

**REVIEW**

WILEY

# Exercise interventions and their effect on masculinity, body image, and personal identity in prostate cancer—A systematic qualitative review

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**Funding information**

University of Calgary, Grant/Award Number: Scholarship; Canadian Institutes of Health Research, Grant/Award Numbers: Canadian Graduate Student Masters Scholarship and TRACTION - Training in Research And Clinical Trial

**Abstract**

**Objective:** Men with prostate cancer face various body composition and psychosocial challenges following diagnosis. Movement-based interventions such as exercise may represent novel strategies to improve these important biopsychosocial changes. This systematic qualitative review aimed to examine the various exercise interventions and their effect on male perception of masculinity, body image, and personal identity.

**Methods:** A systematic search across nine electronic databases was conducted in July 2017 and repeated in August 2018. Eligible studies included qualitative works examining masculinity, body image, or personal identity within an exercise intervention. Thematic content analysis allowed for qualitative synthesis across numerous studies.

**Results:** Six studies met eligibility criteria for inclusion. Four interventions used multimodal aerobic and resistance training, one incorporated aerobic exercise through football practice, and one utilized a home-based aerobic plus yoga program. Exercise was implicated to improve masculinity through creation of a safe community, allowed for refocusing on valued male traits, provided a source of distraction, and offered a means of establishing control over one's illness. Exercise also facilitated a process of self-reflection secondary to changes in physique and helped to re-establish male self-efficacy.

**Conclusions:** Regardless of prostate cancer stage, treatment status, or prior androgen deprivation therapy exposure, both aerobic or aerobic and resistance training exerted positive effects on perceived feelings of masculinity, body image, and personal identity.

**KEYWORDS**

body image, cancer, exercise, masculinity, movement, oncology, prostate neoplasms, qualitative, review, self-concept

## 1 | BACKGROUND

Prostate cancer remains the third leading cause of cancer-related death in American men, with an estimated one in seven diagnosed and one in 39 dying from the disease.<sup>1</sup> While the vast majority of men diagnosed with prostate cancer will not die from prostate cancer, survivors are often left with a myriad of physical, emotional, and social consequences.<sup>2</sup> These side effects include fatigue,<sup>3</sup> urinary or bowel incontinence,<sup>4,5</sup> increased adiposity,<sup>6</sup> and reductions in physical fitness.<sup>7</sup> Arguably, one of the most disabling adverse effects identified by prostate cancer survivors is the loss or shift in how men experience or conceptualize their masculinity.<sup>8-10</sup>

Changes in perceptions of masculinity have been described as a complex process resulting from a combination of sexual dysfunction (eg, low libido, impotence, and shortened penis), characteristic body changes compatible with the female archetype (eg, gynaecomastia, loss of male pattern hair, and sarcopenia), and emotional or behavioral changes (eg, loss of control, emergence of help-seeking behaviors, and emotional transparency).<sup>11</sup> Along with other changes, these may serve to undermine males' previously held masculine values and result in increased levels of psychological distress.<sup>12,13</sup>

Research relating to masculinity changes has found that many prostate cancer survivors seek to restore their masculinity through a focus on physical appearance and participating in activities that facilitate demonstration of control over their illness.<sup>14</sup> Therefore, activities which promote body awareness and facilitate control, such as aerobic and resistance training, have become increasingly recognized for their established effect on improving body composition and physical function.<sup>6,15</sup>

To date, numerous randomized controlled trials (RCT) have attempted to capture and quantify masculinity, body image, and personal identity changes experienced by men with prostate cancer.<sup>6,16-19</sup> Studies examining masculinity have often extrapolated their claims from quantitative assessments of erectile dysfunction,<sup>20,21</sup> levels of sexual activity, intimacy or function,<sup>6,15-18,22-25</sup> or on perceptions of one's masculine self-esteem.<sup>15</sup> There thus exists significant heterogeneity across studies on what constitutes masculinity, and to date, most studies have quantitatively examined changes in masculinity in men receiving androgen deprivation therapy (ADT).<sup>6,16,19</sup> Additionally, the measurement tools currently used by psychosocial researchers have been designed to capture more "traditional" interpretations of masculinity and therefore may not account for sociocultural variations in how masculinity can be expressed.<sup>21</sup>

To address these limitations in the work to date, qualitative studies offer the unique opportunity for men to express their understanding of masculinity and provide insight into how exercise interventions may influence masculinity, body image changes, and personal identity. Specifically, within the exercise literature, qualitative studies examining these psychosocial issues have often taken place within an ongoing exercise RCT,<sup>26-29</sup> reflecting various types or intensities of exercise. Understanding how masculinity, body image, and personal identity are expressed across different exercise modalities may offer additional insight into whether specific exercise prescriptions may offer superior benefits over one another.

### 1.1 | Aims and objectives

The objective of this systematic review was to summarize the impact of various exercise interventions with a focus on the psychosocial domain of masculinity in prostate cancer patients. Other psychosocial outcomes including body image and personal identity were also considered. Specifically, this review reports on (a) which exercise programs have been examined in prostate cancer patients, (b) the relative effects of specific exercise characteristics on the specified psychosocial domains, (c) the quality within the available studies, and (d) the current gaps in the literature.

## 2 | METHODS

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)<sup>30</sup> and the AMSTAR tool for assessing methodological quality of systematic reviews.<sup>31</sup>

### 2.1 | Search strategy

Prior to the start of this review, a preliminary search including key terms (ie, prostate cancer, exercise, physical activity, masculinity, body image, and identity) was performed to identify any similar reviews on the topic. It was established that no relevant reviews on the research question had been registered or published. A systematic search across nine electronic databases from their earliest available dates (Medline, CINAHL, EMBASE, PubMed, PsychInfo, Academic Search Complete, SocIndex, SPORTDiscus, and LGBT Life with Full Text) was carried out from July 14, 2017, to July 16, 2017. The search was developed and tested through an iterative process including two authors (D.M. L. and N.C.R.) and an experienced medical librarian.

The search strategy used a wide range of controlled vocabulary (MeSH terms) and keywords transferable across all databases. Vocabulary and syntax were adjusted for database requirements; and keywords were truncated to broaden results. Keywords included "prostate neoplasm\* OR prostate cancer\* AND male identit\* OR gender identit\* OR gender role\* OR gender script\* OR masculin\* OR manhood OR macho OR self esteem\* OR self perception OR body image\* OR body represent\* OR body schema AND physical activit\* OR physical exercise\* OR exercise\* OR athletic\* OR calisthenics OR interval train\* OR resistance train\* OR yoga OR pilate\* OR stretching OR martial art\* OR tai chi OR movement." No publication type or date restrictions were applied, but results were restricted to English language. Additionally, the reference lists of eligible studies were reviewed.

