOL after the program - Significant decreases in hip-waist index, waist perimeter and fat percentages	Physical Social	5 out of 5

Authors (Year)	Study Purpose	Study Design	Setting; Sample Description & Size (N)	Intervention	Primary Outcomes	Results	SCFCC Domain	MMAT (# of YES)
Taaffe DR, Newton RU, Spry N, et al. (2017)	To report the efficacy of a 1-year long RCT of varying supervised exercise modalities on fatigue and vitality	3-armed randomized controlled trial	Perth & Brisbane, Australia Men with localized and locally advanced prostate cancer N = 163	ILRT arm (n=58): Impact loading & resistance training ART arm (n=54): Aerobic & resistance training DEL arm (n=51): Usual care & delayed exercise	At baseline, 6, and 12 months - Fatigue - Vitality - Cardiovascular fitness - Muscle strength	- Reduced fatigue in ILRT at 6 & 12 months - Reduced fatigue in ART at 12 months - No change in fatigue or vitality in DEL at 6 months - Increased vitality in all 3 groups at 12 months - Increased muscle strength in ILRT group at 6 & 12 months & in ART after 6 months - All exercise modalities have beneficial effect on fatigue & vitality	Physical Social	4 out of 5
Villumsen BR, Jorgensen MG, Frystyk J, et al. (2019)	To explore the effects of 12-week unsupervised home-based exergaming compared to usual care	Single-blinded, 2-armed randomized controlled trial	Outpatient clinics at Regional Hospital Holstebro and Regional Hospital Viborg, Denmark. Men at all stages of Prostate cancer N = 46	Intervention arm (n = 23): 90-min instruction on exergaming X-Box 360 Kinect system; 1-hour, 3/ week aerobic & strength exercise Usual care (n=23): normal daily activities	Baseline and 12-weeks - Effects of exergaming-physical function - Leg extension power - Body Composition - Self-reported QOL - Fatigue	- 4.2% improvement favoring the intervention LEP: - No significant difference between groups - Lean mass increased and fat mass decreased numerically between groups-not statistically significant - No difference in QOL between groups- numerical increase in global health status in intervention arm - No improvements in fatigue in intervention arm - Study shows trends favouring the exergaming intervention	Physical Practical	4 out of 5
Winters-Stone KM, Dobek JC, Bennett JA, et al. (2015)	To report effects of POWIR on muscle strength, physical function, and disability To explore if changes in strength, physical function or fatigue mediated changes in self-reported function or disability	Single-blind, 2-parallel groups, randomized controlled trial	Oregon Health & Science University, Portland, Oregon (USA) Men with localized and locally advanced prostate cancer N = 51	POWIR arm (n = 29): Supervised program of resistance + impact training FLEX arm (n = 22): placebo control program; seated stretching exercise	At baseline, 6 and 12 months - Prevalence chronic conditions - Energy in physical activity - Fatigue - Muscle strength - Physical function performance battery (objective) - Self-reported physical function	- Retention for POWIR arm 90% - Retention for FLEX arm 75% - Attendance while supervised 83% & 67% for POWIR and FLEX respectively - Significant increase of 7% for bench press and 17% for leg press in POWIR group (muscle strength) - No significant changes in objective measures in physical function - POWIR group increased mean self-reported physical function on EORTC QOL and decreased disability on LLFDI subscale - No significant differences in fatigue or 36-item health survey - Overall, men in POWIR reported better levels of physical function & less disability than men in FLEX	Physical Social	5 out of 5

Authors (Year)	Study Purpose	Study Design	Setting; Sample Description & Size (N)	Intervention	Primary Outcomes	Results	SCFCC Domain	MMAT (# of YES)
Yanez B, McGinty HL, Mohr DC, et al. (2015)	To evaluate the participation & retention of a Web-based intervention targeting symptom burden and HRQOL To assess participant satisfaction To report preliminary evidence for the efficacy of a cognitive behavioural stress management (CBSM) on HRQOL and intervention targets	2-armed randomized controlled trial	Robert H. Lurie Comprehensive Cancer Center of Northwestern University and the Jesse Brown VA Medical Center Chicago, IL (USA) Men with locally advanced (III) or metastatic (IV) prostate cancer N = 74	CBSM arm (n = 37): Group session targeting stress reduction, coping skills, interpersonal skills, social network HP arm (n = 37): Health info and education on sleep, nutrition, & physical fitness	At baseline, and 6 months - Feasibility & acceptability: recruitment, retention & attendance rates - Cancer-related stress - Depressive symptoms - Health-related QOL - Intervention targets: self-efficacy in stress management skills	- Recruitment rate was 31.3% - Retention rate at 6 mo was 85.7% for CBSM and 86.1% for HP - HP group attended more sessions - Acceptability: confidence in material learned was “quite” for CBSM and “somewhat” for HP group - CBSM fewer depressive symptoms than HP - HP reported better social well-being - CBSM reported higher scores for relaxation than HP over time Findings support feasibility, acceptability, and preliminary efficacy of a web-based psychosocial intervention	Social Informational Emotional Practical Psychological	4 out of 5
Yennurajalingam S, Atkinson B, Masterson J, et al. (2012)	To describe the impact of an outpatient palliative care (PC) consultation on symptoms of advanced prostate cancer	Retrospective descriptive study	M.D. Anderson Cancer Center, Houston, TX (USA) Charts of patients with metastatic prostate cancer N = 55	Outpatient palliative care consultation	- Age - Disease state: 10- symptom severity Performance Status - Survival - Biomarkers: hemoglobin, testosterone, PSA - Medication changes	- Most relevant symptoms: fatigue, drowsiness & pain - Statistically significant improvement in 7 out of 10 symptoms after the PC consultation: pain, depression, drowsiness, fatigue, sleep, sense of well-being & anxiety - Longer duration between PC referral and death than in previous studies: 175 days versus 141 & 42	Physical Informational Emotional	4 out of 5

Abbreviations: BP, blood pressure; BMI, body mass index, CR, cardiorespiratory; EORTC, European Organization for Research and Treatment on Cancer; FLEX, placebo control program of seated stretching exercise; Hb, hemoglobin; HDL, high density lipoproteins HR, heart rate; IGF, insulin growth factor; MBCT, mindfulness-based cognitive therapy; PC, palliative care; POWIR, Prevent Osteoporosis with Impact + Resistance; PRD, polyamine-reduced diet; PSA, prostate specific antigen; QOL, quality of life; RTC, randomized controlled trial; VO₂, oxygen uptake; UI, urinary incontinence; WBC, white blood

descriptive, mixed-methods, and qualitative (Hong et al., 2018). Methodological are evaluated as “Yes”, “No”, or “Can’t tell”. More “Yes” responses indicate greater methodological quality. The final evidence table was reviewed by all authors to ensure accuracy of the findings.

