Title: Diet and nutrition information and support needs in pelvic radiotherapy: a systematic, mixed-methods review.

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Abstract

Introduction: This study aimed to review diet and nutrition information and support needs of cancer patients who receive pelvic radiotherapy to inform the development of interventions to improve this area of care.

Methods: The systematic review followed the PRISMA guidelines. Six electronic databases were searched for peer-reviewed studies of any design that assessed diet and nutrition needs after a pelvic cancer diagnosis. Narrative synthesis was used to integrate findings.

Results: Thirty studies (12 quantitative, 15 qualitative, 3 mixed-methods) were included. Four themes, “content of dietary information”; “sources of information”. “sustaining dietary change”; and “views on the role of diet post-treatment”, summarised evidence about provision of nutritional guidance following diagnosis, but also contrasting views about the role of diet post-diagnosis. Qualitative studies contributed considerably more to the synthesis, compared to quantitative studies. Included studies were of moderate to good quality; selection bias in quantitative studies and poor evidence of credibility and dependability in qualitative studies were highlighted.

Conclusion: There is some evidence of lack of nutrition support in pelvic cancer survivors, but methodological limitations of included studies may have had an impact on the findings. Future, prospective studies that focus on diet and nutrition needs post-diagnosis are warranted to improve care.

Keywords: pelvic radiotherapy; pelvic cancers; information needs; support needs; nutrition; diet; mixed methods review

1. Introduction

Cancer is a significant public health problem worldwide, with 18.1 million new cases estimated to have occurred in 2018 (Bray et al., 2018). Cancer incidence has increased by approximately 4 million since 2012 (Torre et al., 2015) and is projected to further increase in both developed and developing countries (Bray et al., 2018). Advances in early detection and management of cancer have also led to an increasing number of people surviving their cancer (Allemani et al., 2018). Pelvic cancers (anus, bladder, rectum/bowel, female and male reproductive organs) show increasing survival rates, with 5-year survival estimated to be more than 50% in most countries for prostate, cervical and rectal cancers (Allemani et al., 2018). Alongside increased survival, it is important to address the supportive care needs of people diagnosed with cancer, including adjustments in lifestyle, which may differ according to the phase of the cancer journey (from diagnosis to survival) (Fletcher, Flight, Chapman, Fennell, & Wilson, 2017; Kotronoulas, Papadopoulou, Burns-Cunningham, Simpson, & Maguire, 2017; Puts, Papoutsis, Springall, & Tourangeau, 2012; van Mossel et al., 2012).

Pelvic radiotherapy is often an integral part of the multidisciplinary approach used to treat pelvic tumours. Although technological advances have led to improvement of techniques, toxicity still affects the gastrointestinal tract and can lead to functional damage, including malabsorption and change in motility of the intestinal tract (Teo, Sebag-Montefiore, & Donnellan, 2015). These adverse effects can have a significant impact on a patient’s diet, subsequent nutritional status and quality of life (Andreyev, Wotherspoon, Denham, & Hauer-Jensen, 2011). Moreover, treatment side effects that are result of pelvic radiotherapy have been reported to affect cancer survivors’ daily life in the long term, as late as 11 years post-diagnosis (E. Adams et al., 2014) due to structural damage of the gastrointestinal tract.

Furthermore, a cancer diagnosis is often viewed as a “teachable moment” when patients may be considering changing current lifestyle habits, such as smoking cessation and maintenance of a healthy weight through diet (Hawkins et al., 2017). There is growing evidence of the importance of diet and nutrition in cancer survivorship. Dietary interventions in cancer survivors are associated with reduced body weight (Mohamad et al., 2015; Pekmezi & Demark-Wahnefried, 2011), improved quality of life (Mosher et al., 2009; Smits et al., 2015) and may influence survival (Jochems et al., 2018; van Zutphen, Kampman, Giovannucci, & van Duijnhoven, 2017). Obesity is prevalent in pelvic cancer populations and has a negative impact on physical and functional well-being and quality of life (S. V. Adams, Ceballos, & Newcomb, 2016; Dieperink et al., 2012; Koutoukidis, Knobf, & Lanceley, 2015). Systematic reviews have demonstrated increased mortality in obese ovarian (Protani, Nagle, & Webb, 2012), prostate (Cao & Giovannucci, 2016) and endometrial cancer survivors (Secord et al., 2016) in comparison to non-obese cancer survivors.

Improving the quality of nutritional care provided to people with cancer requires gaining a better understanding of their needs and identifying ways to offer solutions to these needs. To date, there has been no review of the literature regarding information and support needs in relation to diet and nutrition in cancer patients. In line with the National Health Service initiative towards a patient-centred and personalised approach in relation to management and support after a cancer diagnosis (Independent Cancer Taskforce, 2015), this review focussed on cancers in receipt of pelvic radiotherapy.

