




# BMJ Open Dietary habits and breast cancer in South Asian women: a systematic review protocol

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## ABSTRACT

**Introduction** Breast cancer is the fifth-leading cause of cancer-related mortality in women globally. Asia has a lower overall incidence of breast cancer compared with global incidence rates. Unique dietary habits observed in South Asians contribute significantly to low incidence rates. This review aims to explore the literature on the association between dietary habits and breast cancer among South Asian women.

**Methods and analysis** A systematic search will be conducted using electronic databases MEDLINE, EMBASE, CINAHL, Web of Science and Scopus. Additional articles will be searched in Google Scholar and a reference list of the selected articles. Review questions will be framed into different components according to the PICOS (population, intervention, comparator, outcomes, studies) framework. Women above 18 years of age who are diagnosed with breast cancer in the South Asian region will be the population of interest. Only the studies reported in the English language will be included. Both title and abstract screening and full-text screening will be done by two independent reviewers. The quality of included studies will be assessed using the Joanna Briggs Institute critical appraisal tools. Based on the findings, a random-effects meta-analysis will be performed if outcomes are homogeneous, or a narrative synthesis will be conducted if outcomes are heterogeneous.

**Ethics and dissemination** This study does not require ethics approval, as it is based on published documents. The findings of this study will be shared with a broader audience through scientific channels including publication in open-access journals and presentations at both national and international forums.

**PROSPERO registration number** CRD42023464682.

## INTRODUCTION

Breast cancer is the most frequently diagnosed malignancy in women worldwide. About 2.3 million new cases of breast cancer are diagnosed globally each year.<sup>1</sup> Due to changes in risk factor profiles, improved cancer registration and cancer detection, its global incidence and death rates have increased over the past three decades.<sup>1</sup> In 2020, there were about 685 000 deaths due to breast cancer across the globe.<sup>2</sup>

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Five databases will be searched using the comprehensive search strategy developed through an iterative process by a multidisciplinary team, including experts in nutrition, cancer and public health with expertise in conducting systematic reviews.
- ⇒ A rigorous methodology will be adhered to throughout the study in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.
- ⇒ Since only articles published in English will be reviewed in this study, this limitation may introduce language bias.
- ⇒ The certainty of the evidence in this systematic review may be limited by the limited number of available studies in the region and the possible low quality of individual studies.

While the most significant risk factors for breast cancer, such as family and reproductive history, cannot be modified, behavioural risk factors, including those related to alcohol, smoking, physical activity, body composition and dietary habits, can be modified.<sup>3</sup> These factors may provide useful targets for preventive actions.

Research on breast cancer is heavily concentrated in Western countries where the disease is highly prevalent. Numerous epidemiological studies have investigated the links between specific dietary factors and the risk of breast cancer.<sup>4–25</sup>

Increased breast cancer risk has been demonstrated with high consumption of red meat, animal fats and refined carbs.<sup>4–6</sup> Intake of fruits, vegetables, whole grains and dietary fibre has been related to a decreased risk of breast cancer.<sup>4 7 8</sup> A Mediterranean-style diet, characterised by high consumption of fish, vegetables, beans, boiled potatoes, fruits, olives and vegetable oils with a low intake of fruit juice, has been shown to reduce breast cancer risk and improve survival and quality of life, particularly in postmenopausal

patients.<sup>9–13</sup> Conversely, inflammatory dietary patterns, including high intake of sugary soft drinks, refined grains, red and processed meats, margarine, and hydrogenated fats, alongside low intake of green leafy vegetables, cruciferous vegetables and coffee, have been linked to increased breast cancer risk, especially in premenopausal and overweight postmenopausal women.<sup>14–15</sup> Plant-based diets, assessed through a Plant Diet Index (PDI), have been inversely associated with breast cancer risk, with healthy PDI reducing the risk and unhealthy PDI increasing it, as observed in studies from Iran, China, Spain and North India.<sup>7–16–18</sup> Additionally, lacto-ovo vegetarians, whose diet includes plants, dairy and eggs, have shown a lower breast cancer risk compared with meat eaters and lacto vegetarians.<sup>7</sup> Meanwhile, Western dietary patterns, characterised by high consumption of fats, sugars and processed meats, have been linked to increased breast cancer risk in studies from Spain and Mexico.<sup>19–20</sup> Overall, adopting healthy dietary habits, such as diets rich in unrefined cereals, vegetables, fruits, nuts and olive oil, while limiting saturated fats, red meats and processed foods, may improve breast cancer prognosis and survival outcomes.<sup>21</sup>

While individual dietary components like red meat, carbohydrates, fatty acids and vegetables have been occasionally linked to breast cancer, evidence indicates a noteworthy connection between cumulative food consumption and the risk of breast cancer.<sup>3</sup> Consequently, contemporary nutrition epidemiological studies on breast cancer place more emphasis on dietary patterns.<sup>22</sup>

Numerous studies have examined the complex relationship between dietary decisions, nutrient consumption and the emergence of breast cancer.<sup>4–24</sup> A study reported the decreased incidence of breast cancer in Southeast Asian women due to low-fat and high-phytoestrogen diets.<sup>24</sup> Due to their unique culinary traditions that are steeped in custom and legacy, South Asian women stand out as a population of interest. Systematic reviews on diet and breast cancer in Western and Asian countries have generated evidence revealing diet-related protective and risk factors.<sup>4–24</sup> However, reviews focused on the association between breast cancer and the South Asian diet are scarce.

