



The prescription or proscription of exercise in endometrial cancer care[☆]



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HIGHLIGHTS

- Few endometrial cancer (EAC) patients were able to exercise without supervision.
- Age and BMI were associated with the need to refer to a supervised exercise program.
- 75% of EAC patients whose age ≥ 60 , or BMI ≥ 35 , need supervision to exercise.

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ABSTRACT

Objective. To determine the proportion of endometrial cancer patients who can be safely prescribed community/home based unsupervised exercise. A better understanding of the physical dysfunction secondary to comorbidities among endometrial cancer patients would assist clinicians in delineating which patients to send to medically-based supervised rehabilitation versus a community/home based unsupervised exercise program.

Methods. A literature review identified health issues which could impede patients from successfully completing an unsupervised exercise program after a cancer diagnosis. The charts of 479 endometrial cancer patients treated between 2006 and 2010 were reviewed to determine the health status at the time of diagnosis and the type and percentage of health-issues that could preclude an unsupervised exercise program in this population. Univariable modeling and multivariable modeling were used to evaluate the association of demographic, cancer-related characteristics and clinical variables with ability to participate in unsupervised exercise.

Results. We determined that 14.2% of endometrial cancer patients were able to exercise without supervision based on their health status at the time of diagnosis. After excluding common comorbidities (hypertension, diabetes and morbid obesity) from the identified health-issues, the proportion increased to 20.5%. Older at diagnosis ($P = 0.007$) and higher BMI ($P < 0.001$) are more likely to exclude patients from community/home based unsupervised exercise program.

Conclusions. Only 14.2% to 20.5% of endometrial cancer patients were deemed able to exercise without supervision based on their health status at diagnosis. Our data suggest that approximately 80% of endometrial cancer patients would benefit from a referral to a medically-based supervised exercise program.

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1. Introduction

Physical activity may reduce the risk of endometrial cancer by 38–46% [1]. Besides the significant role in the primary prevention of endometrial cancer, physical activity also can provide health benefits during and after endometrial cancer therapy. The standard therapy for endometrial cancer includes surgery with or without adjuvant chemotherapy

and/or radiation. These treatments can be associated with adverse effects on the cardiovascular and pulmonary systems, and may also lead to acute and chronic side effects such as musculoskeletal weakness, gastrointestinal upset, dysfunction, pain, cancer-related fatigue, depression and long-term physical limitations, which may restrict or impair activities of daily living [2–4]. Aerobic exercise significantly improves cardiopulmonary function, decreases fatigue and pain symptoms, improves muscle strength and physical function, and also positively influences psychological outcomes among cancer survivors during and after curative cancer treatments [5–11].

Three organizations (the American College of Sports Medicine (ACSM), American Cancer Society (ACS), and National Comprehensive Cancer Network (NCCN)) recommend all cancer survivors avoid

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inactivity, and as soon as initial recovery is completed, to engage in 150 min of moderate-intensity, or 75 min of vigorous-intensity aerobic exercise per week, perform two to three muscle strengthening sessions per week, and perform flexibility activities on days of exercise [12–14]. Furthermore these three organizations agree that physical activity or exercise training for cancer survivors should be tailored to accommodate the participant's health status, medical comorbidities and side effects of cancer treatment. Prior studies demonstrate that cancer patients may benefit from prescreening for comorbidities to improve the specificity of exercise recommendations [15]. Although these guidelines noted above are shared with oncologists to inform the delivery of physical activity in clinical practice, few oncologists have implemented them [16]. Endometrial cancer patients, in particular, have low physical activity participation rates, ranging from 22% – 41% [5–11]. There may be multiple barriers to engage in physical activity, and in the experience of the gynecologic oncologists at our institution, clinicians and patients may be concerned about the safety of exercise. More specifically, there is a concern regarding the need for and capacity to appropriately triage those needing more medical or supervised interventions versus those for whom community/home based unsupervised exercise may be safe and advisable.

To assess the proportion of endometrial cancer patients who can be safely prescribed community/home based unsupervised exercise, we retrospectively assessed health-issues including comorbidities, medical devices and medical problems at the time of cancer diagnosis of a cohort in endometrial cancer patients. The primary objective of this study was to estimate the proportion of endometrial cancer patients for whom oncologists could safely prescribe community/home based unsupervised exercise at the dose suggested by the ACSM/ACS/NCCN clinical guidelines, based on the health status at the time of diagnosis. We hypothesized the majority of endometrial cancer patients harbor physical dysfunction secondary to their comorbidities present at the time of cancer diagnosis, and that impedes the potential uptake of physical activity during survivorship and an inability to achieve ACSM/ACS/NCCN guidelines.