### 2.2 | Study eligibility criteria

Studies were eligible if they were written in English; published in peer-reviewed journals as original research; included prostate cancer patients as the primary population or provided separate subgroup analysis in mixed cancer diagnoses; included interventions incorporating exercise outside the context of conventional rehabilitation or

physical therapy; and examined at least one psychosocial domain of masculinity, body image, or personal identity. Masculinity was classified as coherence of one's identity derived from valued male norms and constructed within a social environment.<sup>32</sup> Body image was considered the dynamic perception of one's own bodily appearance, function, and sensation as well as feelings associated with these perceptions.<sup>33</sup> Body image was not isolated to physicality in its operationalization. It encompasses the person as a whole including social expression, functional status, and cognitive and emotional features perceived by that individual. Personal identity was conceptualized as an internal concept developed about oneself that could evolve over time.<sup>34</sup>

This review focused on qualitative studies but considered mixed methods research if prostate specific results could be extracted. Studies were excluded if they were quantitative only, editorials, opinion pieces, abstracts without full text, conference proceedings, guidelines, dissertations, reviews, and systematic reviews or meta-analysis. Studies failing to include both an exercise intervention and at least one of the psychosocial outcomes of interest were excluded.

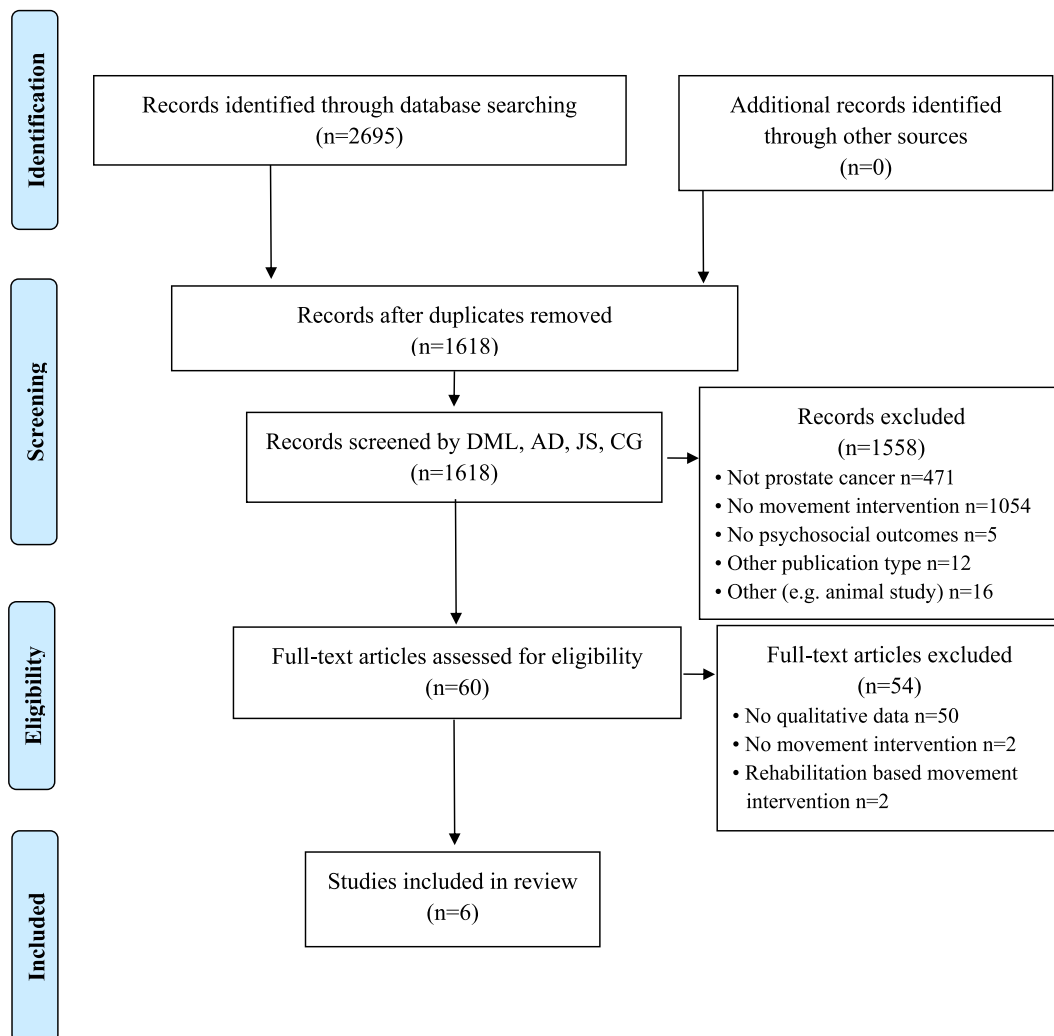
## 2.3 | Article selection

The study selection process is outlined in Figure 1. All title and abstracts were randomly assigned to two members of the research team (D.M.L., A.D., J.S., or C.G.) who performed independent screening using the study eligibility criteria. In studies resulting in a discrepancy for inclusion, a third author (N.C.R.) resolved any discrepancies. Full text versions of the relevant studies were evaluated by the first three authors (D.M.L., A.D., and J.S.). Consensus was required for inclusion in this review.

Nearing completion of this review, the systematic search was repeated (August 18, 2018) to identify any additional publications.

## 2.4 | Data collection process

Data extracted from each individual study are listed in Figure 2. Collected data were entered, combined, and stored in an excel spreadsheet. Where available, parent studies from which the qualitative samples were drawn were used when demographic or exercise



**FIGURE 1** Preferred Reporting Items for Systematic Reviews and Meta Analysis (PRISMA) of selection process with reasons for exclusion

<p>Study Details:</p> <ul style="list-style-type: none"> <li>• First author</li> <li>• Year of publication</li> <li>• Country</li> </ul> <p>Participants:</p> <ul style="list-style-type: none"> <li>• Age (ie, mean or range)</li> <li>• Ethnicity</li> <li>• Cancer stage</li> <li>• Treatment</li> <li>• Sample size</li> </ul> <p>Exercise Intervention Specifics:</p> <ul style="list-style-type: none"> <li>• Mode of movement delivery</li> <li>• Type of movement</li> <li>• Frequency</li> <li>• Intensity</li> <li>• Time</li> <li>• Program length</li> <li>• Progression</li> <li>• Co-Interventions</li> </ul> <p>Study Characteristics:</p> <ul style="list-style-type: none"> <li>• Type of study from which qualitative sample was drawn (eg RCT)</li> <li>• Stated aims</li> <li>• Methodological framework</li> </ul> <p>Qualitative Results &amp; Themes:</p> <ul style="list-style-type: none"> <li>• Masculinity</li> <li>• Body image</li> <li>• Sense of self / personal identity</li> </ul>
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**FIGURE 2** Extracted data items from each article included within the systematic review

characteristics were insufficient. In cases of missing data, corresponding authors were contacted.

As the studies contained within this review were qualitative in nature, a content analysis was undertaken. This allowed qualitative

data and themes to be extracted, compared, and systematically distilled across multiple studies.<sup>35,36</sup> Authors (D.M.L., A.D., and J.S.) independently read the articles in depth, then met to discuss which data or author inferences from the text were directly applicable to the psychosocial outcomes of interest. Any statement corresponding exclusively to a cointervention (eg, dietary advice, and meditation) beyond exercise interventions were not included to ensure data represented participant views of exercise strategies. Qualitative data supporting the psychosocial outcomes of interest are available online (Table S1).