On this backdrop, the current review aims to comprehend the complex association between dietary practices and breast cancer risk in South Asian women and analyse how dietary choices may affect the incidence of breast cancer within this specific population by identifying and summarising available literature.

## Objectives

The objectives of this review are as follows:

1. To explore the relationship between dietary habits and breast cancer in South Asian women.
2. To identify dietary habits that act as modifiable risk or protective factors to reduce breast cancer incidence.

## METHODS AND ANALYSIS

This protocol was registered in the PROSPERO registry on 30 September 2023 (ID CRD42023464682). Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines will be followed in conducting and reporting of this systematic review.

### Eligibility criteria

We used the PICOS (population, intervention, comparator, outcomes, studies) criteria to facilitate a more focused search of literature.

#### Participants/population

Women diagnosed with breast cancer in South Asian countries, which includes the following countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

Studies among women in other geographical locations as well as among men will be excluded.

#### Interventions/exposures

The exposure of interest is dietary patterns or dietary habits among women in the South Asian region.

If a study does not contain information on diet, it will be excluded.

#### Comparator

Women without breast cancer.

#### Outcome

The outcome of interest is breast cancer incidence. The results should give us guidance on the link between dietary habits and the risk of breast cancer.

#### Studies

For this review, we will consider quantitative studies (cross-sectional, case-control and cohort) published in the English language. Studies published in other languages will be excluded.

#### Time frame

There will be no restrictions on publication date. Articles published until 31 December 2024 will be searched.

The planned start date for this review is April 2024 and the end date is June 2025.

#### Information sources

The following databases will be searched for the above review with language filters: MEDLINE, EMBASE, CINAHL, Web of Science and Scopus. As aforementioned, we will only include studies reported in the English language. Google Scholar will be screened for non-indexed journal publications. Reference searching of all included studies will be done to identify any additional literature. An updated search of the same databases will be carried out just before the submission of the manuscript for publication.

## Search strategies

The search strategy will be developed through an iterative process by a multidisciplinary team including experts in the fields of nutrition, cancer and public health having expertise in conducting systematic reviews. In addition, popular and commonly used phrases stated in related literature will be used to identify appropriate keywords to capture literature on the availability of dietary habits and breast cancer in South Asian women. First, the search strategy will be developed for the MEDLINE search and then the same strategy will be applied with relevant modifications to the other databases.

Our initial search strategy for MEDLINE is as follows:

(Food OR Diet OR Meal\* OR Consumption OR intake OR ingestion OR eating OR “dietary habit\*” OR “dietary pattern\*” OR Macronutrients OR Micronutrients OR “Food group\*” OR Protein\* OR Vitamin\* OR Sugar OR Milk OR Dairy OR Meat OR Fish OR eggs OR Fruit\* OR Vegetable\* OR “Green tea” OR “Black tea” OR “Coffee” OR “alcohol” OR “Soy foods” OR “Soy intake” OR Isoflavonoids OR Isoflavones OR “fermented food\*” OR “heterocyclic compounds” OR amines OR “dietary fibre” OR “dietary carbohydrate\*” OR “glycemic index” OR “dietary fat” OR “fatty acids” OR “trace element\*” OR “phytochemical\*” OR “Processed food\*” OR spice\* OR condiment\* OR functional food\*)

AND

“Breast malignan\*” OR “Breast neoplasm\*” OR “Breast cancer\*” OR “Breast tumour\*” OR “Breast tumour\*”)

AND

(Asia\* OR South Asia\* OR Sri Lanka\* OR India\* OR Bangladesh\* OR Pakistan\* OR Afghanistan\* OR Nepal\* OR Bhutan\* OR Maldives\*)

AND

(Woman OR Women OR Female\*)

## Data selection and management

All selected articles from the database search will be managed by the reference management software Endnote V.20.4.1. After the initial removal of duplicates, articles will be imported into the web-based application Rayyan.<sup>26</sup> The title and abstract of the studies identified in the initial search will be screened by two independent reviewers for relevance after removing duplicates. The initial screening of manuscripts will be as inclusive as possible to identify relevant studies within the eligibility criteria to capture the breadth of the literature. The reference lists of retrieved articles will also be manually assessed for inclusion in further studies. Studies and reports that appeared to meet the eligibility criteria will be retrieved, and the full text will be assessed for relevance by two independent investigators. The results will be compared, and any disagreement between the two reviewers on the eligibility of a study will be resolved through consensus. In the event of a dispute, a third reviewer will be consulted to arrive at a decision.