RESULTS

Overall Characteristics of the Sample Studies

The sample of selected studies (*n* = 18) reported on original intervention research. Sixteen used quantitative designs and two studies used a qualitative or mixed-methods methodology. Twelve of the quantitative studies were randomized controlled trials (Table 1). The remaining used a quasi-experimental, a prospective observational cohort, and a retrospective descriptive design. Overall, sample sizes across studies were

moderately small, ranging from 19 to 189 participants, with the exception of one study including 859 subjects (Beydun et al., 2014). All studies included advanced stage PC survivors (III, IV), either exclusively or in combination with earlier stage PC. The majority of studies included only White participants; only three included Black participants (Badger et al., 2011; Yanez et al., 2015; Yennurajalingam et al., 2012). Studies were conducted in Turkey (*n* = 1), United States (*n* = 4), Canada (*n* = 1), Europe (*n* = 6), and Australia/New Zealand (*n* = 6). The methodological quality of the reviewed studies was high: 44.4% of the studies met all quality criteria (5/5 “Yes” out of 5 in the MMAT tool), while the remaining 55.6% met four out of five criteria. None of the studies ranked lower than four.

Addressing the multidomain supportive care needs is an essential part of the therapeutic management of cancer to

Table 2

Interventions, Outcomes, and Main Results per SCNCCF

Domain	Intervention(s)	Outcomes	Results	Studies
PHYSICAL	<p>EXERCISE:</p> <ul style="list-style-type: none"> • Aerobic exercise • Resistance training • Impact loading • Combination <p>PSYCHOSOCIAL:</p> <ul style="list-style-type: none"> • Counselling / education 	<ul style="list-style-type: none"> • Fatigue • Body changes • Physical activity • Urinary symptoms • Muscle strength • Vitality • Pain • Overall survival 	<ul style="list-style-type: none"> • Half interventions decreased fatigue • Significant decrease in waist/hip circumference • No significant reduction in weight/BMI • Significant improvement in urinary symptoms • Better muscle strength • More vitality • Only two studies ameliorated level of pain • Longer survival 	<p>Badger et al., 2011 Beydun et al., 2014 Bourke et al., 2014 Cipolla et al., 2010 Cormie et al., 2013 Galvão et al., 2014 Huri et al., 2015 Mina et al., 2013 Paterson et al., 2018 Primeau et al., 2017 Serda et al., 2010 Taaffe et al., 2017 Villumsen et al., 2019 Winter-Stone et al., 2015 Yennurajalingam et al., 2012</p>
SOCIAL	<ul style="list-style-type: none"> • Group mindfulness • Group counselling • Cognitive occupational therapy • Group stress reduction 	<ul style="list-style-type: none"> • Social support • Social well-being • Social belonging 	<ul style="list-style-type: none"> • Significant improvement in all social outcomes across studies addressing social domain 	<p>Badger et al., 2011 Beydun et al., 2014 Bourke et al., 2014 Chambers et al., 2012 Chambers et al., 2017 Cormie et al., 2013 Galvão et al., 2014 Huri et al., 2015 Primeau et al., 2017 Serda et al., 2010 Taaffe et al., 2017 Winter-Stone et al., 2015 Yanez et al., 2015</p>
INFORMATIONAL	<ul style="list-style-type: none"> • Cancer process • Consequences treatment • Daily life: through presenting resources, educating on diet, exercise, self-management, relaxation, or informing about symptom-related problems 	<ul style="list-style-type: none"> • Informational needs • Survival • Fat intake • Coping skills • Sense well-being 	<ul style="list-style-type: none"> • Less prevalence of unmet informational needs • Better sense of well-being • No further physical deterioration • Non-significant reduction in fats intake 	<p>Badger et al., 2011 Beydun et al., 2014 Bourke et al., 2014 Cipolla et al., 2010 Huri et al., 2015 Paterson et al., 2018 Primeau et al., 2017 Yanez et al., 2015 Yennurajalingam et al., 2012</p>
EMOTIONAL	<p>PSYCHOSOCIAL:</p> <ul style="list-style-type: none"> • Mindfulness • Counselling • Occupational therapy • Stress reduction 	<ul style="list-style-type: none"> • Depression • Anxiety • Stress/distress • Fear recurrence • Changes lifestyle 	<ul style="list-style-type: none"> • Two interventions reported as not efficacious • Remaining studies: significant improvement in depression, anxiety, stress, fear, mindfulness ability 	<p>Badger et al., 2011 Chambers et al., 2012 Chambers et al., 2017 Huri et al., 2015 Paterson et al., 2018 Primeau et al., 2017 Yanez et al., 2015 Yennurajalingam et al., 2012</p>
PRACTICAL	<p>PSYCHOSOCIAL: technology-assisted:</p> <ul style="list-style-type: none"> • Counselling • Mindfulness • Stress reduction <p>EXERCISE:</p> <ul style="list-style-type: none"> • Web Exergaming <p>IDENTIFICATION OF DAILY LIFE ACTIVITIES AFFECTED</p>	<ul style="list-style-type: none"> • Feasibility • Helpfulness <ul style="list-style-type: none"> • Physical activity • QOL, body composition 	<ul style="list-style-type: none"> • Reported to be feasible and/or helpful <ul style="list-style-type: none"> • Non-significant lean mass increase • 4.2% favouring intervention <ul style="list-style-type: none"> • Ability to identify issues with home help 	<p>Badger et al., 2011 Chambers et al., 2017 Huri et al., 2015 Villumsen et al., 2019 Yanez et al., 2015</p>
SPIRITUAL	<ul style="list-style-type: none"> • No specific component 	<ul style="list-style-type: none"> • Spiritual well-being 	<ul style="list-style-type: none"> • Significant improvement 	<p>Badger et al., 2011</p>
PSYCHOLOGICAL	<ul style="list-style-type: none"> • Stress reduction 	<ul style="list-style-type: none"> • Coping skills 	<ul style="list-style-type: none"> • No available results 	<p>Yanez et al., 2015</p>
<p>Abbreviations: BMI, body mass index; QOL, quality of life; SCNCCF, supportive care needs for cancer care framework.</p>				

maintain QOL (Afiyanti et al., 2018; Comert et al., 2013). All the studies included supportive care interventions that aimed to support QOL, improve coping with the disease and the side-effects, and maintain their dignity by addressing one or more SCFCC domains (Fitch, 2008). Three major intervention categories emerged from the studies: 1) exercise; 2) cognitive-behavioural/psychosocial; and 3) educational (Table 2). Two studies combined psychosocial counselling and educational components and one combined a physical activity intervention with daily life education (Badger et al., 2011; Beydun et al., 2014; Huri et al., 2015). One study included all three categories (Bourke et al., 2014). Interventions that were delivered face-to-face or were supervised, reported improvements in a greater number of study outcomes compared to interventions delivered using technology or teleconferencing. Four interventions were unsupervised or used mixed delivery methods (some components delivered in person and components unsupervised) (Table 1).