This review aims to provide answers to the following questions:

- What dietary information do patients with a pelvic cancer receive in relation to their diagnosis?

- What are pelvic cancer patients' perceived information and support needs regarding diet and nutrition?
- Are there differences in information and support needs in different survivorship stages (during treatment and post-treatment)?

2. Methods

This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. The review protocol has been registered at the International Prospective Register of Systematic Reviews (PROSPERO CRD42018115832).

2.1. Search strategy

Six databases (MEDLINE, EMBASE, CINAHL, Web of Science, Allied and Complementary Medicine, PsycINFO) were searched in February 2019. There were no restrictions in publication date. The keywords and search strategy (Web of Science) are outlined in Online Resource 1. Subject headings were used, where applicable. Initial database searches revealed a number of studies published in specific journals: Supportive Care in Cancer; Journal of Cancer Survivorship; and European Journal of Cancer Care. In addition to the search of databases, all volumes and issues of these journals were searched from 2000 to February 2019 using the words “diet and cancer” or “nutrition and cancer”. Finally, reference lists of two scoping (Fletcher et al., 2017; van Mossel et al., 2012) and two systematic reviews (Kotronoulas et al., 2017; Puts et al., 2012) of unmet needs of cancer patients were also thoroughly searched for relevant publications.

2.2. Eligibility criteria

Studies were considered for inclusion if:

- They investigated supportive care needs or information needs in relation to diet and nutrition of people diagnosed with a cancer in the pelvic area, irrespective of disease stage or time-point after diagnosis. It was decided to focus on the diagnosis, rather than treatment only, as treatment may not be reported in studies.
- The study design was cross-sectional, prospective, retrospective, a randomised trial or qualitative. All quantitative and qualitative research designs were considered as the aim was to provide a complete picture, deduce maximum information and get a better understanding of the phenomenon (Hong, Pluye, Bujold, & Wassef, 2017).
- They were conducted with adult individuals (i.e. aged >=18 years)
- They were original research published in peer reviewed journals
- They were published in English (a translation service was not possible)

Studies were excluded if:

- They did not highlight diet and nutrition support needs of the target population
- They were an audit of a current hospital service, editorials, case studies, reviews, opinion papers or conference proceedings.
- The sample was a mix of pelvic and other cancer diagnoses except when separate sub-groups analyses were reported for pelvic cancers.
- Patients were in receipt of palliative care for advanced cancer.

2.3. Study selection

The studies were selected in two stages. First, a title and abstract screening was performed by GS for all identified studies. A randomly selected subsample (10%) of the studies was also screened by EW, HL or SC to ensure consistency. After title and abstract exclusion, all remaining studies were considered for full-text review. Eligibility criteria were applied to full-text articles by GS. In case of uncertainty or any disagreements, discussions took place among all authors until a mutual decision was reached.

2.4. Data extraction and synthesis

Relevant features and results were extracted for each included study. Data were extracted by one researcher (GS) and were confirmed by EW, HL or SC (Table 1). Location of study, study design, study duration, aim(s), inclusion criteria, sample size, percentage of women in sample, mean/median age and age range of participants, response rate and sample cancer diagnosis were extracted, where possible, for all included studies.

In this review, a narrative synthesis informed by Popay et al. (Popay et al., 2006) was used to present the findings. Narrative synthesis relies on the use of words and text to summarise and explain the findings of the synthesis and is the preferred method of synthesis for results deriving from studies with a diverse design (Popay et al., 2006). Studies in the data extraction table (Table 1) have been grouped according to the research design and cancer diagnosis. Thematic analysis was performed to develop preliminary synthesis of results and identify common themes and concepts related to diet and nutrition information and support needs (Popay et al., 2006). Thematic analysis was conducted according to Braun and Clarke (Braun & Clarke, 2006) which involves six steps: familiarisation with the data; coding; searching for themes; reviewing the themes; defining and naming the themes; and producing the report.

2.5. Quality assessment

For the assessment of cross-sectional studies, the Appraisal Tool for Cross-Sectional studies (AXIS) was used (Downes, Brennan, Williams, & Dean, 2016). This comprises 20 questions, seven of which relate to the quality of reporting, seven to study design and six to study biases. For the assessment of qualitative studies, a previously adapted appraisal tool for qualitative studies (Cesario, Morin, & Santa-Donato, 2002; Hannes, 2011) was used. The tool comprises five categories: descriptive vividness (credibility); methodological congruence (dependability and confirmability); analytical preciseness; theoretical connectedness (transferability); and heuristic relevance (Collaco et al., 2018). A score range of 1-24 was given to each qualitative study based on the scores for each of the five categories. The quality of a study was considered good for a score of 18-24 (75-100% of the total criteria met), fair for a score of 12-17 (50-74% of the total criteria met) and poor for a score lower than 12 (less than 50% of the total criteria met). The quantitative and qualitative arm of the mixed-methods studies was assessed separately.

