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What are the barriers and enablers to physical activity participation in women with ovarian cancer? A rapid review of the literature

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ABSTRACT

Background: Engagement in regular physical activity is recommended for women diagnosed with ovarian cancer due to aggressive treatment approaches, an increased risk of disease recurrence and low survival rates.

Objectives: To synthesise the current available evidence identifying barriers and enablers to participation in physical activity among women diagnosed with ovarian cancer.

Data Sources: Peer reviewed articles in electronic databases including CINAHL, Cochrane, Medline, Psych INFO and Scopus and key studies' reference lists.

Conclusions: Although evidence pertaining to the study population was limited, the findings of this review suggest women with ovarian cancer experience similar barriers and enablers to the general population and other cancer cohorts. The primary barriers to physical activity participation reported by this population were treatment or disease related side effects, fear of injury or falling and the absence of physical activity counselling. Key enablers reported to facilitate physical activity participation were the implementation of individualised interventions with targeted goals in addition to support from health and medical professionals. Future research on ovarian cancer populations is warranted to confirm this notion.

Implications for Nursing Practice: Nurses working within the oncology field are well positioned clinically to facilitate physical activity engagement and identify and overcome barriers to participation within a population that experiences high mortality rates and disease recurrence.

Key words: Ovarian cancer, physical activity, exercise, barriers, facilitators, rapid review.

INTRODUCTION

Ovarian cancer has a relative five-year survival rate of 45.7% and in 2019 had the highest mortality rate of any cancer of the female reproductive system.[1] There is no early effective screening test available to diagnose ovarian cancer, and most women initially present with vague, non-specific symptoms.[2] Consequently, a clinical diagnosis usually occurs at an advanced stage of disease. An advanced diagnosis of ovarian cancer is associated with a poor prognosis and high risk of recurrent disease.[3] Initial treatment commonly involves a combination of platinum-based chemotherapy and surgery, and recurrent disease often requires additional cytoreductive surgery involving resection of the bowel or other organs.[4] Women often remain or become sedentary after diagnosis,[5] with evidence acknowledging that a lack of physical activity can further impair physical function and quality of life[6]; concurrently increasing levels of anxiety and depression.[2]

Physical activity is an intervention that has been suggested to combat adverse side effects of cancer treatment and improve quality of life.[2] Physical activity is defined as any movement of the body produced by skeletal muscle contractions, and includes every day activities such as house work, grocery shopping or gardening.[7] Exercise is a sub-category of physical activity, and refers to structured, intentional or planned movement with the intention of improving/maintaining physical fitness.[7] Physical activity will be the primary focus of this rapid review; however, it is important to recognise that published literature uses both terms (physical activity and exercise) interchangeably.[7,8] The positive effects of physical activity for individuals diagnosed with any type of cancer has been outlined in existing literature.[9,10]

Physical activity also plays a key role in the prevention of other chronic diseases and the management of treatment related side effects.[10] As a result of the positive association between physical activity and health outcomes, the Clinical Oncology Society of Australia released a position statement in 2019, calling for physical activity to be included in standard

cancer care.[11] Similarly, in 2019, Exercise and Sports Science Australia also released evidence-based guidelines to support the implementation of physical activity interventions throughout the cancer continuum.[12] These recent statements demonstrate the growing body of evidence to underscore the importance of physical activity programmes to be included in standard cancer care services. Importantly, research has identified that it is safe and feasible for women diagnosed with ovarian cancer to participate in physical activity, irrespective of their stage of disease or treatment modality.[13,14]

Despite the known benefits of physical activity for individuals diagnosed with cancer[9], research[15] from one study reported that the majority (81%, N = 95) of participants (women living with ovarian cancer) do not adhere to the American College of Sports Medicine physical activity guidelines.[16] These guidelines accommodate chronic conditions and recommend individuals diagnosed with cancer engage in a weekly minimum of 150 minutes of moderate intensity aerobic activity and two-three strength training sessions.[16] The reasons for non-adherence to physical activity recommendations within ovarian cancer survivors are largely unknown but are hypothesised to be linked with aggressive treatment strategies such as major abdominal surgery and the high rates of disease recurrence.[2,15]

To date, there has been only one published study[15] that has exclusively explored the barriers to physical activity participation in a sample of women with ovarian cancer (N = 95). Utilising a questionnaire, researchers found fatigue, lack of routine and lack of self-discipline were the most commonly reported barriers among participants.[15] The researchers from this study highlighted the limitation of collecting data via a questionnaire as this tool did not capture unique barriers specific to ovarian cancer.[15] Beyond this study, several other studies[17-20] have investigated barriers to physical activity in samples of mixed gender and cancer types, which also included women with ovarian cancer. These studies found that the primary barriers to physical activity were individual disease related factors (primarily fatigue) and availability of

cancer specific facilities and programs.[17-19] Although these studies provide some evidence of the barriers to physical activity that may be experienced by people with cancer, it is important to acknowledge that the findings from these studies cannot be generalised to women with ovarian cancer due to the heterogeneity of the study samples and the aggregation of the reported findings across these studies.[15-17]