The number of outcomes measured in the studies ranged from one to 13. All studies reported various primary outcomes, typically more than three (Tables 1 & 2). More than half of the outcomes assessed a wide array of symptoms and perceptions (e.g., anxiety, pain, QOL, self-efficacy), were patient self-reported, and were measured either by questionnaires or individual interviews. The remaining outcomes were objectively measured (e.g., biomarkers, blood pressure, weight). None of the studies reported the psychometric properties of the measurement instruments. Only the physical domain was assessed using objective measures such as biomarkers (e.g., maximum oxygen consumption, resting heart rate).

Self-reported QOL was measured as an outcome in 12 studies using various instruments (e.g., FACT, EORTC, SF-36; Table 1). The results across these studies reported that although there were no significant differences observed in the overall QOL total score, some improvements were noted on the physical, emotional, and social subscale scores.

Summary of Interventions by SCFCC Domain

Physical Domain

The physical domain encompasses physical comfort and the ability to carry out usual ADL (Fitch, 2008). This domain was represented most frequently in the selected evidence. Fourteen studies reported on interventions aiming to alleviate ongoing effects pertaining to the physical domain (Tables 1 & 2). The most frequent primary outcomes included fatigue, body composition changes, physical activity function, muscle strength, and urinary symptoms. Additional outcomes associated with the physical domain included pain, vitality, and survival. Overall, most studies representing this domain reported a moderate degree of improvement in one or more of the outcomes measured.

Fatigue: Ten studies attempted to decrease fatigue, but only five reported statistically significant improvements (Badger et al., 2011; Bourke et al., 2014; Paterson et al., 2018; Taaffe et al., 2017; Yennurajalingam et al., 2012). Interventions included several modalities of health education, exercise training programs (impact loading, aerobic, or resistance), bladder rehabilitation, individual needs assessment, interpersonal

counselling, or a combination of these. One study testing a multimodal supportive care intervention reported a 7% reduction in fatigue after three months (Paterson et al., 2018). Another study evaluating two exercise modalities (impact loading and aerobic with resistance training) reported a reduction of five points in the fatigue module of the measuring instrument (Taaffe et al., 2017). The interventions occurred in three different settings: hospital, exercise clinics, or at home via telephone. The intervention adherence ranged from 67% to 94%. Some interventions were supervised, and some were independently managed. The duration of the interventions ranged from 8 weeks to 12 months.

Body Composition: One of the most effective advanced PC treatments is androgen deprivation therapy (ADT). However, changes in body composition including gains in fat mass and losses in bone health have been often reported by PC survivors (Comert et al., 2013; Mina et al., 2013). Six studies evaluated interventions by measuring body composition through body weight, body mass index (BMI), waist and hip circumference, body fat mass, whole-body and appendicular lean mass, and certain biomarkers (e.g., leptin and insulin-like growth factors 1,3; Table 1). Only one study that tested combined resistance and aerobic exercise with an education program reported a statistically significant reduction in waist and hip circumference ($p < 0.0001$; Beydun et al., 2014). A home-based aerobic versus resistance exercise training intervention showed a decrease in body weight and BMI associated with a non-significant reduction in leptin (Mina et al., 2013). An unsupervised exergaming intervention (exercise through videogames) reported numerical reduction in fat mass and increase in lean mass, though these were also not statistically significant (Villumsen et al., 2019). All other exercise interventions with or without an educational component reported modest or no changes in body composition. The interventions were implemented at home or in exercise clinics and had a duration from 10 weeks to 12 months. When reported, adherence was high, ranging from 70 to 91%.

Muscle Strength and Physical Activity: Five studies tested interventions that targeted muscle strength. Measures included resistance, muscular power, and chest and leg extension muscle strength. All interventions reported a significant improvement in the measures, were supervised, and shared common components, such as aerobic, impact, and resistance training. A resistance exercise intervention resulted in an 11% improvement in muscle strength when measuring leg extension (Cormie et al., 2013). Regarding physical activity, the majority of the studies assessing physical activity measures reported a positive improvement favouring the intervention group, three of them with statistical significance ($p < 0.001$). Measurements included ambulation, exercise behaviour, chair rise time(s), 6-Minute Walking Ability Test (6MWT), Godin Leisure-Time Exercise score, and self-reported physical function. An intervention testing resistance exercises improved ambulation by 12% (Cormie et al., 2013). A home-based exergaming intervention reported a 4.2% improvement in physical activity function by assessing the 6MWT (Villumsen et al., 2019). The

interventions targeting muscle strength and physical activity were all delivered at a hospital, exercise clinics, or were home-based. All interventions ranged from 10 weeks to 12 months.

Urinary Symptoms: One study involved a progressive urinary rehabilitation program with the purpose of reducing prostate-related urinary symptoms, resulting in a moderate reduction of difficulty, frequency, and nocturia (Serda et al., 2010). Four other studies tested interventions measuring the prostate-specific QOL, including urinary symptoms, via a self-administered instrument (FACT-P, UCLA PC Index, or EORTC-QOQ-30 PR25), but did not include urinary-specific outcome measures (Badger et al., 2011; Bourke et al., 2014; Huri et al., 2015; Villumsen et al., 2019).

Social Domain

The social domain addresses needs related to relationships, communication, and support systems within the family and the community (Fitch, 2008). This domain was the second most frequently represented within the body of evidence based on the nature of the intervention delivery. Thirteen studies delivered the intervention in a group format either face-to-face or via technology (Table 1). Outcomes included social well-being, social support, social functioning, sense of belonging, peer learning, and socialization. These outcomes were secondary in all studies except in one, which measured social well-being and social support with instruments (Social Well-Being scale & PSS-FA; Badger et al., 2011).