## 2.5 | Quality appraisal

Methodological quality was assessed according to the Critical Appraisal Skills Program (CASP).<sup>37</sup> This tool assesses the usefulness of studies through 10 screening questions. (a) Was there a clear statement of the aims? (b) Is the qualitative methodology appropriate? (c) Was the research design appropriate? (d) Was the recruitment strategy appropriate? (e) Was the data collected in a way that addressed the issue? (f) Has the relationship between research and participants been considered? (g) Have ethical issues been considered? (h) Was the analysis sufficiently rigorous? (i) Is there a clear statement of findings? (j) How valuable is the research? Studies were independently screened and scored (0-10) by three researchers (D.M.L., A.D., and J. S.). Discrepant scores were resolved through discussion and consensus. All studies were judged to be high quality (scores of 8-10) and were subsequently included in the final analysis (Table 1). Main methodological issues included inadequate explanation of the researcher-participant relationship and how this may have influenced conclusions and inadequate explanation of the rigorosity of the data analysis.

## 3 | RESULTS

The original full search yielded 2695 articles. EndNote X8 was used to identify and remove internal and external duplicates that the primary author then verified. Across all databases, 76 internal and 1001 external duplicates were removed, leaving 1618 for initial screening by title, abstract, or full text. At the end of the review, six studies met eligibility criteria and agreement between reviewers was 100% (Figure 1).

**TABLE 1** Methodological quality within qualitative studies

Author, year	Criteria										Total
	A	B	C	D	E	F	G	H	I	J	
Cormie et al (2015) <sup>38</sup>	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10
Martin et al (2015) <sup>39</sup>	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10
Hamilton et al (2015) <sup>28</sup>	Y	Y	Y	N	Y	N	Y	Y	Y	Y	8/10
Bruun et al (2014) <sup>27</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10
Bourke et al (2012) <sup>26</sup>	Y	Y	Y	Y	Y	N	Y	N	Y	Y	8/10
Kronenwetter et al (2005) <sup>29</sup>	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	9/10

Scores: 1-5/10 low; 6-7/10 medium; 8-10/10 high quality; Y, yes met criteria; N, no did not meet criteria.

### 3.1 | Study characteristics

In the studies eligible for review, four were substudies within an ongoing RCT,<sup>26-29</sup> and two were stand-alone qualitative studies.<sup>38,39</sup> Data were collected by either focus group<sup>26,27,39</sup> or individual semistructured interviews.<sup>28,29,38</sup> One study gathered additional data through participant observations during recreational football.<sup>27</sup> Studies ranged from 11 to 26 participants.

### 3.2 | Study participants

A total of 105 men with prostate cancer participated across eligible studies. Both early<sup>29,39</sup> and advanced<sup>26,27</sup> stage disease were represented, with two studies not reporting these demographic details.<sup>28,38</sup> Four studies involved participants actively on ADT,<sup>26-28,38</sup> one involved men undergoing watchful waiting,<sup>29</sup> and one included patient's post surgery and/or chemo radiation treatment.<sup>39</sup>

### 3.3 | Study intervention

Table 2 illustrates the extracted details from the eligible movement based interventions using the FITT principle. This widely accepted technique of reporting exercise describes the frequency (F), intensity (I), type (T), and timing (T), allowing for appropriate analysis and comparison across the exercise interventions.<sup>40</sup> Aerobic and/or resistance training were prescribed across all studies. Four studies examined aerobic and resistance training,<sup>26,28,38,39</sup> one utilized aerobic activity with European football or North American soccer,<sup>27</sup> and one supplemented a home-based walking program with gentle yoga.<sup>29</sup> All but one of the interventions were supervised by an exercise specialist.<sup>26-28,38,39</sup> Programs ranged from 8 weeks to 1 year with a majority of the programs 12 weeks in duration.<sup>26-28,38</sup> Two studies incorporated dietary recommendations within the exercise program,<sup>26,29</sup> one included complementary therapies such as breathing or meditation,<sup>29</sup> and one involved weekly group psychotherapy.<sup>39</sup>

### 3.4 | Synthesis of results

Following content analysis, six subthemes within the psychosocial domains of masculinity, body image, and personal identity emerged in direct reference to exercise (Table 3).

#### 3.4.1 | Exercise programs fostered a shared sense of masculinity through community and safety

A significant finding from all studies was that exercise had the ability to construct a new community for men with prostate cancer. This community came with an established set of internally recognized values, trust, and feelings of group cohesion.<sup>29,39</sup> The camaraderie felt between men did not appear to be linked to any specific exercise (ie, aerobic or resistance) or delivery mode (ie, home or group based exercise).<sup>27,28,38,39</sup> Even in the home yoga plus aerobic program,<sup>29</sup> participants continued to describe a sense of

interconnectedness and belonging similar to the supervised clinic programs. Two studies noted that this sense of shared community could even extend beyond the conventional exercise classroom into participant's everyday lives.<sup>26,35</sup>

Across all studies, exercise interventions appeared to give men with prostate cancer permission to speak openly and honestly about private concerns without compromising their masculinity. For some, this shared sense of community functioned to break down masculine barriers and inherent stoicisms.<sup>27,38</sup> In the study by Bruun,<sup>27</sup> men utilized the locker room setting to share spontaneous and frank details about their disease or treatment. The authors concluded that football may have been an inherently masculine activity affording participants the opportunity for shared catharsis without threatening their own internal masculine concept. Similarly, Hamilton<sup>28</sup> proposed that their combined aerobic and resistance program may have fostered an environment helping to normalize sexual or body image changes. This normalization process may have allowed men with similar concerns to view sexual or body image changes as external to their own masculinity. This may have served to protect other essential aspects of their masculine identity. The use of humor was also highlighted as assisting men to safely express their masculinity without ridicule.<sup>28,38</sup> For example, one gentleman in the study by Hamilton<sup>28</sup> made light of his characteristically feminine changes; he was quoted as saying "... I said well how has it affected you? He said umm oh I keep wanting to make cakes all the time. It was kind of like a jocular way of describing it you know."<sup>28</sup>

Interestingly, Bourke<sup>25</sup> reported that this sense of masculine community required exercise program exclusivity. Men pointed to their need to feel safe and be surrounded by similar prostate cancer patients in order to express their feelings fully. These results are similar amongst other studies in this review, pointing to the importance of having like-minded individuals to promote a collective mentality and sense of community trust.<sup>27,28,38,39</sup> In those playing recreational football, men pointed to their shared experience of contact sport and common goal for victory as essential components to their sense of community, "brotherism," and masculinity.<sup>27</sup>

