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Diet and Physical Activity Behaviors of Breast Cancer Survivors: A Scoping Review

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ABSTRACT

Objectives: This scoping review explored insight into the current evidence on adherence to health behavior guidelines, specifically diet and physical activity among breast cancer survivors.
Methods: A scoping review was conducted through databases including PubMed, CINAHL, Scopus, Web of Science, and SPORTDiscus with Full Text in November 2022, following the JBI methodology. The search strategy combined the keywords i) diet OR nutrition OR eating OR exercise OR physical activity OR fitness and ii) breast cancer survivors OR patients with breast cancer.
Results: Twelve original research studies were included; most were conducted in the United States (50%), followed by the European countries (33.34%). Most studies exclusively focused on physical activity (83.33%) and assessed adherence to the physical activity guidelines for Americans (30%), along with the American Cancer Society (20%) and American College of Sports Medicine (20%) guidelines. Overweight or obesity, comorbidity, race, and quality of life were reported as factors associated with physical activity. Independence of disease status was significantly associated with fruit and vegetable intake.
Conclusion: Studies reported a wide range of prevalence of adherence to dietary and physical activity recommendations among breast cancer survivors. Further studies are needed to explore diet and physical activity in the context of factors affecting these behaviors among cancer survivors to support the development of healthy behavior, improve health outcomes, and reduce the disease burden among this population.
Implication for Nursing Practice: Nurses have a key role in educating and coordinating multidiscipline teams to initiate and provide cancer survivorship care. These findings indicate that nurses should consider developing targeted strategies and education to promote dietary patterns and physical activity adherence among breast cancer survivors.

Breast cancer is one of the global health concerns that threaten women's lives around the world. In the United States (US), an estimated 297,790 women will be newly diagnosed with invasive breast cancer in 2023.[1] Even though breast cancer death rates have decreased by 43% due to early screening, increased awareness, and improved treatment,[2] there are expected to be more than 4 million breast cancer survivors in the US alone.[3] According to the American Cancer Society, cancer survivors refer to people having a history of cancer from the time of diagnosis through the rest of their lives.[3] The transition from a life-threatening disease (e.g. breast cancer) to a chronic condition[4] requires long-term management to decrease the adverse effects of diagnosis and treatment and improve the health outcomes among survivors.[5]

Modifiable health behaviors may further reduce the risk of recurrence and comorbid conditions and offset the detrimental effects of cancer treatment beyond cancer diagnosis. Research showed that adhering to physical activity among breast cancer survivors can help to lower mortality,[6,7] reduce breast cancer progression, reduce new primary cancer, reduce cancer recurrence,[8] improve psychological functioning,[9] and provide a better quality of life (QOL).[10,11] After diagnosis, healthy diet habits are linked to a lower risk of overall and non-breast cancer death, whereas unhealthy dietary patterns are linked to a higher risk of these mortality endpoints.[12,13]

There are guidelines such as the American Cancer Society (ACS), American College of Sports Medicine (ACSM), physical activity guidelines for Americans, Health Plan 2010 for the general Korean adult population, and Dutch Physical Activity guidelines providing

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Layperson Summary

What we investigated and why

Healthy lifestyle choices can help lower the chances of cancer coming back and improve health for people diagnosed with cancer. Although professional health organizations provide healthy eating and physical activity guidelines, many survivors don't follow these recommendations. This paper examines how well people affected by breast cancer adhere to diet and exercise guidelines and what factors influence their adherence.

How we did our research

We searched medical and health science databases to gather information from reliable sources.

What we have found

We included 12 articles published between 2012 and 2020, and most only focus on adherence to the physical activity guidelines. The articles reported that race, weight, and other health conditions affect how well people with breast cancer diagnosis adhere to physical activity recommendations.