The interventions that included a psychosocial component such as group counselling, cognitive-based occupational therapy, or stress reduction reported an improvement in social well-being among the participants in the treatment group (Badger et al., 2011; Huri et al., 2013; Yanez et al., 2015). Group mindfulness sessions delivered by teleconference provided an increased sense of social belonging to the participants (Chambers et al., 2017; Chambers et al., 2012). There were also interventions evaluating various exercising modalities, such as aerobic, impact loading, or resistance training conducted in groups (Beydun et al., 2014; Bourke et al., 2014; Cormie et al., 2013; Galvão et al., 2014; Serda et al., 2010; Taaffe et al., 2017; Winters-Stone et al., 2015). Despite a lack of social-specific outcomes, all group exercising programs resulted in better social functioning and group interaction by encouraging socialization among participating survivors. Additionally, one study evaluating a multimodal supportive care intervention that included group seminars reported an improvement in social support (Primeau et al., 2017). All interventions took place at home via teleconference, at a hospital, or at exercise clinics. They were implemented for periods of 8 weeks to 12 months and demonstrated high adherence rates (65%-100%).

Informational Domain

Fitch's SCFCC associates the informational domain with adequate information regarding the disease trajectory, treatments, care processes, and available resources (2008). Although every type of intervention can be considered "educational" to some degree, 10 studies included interventions that represented the informational domain, by presenting

resources to the participants and/or the caregivers; educating on diet; exercise, relaxation, and self-management; or by informing them about symptom-related burdens (Table 1). No specific informational outcomes related to informational supportive care needs were measured in any of the studies. Three studies included nutritional education. One intervention contained nutrition advice seminars and reported a non-statistically significant reduction in total fats consumption (Bourke et al., 2014). A polyamine-reduced diet proved its safety and suggested an increase in the participants' median cancer-specific survival time to 36 months, versus 17 months in the control group (Cipolla et al., 2010). The health promotion group in the study by Yanez et al. (2015) was provided with health educational information on sleep, nutrition, and physical fitness, proven to be "somewhat" helpful.

One commonality across studies was that the majority of the information disseminated in these interventions was about cancer treatments or supportive care. After an educational intervention about the effects of the ADT, 98% of the participants reported a positive impact from this information on physical fitness level and no further deterioration from the adverse effects of ADT (Yennurajalingam et al., 2012). A web-assisted group intervention with education on stress awareness and reduction resulted in better coping skills regarding prostate-related symptomatology (Yanez et al., 2015). The two studies that included an educational seminar about ADT side effects, self-management, emotion and stress control, nutrition, exercise, and financing reported fewer unmet informational needs about treatment choices and disclosure of test results (Paterson et al., 2018; Primeau et al., 2017). In addition, an early outpatient palliative care consultation addressing symptom burden resulted in an increased sense of general well-being and an increased lifespan (Yennurajalingam et al., 2012). Despite not having a direct effect on QOL, the interventions including an informational component had a positive effect on some of the outcomes measured, such as fat intake, mindfulness, survival, and overall well-being.

Emotional Domain

The emotional domain relates to the need for comfort and reassurance when adjusting to stressful situations (Fitch, 2008). Eight studies assessed an intervention with at least one component addressing emotional needs (Table 1). Intervention methods included interpersonal counselling, occupational therapy, stress reduction, or mindfulness. Depression, anxiety, stress, and cancer-specific distress were the most commonly measured primary and secondary outcomes. The duration of the interventions averaged between 8 weeks and 12 months. Half were delivered via telephone and half were face-to-face at the hospital.

Two studies tested mindfulness-based cognitive therapy in groups using self-help materials and meditation CD delivered via teleconference (Chambers et al., 2012; Chambers et al., 2017). Although not statistically significant, one reported improved levels of anxiety, fear of recurrence, and avoidance in the subscales of the distress-measuring instruments (Chambers et al., 2012). An eight-week telephone intervention

combining interpersonal counselling and cancer education reported a statistically significant reduction in depression and disease-related stress ($p < 0.001$; Badger et al., 2011). A multimodal supportive care intervention (ThrivorCare) demonstrated no improvement in reducing stress, anxiety, or depression in the treatment group, but did report lower prevalence of fear and worries (Paterson et al., 2018). A technology-assisted psychosocial intervention to reduce stress also reported better scores in relaxation and fewer depressive symptoms upon completion (Yanez et al., 2015). One additional study evaluating the impact of an outpatient palliative care consultation on symptom burden in advanced PC survivors improved seven out of the 10 symptoms, including depression and anxiety (Primeau et al., 2017). Despite the mixed results of some of the interventions, several reported a statistically significant improvement in the emotional needs (e.g., depression, anxiety) of the study participants ($p < 0.05$).

Practical Domain

Practical needs associated with the cancer journey include supports that reduce the demands on the person's life at home (e.g., finances), facilitate transportation to the care centre, and access to supportive care and resources, childcare, and shopping (Fitch, 2008). Across multiple studies, intervention accessibility was facilitated through alternatives to in-person participation (e.g., telephone, teleconference or Web-assisted) (Table 1). The majority of these technology-assisted interventions were psychosocial in nature, such as interpersonal counselling, mindfulness, or stress reduction, and reported no significant differences in most primary outcomes (e.g., fatigue, QOL, physical function, psychological well-being) despite the degree of "feasibility and helpfulness."

The practical domain was addressed by one study that explored the relationship between ADL and consequences of the PC treatments (Huri et al., 2015). The intervention included a combination of individualized ADL training, group recreational activity, and education about PC and relaxation. Practical issues that were negatively affected by advanced PC included: personal activities, such as grooming, driving, bathing, or dressing; productive activities, such as typing, storing groceries, home repair, leisure, walking the pet, moving after rest, using the phone, or reading the newspaper in bed. Participants reported some improvement in functioning upon completion of the intervention. A web-based exergaming intervention, implemented in the participants' home using devices that can be acquired inexpensively in any technology-selling store, indicated modest, non-significant improvement of the physical activity outcomes (Villumsen et al., 2019). Overall, interventions representing the practical domain were limited to facilitating study participation. Despite being helpful, they did not report any specific practical outcomes.

Spiritual Domain

The spiritual domain relates to finding a personal sense of meaning in life and the need to practice some sort of spirituality, whether in the form of a religious or alternative belief (Fitch, 2008). Only one study addressed the spiritual domain as a secondary outcome (Badger et al., 2011).