3. Results

The initial search yielded 4,529 results. After removal of duplicates (1,407), 3,048 articles were excluded following review of title and abstract and a further 44 were excluded after full-text read. Thirty articles are included in this review (Figure 1).

3.1. Characteristics of selected studies

Of the 30 included studies, eleven studies were conducted in the UK (Anderson, Steele, & Coyle, 2013; Avery et al., 2014; Beaver et al., 2010; Beaver et al., 2011; Brown, Greenfield, & Thompson, 2016; Er et al., 2017; Evans et al., 2007; Kassianos, Coyle, & Raats, 2015; Koutoukidis, Beeken, Lopes, Knobf, & Lanceley, 2017; Rozmovits, Rose & Ziebland, 2004; Sutton et al., 2017), five in the USA (Clark et al., 2016; Demark-Wahnefried, Peterson, McBride, Lipkus, & Clipp, 2000; des Bordes et al., 2016; Tseng et al., 2015; Zaleta, Neff, McCann, O'Malley, & Carpenter, 2017), four in Australia (Dunn et al., 2006; Hardcastle, Glassey, Salfinger, Tan, & Cohen, 2017; Hardcastle, Maxwell-Smith, Hagger, O'Connor, & Platell, 2018; Nikoletti et al., 2008), two in Canada (Fitch, Gray, & Franssen, 2000; Fitch, Gray, & Franssen, 2001), two in New Zealand (Cha et al., 2012; Pullar, Chisholm, & Jackson, 2012), two in South Korea (Jang, Kim, Kim, & Lee, 2019; Lee, Shin, Bae, & Lim, 2016) and one each in Israel (Perl et al., 2016), the Netherlands (Hoedjes et al., 2017), Sweden (Samuelsson et al., 2018) and Malaysia (Lee et al., 2017). Twelve studies employed a quantitative design (Beaver et al., 2011; Cha et al., 2012; Clark et al., 2016; Demark-Wahnefried, Peterson, McBride, Lipkus, & Clipp, 2000; Fitch, Gray, & Franssen et al., 2000; Fitch, Gray, & Franssen, 2001; Lee, Shin, Bae, & Lim, 2016; Nikoletti et al., 2008; Perl et al., 2016; Pullar, Chisholm, & Jackson, 2012; Tseng et al., 2015; Zaleta, Neff, McCann, O'Malley, & Carpenter, 2017), fifteen were qualitative (Anderson, Steele & Coyle, 2013; Avery et al., 2014; Beaver et al., 2010; Brown, Greenfield &

Thompson, 2016; Dunn et al., 2006; Er et al., 2017; Evans et al., 2007; Hardcastle, Glassey, Salfinger, Tan, & Cohen, 2017; Hardcastle, Maxwell-Smith, Hagger, O'Connor, & Platell, 2018; Kassianos, Coyle & Raats, 2015; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Lee et al., 2017; Rozmovits, Rose & Ziebland, 2004; Samuelsson et al., 2018; Sutton et al., 2017) and three were mixed-methods studies (des Bordes et al., 2016; Hoedjes et al., 2017; Jang, Kim, Kim & Lee, 2019). Sample size varied according to research design, with the range being 8-58 participants in qualitative studies and 20-1198 participants in quantitative studies. Twelve studies (40%) were conducted on colorectal cancer patients (Anderson, Steele & Coyle, 2013, Beaver et al., 2010; Beaver et al., 2011; Brown, Greenfield & Thompson, 2016; Rozmovits, Rose & Ziebland, 2004; Dunn et al., 2006; Hardcastle, Maxwell-Smith, Hagger, O'Connor & Platell, 2018; Nikoletti et al., 2008; Cha et al., 2012; Pullar, Chisholm & Jackson, 2012; Hoedjes et al. 2017; Samuelsson et al., 2018), nine studies (30%) on gynaecological cancer patients (Clark et al., 2016; Fitch, Gray & Franssen, 2000; Fitch, Gray & Franssen, 2001; Hardcastle, Glassey, Salfinger, Tan & Cohen, 2017; Jang, Kim, Kim & Lee, 2019; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Lee, Shin, Bae & Lim, 2016; Tseng et al., 2015; Zaleta, Neff, McCann, O'Malley & Carpenter, 2017), five studies (17%) on prostate cancer patients (Avery et al., 2014; Er et al., 2017; Kassianos, Coyle & Raats, 2015; Lee et al., 2017; Sutton et al., 2017) and four studies (13%) had a sample with mixed cancer diagnoses (Demark-Wahnefried, Peterson, McBride, Lipkus, & Clipp, 2000; Des Bordes et a., 2016; Evans et al., 2007; Perl et al., 2016). All studies were published after the year 2000 and most (80%) after 2010. Table 1 shows the characteristics of the included studies, which have been grouped according to the research design (qualitative, quantitative) and cancer diagnosis (prostate, colorectal, gynaecological cancer).

