

Pre-operative Pelvic Floor Muscle Training Prior to Radical Prostatectomy: Impacts on Mental Health

Nilanga Aki Bandara¹, Dhruv Lalkiya², Parsa Khatami³, Miles P. Mannas^{4,5}, Vahid Mehrnoush², Walid Shahrour^{2,*}

¹The University of British Columbia Faculty of Medicine, Vancouver, BC, Canada

²Urology Northern Ontario School of Medicine University, Thunder Bay, Ontario, Canada

³The University of British Columbia Faculty of Science, Vancouver, BC, Canada

⁴Department of Urologic Sciences, University of British Columbia, Vancouver, BC, Canada

⁵Vancouver Prostate Centre, Vancouver, BC, Canada

*Correspondence should be addressed to Walid Shahrour, walid.shahrour@gmail.com

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Abstract

Prostate cancer has a notable public health impact. One of the key treatment modalities for prostate cancer is radical prostatectomy, which involves surgically removing the prostate. Unfortunately, there are adverse outcomes associated with this modality, specifically erectile dysfunction, and urinary incontinence. Preoperative pelvic floor muscle training has the potential to improve the erectile function and urinary continence postoperatively. Poor erectile function and urinary incontinence may negatively impact sexual and mental health. Therefore, preoperative pelvic floor muscle training has the potential to improve sexual and mental health. This study outlines potential barriers and practical ways to incorporate pelvic floor muscle training into the care that patients with prostate cancer receive.

Keywords: Prostatic neoplasms, Public health, Preoperative care, Prostatectomy, Pelvic floor, Mental health, Sexual health

Introduction

Prostate cancer (PCa) has a substantial impact on our society's health. One in every eight men in North America are diagnosed with PCa in their lifetime, making it the second most common cancer, only second to skin malignancies [1]. Moreover, this year, in the United States alone, there will be 288,300 new diagnoses of PCa [1]. Unfortunately, 34,700 men will die from PCa in 2023 [1]. Radical prostatectomy (RP) is a treatment option which involves surgically removing the prostate and remains a cornerstone in the treatment of intermediate and high-risk PCa [2].

Despite the highlighted role of RP in treatment of PCa there are potential negative mental health outcomes related to RP. Some of these negative outcomes include a reduction

in sexual well-being, social withdrawal, depression, anxiety, and fatigue [3]. In addition, a reduction in sexual health associated with PCa may also result in erectile dysfunction due to surgery (damage to the nerves that support erectile function). It is important to note that even in nerve-sparing surgery, it can take up to 24 months for the nerves implicated in erectile function to completely heal. Additionally, stress urinary incontinence caused by RP may push some men away from social interaction. There are multiple pre-operative intersecting factors that can lead to depression and anxiety, for example: information overload, social withdrawal, and concerns about PCa recurrence [4]. Moreover, fatigue can also arise due to loss of independence [5].

Physical activity plays a key role in improving both mental [6] and sexual health [7]. Moreover, given the specific

consequences of PCa treatment modalities, preoperative pelvic floor muscle training (PPFMT) has the potential to be a promising therapeutic avenue to improve sexual health, specifically in the context of erectile dysfunction and urinary incontinence [8,9]; prior to PCa treatment, such as RP (open or robotic), or radiation. Sexual and mental health are concepts that are deeply intertwined and therefore an improvement in sexual health is likely to subsequently improve mental health as well [10]. PPFMT may help by increasing the supply of blood to the pelvic floor muscles and penis, thereby, increasing the delivery of oxygen and nutrients [11]. Ultimately, this can have a positive impact on blood flow to the penile tissue and the erection mechanism [11]. Despite the potential positive impact of PPFMT, according to Mehrnoush et al. 's [9] systematic review, there is limited evidence indicating the positive effect that PPFMT can have on resolving complications of ED after RP. Therefore, this paper aims to outline the potential role of preoperative pelvic floor muscle training (PPFMT) in improving sexual and mental health outcomes postoperatively.

PPFMT

PPFMT programs can be delivered in a variety of ways. For example, PPFMT may involve a physiotherapist or nurse actively teaching patients diverse pelvic floor exercises [8]. This teaching can entail knowledge of proper techniques for pelvic floor muscle contraction and relaxation [8]. Additionally, clinicians can educate patients on specific training regimens, such as doing three sets consisting of eight to 12 pelvic floor contractions with each contraction sustained from eight to 10 seconds, performed three times per day [8]. There are several tools that may support a patient's participation in PPFMT, such as biofeedback therapy, electrical stimulation, and mobile applications to mention a few [8]. PPFMT may also be delivered to patients in either a group or individual setting [8]. In terms of the duration of the training, PPFMT may start at any time prior to surgery, for example, Milios et al. 's [12] randomized control trial evaluated PPFMT five weeks prior to the day of surgery.