What it means

Nurses are essential in helping people with a cancer diagnosis to improve healthy lifestyles by working with other healthcare professionals. Nurses should focus on strategies to encourage healthy eating and physical activity by addressing factors such as race and other health conditions affecting the healthy lifestyle of breast cancer survivors.

information and guidance on the types and amounts of health behaviors to have substantial health benefits.[14-17] The American Cancer Society (ACS) offers evidence-based suggestions for anthropometric factors, physical activity, food, and alcohol consumption regarding lowering the risk of recurrence and cancer-specific and overall mortality.[16] Although evidence shows the positive effects of the adoption of healthy behaviors on health outcomes in cancer survivors, research also suggests a lack of adherence to this recommendation and guidelines. For instance, the Behavioral Risk Factor Surveillance System (BRFSS) reported only 15.1% of cancer survivors reported eating enough fruits and vegetables, 66.8% reported having a BMI under 30, and 51.1% reached the ACS recommended levels of physical activity.[18]

Currently, several guidelines exist for cancer survivors to improve health behaviors, suggesting further research is needed to evaluate and integrate guidelines into practice to help people affected by cancer maintain health behaviors beyond a cancer diagnosis. Oncology nurses are healthcare professionals involved in every phase of the cancer journey. The role of the oncology nurse is crucial in helping cancer survivors modify their health-related behaviors.[19] To our knowledge, no scoping review has explicitly focused on the overall current diet and physical activity adherence to the health behaviors guidelines in breast cancer survivors in different settings, among various people with other backgrounds. Understanding the current diet and physical activity adherence will be helpful for healthcare professionals, including nurses, in planning care and promoting adherence, which ultimately improves a person's well-being and quality of life. Therefore, our study aims to examine adherence to diet and physical activity guidelines. In addition, we determined the factors affecting adherence among breast cancer survivors. The result of this scoping review was useful in gaining the information to develop strategies and programs to encourage breast cancer survivors to maintain recommended levels of physical activity and diet.

Objectives

The primary goal of this scoping review was to explore the current evidence on adherence to diet and physical activity guidelines and the factors affecting adherence among breast cancer survivors. The research questions are as follows,

1. What is the current evidence on the prevalence of health behaviors (i.e., diet and physical activity) among breast cancer survivors?
2. What are the factors affecting health behaviors (i.e., diet and physical activity) among breast cancer survivors?

Methods

Search Strategy

The scoping review is used to assess a body of literature, explore knowledge gaps, refine concepts, or examine research conduct.[20] It can also synthesize existing evidence on the given topic.[21] This scoping review followed the Joanna Briggs Institute (JBI) methodology. Multiple electronic databases were searched systematically, including PubMed, CINAHL, Scopus, Web of Science, and SPORTDiscus with Full Text were carried out in November 2022. We used the patient, intervention, comparison, outcome (PICO) as a search strategy tool as follow; P: Breast cancer survivors or/and anyone diagnosed with breast cancer; I: No intervention; C: No comparator; O: Diet, eating, physical activity, or exercise; S: Descriptive, cross-sectional studies or quantitative studies. A comprehensive search strategy was developed. The search strategy combined the keywords i) diet OR nutrition OR eating OR exercise OR physical activity OR fitness and ii) breast cancer survivors OR patients with breast cancer. Reference lists of selected studies were also hand-searched to identify further relevant studies not detected by the electronic search.

Inclusion and Exclusion Criteria

The inclusion criteria were descriptive and cross-sectional quantitative studies exploring the diet and physical activity behaviors of patients with breast cancer. Only studies focusing on a diet or physical activity assessment based on current guidelines and published in English were included. The nutrition and physical activity guidelines for cancer survivors were primarily launched in 2012; therefore, the search year was limited to 2012 to 2022. We excluded all intervention studies, book chapters, protocols, opinions, notes, discussions, review papers, presentations, and editorial letters.

Selection Process

Management of articles from various database searches was done using the Rayyan online application.[22] All titles and abstracts identified in the search were imported into the application. Duplicate articles were detected first with the automated duplicate function. Then, articles were manually checked for duplicates and removed. Relevant studies were retrieved in full text, and their citation details were imported. Full texts of the articles were reviewed for inclusion.