Table 2 describes the main findings reported across the papers in relation to diet and nutrition information needs, the tool(s) used to collect data and the related themes from the thematic analysis. Ten cross-sectional studies, including one mixed-methods study, used non-validated questionnaires developed by the study authors (Cha et al., 2012; Clark et al., 2016; Demark-Wahnefried, Peterson, McBride, Lipkus, & Clipp, 2000; Fitch, Gray & Franssen, 2000; Fitch, Gray & Franssen, 2001; Hoedjes et al., 2017; Lee, Shin, Bae & Lim, 2016; Nikoletti et al., 2008; Pullar, Chisholm & Jackson, 2012; Tseng et al., 2015). Three studies, including one mixed methods, used validated tools for one or more of their research questions (Jang, Kim, Kim & Lee, 2019; Perl et al., 2016; Zaleta, Neff, McCann, O'Malley & Carpenter, 2017) and two (including one mixed-methods study) used adapted validated questionnaires (Beaver et al., 2011; Des Bordes et al., 2016). Twelve qualitative studies (including two mixed-methods) conducted interviews (Beaver et al., 2010; Brown, Greenfield & Thompson, 2016; Des Bordes et al., 2016; Er et al., 2017; Evans et al., 2007; Hardcastle, Glassey, Salfinger, Tan & Cohen, 2017; Hardcastle, Maxwell-Smith, Hagger, O'Connor & Platell, 2018; Jang, Kim, Kim & Lee, 2019; Kassianos, Coyle & Raats, 2015; Rozmovits, Rose & Ziebland, 2004; Samuelsson et al., 2018; Sutton et al., 2017), two (including one mixed-methods) conducted focus groups (Anderson, Steele & Coyle, 2013; Hoedjes et al., 2017) and four used a combination of interviews and focus groups (Avery et al., 2014; Dunn et al., 2006; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Lee et al., 2017). Four main themes were identified: "content of dietary information"; "views on the role of diet in survivorship", "sustaining dietary change"; and "sources of information".

All studies included participants that had completed treatment and seven of these, all qualitative studies, also included patients undergoing treatment at the time of the study (Avery et al., 2014; Demark-Wahnefried, Peterson, McBride, Lipkus, & Clipp, 2000; Er et al., 2017; Evans et al., 2007; Kassianos, Coyle & Raats, 2015; Pullar, Chisholm & Jackson, 2012; Sutton et al., 2017). The studies that include participants in different treatment stages did not present results according to treatment status, so it was not possible to identify any sub-themes related to differences in information and support needs according to treatment status. The four themes provided insights in relation to the first two research questions: “What information do pelvic cancer patients receive in relation to their diagnosis?” and “What are their information and support needs?”.

3.2. Theme 1: Content of dietary information

A total of 27 studies discussed patients’ receipt of information on diet and nutrition. Quantitative studies presented mixed results; in six studies, more than half of participants reported receiving dietary advice (Beaver et al., 2011; Clark et al., 2016; Fitch, Gray & Franssen, 2000; Fitch, Gray & Franssen, 2001; Nikoletti et al., 2008; Tseng et al., 2015) but the content of the advice was not specified. Demark-Wanhnefriend, Peterson, McBride, Lipkus, & Clipp (2000) reported that 29% of prostate and breast cancer survivors were advised to follow a low-fat diet and only 16% to increase their fruit and vegetables intake to 5 portions daily. Similarly, in the Pullar et al. study (2012), 33% of participants received dietary advice in relation to their cancer and in the Zaleta, Neff, McCann, O’Malley & Carpenter study (2017), 14% of the sample got advice regarding weight management. In four studies, three of which asked for receipt of unspecified dietary advice, levels of satisfaction with received information were available (53-88%) (Beaver et al., 2011; Fitch, Gray & Franssen, 2000; Fitch, Gray & Franssen, 2001; Tseng et al., 2015). In Tseng et al. (2015), when asked about the effectiveness of weight management counselling, 88% of gynaeocological cancer survivors were achieving or were highly motivated to make lifestyle changes.