In contrast to barriers, enablers of physical activity are behaviours that facilitate participation in physical activity and provide solutions to overcome barriers.[21] Despite their importance to the promotion of physical activity, limited literature has investigated enablers to physical activity in women with ovarian cancer. Understanding physical activity enablers is vital in this population given the limited research that indicates women with ovarian cancer are inactive.[15] One study investigating enablers in ovarian cancer survivors (N = 395) reported 49% of participants preferred home based programs, with 63% reporting walking as their preferred activity mode.[22] Preferences were captured via a questionnaire, which limits the depth of information captured and lacks exploration into personal attribute factors, emphasising the need for further research exploring physical activity enablers. The aim of this rapid review is to synthesise current available evidence to identify reasons why women with ovarian cancer are not physically active and investigate factors that facilitate participation in physical activity. This rapid review is driven by the following research question, *"What are the barriers and enablers to participation in physical activity in women with ovarian cancer?"* It is anticipated that the results of this rapid review will inform future research directions, as well as clinical practice.

METHODS

Search strategy

The systematic literature search was conducted via a computer search of five databases (CINAHL, Cochrane, Medline, Psych INFO and Scopus) for appropriate papers from 1988 until February 2020. Electronic searches began on the 1st February 2020 and concluded on 29th February 2020. Search terms were developed with the assistance of a professional librarian and review of the existing literature. Medical subject headings (MeSH) for 'ovarian neoplasms' and 'exercise' were used. Search terms included were (ovarian neoplasms OR ovarian cancer) AND (exercise OR exercise therapy OR physical activity OR exercise intervention OR therapeutic exercise) AND (barriers OR challenges OR difficulties OR issues) AND (enablers OR facilitators OR motivators). These search terms were combined using 'AND' and searched in 'All Fields' of each database. Reference lists of full text articles were reviewed to ensure no studies were overlooked.

Inclusion and exclusion criteria

Peer-reviewed papers published between 1988 and February 2020 were included in this search. Qualitative and quantitative research was included, irrespective of research design. Due to the limited research specific to only women with ovarian cancer, studies with a mixed sample of cancer types (including ovarian cancer) were accepted, even if they did not report results of each cancer type separately of one another. Given this is a topic with a developing evidence base, this decision was made to be inclusive of all women with ovarian cancer who have partaken in research. To ensure all relevant literature was captured, studies that investigated women with ovarian cancer were included irrespective of the cancer stage, treatment type or primary/secondary nature of disease. Articles were included if they investigated or inadvertently explored barriers and/or enablers to engagement in physical activity and/or exercise. Barriers to physical activity are any patient-reported reasons for not engaging in

physical activity.[21] Enablers are described as any reasons or preferences which motivate or facilitate an individual to engage in physical activity.[21] Articles were excluded if they did not identify data linked to the primary research question. Case reports/case studies, narrative reviews, commentaries, conference abstracts and editorials were excluded. Articles that were in a language other than English, involved animals or in vitro experiments were also excluded.

Data management and selection procedure

Articles were initially imported into a web-based data management platform (Covidence© 2020, Version 1517, Melbourne, Australia) for screening. All duplicated were removed. All titles were initially screened by KM using the inclusion and exclusion criteria. Abstracts and titles were screened by two reviewers (KM and KT), with any conflicts resolved by a third reviewer (CP). All full texts were screened by one reviewer (KM), where studies were excluded based on the pre-determined exclusion criteria. This review followed a rapid review methodology,[23] which was modified to accommodate a limited timeframe to progress the future proposed qualitative study in women affected by ovarian cancer. This rapid review did not have a second reviewer during the full text screening, data extraction, and quality appraisal stages.

Quality appraisal

Study quality was assessed using the Mixed Methods Appraisal Tool (2018 Version).[24] The Mixed Methods Appraisal Tool includes specific criteria for qualitative, quantitative and mixed methods studies, focusing on methodological quality.[24] Each study included in the quality appraisal was evaluated by one reviewer (KM). Every study was assigned a score (0-2) based on each question within the appraisal tool; with a rating of 2 adopted to indicate a low risk of

bias, a rating of 1 indicating an unclear risk of bias and a rating of 0 indicating a high risk of bias. No studies were excluded based on the quality appraisal.

Data extraction

Data extraction was completed by one reviewer (KM) in a Microsoft© Excel spreadsheet. Initial data extraction included information on study design, aim, setting, location, sample size, sample characteristics, outcome measures, key findings and future directions. Data extraction was consistent irrespective of design. Further data extraction captured reported barriers and enablers to physical activity participation.

Data synthesis

Given the heterogeneity of the study samples and designs, a narrative synthesis and tabulation approach was adopted.[25] The narrative synthesis followed the steps of data reduction, data comparison and conclusion drawing. Data reduction involved the identification of primary themes (barriers and enablers), which were then divided into subgroups to facilitate clearer analysis. This subgroup classification was based on conceptual classification of participants experiences and attitudes, discussed and agreed upon by the entire research team. Individual barriers and enablers under each subgroup were then examined for prevalence using frequency counts in Microsoft© Excel. Data comparison involved identifying patterns, themes or relationships between data and grouping similar themes together.[25] Conclusions were drawn by verifying themes and subgroups against the primary data source.