The study compared an eight-week interpersonal counselling via teleconference with education (interventional group) and eight weeks of health education by telephone using written materials regarding nutrition, exercise, resources, and quitting smoking (control group). The influence of the participants' illness on spiritual well-being was measured with the eight-item spiritual well-being subscale of the Quality-of-Life Breast Cancer version questionnaire. The study reported a statistically significant improvement in spiritual well-being in the health education by telephone group ($p < 0.01$).

Psychological Domain

The primary feature of the psychological domain is the development of skills to cope effectively with illness-related stressors (Fitch, 2008). One study testing web-based group sessions for stress reduction, coping skills, and social network (CBSM) addressed the psychological domain (Yanez et al., 2015). The intervention included stress awareness development, learning stress reduction skills, changing negative stressor appraisals, and developing effective coping skills. The retention rate was 85%. Despite not having outcomes for those targets, results reported high interventional endorsement and feasibility. Statistically significant intervention effects were consistent with medium effect sizes on the health-related QOL scale domains (measured with the Functional Assessment of Cancer Therapy-General scale and subscales of the Measure of Current Status) favouring the intervention.

DISCUSSION

This integrative review confirms that supportive care interventions for advanced PC exist, but they remain limited in number and scope despite the disease's incurable nature, its growing prevalence, and the most current supportive care guidelines. Advanced PC is often associated with long-term challenges leading to greater levels of unmet needs and decreased QOL (Chambers et al., 2012; Cockle-Hearne et al., 2013). Evidence indicates that supportive care interventions are an acceptable and potentially efficacious way to improve some aspects of PC and other cancer survivors' QOL (Chambers et al., 2018; Forbes et al., 2019; Young et al., 2020).

The majority of interventions in this review focused on supportive care needs from the physical domain, such as fatigue, muscle strength, or body composition changes. Despite the mixed results in reducing fatigue, physical outcomes, such as muscle strength, specific anthropometric measures (waist circumference), and physical function improved across all studies. Possible explanations for the mixed results in fatigue could be that the studies considered different outcomes, utilized various measuring instruments, or that the interventions lacked implementation fidelity (intervention dose, intensity, or frequency). This finding is consistent with past studies that have reported supportive care interventions being ineffective in improving QOL in diverse cancer populations due to inadequate doses or variable timeframes (Carey et al., 2012). Supervised interventions with adequate dosages and frequency to increase functional capacity, QOL, and ability to conduct ADL, such as exercise, have shown effectiveness among

advanced PC and other cancer survivors (Dickey & Ogunsanya, 2018). Moreover, all exercise interventions that were delivered in group formats motivated socialization, social support, and sense of belonging among participating survivors despite social well-being not being a specific outcome measured.

The high prevalence of emotional needs in this population is commonly associated with more advanced stages of the disease, uncertainty about the future, and the harmful effects of the treatments (Paterson et al., 2015). Interventions addressing emotional needs are limited and often lack demonstrated efficacy. Only five in this review reported significant improvements in outcomes, such as depression, anxiety, distress, or fear. The heterogeneity of these studies makes it difficult to draw conclusions about the most effective way to provide emotional supportive care. Barriers to emotional health may include traditional masculine stoic roles, a restricted emotional response, and embarrassment (Ettridge et al., 2018; Wood et al., 2017).

A similar situation was found within the spiritual, practical, and psychological domains. Evidence shows that despite 79% of Americans identifying with some spiritual doctrine, spiritual needs are the least represented in cancer research, and the studies reviewed are no exception (Busolo & Woodgate, 2016). Challenges in coping with advanced PC can lead to increased suffering, grief, and loss, contributing to a poorer overall QOL (Laughery & Woodgate, 2015). Educational interventions have shown promising results in enhancing study participants' spiritual well-being.

A study involving web-based group sessions of stress reduction, coping skills, and social network (CBSM) contributed to the psychological domain and reported improvements on the health-related QOL subscales (Yanez et al., 2015). However, the study did not use any existing instrument to assess patients' coping such as the Cancer-Coping Questionnaire (Moore et al., 2003). No studies specifically targeted practical needs, but one study described the impact of advanced PC on daily life, and other studies reported intervention delivery acceptability. Interventions using teleconferencing or the Web were implemented conveniently in the comfort of the home. The majority of those, predominantly psychosocial interventions, reported moderate acceptability and feasibility, with high compliance and retention rates. However, they had mixed results: only one resulted in significant decreases in anxiety, fear, and mindfulness abilities (Chambers et al., 2012). This result coincides with a study reporting that telemedicine care delivery was moderately effective in addressing survivorship symptomatology (Agochukwu et al., 2018). More extensive studies are warranted to demonstrate the usefulness of these delivery formats for advanced PC survivors.

All the studies included advanced disease PC survivors, exclusively or in conjunction with varying disease stages. However, there was a noteworthy lack of racial and ethnic diversity in the studies. Interestingly, the three studies with participants other than White were conducted in the U.S. The majority of the studies reviewed were exploratory with small sample sizes. Also, studies used different outcome measures and the interventions varied in dose, frequency (ranging from 1 to 5 days per week), and length (8 to 24 weeks), making it

difficult to determine which supportive care interventions were the most effective (Bossert et al., 2020; Carey et al., 2012). Despite some promising results, it is premature to generalize the findings to practice in all the settings caring for these survivors. Longitudinal confirmation of the most effective interventions that meet this group's unique and complex needs is needed from more rigorous, multicentre, blinded RCTs that are sufficiently and diversely sampled (Ross et al., 2020).

There were three noteworthy findings from this review. First, the interventions delivered in a group format, whether in person or via technology, resulted in significant improvements in social-related measures (social support, social well-being, or a sense of belonging). This finding supports conclusions from past reviews reporting that the social domain is positively associated with a better overall QOL in advanced PC and breast cancer survivors (Dickey & Ogunsanya, 2018; Post & Flanagan, 2016). Second, the intervention results do not appear to be dependent on the number of domains addressed by the intervention. Some interventions showed positive trends, whether they addressed only one or several of the SCFCC domains. Third, some of the SCFCC domain—social or the practical domains—were impacted by the intervention even when they were not explicitly targeted.

Limitations

Several methodological limitations may limit the generalizability of the findings. The majority of studies were of high methodological quality. However, none of the studies reported a theoretical framework guiding the intervention development or delivery. It is possible that relevant articles were missed since our focus was on supportive care interventions in advanced PC survivors. The search terms were narrow to reflect this specific interventional category, dropping other areas that may have produced additional relevant evidence. Limiting studies to the English language and the last 10 years may have resulted in the omission of relevant evidence.