The initial search showed 14,274 articles (PubMed 5534, CINAHL 1683, SPORTDiscus 376, Web of Science 3532, Scopus 3149). After removing duplicates, the title and abstract of 9,299 were reviewed. A total of 19 primary studies remained for full-text review. The full text of the 9 articles identified was excluded. Reasons for exclusion included the primary aim of the articles focusing on other health behaviors (n = 1), lacking diet or physical activity guidelines (n = 6), focusing on the risk of cancer (n = 1), and including cancer survivors with different types of cancer and not providing specific data for

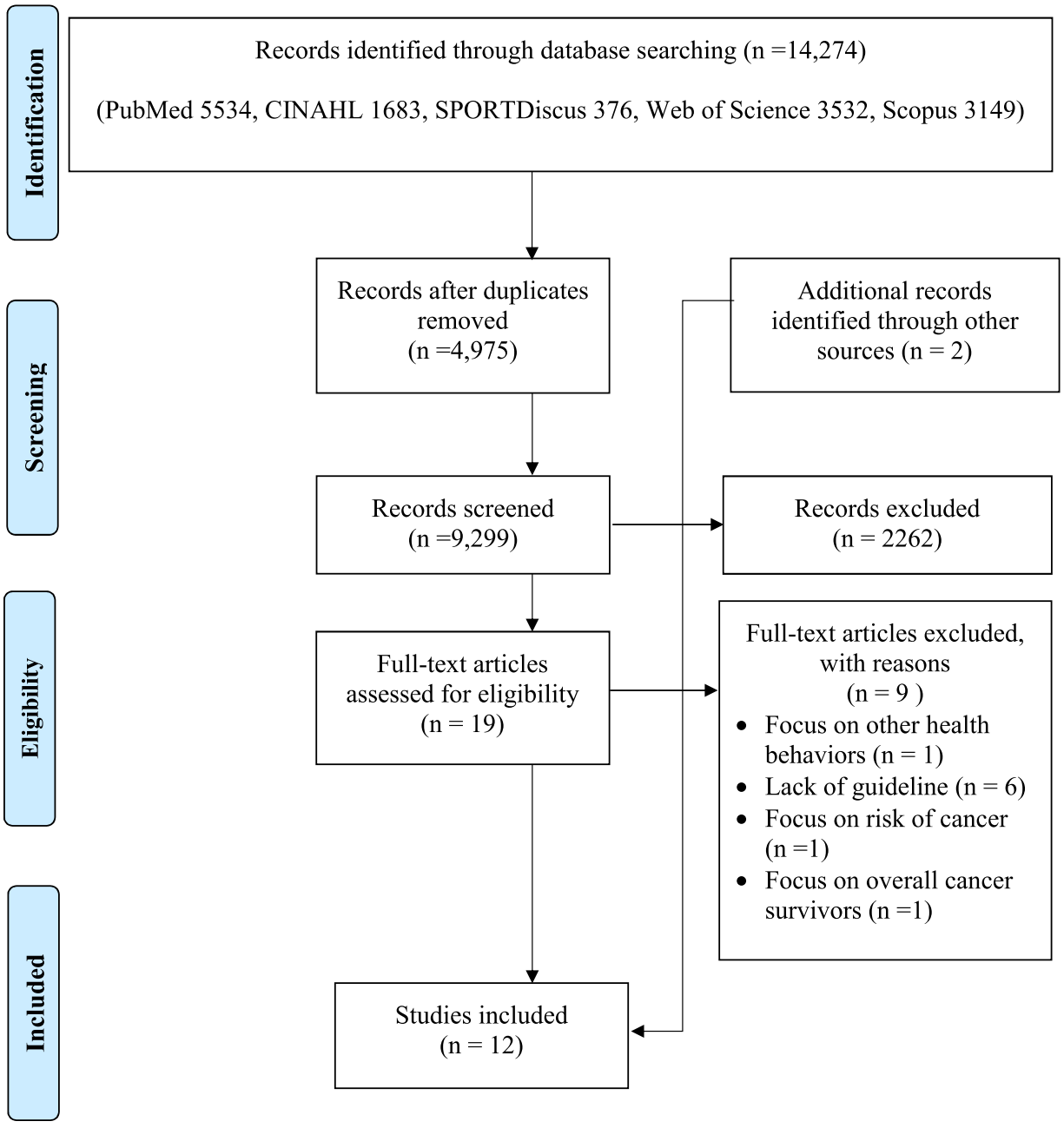

FIG. PRISMA diagram of scoping review methods.

breast cancer survivors (n = 1). Summary statistics were used to report the number of published studies and presented in a PRISMA flow diagram (Fig.).