Eighteen studies, with a qualitative or mixed-methods design, highlighted diet and nutrition counselling as an unmet need (Anderson, Steele & Coyle, 2013; Avery et al., 2014; Beaver et al., 2010; Brown, Greenfield & Thompson, 2016; Cha et al., 2012; Des Bordes et al., 2016;

Dunn et al., 2006; Er et al., 2017; Evans et al., 2007; Hardcastle, Glassey, Salfinger, Tan & Cohen, 2017; Hardcastle, Maxwell-Smith, Hagger, O'Connor & Platell, 2018; Hoedjes et al., 2017; Jang, Kim, Kim & Lee, 2019; Kassianos, Coyle & Raats, 2015; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Lee et al., 2017; Rozmovits, Rose & Ziebland, 2004; Samuelsson et al., 2018; Sutton et al., 2017. Participants reported receipt of vague and often contradictory advice in six studies (Anderson, Steele & Coyle, 2013; Er et al., 2017; Hardcastle, Maxwell-Smith, Hagger, O'Connor & Platell, 2018; Kassianos, Coyle & Raats, 2015; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Lee et al., 2017). Patients also reported being advised or following themselves a "trial and error" approach, particularly in relation to diet adaptation to altered bowel habits (Anderson, Steele & Coyle, 2013; Beaver et al., 2010; Hardcastle, Maxwell-Smith, Hagger, O'Connor & Platell, 2018), which was perceived as "unhelpful" (Anderson, Steele & Coyle, 2013). In Avery et al.'s study (2014), lack of reliable information was considered to be a barrier to dietary change for prostate cancer patients. It was highlighted across studies that patients look for simple, clear messages (Anderson, Steele & Coyle, 2013; Avery et al., 2014; Hardcastle, Maxwell-Smith, Hagger, O'Connor & Platell, 2018; Hoedjes et al., 2017; Rozmovits, Rose and Ziebland, 2004) and reliable, evidence-based information (Avery et al., 2014; Kassianos, Coyle & Raats, 2015; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Sutton et al., 2017) which could influence dietary change. Also, tailored advice was expected and should be provided (Anderson, Steele & Coyle, 2013; Avery et al., 2014; Beaver et al., 2010; Brown, Greenfield & Thompson, 2016; Evans et al., 2007; Hardcastle, Maxwell-Smith, Hagger, O'Connor & Platell, 2018; Hoedjes et al., 2017; Kassianos, Coyle & Raats, 2015; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Lee et al., 2017; Samuelsson et al., 2018; Sutton et al., 2017). Hoedjes et al. (2017) reported that not only content, but also format, intensity and timing of counselling should be individualised.

Patients frequently asked about dietary support in relation to physical symptoms, such as management of bowel problems and weight changes. Queries about management of bowel problems were reported in ten studies with colorectal cancer patients (Anderson, Steele & Coyle, 2013; Beaver et al., 2010; Brown, Greenfield & Thompson, 2016; Dunn et al., 2006; Hardcastle, Maxwell-Smith, Hagger, O'Connor & Platell, 2018; Hoedjes et al., 2017; Nikoletti et al., 2008; Pullar, Chisholm & Jackson, 2012; Rozmovits, Rose & Ziebland, 2004; Samuelsson et al., 2018) and two studies with gynaecological cancer patients (Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Lee, Shin, Bae & Lim, 2016). In particular, patients expressed concerns on which specific diet would be appropriate after removal of part of the bowel (Beaver et al., 2010; Rozmovits, Rose & Ziebland, 2004). In the Rozmovits, Rose & Ziebland study (2004), patients reported difficulties adjusting their dietary habits to the altered bowel function but could not find the information they wanted. Anderson et al. (2013) reported that patients sought practical dietary advice on which foods to avoid for controlling diarrhoea and flatulence, which affected them on a daily basis. According to two studies, dietary support was more frequently provided to colorectal cancer patients with a stoma, in comparison to those who did not have a stoma (Hardcastle, Maxwell-Smith, Hagger, O'Connor & Platell, 2018; Rozmovits, Rose & Ziebland, 2004). Regarding weight changes, Anderson et al. (2013) showed that colorectal cancer patients experience both weight loss and weight gain during their treatment and attribute these changes to a lack of guidance. In Samuelsson et al. study (2018), older patients lost weight during treatment and were experiencing difficulties regaining weight; yet few of them reported dietetic support. In two studies of gynaecological cancer survivors, most participants (85 and 90%) were largely receptive to weight management counselling, which would reinforce the importance of attempting weight loss (Tseng et al., 2015; Zaleta, Neff, McCann, O'Malley & Carpenter, 2017).