Implications for Research

This review highlights several gaps. First, different sampling approaches need to be considered to advance research in this area. Future research must include racial and ethnic diversity to reduce health disparities and promote QOL across communities suffering from chronic illnesses such as advanced PC (National Institute of Nursing Research [NINR], 2016). Second, researchers must focus on studying interventions that combine several components addressing the maximum number of supportive care domains since those interventions can be more cost-efficient in the long run. Third, interventions need to be guided by a theoretical framework and align with the recommended guidelines for survivorship care (ASCO, 2019; Cancer Care Ontario [CCO], 2019). An absence of theory makes it difficult to understand how and why the interventions were or were not successful in addressing this growing population's unmet supportive care needs (Nilsen, 2015). Finally, some of the mixed results may be attributable to the dissimilarities in psychometric properties of the instruments used across studies, making a comparison of the results challenging. Future research must

consider assessing the validation properties and quality of all measurement instruments, as well as utilizing the same instruments to measure the same outcomes. Also, there is a need to diversify research methodologies and include more qualitative and mixed methods research studies. These methodologies can provide a more in-depth understanding of advanced disease PC survivors' experiences and perceptions of regarding supportive care interventions.

CONCLUSION

Supportive care in advanced PC remains underserved and overlooked. This review reveals valuable insights regarding

available supportive care interventions that improve the QOL in this growing population. Findings suggest that the majority of interventions reported some effectiveness. However, no intervention can be recommended over another and the results must be interpreted with caution due to the existing limitations. This review supports the need for further interventional research, specifically longitudinal studies with larger, more racially diverse samples and methodologies. Future directions may include multi-domain designs and systematic use of theories and cancer survivorship guidelines. Finally, it also is critical to focus on the spiritual, practical, and psychological domains, as they can significantly enhance these survivors' overall QOL and sense of overall meaning.

REFERENCES

- Afiyanti, Y., Milanti, A., & Putri, R. H. (2018) Supportive care needs in predicting the quality of life among gynecological cancer patients. *Canadian Oncology Nursing*, 28(1), 22-29. <https://doi.org/10.5737/236880762812229>
- Agochukwu, N. Q., Skolarus, T. A., & Wittmann, D. (2018). Telemedicine and prostate cancer survivorship: A narrative review. *Mental Health*, 4, 45-55.
- American Society of Clinical Oncology. (2019). *Prostate cancer: Statistics*. www.cancer.net/cancer-types/prostate-cancer/statistics
- Antolin, A. R., Martinez-Piñeiro, L., Jimenez-Romero, M. E., Garcia-Ramos, J. B., Bellido D. L., del Toro, J. M., Garcia-Porrero, A. G., & Veiga, F. G. (2019). Prevalence of fatigue and impact on quality of life in castration-resistant prostate cancer patients: The VITAL study. *BMC Urology*, 19(1), 92.
- Badger, T. A., Segrin, C., Figueredo, A. J., Harrington, J., Sheppard, K., Passalacqua, S., Pasvogel, A., & Bishop, M. (2011). Psychosocial interventions to improve quality of life in prostate cancer survivors and their intimate or family partners. *Quality of Life Research*, 20, 833-844
- Beydun, N., Bucci, J. A., Chin, Y. S., Spry, N., Newton, R., & Galvão, D. A. (2014). Prospective study of exercise intervention in prostate cancer patients on androgen deprivation therapy. *Journal of Medical Imaging and Radiation Oncology*, 58, 369-376.
- Bossert, J., Wensing, M., Thomas, M., Villalobos, M., Jung, C., Siegle, A., Hagelskamp, L., Deis, N., Junger, J., & Krug, K. (2020). Implementation of the milestones communication approach for patients with limited prognosis: Evaluation of intervention fidelity. *BMC Palliative Care*, 19(1). <https://doi.org/10.1186/s12904-020-0527-1>
- Bourke, L., Gilbert, S., Hooper, R., Steed, L. A., Joshi, M., Catto, J. W. F., Saxton, J. M., & Rosario, D. J. (2014). Lifestyle changes for improving disease-specific quality of life in sedentary men on long-term androgen deprivation therapy for advanced prostate cancer: A randomized controlled trial. *European Urology*, 65, 865-872.
- Busolo, D. S., & Woodgate, R. L. (2016). Using a supportive care need framework to understand and improve palliative care among cancer patients in Africa. *Palliative Supportive Care*, 14(3), 284-301.
- Cancer Care Ontario. (2019). Follow-up model of care for cancer survivors. <https://www.cancercareontario.ca/sites/ccocancercare/files/guidelines/full/FollowUpModelOfCareCancerSurvivors.pdf>
- Carey, M., Lambert, S., Smiths, R., Paul, C., Sanson-Fisher, R., & Clinton-McHarg, T. (2012). The unfulfilled promise: A systematic of interventions to reduce the unmet supportive care needs of cancer patients. *Support Care in Cancer*, 20, 207-2019.
- Chambers, S. K., Foley, E., Galt, E., Ferguson, M., & Clutton, S. (2012). Mindfulness groups for men with advanced prostate cancer: A pilot study to assess feasibility and effectiveness and the role of peer support. *Support Care Cancer*, 20, 1193-1192.
- Chambers, S. K., Hyde, M. K., Laurie, K., Legg, M., Frydenberg, M., Davis, I. D., Lowe, A., & Dunn, J. (2018). Experiences of Australian men diagnosed with advanced prostate cancer: A qualitative study. *BMJ Open*, 8, 1-12.
- Chambers, S. K., Occhipinti, S., Foley, S., Clutton, S., Legg, M., Berry, M., Stockler, M. R., Frydenberg, M., Gerdiner, R. A., Lepore, S. J., Davis, I. D., & Smith, D. P. (2017). Mindfulness-based cognitive therapy in advanced prostate cancer: A randomized controlled trial. *Journal of Clinical Oncology*, 35(3), 291-300.
- Cheah, W. L., Ling, N. C., & Chang, K. H. (2016). The supportive care needs for prostate care patients in Sarawak. *Chinese Clinical Oncology*, 5(1), 7-14.
- Cipolla, B. G., Havouis, R., & Moulinoux, J. P. (2010). Polyamine reduced diet (PRD) nutrition therapy in hormone refractory prostate cancer patients. *Biomedicine & Pharmacotherapy*, 64, 363-368.
- Cockle-Hearne, J., Charnay-Sonnek, F., Denis, L., Fairbanks, G. E., Kelly, D., Kav, S., Leonard, K., Muilekom, E. V., Fernandez-Ortega, P., Jensen, B. T., & Faithfull, S. (2013). The impact of supportive nursing care on the needs of men with prostate cancer: A study across seven European countries. *British Journal of Cancer*, 109, 2121-2130.
- Comert, M., Gunes, A. E., Sahin, F., & Saydam, G. (2013). Quality of life and supportive care in multiple myeloma. *Turkish Journal of Hematology*, 30, 234-246.
- Cormie, P., Newton, R. U., Spry, N., Joseph, D., Taaffe, D. R., & Galvão, D. A. (2013). Safety and efficacy of resistance exercise in prostate cancer patients with bone metastases. *Prostate Cancer & Prostatic Disease*, 16, 328-335.
- Crawford-Williams, F., March, S., Goodwin, B. C., Ralph, N., Galvão, D. A., Newton, R. U., Chambers, S. K., & Dunn, J. (2018). Interventions for prostate cancer survivorship: A systematic review of reviews. *Psycho-Oncology*, 27, 2339-2348.
- Darwish-Yassine, M., Berenji, M., Wing, D., Copeland, G., Demers, R. Y., Garlinghouse, C., Fagerlin, A., Newth, G. E., Northouse, L., Holmes-Rovner, M., Rovner, D., Sims, J., & Wei, J. T. (2014). Evaluating long-term patient-centered outcomes following prostate cancer treatment: Findings from the Michigan prostate cancer survivorship study. *Journal of Cancer Survivorship*, 8, 121-130.
- Denlinger, C. S., Carlson, R. W., Are, M., Baker, K. S., Davis, E., Edge, S. B., Friedman, D. L., Goldman, M., Jones, L., King, A., Kvale,