Data Extraction

The data extracted included the prevalence of diet and physical activity, adherence to the diet and physical activity guidelines and factors affecting adherence among breast cancer survivors. We created a data extraction tool to include the following: year of publication, country of study setting, study design, characteristics of the sample, objectives, study measures, and main results on prevenance and factors affecting adherence to diet and physical activity guidelines. All articles identified from the electronic databases search were screened for eligibility. Two authors (JP, MS) independently screened the titles and abstracts of all identified articles, reviewed their results, and agreed on studies eligible for full-text review and possible inclusion. All authors discussed and agreed on which studies were eligible for inclusion and on the data extracted from them.

Results

Descriptive Characteristics of the Studies

A total of 12 studies included in this scoping review were published between 2012 to 2020. Most of the studies were conducted in the United States,[23-28] and more than a quarter were conducted in Europe.[29-32] There is only 1 study from an Asian country.[32]

Approximately 50% of the studies (n=6) were cross-sectional,[24,27,28,32-34] whereas the rest were secondary analysis,[23] longitudinal,[29,31] prospective cohort,[30] and case-control studies.[26] Half of the studies also focused on comparing the diet and physical activity of women with cancer to women without cancer.[23,26-28,30,32] Physical activity was the most commonly assessed outcome measure

TABLE
Descriptive Characteristics of the Studies (n = 12)

Variables	n	%
Country of origin		
United States	6	50
Europe (Netherlands, Greece, Sweden, Belgium)	4	33.34
Korea	1	8.33
Chile	1	8.33
Year published		
2012-2017	7	58.33
2018-2023	5	41.67
Study design		
Cross-sectional study	6	50
Secondary analysis	2	16.67
Longitudinal study	2	16.67
Prospective cohort study	1	8.33
Case-control study	1	8.33
Sample[a]		
Breast cancer survivors	12	100
Noncancer women	6	50
Noncancer chronic disease	1	8.33
Main outcome measures		
Diet	2	16.67
Physical activity (PA)	10	83.33
Adherence to PA guidelines		
American Cancer Society (ACS)	2	20
American college of sports medicine (ACSM)	2	20
Physical activity guidelines for Americans	3	30
ACSM and the ACS	1	10
Health plan 2010 for the general Korean adult population	1	10
Dutch physical activity guidelines	1	10
Factors affecting adherence to diet or physical activity		
Yes	3	25
No	9	75

[a] n is not 12 because of the measurement of more than 1 sample in some articles

(83.33 %, n = 10). In comparison, only two studies exclusively assessed diet among breast cancer survivors.[25,28] The descriptive characteristics of the studies included in the review are shown in the Table.

Cancer Trajectory of Sample Included in the Studies

Study participants were recruited at various points from diagnosis through treatment. Studies recruited participants before treatment, such as radiotherapy, with three years of follow-ups.[30] Some studies recruited participants within three years after primary cancer diagnosis,[26] and some recruited participants equal to or more than two years after diagnosis.[24] One study included breast cancer patients undergoing surgery.[29] Three studies explored physical activity in breast cancer patients who are planning to receive[31] or who are undergoing adjuvant chemotherapy.[32,34]

Measurements of Health Behaviors

Regarding the dietary measurement, Miller et al. (2012) used two telephone surveys of 24-hour dietary recalls using the interactive nutrition data system for research software. The dietary recalls were conducted using a multiple-pass interview methodology, which gives respondents multiple chances to recollect their dietary consumption from the day before (midnight to midnight), one weekend day, and 1 weekday.[25] Zuniga et al. (2016) used a 3-day food record that included 1 weekend day and two weekdays, entered in Food Processor® (ESHA Research, Salem, OR) for analysis.[28]