RESULTS

Search results and overview

The flow of records through the rapid review is summarised in Figure 1. The initial search yielded 96 articles after the removal of duplicates. Based on the screening of titles and abstracts, a further 56 articles were excluded. No additional studies were identified from the reference lists. Twenty studies were read in full and eleven publications were excluded due to being inaccessible or not meeting the primary research objective. Subsequently, two mixed methods, six quantitative studies and one qualitative study published between 2009 and 2020 were included in the final rapid review. A total of 1479 participants (of which 264 were diagnosed with ovarian cancer) were included across the studies and sample sizes ranged from N = 10 to N = 456 (age range: 50 – 66 years). An overview of the included studies, including participant characteristics can be found in Table 1. Two articles included only participants with ovarian cancer, with the remaining seven articles containing mixed and female gynaecological cancer cohorts with a subset of ovarian cancer participants comprising each studies sample. Data was extracted from all articles, irrespective of sub-analysis for cancer type.

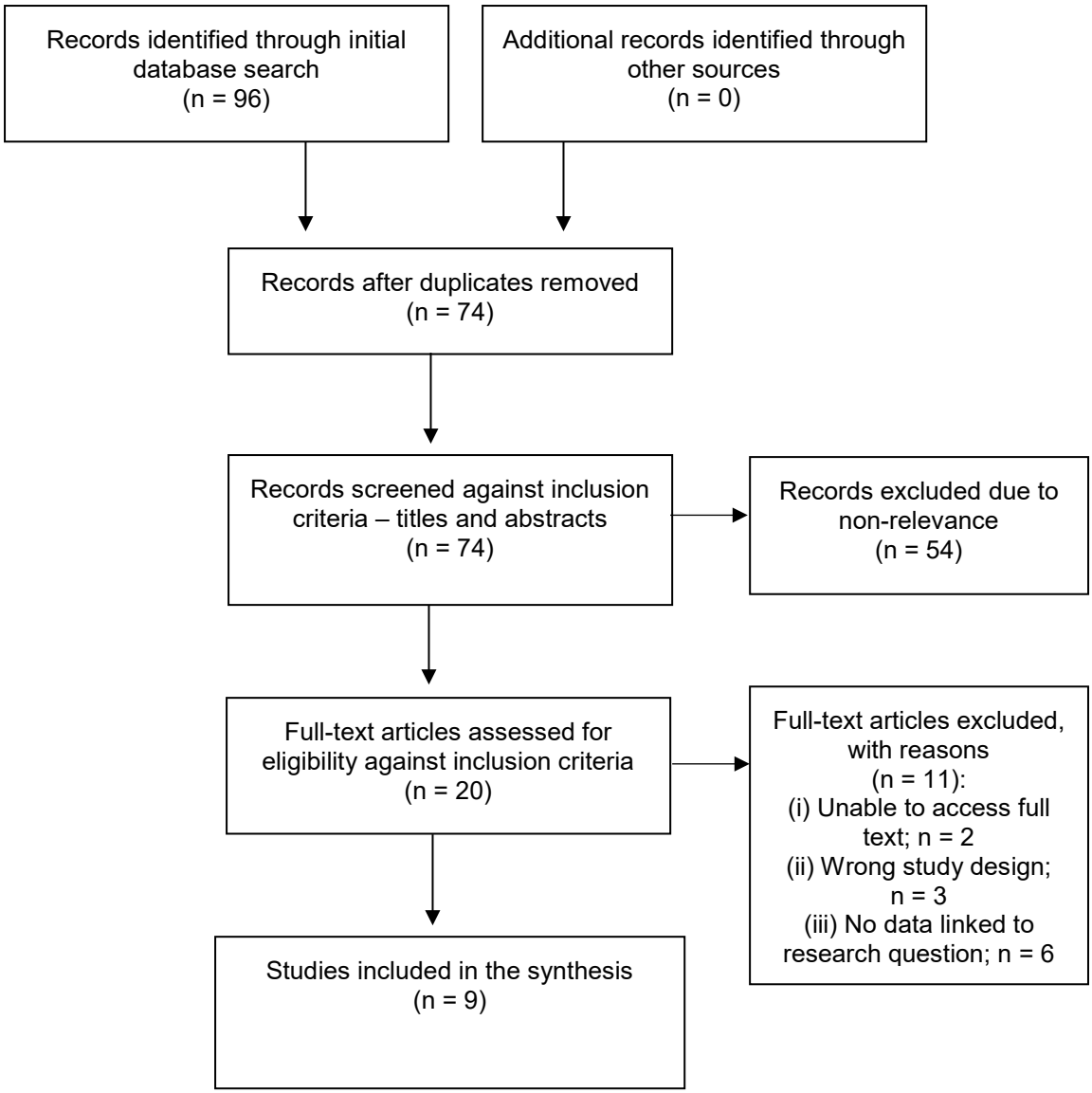

Figure 1. PRISMA flow diagram of the study selection, including literature search and reasons for exclusion.