#### 3.4.2 | Exercise placed a focus on valued male traits

Men viewed exercise as a directed conduit to improved masculine identity following the aftermath of treatment. The exercise programs allowed men to set goals and have a sense of personal achievement when goals were reached. Furthermore, participants described an internal competitive spirit that was fostered within a trial-based design.<sup>26</sup> Specifically, studies measuring body composition data (eg, body mass index or skin fold thickness) as part of a larger RCT provided objective, modifiable aspects of their body for the men to focus their efforts and measure their gains.<sup>27,38,39</sup>

In the home-based yoga and aerobic program, the authors did not report on whether body composition details were collected, nor was goal setting or goal attainment reported.<sup>28</sup> Cormie<sup>35</sup> also did not incorporate body specific measurements, but men in this study did endorse statements of achievement attributable through exercise. Specifically, participants highlighted observed physical capabilities

**TABLE 2** Description of exercise interventions in reviewed studies

Author, Year, Location	Participants	Study Characteristics, Parent Study Primary Outcome, Aim(s), and Framework	Exercise Prescription	Cointervention
Cornie et al (2015) <sup>38</sup> Australia	N = 12 Age: 75.3 ± 4.5 years old Ethnicity: NR Cancer type: Prostate Stage: NR Treatments: current (n = 7) and prior (n = 5) ADT	Primary qualitative study Aim(s): Provide in-depth description of experience within supervised exercise in men with prostate cancer. Identify critical elements for participant engagement Interview type: individual, semistructured interviews Time: during intervention Framework: Interpretative phenomenological framework	<ul style="list-style-type: none"> <li>• Delivery mode: supervised, clinic-based, group exercise program</li> <li>• Type: <ul style="list-style-type: none"> <li>◦ Aerobic: NR</li> <li>◦ Resistance: NR</li> </ul> </li> <li>• Frequency: 2 d/wk</li> <li>• Intensity: NR</li> <li>• Time: 60 min</li> <li>• Length: At least 12 wk</li> <li>• Progression: NR</li> </ul>	None
Martin et al (2015) <sup>39</sup> Australia	N = 11 Age: NR Ethnicity: NR Cancer type: prostate, breast Stage: 1, 2 or 3 Treatments: completed all planned surgery, chemotherapy, and/or radiation	Primary qualitative study Aim(s): NR Interview type: focus groups (analysis included only prostate cancer patients) Time: 1-wk postintervention Framework: Interpretative phenomenological analysis with ideographic focus	<ul style="list-style-type: none"> <li>• Delivery mode: Supervised group based program (individualized)</li> <li>• Type: <ul style="list-style-type: none"> <li>◦ Aerobic: walking outside, stairs, treadmill, stationary bicycle, elliptical, rower, arm crank, cardio boxing, hydrotherapy class</li> <li>◦ Resistance: body weight, free weights, resistance machines◦ Static stretching</li> </ul> </li> <li>• Frequency: 3 d/wk</li> <li>• Intensity: Moderate, RPE 12</li> <li>• Time: ◦ Aerobic: 20-30 min</li> <li>◦ Resistance: 20-30 min◦ Stretching: 10 min</li> <li>• Length: 8 wk</li> <li>• Progression: Light resistance (RPE 6-10), with gradually progression to higher intensities (RPE 13-15)</li> </ul>	Supportive group psychotherapy 1 d/wk for 90 min
Hamilton et al (2015) <sup>28</sup> Australia	N = 18 Age: 63.1 ± 3.8 years old Ethnicity: NR Cancer type: prostate Stage: NR Treatments: prostatectomy, radiation, and/or ADT for <12 mo	Substudy from RCT (analysis inclusive of exercise [n = 11] and usual care [n = 7] participants) Parent study primary outcome: body composition (lean and fat mass) Aim(s): Explore the impact of ADT on men's sexuality and the effect of exercise on this experience Interview type: individual, semi-structured telephone interviews	<ul style="list-style-type: none"> <li>• Delivery mode: Supervised, group program with self-directed home program</li> <li>• Type: <ul style="list-style-type: none"> <li>◦ Aerobic: walking, jogging, treadmill, cross-trainer, cycling, rowing, stationary ergometer</li> <li>◦ Resistance: leg press, leg extension, leg curl, calf raise, chest press, latissimus pull down, bicep curl, triceps extension</li> </ul> </li> </ul>	None

(Continues)



TABLE 2 (Continued)

Author, Year, Location	Participants	Study Characteristics, Parent Study Primary Outcome, Aim(s), and Framework	Exercise Prescription	Cointervention	
Bruun et al (2014) <sup>27</sup> Denmark	N = 26 Age: 67.1 (range: 58-74) years old Ethnicity: NR Cancer type: prostate Stage: locally advanced or disseminated Treatments: On ADT >6 mo	Time: NR Framework: Social constructionism epistemology with theoretical perspectives of identity and paradigms of lived body. Thematic analysis	<ul style="list-style-type: none"> <li>• Frequency: 2 days/week</li> <li>• Intensity: <ul style="list-style-type: none"> <li>◦ Aerobic: 70%-85% HRM or moderate to high</li> <li>◦ Resistance: 60%-85% 1RM or moderate to high</li> </ul> </li> <li>• Time: <ul style="list-style-type: none"> <li>◦ Aerobic: 60 min</li> <li>◦ Resistance: 1-4 sets of 6-12 repetitions targeting eight large muscle groups</li> </ul> </li> <li>• Length: 12 wk</li> <li>• Progression: Increase resistance by 5%-10% for next set/training session if worked past max repetitions</li> </ul>	None	
Bourke et al (2012) <sup>26</sup> United Kingdom	N = 12 Age: NR Ethnicity: NR Cancer type: prostate Stage: T3, T4 (advanced) Treatments: On ADT >6 mo	Substudy from RCT (analysis inclusive of exercise group only) Parent study primary outcome: body composition (DEXA scan) Aim(s): Gain understanding of recreational football as a team and interaction-oriented health promotion activity in men with prostate cancer. To explore men's beliefs and experiences related to football participation and to explore behavior and interaction during football Interview type: focus groups + participant observations (20 h) Time: during intervention Framework: Framework analysis, ethnographic approach with the intention to enable collective constructions of meaning and realities detached from participant perspective	<ul style="list-style-type: none"> <li>• Delivery mode: Supervised outdoor program</li> <li>• Type: <ul style="list-style-type: none"> <li>◦ Aerobic: recreational football/soccer including drills and competitive matches</li> </ul> </li> <li>• Frequency: <ul style="list-style-type: none"> <li>◦ Weeks 1-8: 2 d/wk</li> <li>◦ Weeks 9-12: 1 d/wk</li> </ul> </li> <li>• Intensity: Low intensity drills</li> <li>• Time: <ul style="list-style-type: none"> <li>◦ Week 1-4: 45 min</li> <li>◦ Week 5-12: 60 min</li> </ul> </li> <li>• Length: 12 wk</li> <li>• Progression: NR</li> </ul>	<ul style="list-style-type: none"> <li>• Delivery mode: Supervised tapered program supplemented with aerobic self-directed home program</li> <li>• Type: <ul style="list-style-type: none"> <li>◦ Aerobic: walking, cycling, gym</li> </ul> </li> <li>• Resistance: body weight, free weights</li> <li>• Frequency: <ul style="list-style-type: none"> <li>◦ Weeks 1-6: 2 d/wk</li> <li>◦ Weeks 7-12: 1 d/wk</li> </ul> </li> </ul>	Nutritional counselling (ie, reduce fats, reduced refined carbohydrates, and increased fiber) and health eating seminars