Regarding the physical activity measurement, most of the studies utilized a self-administered questionnaire, including the International Physical Activity Questionnaire Short Form (IPAQ-SF),[24,32] Dutch Version of the Short Questionnaire to assess health-enhancing physical activity (SQUASH) questionnaire,[30] the Flemish Physical Activity Computerized Questionnaire (FPACQ),[29] and Godin Leisure-Time Exercise Questionnaire.[34] Two studies used the telephone survey,[23,31] including questions on the frequency of both self-reported moderate and strenuous physical activity.[26] Another study asked questions about physical activity for the previous year, during chemotherapy and at 6- and 12-month follow-ups using a diary (consisting of 1 page for each day over 1 week), relative intensity using self-reported perceived exertion, and absolute intensity using the Compendium of Physical Activities.[31] Three studies measured physical activity by asking for frequency per week and duration in minutes of each physical activity,[33] assessing frequency and duration of non-occupational moderate-intensity PA (MPA) and vigorous-intensity PA (VPA) during a usual week,[23] and asking how many days per week and how much total time per day participants spent engaging in activities of moderate intensity or activities of vigorous intensity for at least 10 minutes at a time.[27]

Physical Activity Guidelines Used in the Studies

Studies in this scoping review used the American Cancer Society (ACS) physical activity recommendations,[24,26] the American College of Sports Medicine (ACSM),[29,34] the physical activity guidelines for Americans,[23,27,31] the ACSM and the ACS together,[33] the Dutch physical activity guidelines,[30] the health plan 2010 for the general Korean adult population[33] to assess adherence to health behaviors recommendations.

Seven studies used the recommendation of at least 150 min of moderate-intensity activities,[24,27,30-34] or 75 min of vigorous-intensity activities per week,[24,32,34] an equivalent combination of moderate- and vigorous-intensity activities to assess adherence to physical activity guidelines for cancer survivors. Gal et al. (2019) also included the criteria of physical activity at least twice a week that strengthens muscles and bones. At the same time, Maridaki et al. (2020) included resistance training exercises two to three times per week to evaluate adherence to physical activity guidelines. However, Oh et al. (2013) considered only 20 min of vigorous physical activity at least three days a week as physical activity. Zhao et al. (2013) also proposed the cut point of physically inactive (0 min/week) and insufficiently active (>0 to <150 min/week).

One study used different criteria compared to most, as at least 30 minutes of moderate to vigorous aerobic physical activity on top of their usual activities at least three days a week and muscle strength training at least two days per week.[31] Some studies used the hour per week as the criteria for meeting the physical activity guideline. If a person reported engaging in at least 1.25 hours (75 mins) of vigorous activity or 2.5 hours (150 mins) of vigorous and moderate physical activity each week.[26] Another study considered the moderate-intensity exercise (MIE) levels, including high (301+min/week MIE), medium (150-300 min/week MIE), low (10-149 min/week MIE), and inactive (10 min/week MPA or VPA) based on categorizations of the 2008 PA guidelines.[23]

Adherence to Health Behaviors Guidelines

Prevalence of Adherence to Diet Guideline

Only two studies explore the dietary pattern among breast cancer survivors.[25,28] Zuniga et al. (2016) reported that the average intake of fruits and vegetables in both breast cancer survivors and aged-matched group women without cancer was less than the 2010 USDA dietary recommendations. Miller et al. (2012) explored the dietary patterns among overweight urban and rural cancer survivors, including breast cancer survivors. They found that three primary dietary patterns among rural dwellers were high sweets and high reduced-fat dairy, cereal, nuts, and fruits, and mixed patterns (i.e., higher intakes of eggs, fried potatoes, mayonnaise, and mayonnaise-based dressings, margarine, salty snacks, legumes, poultry, and vegetables, and lower intakes of fish and wine) whereas among urban dwellers

were high fruits and, high meat and refined grains, and high sugar-sweetened beverages.

Prevalence of Adherence to Physical Activity Guideline

Ten studies explored physical activity among breast cancer survivors.[23,24,26,27,29-34] Regarding the prevalence of adherence to physical activity guidelines, less than fifty percent (13-33.2%) of breast cancer survivors had the recommended level of physical activity based on the guideline used. The highest rate was 33.2% of breast cancer patients, meeting the physical activity guidelines at the point of diagnosis.[26] After the cancer diagnosis, the rate of adhering to physical activity recommendations was also low, ranging from 19.8%[23] to 26%.[33] Besides, during receiving chemotherapy, only 13% of breast cancer patients met the exercise guidelines.[34] In contrast, another study found that 56.1 % of cancer survivors reported engaging in physical activity ≥150 min/week.[27] However, the report of insufficiently active is still high, with 26.7 % of cancer survivors reported being insufficiently active, and 17.2 % of cancer survivors reported being physically inactive.[27] The highest rate of participants meeting recommended physical activity guidelines ranged from 73-94%.[23,31]