Table 1. Overview of the included studies (N = 9).

Author and Year	Purpose	Setting	Country	Sample Size	Mean Age (years)*	Treatment Type	Study Design	Outcome Measures	Key Findings	Future Directions
Beck et al., 2020	To investigate if prehabilitation recommendations were more likely to be adhered to with the use of an educational support pamphlet.	University Hospitals	Denmark	Overall sample N=53 (Ovarian cancer N=33)	66.0	Not reported.	Mixed methods	Leaflet; face-to-face interviews	Prehabilitation recommendations were too generalised and could represent a barrier to adherence; more tailored interventions needed to promote adherence.	To combine patient preference with biomedical evidence to optimise prehabilitation programs.
Blaney et al., 2013	To investigate exercise barriers, facilitators and preferences.	Cancer Care Charity	Ireland	Overall sample N=456 (Ovarian cancer N=4)	61.0	Surgery (14.4%) Chemotherapy alone (6.9%); Radiotherapy alone (6.6%); Chemotherapy + radiotherapy (2.9%); Surgery and chemotherapy +/- radiotherapy (67.7%)	Descriptive cross-sectional study	Questionnaire; MSFI-FS; EORTC QLQ-C30; LSI.	Exercise facilitators, preferences and motivators are related to cancer survivor's needs. Primary barriers discovered were health related or linked to facility access.	To include a wide variety of cancer diagnosis in future questionnaires. Future questionnaires investigating physical activity should include intensity, duration and frequency.
Farrokhzadi et al., 2016	To identify physical activity barriers and preferences in women with gynaecological cancers.	Hospitals	Australia	Overall sample N=101 (Ovarian cancer N=59)	57.5	Chemotherapy or radiation therapy (60%)	Descriptive cross-sectional survey	Questionnaire; Active Australia Survey; SF-36; Godin-Leisure Time.	Barriers such as fatigue and poor health were linked with low levels of physical activity. Odds of having disease specific barriers were highest for women with ovarian cancer (p=0.04).	Interventions to increase physical activity should address disease specific barriers.
Lapen et al., 2018	To determine the feasibility of two different types of yoga intervention for sedentary cancer survivors.	Cancer Centre	United States of America	Overall sample N=42 (Ovarian cancer N=2)	56.5	Not reported.	Pilot randomised study	Accrual, adherence and attendance rates.	Ovarian cancer survivors can participate in a restorative yoga intervention; however, time commitment and travel distance were cited barriers.	Address barriers such as time commitment and travel requirements to improve recruitment. Investigate restorative yoga as a more feasible intervention in cancer survivors.

Midtgaard et al., 2009	To investigate self-reported physical activity behaviour and exercise motivation in cancer patients undergoing chemotherapy.	University Hospital	Denmark	Overall sample N=451 (Gynaecological cancer N=114)	50.2	Chemotherapy and/or radiation therapy (% not reported).	Descriptive cross-sectional survey	Questionnaire.	Physical activity levels declined as treatment progressed. Primary exercise barriers were fatigue and physical discomfort. Patients exhibited a positive interest in physical activity.	To investigate physical activity intervention to overcome disease and treatment related side effects.
Midtgaard et al., 2012	To describe cancer survivor's lived experience of postintervention maintenance of physical activity.	University Hospital	Denmark	Overall sample N=23 (Ovarian cancer N=3)	50.0	Not reported.	Qualitative	Semi-structured focus groups.	Cancer survivors motivation to maintain physical activity was linked to living a meaningful live and fear of what may occur if they ceased activity.	Develop theory-based interventions to promote physical activity maintenance.
Mizrahi et al., 2015	To quantify physical activity levels in women with ovarian cancer and investigate barriers to physical activity.	Oncology Clinics	Australia	Overall sample N=95 (Ovarian cancer N=95)	58.6	Chemotherapy (39%); Not on treatment (61%)	Descriptive cross-sectional survey	Questionnaire; IPAQ-SF; PPABS.	Women with ovarian cancer are at high risk for low levels of physical activity. Majority of barriers identified were motivational, environmental and behaviour-related.	Patient interviews or focus groups may offer more insight into barriers to physical activity not captured in existing questionnaires. Address motivational, symptomatic and behavioural barriers.
Tyrrell et al., 2014	To identify and explore physical activity preferences of gynaecologic cancer survivors.	Cancer Registry	Canada	Overall sample N=239 (Ovarian cancer N=58)	52.9	Not reported.	Mixed methods	Questionnaire; LSI; IPAQ-SF; semi-structured interviews.	Physical activity support and counselling was highly desired among gynaecologic cancer survivors.	Investigate specific subgroups to determine more specific physical activity preferences in different age groups and disease stages.
Zhang et al., 2017	To explore the feasibility for women with ovarian cancer to complete a higher dose of planned physical activity whilst undergoing active treatment.	University	United States of America	Overall sample N=10 (Ovarian cancer N=10)	63.0	Chemotherapy (50%); Not on treatment (50%)	Non-randomised study	Self-report diary; phone interviews; Fitbit Zip.	Data indicates it may be feasible for women with ovarian cancer to complete 225 minutes per week of physical activity with support of exercise counselling.	Larger scale, dose-response trial to investigate therapeutic effects of exercise intervention (180 and 225 minutes/week) vs control (no exercise).