(Continues)

TABLE 2 (Continued)

Author, Year, Location	Participants	Study Characteristics, Parent Study Primary Outcome, Aim(s), and Framework	Exercise Prescription	Cointervention
Kronenwetter et al (2005) <sup>29</sup> United States	<p>N = 26                      Age: 67 (range: 50-85) years old                      Ethnicity: &gt;90% Caucasian                      Cancer type: prostate                      Stage: T1, T2 (early disease)                      Treatments: watchful waiting</p>	<p>specifics of the program, social supports and program recommendations explored                      Interview type: focus groups                      Time: 3-6 mo post intervention                      Framework: Thematic analysis with constant comparisons</p>	<ul style="list-style-type: none"> <li>● Intensity: ○ Aerobic: 55%-85% HRM or 11-15 RPE (fairly light to hard)</li> <li>○ Resistance: NR</li> <li>● Time:                             <ul style="list-style-type: none"> <li>○ Aerobic: 30 min + home target of 150 min/wk</li> <li>○ Resistance: 2-4 sets targeting large muscle groups</li> </ul> </li> <li>● Length: 12 wk</li> <li>● Progression: Increased emphasis of home program after 6 wk</li> </ul>	<p>Vegan diet, stress management including breathing, meditation, imagery, progressive relaxation, and group support (60 min/wk)</p>
		<p>Sub study from RCT                      Parent study primary outcome: Serum PSA                      Aim(s): Examine the psychological, emotional, spiritual, and social reactions to diagnosis or early stage prostate cancer and how participation may have changed these domains                      Interview type: individual, semi structured interviews                      Time: NR                      Framework: NR</p>	<ul style="list-style-type: none"> <li>● Delivery mode: Unsupervised, home program</li> <li>● Type:                             <ul style="list-style-type: none"> <li>○ Aerobic: walking</li> <li>○ Other: yoga based stretching within stress management practices</li> </ul> </li> <li>● Frequency:                             <ul style="list-style-type: none"> <li>○ Aerobic: 6 d/wk ○ Yoga: Daily</li> </ul> </li> <li>● Intensity:                             <ul style="list-style-type: none"> <li>○ Aerobic: moderate ○ Yoga: gentle</li> </ul> </li> <li>● Time:                             <ul style="list-style-type: none"> <li>○ Aerobic: 30 min</li> <li>○ Other: 60 min</li> </ul> </li> <li>● Length: 12 mo</li> <li>● Progression: None</li> </ul>	

Abbreviations: 1RM, one repetition maximum; ADT, androgen deprivation therapy; DEXA, dual-energy x-ray absorptiometry; FACT-F, Functional Assessment of Cancer Therapy—Fatigue; FACT-P, Functional Assessment of Cancer Therapy—Prostate; GLSI, Godin Leisure Score Index; HRM, heart rate maximum (age predicted); NR, not reported; PSA, Prostate Specific Antigen; RCT, randomized controlled trial; RPE, Rated Perceived Exertion (Borg Scale).



**TABLE 3** Subthemes identified across eligible studies

Theme	Subtheme	Cormie et al (2015) <sup>38</sup>	Martin et al (2015) <sup>39</sup>	Hamilton et al (2015) <sup>28</sup>	Bruun et al (2014) <sup>27</sup>	Bourke et al (2012) <sup>26</sup>	Kronenwetter et al (2005) <sup>29</sup>
Masculinity	M1	Exercise programs fostered a shared sense of masculinity through community and safety	✓	✓	✓	✓	✓
	M2	Exercise placed a focus on valued male traits	✓	✓	✓	✓	✓
	M3	Exercise provided distraction			✓	✓	✓
	M4	Exercise restored control	✓	✓	✓	✓	✓
Body image	B	Exercise facilitated self-reflection through changes in physique	✓	✓	✓	✓	
Personal identity	P	Self-efficacy could be redefined through exercise	✓	✓	✓	✓	✓

Abbreviations: M1, masculine theme 1; M2, masculine theme 2; M3, masculine theme 3; M4, masculine theme 4; B, body image theme; P, personal identity theme; ✓, theme represented in the data.

such as the amount of weight they could lift as interpretations of improved masculinity and health. Another important finding from a majority of authors were the connections between exercise participation and feelings of increased energy<sup>26-28</sup> and physical strength.<sup>26,27</sup> Moreover, these improvements in strength and energy appeared to represent a way to become more productive in their home lives.<sup>26-28</sup> For example, in those men engaging in recreational football, exercise was expressed as a crucial reason they were able to preserve their functionality. These functional improvements were then perceived by men as an indication of whether they could adequately provide for their families as a husband or father figure.<sup>27</sup> Exercise was also observed to represent embodiment of an “action-oriented” attitude to health<sup>38</sup> or instilled a sense of responsibility.<sup>39</sup>

### 3.4.3 | Exercise provided distraction

In three of the studies, exercise helped men escape disease-related concerns such as fear of cancer progression or awareness of one's own mortality.<sup>26-28</sup> Exercise may have helped redefine masculine priorities by distracting men from attributes lost (ie, libido and erectile dysfunction) while drawing attention to the benefits gained (ie, longevity and preserved family relationships).<sup>28</sup> There did not appear to be a significant difference between the studies with exercise programs that included subthemes of distraction<sup>26-28</sup> from those that did not.<sup>29,38,39</sup> However, two of the three studies failing to report on this subtheme also included group psychotherapy or support.<sup>29,39</sup> These cointerventions occurred separately from the exercise intervention. Additionally, in the home exercise program by Kronenwetter,<sup>29</sup> dietary changes, meditation, and progressive relaxation were reinforced within group sessions.

### 3.4.4 | Exercise restored control

The relationship between exercise and control was universally reported in all studies and exercise interventions. However, the ways that men internalized or defined this sense of control through exercise differed from study to study. In some men, exercise offered hope and

optimism giving them control over their future forward perspective.<sup>29,38,39</sup> In other studies, control was expressed as a sense of responsibility from agreeing to participate in exercise classes<sup>27</sup> or resulted from belief that exercise improved sexual function or masculine identity.<sup>28</sup>

### 3.4.5 | Exercise facilitated self-reflection through changes in physique

Five of the studies directly reported improvements in male body image associated with participation in an exercise program.<sup>26-28,38,39</sup> In the studies reporting this outcome, men tended to associate physical changes (eg, muscularity, increased strength, and reduced obesity) with improved masculinity<sup>27,38</sup> or identity.<sup>26,27,39</sup> In some cases, men opted to express their masculine gains by describing loss of feminine body changes.<sup>27,28</sup> Interestingly, in the unsupervised home yoga and aerobic program, statements concerning body image were not explicitly mentioned. This study only included men with early disease participating in watchful waiting.<sup>29</sup>

### 3.4.6 | Self-efficacy could be redefined through exercise

Participation in any one of the exercise programs resulted in a wide range of identity changes. For some, exercise provided a boost in confidence and helped to re-establish a new identity.<sup>38,39</sup> For others, exercise elevated mood, reduced depression, and gave men a restored capacity to deal with stress.<sup>26,28</sup> In all studies, the accumulation of these changes appears to increase a man's self-efficacy and beliefs in his own ability to succeed.