Moreover, half of the studies compared the physical activity of breast cancer survivors with women without cancer.[23,26,27,30,32] Compared to a population without cancer, the prevalence of meeting the guidelines in breast cancer survivors was statistically significantly lower at baseline (38%) and six months (38%) compared to the prevalence of 43% in the Dutch female population.[30] Considering metabolic equivalents (MET), breast cancer survivors spent lower vigorous physical activity (134 ± 469 MET/week) compared to healthy females (985±1508 MET/week).[32] On the contrary, Oh et al. (2013) found that the proportions of participants performing the recommended physical activity levels were higher among cancer survivors (26%) compared to individuals with noncancer chronic disease (23.9 %), and without any chronic disease (25.5%).

Factors Related to Diet and Physical Activity

Fruit and vegetable consumption was significantly associated with disease status among breast cancer survivors and age-matched controls.[28] Miller et al. (2012) also found that lower BMI was associated with greater consumption of high-reduced-fat dairy, cereal, nuts, and fruit among rural cancer survivors and greater adherence to the high fruits and vegetables pattern among urban cancer survivors.

Only three studies explore the factors related to physical activity performance, including overweight or obesity, comorbidity, race, and quality of life. Cancer survivors who were overweight or obese were less likely to meet the physical activity guidelines than healthy-weight survivors. Survivors with two or more comorbidities were less likely to meet the physical activity guidelines than survivors with 1 comorbidity.[24] Regarding race, whites, compared to African Americans (AAs), were over three times as likely not to adhere to the ACS guidelines.[26] Furthermore, a positive correlation was reported between QOL and vigorous PA.[30]

Discussion

This scoping review, including 12 articles, explored the evidence of adherence to recommended guidelines for diet and physical activity among breast cancer survivors. Studies included breast cancer survivors at different periods of cancer trajectories, including cancer diagnosis, planning, undergoing cancer treatment, and follow-up during the post-treatment survivorship. Almost all studies conducted in the United States highlight a lack of research on these areas, particularly in Asian countries with a high burden of cancer.[35]

In this review, most of the studies found that the prevalence of meeting the physical activity guideline recommendations among breast cancer survivors was low, ranging from 13% to 33.2%. Compared to physical adherence among healthy people, cancer survivors tend to have a lower rate; the systematic review found that the proportion of older adults who met recommended physical activity guidelines varied from 2.4% to 83.0%.[36] Furthermore, most studies reported as much as 44% of study participants reporting insufficiently active and physically inactive in this scoping review. This finding is congruent with the population-based study that 30.4% of patients with breast cancer were physically inactive.[37] It shows that cancer survivors need strategic focus on developing strategies to develop and maintain physical activity and reduce sedentary behavior. Oncology nurses are responsible for identifying resources available for cancer survivors to provide survivorship care.[38] This includes promoting participation in recommended healthy behaviors. Therefore, nurses should assess and monitor cancer survivors' needs and encourage physical activity by providing information, advice, and resources. Healthcare providers should also integrate and implement lifestyle modification interventions or programs combining diet and physical activity promotion in clinical settings.

Social determinants of health (SDOH), such as education, employment status, income level, gender, and ethnicity, significantly impact people's health and health behaviors.[39] In the studies included in this review, different sociodemographic factors were reported as being associated with cancer survivors' physical activity. Studies generally focused on individual-level sociodemographics, such as race and gender, and clinical characteristics, such as BMI.[37] However, health behaviors are not simply developed based on individual choice but are also shaped by the social, cultural, and physical contexts in which they occur.[40] Many cultural and contextual factors influence the beliefs and practices related to physical activity.[41] This review shows the need for a broader understanding of factors such as cultural effects, social and community context, housing, and neighborhood environment affecting physical activity among breast cancer survivors. Further research would focus on cultural, social, and environmental factors promoting physical activity among breast cancer survivors. Nurses should receive educational training or strategy updates to address physical activity among these groups of patients.