Barriers to PPFMT

With any physical activity program there will inherently be barriers to participation. For example, in addition to the cancer diagnosis reported to be a major emotional factor, some of the environmental barriers to physical activity include cost and the distance and time to spaces where physical activity occurs [5]. Patients who wish to participate in pre-operative PPFMT may also encounter financial barriers that can hinder their engagement in PPFMT. This may be especially true for patients who have PCa and identify as being of low socioeconomic status. Additionally, safe, accessible spaces where patients can both learn and participate in PPFMT are important. If these places are too far, patients may become less motivated to participate in PPFMT. There has been growing use of telehealth

in delivering physiotherapy care to patients, but the feasibility of delivering PPFMT is still unknown [13]. Further, the weight-bearing and aerobic aspects of PPFMT can pose tremendous challenges to people in terms of physical and mental health [14]. Patients can often be unmotivated to engage in PPFMT consistently due to an inconsistent pattern of exercise prior to surgery [14]. A study by Hirschhorn et al. [15] reported that limited knowledge and awareness about the use of PPFMT before RP can be another hindrance to the implementation of PPFMT rehabilitation approach. Furthermore, barriers to such PPFMT programs can also include feelings of embarrassment, physical discomfort, language barriers and social awkwardness as physical treatment involves the area of pelvic floor or penile region [15]. Another barrier can be long waitlists for PPFMT, such that some patients may be unable to start PPFMT before their surgery.

Addressing Barriers to PPFMT

One way to address the barrier of cost could be health authorities subsidizing or covering the costs of PPFMT prior to RP. Future efforts can build on existing programs, for example the Vancouver Prostate Centre provides support with sexual rehab, pelvic floor physiotherapy, psychological counselling, and lifestyle management [16]. Administrators of these programs may choose to add PPFMT as another form of support for patients. Further, in order to address the challenge of distance to spaces where patients can learn and participate in PPFMT, health authorities may consider implementing virtual options, such as PPFMT over teleconference platforms. Patients may appreciate being able to do PPFMT follow-up from a location of their choice, such as from home [8]. To address the barriers brought on by the weight-bearing aspects of PPFMT, the exercise plan can be tailored to the patients' needs. This can include non-weight-bearing exercises such as cycling and use of resistance bands [14]. The use of home-based and web-based exercise routines can overcome the lack of access to patients who live too far and improve adherence [14]. The use of technology improves patient compliance with PPFMT, such as the use of wearable devices that can provide quantifiable data for the care providers while increasing patient compliance through reminders [14]. Utilizing verbal and written instruction with a focus on the positive outcomes of PPFMT can be more effective than messaging that discusses the negatives of not engaging in PPFMT [14]. With that, facilitating lessons about pelvic floor muscle exercises with the patient's family and encouraging family members to engage in PPFMT with patients can improve adherence [17]. Additionally, a strong suggestion by the urological surgeon was seen to be a remarkable step to convince patients to engage in a PPFMT regimen before undergoing RP [15]. Moreover, a detailed consultation including the role of PPFMT before RP surgery in mitigating some of the risks associated with surgery - namely, incontinence and erectile dysfunction - and regular follow-up might help in creating impact by overcoming the knowledge

barrier and reforming the thinking pattern related to use of PPFMT [15]. Milios et al. 's [12] randomized control trial showed the potential role of PPFMT by presenting findings from the quality of life questionnaire. Namely, by comparing the control (who did not received PPFMT) and experimental group (received PPFMT) pre and post RP and it was concluded that PPFMT plays a significant role in the expeditious recovery of pelvic floor muscles post- RP when pelvic muscle are trained in a continuous manner [12]. Finally, the challenge associated with wait-times can be dealt with by prioritizing patients based on their anticipated surgical date. Further, having group classes may enhance the ability to have multiple participants engage in PPFMT at the same time.

A recent systematic review of pre-operative PFMT looking at postoperative ED did not find any outcomes related to mental health [9]. One article identified in this systematic review, Perez et al. [18] found a significant difference in the postoperative rate of erectile dysfunction between the control group and group treated with PPFMT, highlighting the potential role of PPFMT for improving quality of life related to erectile dysfunction. Watts et al. 's [19] systematic review and meta-analysis found a relatively high prevalence of anxiety and depression during the pre, on, and post-treatment time periods for prostate cancer patients. Hu et al. [20] followed radical prostatectomy patients for three years and found that anxiety and depression generally decreased over time. It is possible that the potential benefits of PPFMT may help with

the deterioration of these negative mental health outcomes. Therefore, moving forward, it is essential for future PPFMT studies to include mental health outcomes as these can help develop comprehensive patient-centred cancer programs. These mental health outcomes should be assessed pre-intervention, during the intervention, and following the intervention. A biopsychosocial approach must be taken in order to create a comprehensive cancer program for patients. By incorporating PPFMT in the care that patients who undergo radical prostatectomy receive, they have access to additional dimensions of support for. **Figure 1** presents a research-focused comprehensive care model for patients. This will allow for the evaluation of the potential benefits and challenges associated with this comprehensive care model. Moreover, research teams and clinicians may consider applying the flow of this framework into their context when assessing the role of PPFMT. Specifically, this framework showcases the key stages that patients pass through during the diagnosis and treatment of prostate cancer. Further, this model outlines important healthcare professionals who support patients with prostate cancer, such as oncologists, urologists, physiotherapists, and mental health clinicians.