## Data items

From each selected article or report, the following information will be extracted: author, country, year of publication, aims/objectives of the study, study period, study setting, study population, study design, methods of data collection and analysis, dietary habits and reported dietary association with BC and limitations.

Diet will be categorised based on the food groups published in the latest food-based dietary guidelines for Sri Lankans<sup>27</sup> as follows: (1) cereals and starchy foods; (2) fruits; (3) vegetables and green leaves; (4) protein sources including pulses, fish, egg and lean meat; (5) fresh milk and its fermented products; (6) oily foods including nuts, oily seeds and oils and (7) other beverages. In addition, protein sources will be further analysed based on plant origin and animal origin.

## Data extraction

The data will be extracted from each selected article by two independent reviewers. Data will be extracted using a pre-tested data extraction spreadsheet in Excel (online supplemental file 1). These two sheets will be compared, and any inconsistencies will be discussed and adjudicated by a third reviewer if required. In case further information or clarification is needed, the corresponding authors will be contacted. The study selection process will be detailed in a PRISMA flow chart.

## Critical appraisal

The studies that are included will be critically appraised using the Joanna Briggs Institute critical appraisal tools.<sup>28</sup> Two reviewers will independently conduct the appraisal and provide comments on each criterion. Any disagreements will be resolved through discussion between the reviewers; if unresolved, a third member of the review team will be consulted for arbitration. This is not intended to exclude studies but to provide context for the analysis. The level of credibility of the included studies will be presented in a table.

The confounding effects of individual studies will be assessed using the framework developed by Vishwanathan *et al* to assess the validity of causal links for observational studies.<sup>29</sup> According to the framework, we will assess the individual study for risk of design-specific sources of bias; controls for potential confounders; and identify additional sources of or insights on confounding through review. The findings will be presented in a table.

## Data synthesis

A random-effects meta-analysis will be performed if the final data are sufficiently homogeneous. This would require more than one study reporting the same dietary patterns/habits against breast cancer incidence. If a meta-analysis is performed, we will use the GRADE approach to grade the quality of the finally drawn evidence.<sup>30</sup> Statistical analysis will be performed in Stata, with heterogeneity examined using I squared. The minimum number of studies for a meta-analysis would be 2. If required,



sensitivity analysis, subgroup analysis, meta-regression and publication bias analysis will also be conducted. If the final articles included in the study present results using measures of association like relative risk (RR) or OR, these measures will be combined based on the weighting of each individual study's results to give a summary measure. The weighting is determined by the sample size (number of patients) of each study. This process will result in a combined measure of association, which is the outcome of our meta-analysis. If articles are included in the study, present results by mean difference (eg, score scales) and pooled mean difference will be calculated.

If our data are insufficient for meta-analysis, we intend to undertake a narrative synthesis. We will present our findings narratively and categorise according to the key research questions.

### Patient and public involvement

No patients or the public were involved in the design or conduct of our research.

### ETHICS AND DISSEMINATION

This research is exempted from ethics approval because the work is carried out on published documents. The findings of this study will be shared with a wider audience through scientific communications, including publication in open-access journals and presentations at both national and international forums.

### DISCUSSION

Breast cancer has become a leading cause of morbidity and mortality among women globally.<sup>1</sup> Dietary habits, which are considered modifiable risk factors, have become the centre of focus, and available literature and facts emphasise the importance of investigating the relationship between dietary habits and breast cancer.<sup>3</sup>

South Asian women have distinctive eating patterns affected by regional cuisines, spiritual practices and socio-economic considerations.<sup>7</sup> It is crucial to look at dietary risk factors in this particular setting because they can be different from those in Western cultures and call for specialised preventive measures.

This comprehensive review sets out to describe dietary habits associated with breast cancer and to determine the modifiable risk factors associated with dietary habits. We hope the findings of this review will contribute to a better understanding of the role of the South Asian diet as a protective factor for breast cancer. This insightful information can guide public health policies and strategies to reduce the incidence of breast cancer. The findings of this study will be shared with to a wider audience through scientific communications, including publication in open-access journals and presentations at national and international forums.

However, limiting the study to English language publications and adhering to the scientific review methods,

which might not capture some technical reports, policy briefs, etc, would be limitations of the current review.

**Contributors** MS and SSD conceptualised the study. SN, MS and SD prepared the search strategy. SSD, SD, SN and MS contributed to the designing of the study protocol. SSD, SN, SJ and SD drafted the manuscript. All authors substantially contributed to the revision of the manuscript and approved the final version. All authors take the responsibility for the integrity of the work as a whole. MS is the guarantor.

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**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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