- E., Langbaum, T. S., Ligibel, J. A., McCabe, M. S., McVary, K. T., Melisko, M., Montoya, J. G., Mooney, K., Morgan, M. A., O'Connor, T., ... Freedman-Cass, D. (2014). Survivorship: introduction and definition. Clinical practice guidelines in oncology. Journal of the National Comprehensive Cancer Network : JNCCN, 12(1), 34–45. <https://doi.org/10.6004/jnccn.2014.0005>
- Dickey, S.L., & Ogunsanya, M.E. (2018). Quality of life among black prostate cancer survivors: An integrative review. *American Journal of Men's Health*, 12(5), 1648-1664.
- Ettridge, K. A., Bowden, J. A., Chambers, S. K., Smith, D. P., Murphy, M., Evans, S. M., Roder, D., & Miller, C. L. (2018). "Prostate cancer is far more hidden...": Perceptions of stigma, social isolation, and help-seeking among men with prostate cancer. *European Journal of Cancer Care*, 27, e12790.
- Fitch, M. I. (2008). Supportive care needs framework. *Canadian Oncology Nursing Journal*, 18(1), 6-14.
- Fitch, M. I., & Steel, R. (2010). Identifying supportive care needs of women with ovarian cancer. *Canadian Oncology Nursing Journal*, 20(2), 66-74.
- Fitch, M. I. (2012). Supportive care needs of patients with advanced disease undergoing radiotherapy for symptom control. *Canadian Oncology Nursing Journal*, 22(2), 84-100.
- Forbes, C. C., Finlay, A., McIntosh, M., Siddiquee, S., & Short, C. E. (2019). A systematic review of the feasibility, acceptability, and efficacy of online supportive care interventions targeting men with a history of prostate cancer. *Journal of Cancer Survivorship*, 13(1), 75-96.
- Freire, M. E. M., Sawada, N. O., de Franca, I. S. X., da Costa, S. F. G., & Oliveira, C. D. B. (2014). Health-related quality of life among patients with advanced cancer: An integrative review. *Revista da Escola de Enfermagem*, 48(2), 351-361.
- Galvão, D. A., Spry, N., Denham, J., Taaffe, D. R., Cormie, P., Joseph, D., Lamb, D. S., Chambers, S. K., & Newton, R. U. (2014). A multicenter year-long randomized controlled trial of exercise training targeting physical functioning in men with prostate cancer previously treated with Androgen Suppression and radiation from TROG 03.04 RADAR. *European Urology*, 65, 856-864.
- Handberg, C., Thorne, S., & Maribo, T. (2018). When a policy decision meets practice realities: The case of cancer survivorship care and rehabilitation needs assessment. *European Journal of Oncology Nursing*, 33, 70-77.
- Holm, M., Doveson, S., Lindqvist, O., Wennman-Larsen, A., & Fransson, P. (2018). Quality of life in men with metastatic prostate cancer in their final years before death—A retrospective analysis of prospective data. *BMC Palliative Care*, 17, 126-133.
- Hong, Q. N., Pluye, P., Fabregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M. P., Griffiths, F., Nicolau, B., O'Cathain, A., Rousseau, M. C., & Veddel, I. (2018). Mixed methods appraisal tool (MMAT), version 2018. http://mixedmethodsappraisaltoolpublic.pbworks.com/w/file/fetch/127916259/MMAT_2018_criteria-manual_2018-08-01_ENG.pdf
- Huri, M., Huri, E., Kayihan, H., & Altuntas, O. (2015). Effects of occupational therapy on quality of life of patients with metastatic prostate cancer. *Saudi Medical Journal*, 36(8), 954-961.
- Jacobsen, P. B., Nipp, R. D., & Ganz, P. A. (2017). Addressing the survivorship care needs of patients receiving extended cancer treatment. *ASCO Educational Book*, 2017, 674-682.
- King, A. J. L., Evans, M., Moore, T. H. M., Paterson, C., Sharp, D., Persad, R., & Huntley, A. L. (2015). Prostate cancer and supportive care: A systematic review and qualitative synthesis of men's experiences and unmet needs. *European Journal of Cancer Care*, 24, 618-634.
- Laughery, J., & Woodgate, R. L. (2015). Supportive care needs of rural individuals living with cancer: A literature review. *Canadian Oncology Nursing Journal*, 25(2), 157-166.
- McIntosh, M., Opozda, M. J., Evans, H., Finlay, A., Galvão, D. A., Chambers, S. K., & Short, C. E. (2019). A systematic review of the unmet supportive care needs of men on active surveillance for prostate cancer. *Psycho-oncology*, 2019, 1-16.
- Mina, D. S., Connor, M. K., Alibhai, S. M. H., Toren, P., Guglietti, C., Matthew, A. G., Trachtenberg, J., & Ritvo, P. (2013). Exercise effects on adipokines and the IGF axis in men with prostate cancer treated with androgen deprivation: A randomized study. *Canadian Urological Association*, 7(11-12), E692-E698.
- National Cancer Institute. (2015). *Cancer stat facts: Prostate cancer*. <https://seer.cancer.gov/statfacts/html/prost.html>
- National Institute of Nursing Research. (2016). *The NNIR Strategic Plan: Advancing science improving lives*. https://www.ninr.nih.gov/sites/files/docs/ninr_stratplan2016_reduced.pdf
- National Research Council. (2005). From patient to cancer survivorship: Lost in translation. Academies Press.
- Nilsen, P. (2015). Making sense of implementation theories, models, and frameworks. *Implementation Science*, 10, 53-65.
- Noonan, E.M., & Farrell, T.W. (2016). Primary care of the prostate cancer survivor. *American Family Physician*, 93(9), 764-771.
- Parahoo, K., McDonough, S., McCaughan, E., Noyes, J., Semple, C., Halstead, E. J., Neuberger, M. N., & Dahm, P. (2013). Psychosocial interventions for men with prostate cancer. *Cochrane Database of Systematic Reviews*, 12. <https://doi-org.ezproxy-v.musc.edu/10.1002/14651858.CD008529.pub3>
- Park, S. A., Chung, S. H., & Lee, Y. (2017). Factors influencing the quality of life of patients with advanced cancer. *Applied Nursing Research*, 33, 108-112.
- Paterson, C., Primeau, C., & Nabi, G. (2018). A pilot randomized controlled trial of a multimodal supportive care (ThriverCare) intervention for managing unmet supportive care needs in men with metastatic prostate cancer on hormonal treatment and their partner/caregivers. *European Journal of Oncology Nursing*, 37, 65-73.
- Paterson, C., Robertson, A., Smith, A., Nabi, G. (2015). Identifying the unmet supportive care needs of men living with and beyond prostate cancer: A systematic review. *European Journal of Oncology Nursing*, 19, 405-418.
- Post, K. E., & Flanagan, J. (2016). Web-based survivorship interventions for women with breast cancer: An integrative review. *European Journal of Oncology Nursing*, 25, 90-99.
- Primeau, C., Paterson, C., & Nabi, G. (2017). A qualitative study exploring models of supportive care in men and their partners/caregivers affected by metastatic prostate cancer. *Oncology Nursing Forum*, 44(6), E241- E250.
- Prostate Conditions Education Council. (2019). *Advanced disease*. <https://www.prostateconditions.org/about-prostate-conditions/prostate-cancer/advanced-disease>
- Ross, X. S., Gunn, K. M., Olver, I., Willems, R. A., Lechner, L., Mesters, I., & Bolman, K. A. W. (2020). Online psychosocial interventions for posttreatment cancer survivors: An international evidence review and update. *Supportive and Palliative Care*, 14(1), 40-50.
- Serda, B. C., Vesa, J., Del Valle, A., & Monreal, P. (2010). Urinary incontinence and prostate cancer: A rehabilitation program design. *Actas Urológicas Españolas*, 34(6), 522-530.
- Shakeri, J., Kamangar, M., Ebrahimi, E., Aznab, M., Shakeri, H., Arman, F. (2015). Association of coping styles with quality of life in cancer patients. *Indian Journal of Palliative Care*, 21(3), 298-304.