## 4 | DISCUSSION

To our knowledge, this is the first systematic review of qualitative studies to examine the effect of various exercise interventions on the psychosocial domains of masculinity, body image, and personal

identity in men with prostate cancer. The primary finding from this review supports exercise as a useful intervention to improve psychosocial outcomes of general masculinity, body image and personal identity. A secondary finding from this review is that there is no significant psychosocial benefit of one form of exercise over another. However, there may be certain subthemes within masculinity and body image that are more highly associated with particular exercise FITT characteristics.

First, the way in which exercise was delivered (ie, home, group, and supervised) provides insight into how exercise delivery may facilitate expression of particular masculine themes. This review suggests that supervised group exercise programs allow men to foster traditional masculine characteristics through communal yet competitive strength and aerobic training. This, in turn, fosters re-establishment of precancer masculine roles and self-identity. It follows that masculine traits can be enhanced within a group structure, presumably because this provides the opportunity for social comparison. In support of this notion, the home program within this systematic review failed to include themes of valued male traits.<sup>29</sup> While the lack of findings in this one study may at least in part be supportive of group exercise, caution is required with interpretation of a single study. In the case of the home program, only men with early stage prostate cancer undergoing watchful waiting were included. The men in this study presumably had a lower burden of disease and thus a lessened sense of lost masculinity. This is consistent with what is known from advanced disease and men treated with ADT, where more significant body composition changes including feminization and sexual dysfunction can occur.<sup>16</sup> Another equally important consideration is whether the study aims and design in the home program were powered to capture themes of valued male traits.

The second issue for consideration is the mode of exercise. All exercise interventions in this review included an aerobic component, and four also included resistance training.<sup>26,28,38,39</sup> As improvements in masculinity were expressed universally across all studies, this could suggest aerobic activity is a stronger determinant of masculinity than resistance-based programming. This theory is supported by a recent cross-sectional study that demonstrated significantly higher scores of masculinity when men achieved recommended levels of aerobic exercise compared with those achieving recommended levels of resistance exercise.<sup>41</sup> However, the small number and heterogeneity between the exercise programs limits our current understanding; thus, future research must address the impact of exercise type on masculinity outcomes.

Because of the low number of included studies in this review ( $n = 6$ ), assessment of thematic strengths between exercise types was not feasible. However, in the studies that included resistance training in addition to aerobic exercise, there did not appear to be a substantial difference in how men expressed the psychosocial themes compared with aerobic only programs.

Currently, the American College of Sports Medicine recommends that survivors should strive for the same volume and intensity of exercise as the general population and should include aerobic, resistance, and flexibility training.<sup>42</sup> The fact that most programs were not frequent or long enough to achieve the aerobic exercise guidelines

suggests that exercise benefits to masculinity, personal identity, and body image may be obtained at lower levels of activity than guideline levels.<sup>42</sup> Only two studies in this review instructed patients to supplement their group training with home-based aerobic activity; however, it is unclear whether guideline levels of activity were obtained.<sup>25,27</sup>

Overall, there was a high level of agreement of masculine themes identified from these reviewed studies. This strengthens previous exercise and masculinity theories<sup>26-28,38,39,43,44</sup> and provides credibility to the emergent subthemes developed in this review. Across all exercise interventions, a sense of community was created. Although the precise mechanism and prerequisites required for men to tap into these communities remains unclear, this review suggests the process may include a combination of exclusive male-only programming or creation of an exercise environment fostering humor and shared stories.<sup>27,28,38</sup> For some men, group aerobic and/or resistance training represented an activity requiring a certain degree of physical prowess. For them, exercise programs represented a connection to manliness.<sup>28,38</sup> As such, participation in exercise may have allowed men within these studies to demonstrate their maintained physical performance, thereby preserving their sense of masculinity.<sup>28</sup> Overall, this shared sense of community spirit is similar to what has been observed in other tumor-specific exercise programs such as yoga for breast cancer survivors<sup>45</sup> and children's cancer camps for pediatric patients.<sup>46</sup>

Finally, another important finding from this review was that exercise programs may provide community building from the process of introducing individuals to one another. Kronenwetter<sup>29</sup> demonstrated that a home-based exercise intervention, where the only means of interaction were supportive counseling sessions, still enabled men to establish a sense of interconnectedness. This supports exercise as an important community engagement tool, offering the opportunity for male connectedness and the ability for men to express concern about their health without threatening their masculine identity.<sup>14,27</sup>

## 5 | CONCLUSION

This systematic qualitative review is the first to examine the psychosocial domains of masculinity, body image, and personal identity within exercise interventions for men with prostate cancer. This review found that regardless of tumor stage, prior treatment status, or exposure to ADT, either aerobic with or without resistance training can exert positive effects on masculinity and personal identity. Exercise appears to improve masculinity through creation of a safe community, allows for a refocusing of attention on new or different masculine traits, provides a sense of distraction from mortality or treatment of adverse effects, and offers a means of re-establishing control. In terms of body image, visible changes from exercise appeared directly linked to perceived functional capabilities, masculinity, and overall health. Improvements in body image were restricted to supervised, group-based activity and within patients receiving or having completed treatments. Lastly, exercise appears to improve personal identity through self-efficacy and appreciation of one's capabilities.

## 5.1 | Study limitations and strengths

A number of methodological limitations and strengths are associated with this review. Among the limitations is the significant heterogeneity observed across the exercise interventions. The differences between the exercise prescriptions make it challenging to directly compare each intervention and their relative effects on the psychosocial domains of masculinity, body image, and personal identity. Second, as it often exists in psychosocial research, the constructs of masculinity, body image, and identity are multidimensional. These domains often vary across sociocultural factors and are influenced by gender, sexuality, relationship status, and prior experiences. Thus, review results are limited to how the constructs were assessed within the given studies. Finally, as this review required the authors of included studies to appropriately define then identify psychosocial outcomes from qualitative data, studies using different psychosocial definitions or studies capturing this data as a secondary outcome may have been excluded from this systematic search.

Strengths of this review included the varied populations of men with prostate cancer (ranging from watchful waiting to men with advanced disease on ADT), the comparison of masculinity, body image, and personal identity themes across various exercise programs, and the synthesis of how exercise characteristics may individually contribute to expressions of these psychosocial themes. Overall, by understanding the relative values men placed on various expressions of masculinity, body image, or personal identity, qualified exercise professionals can begin to prescribe more tailored exercise programming based on interest.