Inherent to this model, mental health outcomes should be actively assessed throughout the process. It is necessary for a mental health baseline to be established so that clinicians can assess how patients' mental health transforms throughout the cancer treatment process. Korfage et al. 's [21] study showed

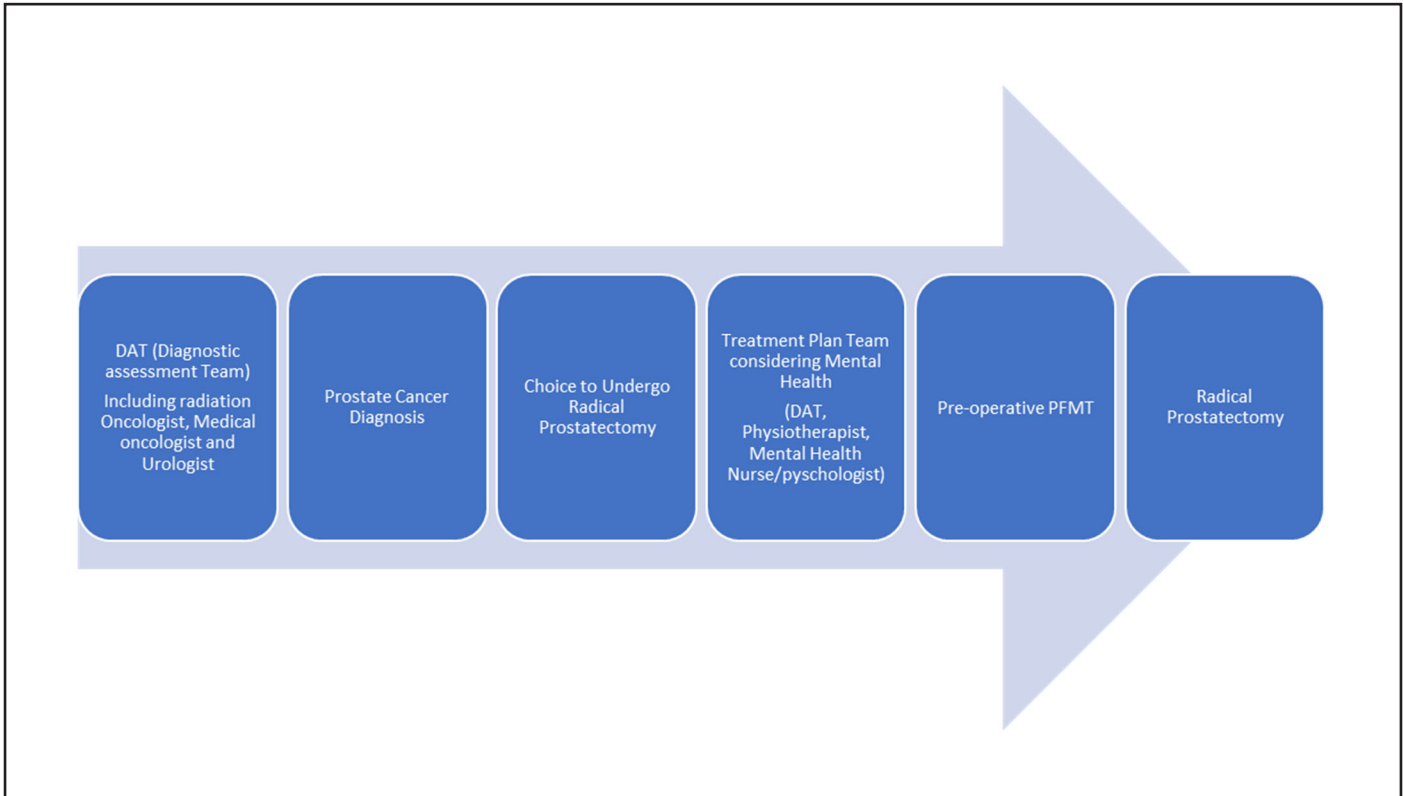


Figure 1. Comprehensive care model for patients with prostate cancer who elect to undergo radical prostatectomy.

that patients' anxiety and depression levels changed over five years following pre-treatment. Moreover, by considering mental health outcomes, such as prevalence of anxiety and depression over the long term, the role of PPFMT can be better delineated. Other mental health outcomes such as sexual health, stress and social isolation should also be assessed. Implementation and evaluation of this model are necessary moving forward. Specifically, short, intermediate, and long-term evaluations are needed.

Conclusion

In conclusion, PPFMT has the potential to improve mental and health sexual health outcomes. To date, existing studies on PPFMT have limited data on outcomes related to mental health. Therefore, future studies should purposefully integrate mental health outcomes. There are various barriers related to PPFMT that must be acknowledged and this paper describes strategies to mitigate these barriers. It is necessary for ongoing evaluation of these programs to be conducted.

Supplementary Materials

Not applicable.

Conflicts of Interest

Not applicable.

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