MSFI-FS: Multidimensional Fatigue Symptom Index - Short Form. EORTC QLQ-C30: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire – C30. LSI: Leisure Score Index. SF-36: Short Form Health Survey. IPAQ-SF: International Physical Activity Questionnaire – Short Form. PPABS: Perceived Physical Activity Barriers Scale. *At time of study.

Quality appraisal results

Quality appraisal of the final nine studies was completed utilising the Mixed Methods Appraisal Tool (Table 2).[24] Based on the quality appraisal, three articles had a low risk of bias across all scoring domains. The remaining six articles scored 'unclear' or 'high' risk of bias across one or more domains. The quality appraisal highlighted an unclear risk of nonresponse bias in most studies. One study lacked complete data and the intervention was not administered as intended due to poor compliance of participants.[14] Women with ovarian cancer were under represented in studies of mixed cancer cohorts.[17,19,26-28] The studies that only investigated women with ovarian cancer contained small (N = <100) sample sizes.[14,15] Studies that utilised questionnaires had pre-determined barriers and/or enablers, which may not capture the breadth or specificity of barriers/enablers experienced by cancer survivors.[15,19,20]

Table 2. Quality appraisal of studies assessed in the current rapid review. A score of 0 indicates a high risk of bias (dark grey), a score of 1 indicates an unclear risk of bias (medium grey) and a score of 2 indicates a low risk of bias (light grey).

Study type	Item Number of Checklist						
	1	2	3	4	5	6	7
• **Mixed Methods Studies**[a]							
Beck et al., 2020	2	2	2	2	2	2	2
Tyrrell et al., 2014	2	2	2	2	1	2	2
[a] **Mixed Methods Item number check list key** 1 – Are there clear research questions? 2 – Does the collected data answer the research questions? 3 – Is there an adequate rationale for using a mixed methods design to address the research question? 4 – Are the different components of the study effectively integrated to answer the research question? 5 – Are the outputs of the integration of qualitative and quantitative components adequately interpreted? 6 – Are divergences and inconsistencies between quantitative and qualitative results adequately addressed? 7 – Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?							
• **Quantitative Descriptive Studies**[b]							
Blaney et al., 2013	2	2	2	2	2	2	2
Farrokhzadi et al., 2016	2	2	2	2	2	1	2
Midtgaard et al., 2009	2	2	2	2	2	1	2
Mizrahi et al., 2015	2	2	2	2	2	1	2
[b] **Item number check list key** 1 – Are there clear research questions? 2 – Does the collected data answer the research questions? 3 – Is the sampling strategy relevant to address the research question? 4 – Is the sample representative of the target population? 5 – Are the measurements appropriate? 6 – Is the risk of nonresponse bias low? 7 – Is the statistical analysis appropriate to answer the research question?							
• **Non-Randomised Studies**[c]							
Zhang et al., 2017	2	1	2	2	0	1	0
[c] **Item number check list key** 1 – Are there clear research questions? 2 – Does the collected data answer the research questions? 3 – Are the participants representative of the target population? 4 – Are measurements appropriate regarding the outcome and intervention? 5 – Are there complete outcome data? 6 – Are the confounders accounted for in the design and analysis? 7 – During the study period, is the intervention administered as intended?							
• **Randomised Studies**[d]							
Lapen et al., 2018	1	1	1	2	0	0	1
[d] **Item number check list key** 1 – Are there clear research questions? 2 – Does the collected data answer the research questions? 3 – Is randomisation appropriately performed? 4 – Are the groups comparable to baseline? 5 – Are there complete outcome data? 6 – Are outcome assessors blinded to the intervention provided? 7 – Did the participants adhere to the assigned intervention?							
• **Qualitative Studies**[e]							
Midtgaard et al., 2012	2	2	2	2	2	2	2
[e] **Item number check list key** 1 – Are there clear research questions? 2 – Does the collected data answer the research questions? 3 – Is the qualitative approach appropriate to answer the research question? 4 – Are the qualitative data collection methods adequate to address the research question? 5 – Are the findings adequately derived from the data? 6 – Is the interpretation of the results sufficiently substantiated by data? 7 – Is there coherence between qualitative data sources, collection, analysis and interpretation?							

Barriers to physical activity

Barriers to participation in physical activity reported within each study are summarised in Table 3. Barriers were classified under the following four sub-categories.

(i) Treatment or disease related side effects: this category included any physical symptoms that occurred as a result of a cancer diagnosis and/or cancer treatment. These were the most common barriers across the reviewed literature. Fatigue and pain were the most prevalent, with six studies reviewed reporting these as barriers to physical activity.[14,15,17-19,26] One study investigating physical activity in a sample of mixed cancer types reported 74% (N = 334) of participants experienced fatigue as a barrier to participation.[19] Among studies of ovarian cancer cohorts only, fatigue was reported as a barrier by 37.9% (N = 36) of participants in one study.[15] Diarrhoea and/or incontinence were reported in 22% of studies.