- Skolarus, T. A., Wolf, A., Erb, N. L., Brooks, D. D., Rivers, B. M., Underwood, W., Salner, A. L., Zelefsky, M. J., Aragon-Ching, J. B., & Slovin, S. F. (2014). American Cancer Society prostate cancer survivorship care guidelines. *A Cancer Journal for Clinicians*, *64*(4), 225-249.
- Stolley, M. R., Sheean, P., Matthews, L., Banerjee, A., Visotcky, A., Papanek, P., Woodley, L., Flynn, K. E. (2020). Exploring health behaviors quality of life and support needs in African American prostate cancer survivors: A pilot study to support future interventions. *Supportive Care in Cancer*, *28*, 3135-3143.
- Taaffe, D. R., Newton, R. U., Spry, N., Joseph, D., Chambers, S. K., Gardiner, R. A., Wall, B. A., Cormie, P., Bolam, K. A., & Galvão, D. A. (2017). Effects of different exercise modalities on fatigue in prostate cancer patients undergoing a Androgen deprivation therapy: A year-long randomized controlled trial. *European Urology*, *72*, 293-299.
- The PRISMA statement. (2015). PRISMA flow diagram. <http://www.prisma-statement.org/>
- Villumsen, B. R., Jorgensen, M. G., Frystyk, J., Hordam, B., & Borre, M. (2019). Home-based "exergaming" was safe and significantly improved 6-min walking distance in patients with prostate cancer: A single-blinded randomized controlled trial. *BJU International*, *124*, 600-608.
- Watson, E., Shinkins, B., Frith, E., Neal, D., Hamdy, F., Walter, F., Weller, D., Wilkinson, C., Faithfull, S., Wolstenholme, J., Sooriakumaran, P., Kastner, C., Campbell, C., Neal, R., Butcher, H., Matthews, M., Perera, R., & Rose, P. (2016). Symptoms, unmet needs, psychological well-being, and health status in survivors of prostate cancer: Implications for redesigning follow-up. *BJU International*, *117*, E10-E19.
- Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, *52*(5), 546-553.
- Winters-Stone, K. M., Dobek, J. C., Bennett, J. A., Dieckmann, N. F., Maddalozzo, G. F., Ryan, C. W., & Beer, T. M. (2015). Resistance training reduces disability in prostate cancer survivors on androgen deprivation therapy: Evidence from a randomized controlled trial. *Archives of Physical Medicine and Rehabilitation*, *96*, 7-14.
- Wood, A. W., Barden, S., Terk, M., & Cesaretti, J. (2017). The influence of stigma on the quality of life for prostate cancer survivors. *Journal of Psychosocial Oncology*, *35*(4), 451-467.
- Yanez, B., McGinty, H. L., Mohr, D. C., Begale, M. J., Dahn, J. R., Flury, S. C., Perry, K. T., & Penedo, F. J. (2015). Feasibility, acceptability, and preliminary efficacy of a technology-assisted psychosocial intervention for racially diverse men with advanced prostate cancer. *Cancer*, *121*(24), 4407-4415.
- Yennurajalingam, S., Atkinson, B., Masterson, J., Hui, D., Urbauer, D., Tu, S. M., & Bruera, E. (2012). The impact of an outpatient palliative care consultation on symptom burden in advanced prostate cancer patients. *Journal of Palliative Medicine*, *15*(1), 20-24.