## 5.2 | Clinical and research implications

It is clear that prostate cancer and its treatments negatively effect masculinity, body image, and a man's sense of personal identity. While this review supports that exercise provides a number of benefits, levels of exercise are not improving without direct intervention.<sup>41</sup> This highlights the need to address established exercise barriers and preferences.<sup>44,47</sup> This review provides cautious optimism to the clinicians and researchers that perhaps by understanding and appealing to male masculinities, body image changes, and personal identity issues, they may offer the unique opportunity to acknowledge masculinity preferences within an exercise program. Exercise interventions offer a promising solution to address complex psychosocial issues, over and above the already established physical benefits.<sup>48</sup>

The identification of key themes within this review has specific implications for the future implementation and planning of prostate cancer-specific exercise programming. First, current results suggest aerobic exercise may be a necessary component to address psychosocial distress and issues of masculinity specifically. However, the small number of studies, and none on resistance training alone, necessitate further research to address this gap. Additionally, specific research is needed to determine whether masculinity can be further enhanced within a combined resistance plus aerobic program versus aerobic

program alone. Second, improvements to masculinity, body image, and personal identity may occur at lower levels of exercise than current guideline levels.<sup>42</sup> This supports an exercise prescription including a gradual increase in aerobic and/or resistance exercise within the patient's current capabilities. This is particularly relevant for sedentary men who may be limited by treatment-related adverse effects (eg, fatigue). Third, exercise programs should purposefully include baseline body composition and physical function data in men who value masculine traits of strength, power, and improved capabilities. The ability for men to track their progress may serve to improve their masculine ideals. Finally, the key masculine themes found within group exercise programs suggests social dynamics can be leveraged within a group setting to benefit prostate cancer patient's coping and health-related behaviors. Future research assessing masculinity and body image concerns should include qualitative measures as this technique offers the unique opportunity for men to express their own understanding of masculinity, body image, and personal identity beyond quantitative surveys. Finally, further research is necessary to help establish optimal dosing of exercise to achieve maximum psychosocial benefit.

## ACKNOWLEDGEMENTS

The authors wish to thank Alix Hayden, University of Calgary Librarian, for her assistance reviewing and refining the search strategy and Dr. Prue Cormie for writing and review support.

## CONFLICTS OF INTEREST

There are no conflicts of interest for any of the authors of this manuscript.


## CONTRIBUTIONS

All authors contributed to this work and authorship of this manuscript. D.M.L. planned, conducted the search, analyzed the results, wrote and reviewed the manuscript; A.D. and J.S. conducted the search, analyzed the results, provided writing content and reviewed the manuscript; C. G. conducted the search, assisted with the analysis, wrote and reviewed the manuscript; W.B. and P.C. provided writing and review support; and N.C.R. coordinated the idea, reviewed the analysis, and provided writing and review support.

## FUNDING INFORMATION

The first author was supported by the Canadian Graduate Master's and Training in Research and Clinical Trials Scholarships awarded through Canadian Institutes of Health Research.

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## REFERENCES

1. American Cancer Society [Internet]. Atlanta: Key Statistics for Prostate Cancer, Prostate Cancer Facts; c2017. [cited 2017 October 10].