(ii) Personal attribute factors: barriers that shape behaviour were classified in this category. Fear of injury or falling and a lack of physical activity education were identified as barriers in 44% of studies of both mixed and ovarian cancer samples.[15,17-19] Beyond these, lack of motivation or self-discipline, lack of routine, procrastination, exercise not a priority and lack of enjoyment or interest were other personal attribute factors.[15,17-19]

(iii) *Environmental/social factors:* environmental and social barriers were reported in 77% of studies.[14,15,17-20,27] Time, lack of opportunity and lack of facilities/equipment were commonly reported barriers. Barriers less frequently identified were cost, significant life events and no support or company.

(iv) *Program specific factors:* only two program specific barriers were reported in the included literature.[26,27] In one study of mixed cancer cohorts, researchers found the absence of tailored programs a barrier to adherence.[26,27] Another study of breast and ovarian cancer survivors reported high exertion as a barrier to participation in physical activity.[27]

Enablers to physical activity

Enablers to participation in physical activity reported within each study are shown in Table 4. Enablers to physical activity were included in six studies.[14,17,18,20,26,28] Enablers were classified under the following four sub-categories described below.

(i) Physical activity preferences: physical activity preferences included activity modality, time of day, location, intensity and delivery method. These were reported in 33% of studies.[17,18,20] Physical activity preferences were similar amongst mixed and gynaecological cancer cohorts, with 71-95% of individuals preferring to walk, and 36-79% preferring morning exercise.[17,18,20] Moderate intensity physical activity was favoured by 60-84% of participants.[17,20]

(ii) Motivators: motivation to engage in physical activity was investigated in three studies.[17,20,28] Improving quality of life, getting fit and gaining health benefits were the most common physical activity motivators.

(iii) *Environmental/social factors:* environmental or social enablers were captured in 55% of studies. In a study of mixed cancer survivors, 65.5% of participants (N = 295) reported that approval from their treating oncologist to exercise would facilitate physical activity engagement.[17] Support and education from health professionals was identified as a key enabler by both mixed cancer and ovarian cancer samples.[14,18,20,26]

(iv) *Program specific factors:* enablers specific to physical activity programs were found in 44% of studies. Individualised physical activity interventions with personal goals was the most common enabler to physical activity.[17,28] More than 70% of participants in one study[17] agreed or strongly agreed that factors such as enjoyment, a variety of exercises, gradual progression and good music were likely to facilitate exercise participation.

Table 3. Barriers to physical activity participation reported across all studies including percentage (%) of participants if reported in study.

Author and Year	Beck et al., 2020	Blaney et al., 2013	Farrokhzadi et al., 2016	Lapen et al., 2018	Midtgaard et al., 2009	Midtgaard et al., 2012	Mizrahi et al., 2015*	Tyrrell et al., 2014	Zhang et al., 2017*
(1) Treatment/Disease Related Side Effects									
Pain	✓	✓			✓ (45.0%)		✓ (20.0%)		✓ (70.0%)
Fatigue	✓	✓	✓		✓ (74.0%)		✓ (37.9%)		
Diarrhoea/incontinence	✓		✓						
(2) Personal Attribute Factors									
Lack of motivation or self-discipline		✓					✓ (32.6%)		
Fear of injury or falling		✓	✓		✓ (14.0%)		✓ (13.7%)		
Lacking education or never been active		✓	✓		✓		✓ (12.6%)		
Lack of routine							✓ (34.7%)		
Procrastination							✓ (27.4%)		
Not a priority							✓ (24.2%)		
Lack of enjoyment or interest			✓				✓ (22.1-26.3%)		
(3) Environmental/Social Factors									
Time/lack of opportunity			✓	✓	✓ (14.0%)		✓ (15.8%)		
Weather extremes		✓					✓ (14.7%)		✓
Lack of facilities and/or equipment		✓	✓	✓			✓ (15.8%)	✓	
Cost							✓ (8.4%)	✓	
Significant life events									✓ (60.0%)
No support or company			✓				✓ (21.1%)		
(4) Program Specific Factors									
Program not specific enough/too general	✓								
High exertion				✓					

*Studies with only ovarian cancer participants.

Table 4. Enablers to physical activity participation reported across all studies, including percentage (%) of participants if reported in study.