Apart from dietary information in relation to physical symptoms, a number of other education needs were highlighted across several studies. Patients requested advice in relation to recipes (Des Bordes et al., 2016; Hardcastle, Maxwell-Smith, Hagger, O’Connor & Platell, 2018; Lee, Shin, Bae & Lim, 2016), shopping practices (Des Bordes et al., 2016), classification of foods (Hardcastle, Maxwell-Smith, Hagger, O’Connor & Platell, 2018), portion sizes (Hardcastle, Maxwell-Smith, Hagger, O’Connor & Platell, 2018), energy intake (Hardcastle, Maxwell-Smith, Hagger, O’Connor & Platell, 2018), food labels (Hardcastle, Maxwell-Smith, Hagger, O’Connor & Platell, 2018), supplements (Evans et al., 2007; Des Bordes et al., 2016; Hoedjes et al., 2017), general healthy eating (Anderson, Steele & Coyle, 2013; Hardcastle, Glassey, Salfinger, Tan & Cohen, 2017) and healthy lifestyle (Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017).

3.3. Theme 2: Views on the role of diet post-treatment

Implementation of dietary changes following counselling was viewed as returning control and allowing patients “to do something after diagnosis” or as adjunct therapy by some studies in prostate and colorectal patients (Anderson, Steele & Coyle, 2013; Avery et al., 2014; Kassianos, Coyle & Raats, 2015). Three studies also highlighted the need for a holistic package of survivorship care, including diet alongside physical activity, and mental, sexual and psychological wellbeing (Anderson, Steele & Coyle, 2013; Evans et al., 2007; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017).

Although dietary support is valued as an important topic of discussion with health professionals across most included studies, a few qualitative studies conducted with prostate and colorectal cancer patients showed that diet was not always perceived as an important aspect of survivorship, particularly after curative surgery (Anderson, Steele & Coyle, 2013; Avery et al., 2014; Er et al., 2017; Kassianos, Coyle & Raats, 2015; Sutton et al., 2017). Anderson et al. (2013) also reported that some colorectal cancer survivors did not believe that a healthy diet would reduce the risk of recurrence, since it had not prevented its development. In another study, prostate cancer patients who underwent radical treatment were less likely to consider dietary changes than those on active surveillance (Avery et al., 2014). In the Er et al. pilot study of assessing prostate cancer survivors’ interest in a dietary intervention program (2017), participants perceived their current diet to be healthy and questioned which further changes could be made to improve it.

3.4. Theme 3: Sustaining dietary change

Several studies reported lack of dietary counselling during follow up (Hardcastle, Glassey, Salfinger, Tan & Cohen, 2017; Hardcastle, Maxwell-Smith, Hagger, O’Connor & Platell, 2018; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Samuelsson et al., 2018) and highlighted the need for regular ongoing monitoring as a means of sustaining healthy behaviours, including dietary changes and weight management (Hardcastle, Glassey, Salfinger, Tan & Cohen, 2017; Hoedjes et al., 2017; Kassianos, Coyle & Raats, 2015; Samuelsson et al., 2018; Zaleta, Neff, McCann, O’Malley & Carpenter, 2017). In two quantitative studies participants reported receiving dietary counselling in more than one clinic visit, 25% in Tseng et al. (2015) and 6% in Zaleta, Neff, McCann, O’Malley & Carpenter (2017).

Also, patients expressed an interest in having their current dietary habits assessed and receiving feedback on what could improve in their diets (Hoedjes et al., 2017; Kassianos, Coyle & Raats, 2015; Sutton et al., 2017). Patients perceived health professionals to have an important role in engaging them in regular conversations that could help them sustain healthy dietary habits (Hardcastle, Glassey, Salfinger, Tan & Cohen, 2017; Zaleta, Neff, McCann, O'Malley & Carpenter, 2017). In a study conducted in endometrial cancer survivors, participants expressed a need for accountability and external support to commit to lifestyle behaviour change (Hardcastle, Glassey, Salfinger, Tan & Cohen, 2017). On the other hand, one study showed that self-management was another important aspect of keeping a healthy diet (Hoedjes et al., 2017).