2. Methods

2.1. Study participants

Eligible participants were women aged 20 years and older, with biopsy-proven endometrial cancer (International Classification of Disease, 9th Revision [ICD-9]: 182.0). All patients were treated at one of the Gynecologic Oncology Practices within the University of Pennsylvania Health System (UPHS) between the years of 2006 and 2010. We also excluded those who were 90 years or older, or who were confined to a wheelchair (we assumed we would not prescribe unsupervised exercise for those who are 90 or older or those confined to a wheelchair). All data for the present analysis were abstracted from electronic medical records. The University of Pennsylvania Institutional Review Board approved this protocol (IRB# 817318).

2.2. Defining the primary outcome

The primary outcome was 'the proportion of endometrial cancer patients for whom gynecologic oncologists could prescribe community/home based unsupervised exercise', as defined previously [17]. More specifically, nine documents published between 2006 and 2013 were reviewed by two researchers and have been used to develop a detailed list (health-issues) to define whether patients would be able to perform unsupervised exercise after a cancer diagnosis. This list has been published and previously applied to colorectal cancer survivors [17]. The health-issues were classified into one of the following system-specific categories: hematologic, musculoskeletal, systemic, gastrointestinal, cardiovascular symptoms, cardiovascular disease history, pulmonary, neurologic, comorbidities, and medical device (Table S1). The presence

of one or more health-issues indicated the inability to perform an unsupervised exercise program.

2.3. Outcome assessment time point

Given that a complete medical history and physical exam are typically taken at diagnosis and in preparation for surgery, we selected the time at diagnosis of cancer as the most informative time point regarding a patient's ability to participate in exercise. We presume that a patient's overall status will likely stay the same or slightly decline following cancer treatment but not likely to improve. Therefore, information regarding comorbidities, medical devices and medical problems at the time of endometrial cancer diagnosis was used to construct a composite measure of ability to participate in exercise without supervision.

2.4. Abstraction of outcomes & application of exercise guidelines to participant cohort

Health-issues were evaluated at the time of diagnosis consisting of blood chemistries, resting pulse and blood pressure, oral temperature, physician-diagnosed symptoms, patient-reported symptoms present at the time of the clinical visit, and any ICD-9 or procedure codes used to classify conditions or procedures in our abstracted list (Table S1) [17].

2.5. Covariates

Age and BMI (body mass index) were calculated at the time of cancer diagnosis. Race was classified as white, black, or other. Categorical variables were generated for cancer-related characteristics, including histology (endometrioid carcinoma; other histologic types including papillary serous carcinomas, clear cell carcinomas; MMMTs: malignant mixed mesodermal tumors or malignant mixed Mullerian tumors; and unspecified endometrial cancer), stage, grade (FIGO grades 1–3) and recurrence, as well as clinical variables including type of treatments (surgery, radiation and chemotherapy), other cancer history and Charlson comorbidity index.

3. Statistical analysis

The abstracted medical record data were used to generate a binary variable (yes/no) to indicate whether each participant had health-issues that would impede ability to perform unsupervised exercise. We generated a composite outcome as the sum of all health-issues, and then dichotomized that variable between endometrial cancer patients that had zero versus one or more health-issue(s). A value of zero indicates that community/home based unsupervised exercise may be appropriate. Values of one or more would indicate that the health status precludes patients from safely completing an unsupervised exercise program, and that referral to a medically-based supervised rehabilitation (e.g., physical therapy) might be advisable.

We used median and range to describe continuous variables as they were not normally distributed. Frequency and proportion were used to describe binary and categorical variables. Mann–Whitney test was used to compare the difference of continuous variables. The Pearson Chi-square test and Fisher exact test were used to compare the difference of categorical variables.

We used univariable logistic regression and multivariable logistic regression to assess the association between the ability of participation in a community/home based unsupervised exercise program and demographic, cancer-related characteristics and clinical variables. We also conducted pre-specified sensitivity analyses excluding common comorbidities among endometrial cancer patients from the composite outcome, including hypertension, diabetes and morbid obesity (BMI of 40 or higher) [6–8,18–20].

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