Author and Year	Beck et al., 2020	Blaney et al., 2013	Farrokhzadi et al., 2016	Lapen et al., 2018	Midtgaard et al., 2009	Midtgaard et al., 2012	Mizrahi et al., 2015*	Tyrrell et al., 2014	Zhang et al., 2017*
(1) Physical Activity Preferences									
Modality: walking		✓ (76.7%)	✓ (71.0%)					✓ (95.0%)	
Moderate intensity physical activity		✓ (60.2%)						✓ (84.0%)	
Time of day: morning		✓ (36.6%)						✓ (79.0%)	
Exercise with friends and//or family			✓ (37.0%)					✓ (71.0-76.0%)	
Exercise with other cancer survivors		✓ (40.0%)						✓ (48.0%)	
(2) Motivators									
Improve quality of life		✓ (64.5%)				✓			
Get fit/health benefits		✓ (60.4%)						✓	
Fatigue management		✓ (50.9%)							
Fear of cancer recurrence						✓			
(3) Environmental/Social Factors									
Approval from oncologist		✓ (65.7%)							
Support and education from health professional	✓		✓					✓	✓
Feedback about progress		✓ (66.2%)							
Activity registration (via diary or tracker)	✓								✓
(4) Program Specific Factors									
Tailored intervention with personalised goals	✓	✓ (73.1%)				✓			
Fun		✓ (88.0%)							
Variety of exercises		✓ (81.8%)							
Gradual progression		✓ (78.9%)							
Flexible program		✓ (75.5%)						✓ (54%)	✓
Good music		✓ (73.2%)							

*Studies with only ovarian cancer participants.

DISCUSSION

This rapid review aimed to investigate the barriers and enablers to physical activity participation in women with ovarian cancer. While this topic has been investigated in other cancer cohorts, this is the first rapid review conducted in this clinical area. This rapid review found the most common barriers to physical activity were treatment or disease related side effects and environmental or social factors.[15,17,18] The primary enablers identified were related to physical activity preferences (such as mode and timing of exercise) and environmental or social factors (e.g. guidance and support from medical/health professionals).[14,17,18] This discussion presents the findings of mixed, female gynaecological and ovarian cancer survivors, and investigates the similarities and differences between each to inform future research directions. The implications of the study findings are discussed below.

Across the included study populations, mixed cancer survivor samples included a range of cancer types, such as breast, prostate, colon, haematological and ovarian cancer. Within samples of mixed cancer survivors, treatment and/or disease related side effects were highlighted as a common barrier to physical activity participation.[17,19] The most disabling side effects reported to interfere with participation in physical activity were fatigue, pain and diarrhoea or incontinence.[17,19,26] Cancer related fatigue is prevalent across all cancer types and can be highly burdensome, particularly if fatigue persists after the conclusion of treatment.[29] There is strong evidence for the use of tailored physical activity interventions to combat cancer related fatigue.[9,12,29] Literature also recommends the inclusion of physical activity programs for cancer survivors to reduce faecal and urinary incontinence via pelvic floor exercises and resistance training.[12] This evidence demonstrates the important role physical activity has in combatting such side effects. Personal attribute factors and environmental/social factors were commonly reported as barriers. These personal attribute and environmental/social barriers may be addressed by ensuring cancer survivors have access to low-cost exercise facilities and

physical activity educational tools (such as cancer specific pamphlets).[30]

Female gynaecological cancer survivors encompass women with cervical, endometrial, ovarian, uterine and vaginal cancers. Two studies[18,20] in this rapid review investigated the physical activity barriers, correlations and preferences in female gynaecological cancers. Findings in these studies were similar to mixed cancer survivors, with side effects such as fatigue and diarrhoea identified as physical activity barriers.[18] Cancer related fatigue is a common symptom in women with gynaecological cancer and similar to mixed cancer survivors, evidence supports physical activity interventions to combat fatigue.[17,31-33] Equivalent to mixed cancer survivors, gynaecological cancer survivors also reported lacking physical activity education and support.[18] Educational programs for medical and allied health professionals could be implemented to ensure all staff working in oncology communicate consistent physical activity recommendations to cancer survivors.[30]

Semi-structured interviews conducted in a sample (N = 16) of female gynaecological cancer survivors identified the importance of programs offered close to home, as travelling long distances during times of illness was reported to be unrealistic by the participants.[20] The women in this study also highlighted cost as a barrier when required to take time off work during periods of treatment or illness resulting in a loss of income.[20] In comparison, cost and travel concerns were not reported as a perceived barrier in mixed cancer cohorts. These findings suggest home programs during treatment may be more suitable in gynaecological cancer cohorts,[20] whereby eliminating cost and travel requirements increases physical activity adherence. Home programs have been used effectively in other cancer cohorts, as a systematic review (K = 20) of breast cancer survivors showed home based walking programs successfully increased physical activity participation.[34] A 26-week home aerobic exercise intervention in a sample (N = 10) of women with ovarian cancer also showed significant increases in physical activity, suggesting home based interventions are also suitable in this cohort.[14]

Women with ovarian cancer reported similar physical activity barriers to other cancer populations. Studies of ovarian cancer survivors found 20-70% of women perceived fatigue as a barrier to physical activity engagement.[14,15] Survivors with Stage I (in which the cancer has not spread beyond the ovaries) ovarian cancer reported the least number of physical activity barriers and the highest participation in physical activity.[15] This is unsurprising, given the higher treatment and disease burden associated with advanced stage ovarian cancer.[35] A small proportion of women with ovarian cancer reported cost as a barrier,[15] consistent with findings in gynaecological cancer survivors.[20] Other barriers which were unique to ovarian cancer included lack of routine, procrastination and significant life events,[14,15] although no further detail were reported as these findings were obtained from questionnaires. These findings highlight the paucity of research to date on this cancer survivor cohort.