- Available from: <https://www.cancer.org/cancer/prostate-cancer/about/key-statistics.html>.
2. McGinty HL, Phillips KM, Jim HS, et al. Cognitive functioning in men receiving androgen deprivation therapy for prostate cancer: a systematic review and meta-analysis. *Support Care Cancer*. 2014;22(8):2271-2280.
  3. Moyad MA. Promoting general health during androgen deprivation therapy (ADT): a rapid 10-step review for your patients. *Urol Oncol*. 2005;23(1):56-64.
  4. Carter N, Bryant-Lukosius D, DiCenso A, Blythe J, Neville AJ. The supportive care needs of men with advanced prostate cancer. *Oncol Nurs Forum*. 2011;38(2):189-198.
  5. MacDonald R, Fink HA, Huckabay C, Monga M, Wilt TJ. Pelvic floor muscle training to improve urinary incontinence after radical prostatectomy: a systematic review of effectiveness. *BJU Int*. 2007;100(1):76-81.
  6. Cormie P, Newton RU, Taaffe DR, et al. Exercise maintains sexual activity in men undergoing androgen suppression for prostate cancer: a randomized controlled trial. *Prostate Cancer Prostatic Dis*. 2013;16(2):170-175.
  7. Baumann FT, Zopf EM, Bloch W. Clinical exercise interventions in prostate cancer patients - a systematic review of randomized controlled trials. *Support Care Cancer*. 2012;20(2):221-233.
  8. Cushman MA, Phillips JL, Wassersug RJ. The language of emasculation: implications for cancer patients. *Int J Mens Health*. 2010;9(1):3-25.
  9. Hedestig O, Sandman PO, Tomic R, Widmark A. Living after radical prostatectomy for localized prostate cancer: a qualitative analysis of patient narratives. *Acta Oncol*. 2005;44(7):679-686.
  10. Arrington MI. "I don't want to be an artificial man": narrative reconstruction of sexuality among prostate cancer survivors. *Sex Cult*. 2003;7(2):30-58.
  11. Cormie P, Newton RU, Taaffe DR, Spry N, Galvao DA. Exercise therapy for sexual dysfunction after prostate cancer. *Nat Rev Urol*. 2013;10(12):731-736.
  12. Cecil R, McCaughan E, Parahoo K. 'It's hard to take because I am a man's man': an ethnographic exploration of cancer and masculinity. *Eur J Cancer Care (Engl)*. 2010;19(4):501-509.
  13. Fergus KD, Gray RE, Fitch MI. Sexual dysfunction and the preservation of manhood: experiences of men with prostate cancer. *J Health Psychol*. 2002;7(3):303-316.
  14. Cormie P, Oliffe JL, Wootten AC, Galvao DA, Newton RU, Chambers SK. Improving psychosocial health in men with prostate cancer through an intervention that reinforces masculine values - exercise. *Psychooncology*. 2016;25(2):232-235.
  15. Mareschal J, Weber K, Rigoli P, et al. The ADAPP trial: a two-year longitudinal multidisciplinary intervention study for prostate cancer frail patients on androgen deprivation associated to curative radiotherapy. *Acta Oncol*. 2017;56(4):569-574.
  16. Cormie P, Galvao DA, Spry N, et al. Can supervised exercise prevent treatment toxicity in patients with prostate cancer initiating androgen-deprivation therapy: a randomised controlled trial. *BJU Int*. 2015;115(2):256-266.
  17. Gaskin CJ, Craike M, Mohebbi M, Courneya KS, Livingston PM. A clinician referral and 12-week exercise training program for men with prostate cancer: outcomes to 12 months of the ENGAGE cluster randomized controlled trial. *J Phys Act Health*. 2017;14(5):353-359.
  18. Livingston PM, Craike MJ, Salmon J, et al. Effects of a clinician referral and exercise program for men who have completed active treatment for prostate cancer: a multicenter cluster randomized controlled trial (ENGAGE). *Cancer*. 2015;121(15):2646-2654.
  19. Bjerre E, Bruun DM, Tolver A, et al. Effectiveness of community-based football compared to usual care in men with prostate cancer: protocol for a randomised, controlled, parallel group, multicenter superiority trial (The FC Prostate Community Trial). *BMC Cancer*. 2016;16(1):767.
  20. Ben-Josef AM, Wileyto EP, Chen J, Vapiwala N. Yoga intervention for patients with prostate cancer undergoing external beam radiation therapy: a pilot feasibility study. *Integr Cancer Ther*. 2016;15(3):272-278.
  21. Chambers SK, Chung E, Wittert G, Hyde MK. Erectile dysfunction, masculinity, and psychosocial outcomes: a review of the experiences of men after prostate cancer treatment. *Transl Androl Urol*. 2017;6(1):60-68.
  22. Dahn JR, Penedo FJ, Molton I, Lopez L, Schneiderman N, Antoni MH. Physical activity and sexual functioning after radiotherapy for prostate cancer: beneficial effects for patients undergoing external beam radiotherapy. *Urology*. 2005;65(5):953-958.
  23. Gaskin CJ, Craike M, Mohebbi M, et al. Associations of objectively measured moderate-to-vigorous physical activity and sedentary behavior with quality of life and psychological well-being in prostate cancer survivors. *Cancer Causes Control*. 2016;27(9):1093-1103.
  24. Lyons KS, Winters-Stone KM, Bennett JA, Beer TM. The effects of partnered exercise on physical intimacy in couples coping with prostate cancer. *Health Psychol*. 2016;35(5):509-513.
  25. Skinner TL, Peeters GG, Croci I, et al. Impact of a brief exercise program on the physical and psychosocial health of prostate cancer survivors: a pilot study. *Asia Pac J Clin Oncol*. 2016;12(3):225-234.
  26. Bourke L, Sohanpal R, Nanton V, Crank H, Rosario DJ, Saxton JM. A qualitative study evaluating experiences of a lifestyle intervention in men with prostate cancer undergoing androgen suppression therapy. *Trials*. 2012;13(208):1-8.
  27. Bruun DM, Krusturup P, Hornstrup T, et al. "All boys and men can play football": a qualitative investigation of recreational football in prostate cancer patients. *Scand J Med Sci Sports*. 2014;24(Suppl 1):113-121.
  28. Hamilton K, Chambers SK, Legg M, Oliffe JL, Cormie P. Sexuality and exercise in men undergoing androgen deprivation therapy for prostate cancer. *Support Care Cancer*. 2015;23(1):133-142.
  29. Kronenwetter C, Weidner G, Pettengill E, et al. A qualitative analysis of interviews of men with early stage prostate cancer: the Prostate Cancer Lifestyle Trial. *Cancer Nurs*. 2005;28(2):99-107.
  30. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med*. 2009;6(7):e1000097. <https://doi.org/10.1371/journal.pmed.1000097>
  31. Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ*. 2017;358:j4008.
  32. Zaider T, Manne S, Nelson C, Mulhall J, Kissane D. Loss of masculine identity, marital affection, and sexual bother in men with localized prostate cancer. *J Sex Med*. 2012;9(10):2724-2732.
  33. Dropkin MJ. Body image and quality of life after head and neck cancer surgery. *Cancer Pract*. 1999;7(6):309-313.
  34. Wilson AE, Ross M. From chump to champ: people's appraisals of their earlier and present selves. *J Pers Soc Psychol*. 2001;80(4):572-584.
  35. Liamputtong P, Serry T. Research Methods in Health: Foundations for Evidence Based Practice. In: Liamputtong P, ed. *Making sense of qualitative data*. Melbourne: Oxford University Press; 2013:241-263.
  36. Noblit G, Dwight HR. *Meta-Ethnography: Synthesizing Qualitative Studies (Qualitative Research Methods)*. Newbury Park, CA: SAGE Publications; 1988:88.
  37. Critical Appraisal Skills Programme. CASP Qualitative Research Checklist. 2017.

38. Cormie P, Turner B, Kaczmarek E, Drake D, Chambers SK. A qualitative exploration of the experience of men with prostate cancer involved in supervised exercise programs. *Oncol Nurs Forum*. 2015;42(1):24-32.
39. Martin E, Bulsara C, Battaglini C, Hands B, Naumann FL. Breast and prostate cancer survivor responses to group exercise and supportive group psychotherapy. *J Psychosoc Oncol*. 2015;33(6):620-634.
40. Winters-Stone KM, Neil SE, Campbell KL. Attention to principles of exercise training: a review of exercise studies for survivors of cancers other than breast. *Br J Sports Med*. 2014;48(12):987-995.
41. Langelier DM, Cormie P, Bridel W, et al. Perceptions of masculinity and body image in men with prostate cancer: the role of exercise. *Support Care Cancer*. 2018;26(10):3379-3388.
42. Schmitz KH, Courneya KS, Matthews C, et al. American College of Sports Medicine roundtable on exercise guidelines for cancer survivors. *Med Sci Sports Exerc*. 2010;42(7):1409-1426.
43. Keogh JW, Patel A, MacLeod RD, Masters J. Perceptions of physically active men with prostate cancer on the role of physical activity in maintaining their quality of life: possible influence of androgen deprivation therapy. *Psychooncology*. 2013;22(12):2869-2875.
44. Craike MJ, Livingston PM, Botti M. An exploratory study of the factors that influence physical activity for prostate cancer survivors. *Support Care Cancer*. 2011;19(7):1019-1028.
45. Galantino ML, Greene L, Archetto B, et al. A Qualitative Exploration of the Impact of Yoga on Breast Cancer Survivors with Aromatase Inhibitor-Associated Arthralgias. *Explore (NY)*. 2012;8(1):40-47.
46. Laing CM, Moules NJ. Children's cancer camps: a sense of community, a sense of family. *J Fam Nurs*. 2014;20(2):185-203.
47. Keogh JW, Patel A, MacLeod RD, Masters J. Perceived barriers and facilitators to physical activity in men with prostate cancer: possible influence of androgen deprivation therapy. *Eur J Cancer Care (Engl)*. 2014;23(2):263-273.
48. Gardner JR, Livingston PM, Fraser SF. Effects of exercise on treatment-related adverse effects for patients with prostate cancer receiving androgen-deprivation therapy: a systematic review. *J Clin Oncol*. 2014;32(4):335-346.

## SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

**How to cite this article:** Langelier DM, D'Silva A, Shank J, Grant C, Bridel W, Culos-Reed SN. Exercise interventions and their effect on masculinity, body image, and personal identity in prostate cancer—A systematic qualitative review. *Psycho-Oncology*. 2019;28:1184–1196. <https://doi.org/10.1002/pon.5060>