3.5. Theme 4: Sources of information

Eleven qualitative studies and three quantitative studies provided data about sources of support. Where information and support were provided, this was primarily done by health professionals, such as oncologists (Avery et al., 2014; Clark et al., 2016; Er et al., 2017; Hardcastle, Maxwell-Smith, Hagger, O' Connor & Platell, 2018; Lee et al., 2017; Tseng et al., 2015), specialist nurses (Beaver et al., 2010; Rozmovits, Rose & Ziebland, 2004), dietitians (Hardcastle, Maxwell-Smith, Hagger, O' Connor & Platell, 2018; Kassianos, Coyle & Raats, 2015; Pullar, Chisholm & Jackson, 2012; Samuelsson et al., 2018) and Primary Care Practitioners (PCP) (Anderson, Steele & Coyle, 2013; Clark et al., 2016; Tseng et al., 2015), followed by family members (Avery et al., 2014), friends (Pullar, Chisholm & Jackson, 2012) the internet (Kassianos, Coyle & Raats, 2015; Koutoukidis, Beeken, Lopes, Knobf & Lanceley), 2017, the media (Avery et al., 2014) and support groups (Sutton et al., 2017). In five of these studies, the mode of delivery is mentioned; face-to face (Hardcastle, Maxwell-Smith, Hagger, O' Connor & Platell, 2018; Kassianos, Coyle & Raats, 2015) telephone (Samuelsson et al., 2018), or leaflets (Beaver et al., 2010; Hardcastle, Maxwell-Smith, Hagger, O' Connor & Platell, 2018; Sutton et al., 2017).

In quantitative studies, more information was available. Clark et al. (2016) reported that 52% of gynaecological cancer patients were counselled a PCP and 38% by a Gynae-oncologist to lose weight. Tseng et al. (2015) reported lower numbers of gynaecological cancer patients receiving such advice (33%). In Pullar, Chisholm & Raats (2012) study of colorectal cancer survivors, 15% received advice from friends and 15% from dietitian. It was unclear in these studies whether support was face-to-face or booklets.

Healthcare professionals were considered the most reliable sources of information (Avery et al., 2014; Brown, Greenfield and Thompson, 2016; Clark et al., 2016; Er et al., 2017; Hardcastle, Glassey, Salfinger, Tan & Cohen, 2017; Hoedjes et al., 2017; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Sutton et al., 2017); however, in some studies patients noted that health professionals were lacking adequate knowledge in this topic (Kassianos, Coyle & Raats, 2015; Koutoukidis, Beeken, Lopes, Knobf & Lanceley, 2017; Rozmovits, Rose & Ziebland, 2004) or were uncertain about the role of diet in survivorship (Er et al., 2017). It was not possible to compare experiences of information and support according to different healthcare disciplines (e.g. oncologist Vs dietitian) due to insufficient information from the included studies.

3.6. Quality of the included studies

The results of the quality assessment of the included studies are presented in Online Resource 2. Quality of reporting and quality of study design were generally high across the quantitative (cross-sectional) studies. Aims, population, recruitment settings and basic data were presented clearly and study design was appropriate in all quantitative studies. Most studies provided adequate information regarding statistical analysis, conflicts of interest, ethical approval and study limitations; however, no studies justified sample size and only three described the characteristics of non-respondents. Non-response bias may have occurred in 13 studies (including all mixed-methods). Most studies used non-validated questionnaires. Results were internally inconsistent in four studies.

Quality was overall characterised as “fair” (score 12-17) in nine qualitative and three mixed-methods studies and “good” (18-24) in seven qualitative studies. No studies scored lower than 12 points and no studies achieved the maximum score of 24. All studies provided an adequate description of the methods and ethical procedures and most referred to policy and research recommendations. All studies had enough information to ensure transferability (fair or good scores) and most of them to ensure confirmability. On the other hand, several studies scored “poor” on assessment of credibility and dependability.

4. Discussion

This review collected evidence on information and support needs in relation to diet and nutrition after a pelvic cancer diagnosis. To our knowledge, this is the first systematic review to focus on patients' support needs in diet and nutrition after a cancer diagnosis. The review has highlighted that diet and nutrition is a topic of interest and importance to many cancer survivors, yet findings suggest that information and support in this area is not routinely provided to patients. Also, in some studies, participants questioned the importance of diet following (curative) therapy in preventing recurrence. The somewhat contrasting findings regarding provision of information and support derived from studies of different research design, but most of them highlighted diet and nutrition as an unmet need in survivorship.