Regarding diet, the average intake of fruits and vegetables in breast cancer survivors was less than the dietary recommendations. This is congruent with the previous research that more than 90% of breast cancer survivors did not meet recommendations for fruits, vegetables, and whole grains.[42] Similarly, the 2019 behavioral risk factor surveillance system (BRFSS) data showed that the weighted percentage of cancer survivors meeting the ACS guideline was only 15.1%, meaning that most cancer survivors did not consume adequate vegetables and fruits.[18] Therefore, there is a need for healthcare providers, especially oncology nurses, to create awareness and provide education about adherence to healthy food and the need to change unhealthy dietary patterns. Nurses are also in a critical position to address SDOH and meet the social needs of people with cancer that increase healthy diets,[43] especially access to and consumption of fruit and vegetables.

There were some methodological issues in the studies included in this review. Although most guidelines have common recommendations for diet and physical activity, measurement tools used to assess diet and physical activity varied across studies. Most of the articles focusing on physical activity used the self-administered questionnaire. The international physical activity questionnaire short form (IPAQ-SF) was the most used questionnaire in this review. Previous studies found that the IPAQ-SF was inadequate in assessing PA levels in cancer patients compared to objective measures during[44] and after oncology treatment.[45] However, IPAQ-SF is recommended as a cost-effective measure of physical activity.[46] Regarding the measurement method, using subjective measures of physical activity alone can lead to social desirability bias among participants.

Measurement of diet continues to be a challenge.[47] Two studies using 24-hour dietary recalls gave respondents multiple chances to

recollect their dietary consumption. Although research shows that 24-hour dietary recalls (24-HRs) are one of the most used tools for dietary assessment[48]; it creates some difficulties for participants to write down all the foods they consumed. This may lead to an incomplete capture of the typical diet because participants may not eat the same foods daily or eat healthy foods all the time. Additionally, although physical activity and diet may be dynamic and change over time, most of the studies were collected at one time point. Follow-up data collection may be needed to assess the changes in health behavior.

Limitations

The strengths of our work are that this is the first scoping review to explore adherence to the diet and physical activity guidelines among breast cancer survivors over a different time. Moreover, we used a validated search strategy and searched broad databases to achieve this systematic scoping review' aims.

However, there are limitations of this review. First, this review included only articles published in English. That might overlook articles in a different language. Second, since the review can only capture the articles at the time of the search, it might also overlook articles published right after the search conducted for this review. Lastly, since it is a scoping review, the heterogeneity of the samples, outcome measures, instruments used in the original studies makes it difficult to make explicit conclusions and synthesize the findings.

Implications for Nursing

Oncology nurses can lead the support for cancer survivors to improve their diet and physical activity during active treatment and beyond. Clinical nurses should increase awareness, communicate, and promote the benefits of diet and physical activity with cancer survivors and provide support to develop and maintain health behaviors. It is important to work collaboratively with all cancer care team members and develop innovative, acceptable and accessible ways to integrate and implement lifestyle modification interventions combining diet and physical activity in the clinical settings.

Future studies assessing diet and physical activity should use longitudinal designs and mixed methods to review diet and physical activity changes from diagnosis, the active treatment phase to different stage of the cancer trajectory. Furthermore, future studies need to investigate the modifiable factors such as individual, socio-cultural and environmental factors that influence health behaviors among breast cancer survivors. Understanding multilevel factors can inform the development of interventions and tools to increase the engagement of healthy diet and physical activity following the recommendation to improve health and well-being among breast cancer survivors.

Conclusion

Our scoping review presented a comprehensive overview of adherence of breast cancer survivors to diet and physical activity guidelines. Various guidelines used in the studies make it challenging to compare and contrast the results regarding the diet and physical activity. Controversial findings emerged regarding adherence rates to diet and physical activity guidelines and the factors that influence adherence and/or health behaviors. The findings of this study show the need for future research focusing on diet and physical activity among breast cancer survivors, especially during cancer treatment and exploring the interplay of factors to promote health outcomes. Furthermore, findings can inform the development of effective management strategies to develop and maintain health behaviors and enhance well-being and quality of life among breast cancer survivors.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Jittrarath Phothikul: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Joohyun Chung:** Writing – review & editing, Visualization, Validation, Supervision. **Jamie Faro:** Writing – review & editing, Visualization, Validation, Supervision. **Memnun Seven:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Methodology, Conceptualization.

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