Although enablers were not identified as frequently in the literature, this doesn't discount their importance, as they are key to facilitating participation in physical activity and providing solutions to barriers.[36] Common enablers to physical activity participation fall under physical activity preferences, with studies in mixed and gynaecological cancer cohorts reporting that participants preferred walking and morning activity.[17,18,20] The preference for walking programs may be linked to low cost and minimal travel requirements, which were cited as barriers in gynaecological and ovarian cancer cohorts.[15,20] Other enablers reported in mixed cancer survivor cohorts were motivation to improve quality of life and physical fitness, reduce fatigue and gain overall health benefits.[17,28] These motivations have been reported in other literature, which investigated long term physical activity maintenance in cancer survivors.[28]

Approval from the participant's treating oncologist was reported to enable physical activity participation in a sample of mixed cancer survivors,[17] which is supported by other evidence in women with breast and gynaecological cancer.[30,37] Gynaecological and ovarian

cancer survivors also highlighted the need for support and education from a health professional, underscoring the importance of a multi-disciplinary team approach to facilitate physical activity engagement.[14,18] Medical and allied health professionals with cancer care training are well positioned to deliver physical activity interventions that are safe and evidence-based.[12]

Activity registration was reported as another motivator for women with ovarian cancer to initiate and adhere to a physical activity intervention.[14] Activity registration has been investigated in breast cancer survivors, who reported increased motivation and accountability to exercise when using wearable activity trackers over a four week period.[38] Future physical activity interventions designed for ovarian cancer survivors may consider the addition of activity registration to increase motivation and adherence in the initial stages of a physical activity intervention. Another theme consistent across all cancer samples was the need for physical activity programs to be individualised and allow for flexibility in its' delivery.[14,17,19,28] This is unsurprising given the varied and time intensive treatment schedules cancer survivors are often subject to,[4] in addition to other family and work responsibilities[15]. Physical activity programs designed for ovarian cancer survivors must be flexible and accommodate these responsibilities. Programs should also focus on reducing primary barriers to participation and utilise known enablers to promote engagement. Other recommendations will rely on future research conducted in women with ovarian cancer to investigate barriers and enablers to physical activity participation.

The literature included in this rapid review had several limitations. Many studies investigating barriers and enablers utilised outcome measures such as questionnaires which did not allow for open ended answers.[15,18,20] In addition, many questionnaires rely on self-reported data, introducing possible recall bias.[19] The evidence did not report on additional comorbidities or unique lifestyle factors that may influence physical activity participation, with researchers

suggesting comorbidity data should be included in future research.[17]

STRENGTHS AND LIMITATIONS

The strength of this rapid review was the inclusion of both qualitative and quantitative literature. This rapid review followed a clear and transparent process to enable replication. The use of the Mixed Methods Appraisal Tool[24] was also a strength, given its' ability to assess the methodological quality across a number of different study designs. The findings of this rapid review are confined to the methodological limitations across the included studies. Given that this was a rapid review with a limited timeframe, full text screening, data extraction and the quality appraisal were only completed by one reviewer. Despite this, the researcher discussed the progress of the review at each stage with her supervisory team at weekly supervision meetings. Another limitation of this review is the absence of research in the subject area, with only two[14,15] studies included in this review investigating the perceptions of only women with ovarian cancer in regards to barriers and enablers to physical activity participation. The other studies included in the review had a mix of cancer diagnosis, including women with ovarian cancer, meaning findings are not specific to ovarian cancer.

DIRECTIONS FOR FUTURE RESEARCH

Given the developing evidence base in this clinical area it is difficult to make definitive conclusions regarding the perceived barriers and enablers to physical activity participation in women with ovarian cancer. Further research should utilise the strengths of qualitative and quantitative approaches to capture the unique challenges faced by women with ovarian cancer that both prevent and enable participation in physical activity. Noteworthy, very little qualitative research has been conducted to explore the experiences of women affected by ovarian cancer, specifically related to the barriers and enablers. Future qualitative research

could capture women's unique experiences that questionnaire-based surveys are unable to clearly discern or completely overlook.[15] Future research might also explore include a range of clinical, demographic and psycho-social factors (such as self-management self-efficacy, coping, anxiety and depression and social support) which impact on the experience of physical activity in women. Finally, an exploration of the unique side effects of treatment which pose the greatest difficulty to participating in physical activity would be important to understand.

CONCLUSION

Most women with ovarian cancer are sedentary, despite the range of benefits adopting a physical activity regime can offer. This rapid review found the primary barriers experienced by this population are linked to treatment or disease related side effects (primarily fatigue) and personal attribute factors such as lack of motivation or routine. This rapid review also identified that women with ovarian cancer require support and education from medical and health professionals who are well positioned to facilitate physical activity engagement. Further research in this area will help develop more targeted exercise guidelines assisting allied health, nursing and medical professionals to develop tailored interventions to increasing physical activity participation, which will have the potential to greatly improve quality of life in women with ovarian cancer.

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