The information and support that patients would like (future wellbeing, management of gastrointestinal side effects and weight changes) varied across cancer diagnoses, with advice in relation to the management of bowel symptoms being sought mostly from colorectal cancer survivors. Although radiotherapy is a common treatment for pelvic tumours, each pelvic cancer may be treated with combinations of different treatments; hence bowel problems may be a more serious problem for colorectal cancer patients in comparison to prostate cancer patients. People diagnosed with prostate cancer often follow additional hormone therapy, which may lead to muscle wasting, fat accumulation and weight gain (Cleeland et al., 2012). On the contrary, receipt of chemotherapy is common in rectal and gynaecological cancers, and is linked with loss of appetite, weight loss and increased risk for malnutrition (Cleeland et al., 2012). Irrespective of the treatment regimens, patients diagnosed with pelvic cancers face side effects which affect nutritional status and body weight.

Patients sought evidence-based information that would prompt them to change their current dietary behaviours and improve their quality of life (Theme 1). According to a recent Cochrane review, dietary interventions may help survivors improve Quality of Life and lead a healthier lifestyle (Burden et al., 2019); however, this review highlighted the lack of comprehensive research in this area. Concerns about the lack of consistent evidence about the role of diet or weight loss in outcomes following a cancer diagnosis were also expressed (Theme 2). This lack of evidence may, in part, account for the reported lack of information provision or provision of generic advice about a healthy diet. To date, dietary recommendations for cancer survivors that have been developed by the World Cancer Research Fund (WCRF) (World Cancer Research Fund/American Institute for Cancer Research, 2018) and the European Society for Parenteral and Enteral Nutrition (ESPEN) (Arends et al., 2017) are based on limited evidence. Also, to date, no recommendations tailored to a specific cancer diagnosis have been published. Lack of strong evidence further contributes to the differing views about the role of diet in the survivorship phase for patients (Theme 2) and the “trial and error” approach sometimes recommended by health professionals or used by patients independently (Themes 1 & 4). Coa et al. (2014) also note that healthcare providers also hold varied beliefs about lifestyle changes in the survivorship phase because of the lack of evidence base and therefore are hesitant in engaging in conversations about diet. On the contrary, nutritional support in malnutrition has been found to be *“crucial”* in treatment outcomes among oncologists in a recent survey in Italy (Caccialanza et al., 2020). Irrespective of their beliefs, health professionals are perceived by patients as the most suitable sources to provide dietary support. In some of the included studies there was patient dissatisfaction with health professional’s knowledge or attitude towards diet and nutrition, indicating that health professionals may not be adequately trained on nutritional care of cancer patients (Dempsey, Findlay, & MacDonald-Wicks, 2011; Koutoukidis, Lopes, et al., 2017).

Another important finding in this review was the perception from patients that they should have their dietary behaviour and weight monitored on a regular basis in order to sustain dietary changes (Theme 3). A recent systematic review and meta-analysis showed that supervision and social support improved adherence to a weight loss program in overweight and obese populations (Lemstra, Bird, Nwankwo, Rogers, & Moraros, 2016). A qualitative study in breast cancer survivors who followed a 12-month weight loss program showed that regular monitoring by dietitians was viewed as a facilitator for sustaining healthy behaviours (Terranova, Lawler, Spathonis, Eakin, & Reeves, 2017). This is an important point for future interventions evaluating nutritional education and weight loss in pelvic cancer survivors. It should, however, be noted that regular monitoring may have feasibility and cost implications which need to be taken into consideration.

There was a considerable difference in the amount and type of information extracted from the qualitative and quantitative studies included in this review. Qualitative studies examined issues and concerns around diet and nutrition in more depth and contributed more information to this narrative synthesis compared to quantitative studies. Therefore, it is possible that qualitative design features, such as sampling procedures (purposive sampling) and researcher bias in data collection and interpretation may have influenced the findings. Also, some studies focussed exclusively on diet and nutrition issues whereas some assessed follow-up care needs in general. Consequently, available data extracted from follow-up care studies was limited and, in some quantitative studies, in a form of statement about receipt of dietary information (Beaver et al., 2011; Demark-Wahnefried, Peterson, McBride, Lipkus & Clipp, 2000; Nikoletti et al., 2008), importance of receiving dietary information (Fitch, Gray & Franssen, 2000; Fitch, Gray & Franssen, 2001; Nikoletti et al., 2008) or need for receiving more dietary information in relation to cancer (Cha et al., 2012; Jang, Kim, Kim & Lee, 2019; Perl et al., 2016). Although limited, the data could clearly be extracted and therefore the studies were eligible for inclusion in this review. Due to the large heterogeneity of the studies, it was decided that a narrative synthesis was the best approach of presenting the results in this review.

It was not possible to extract any information from the included studies about dietary support needs for patients currently undergoing treatment. Studies in breast cancer patients have shown that information needs may vary according to the survivorship stage. A study by Halbach et al. (2016) showed that breast cancer respondents were more interested in information about nutrition shortly after surgery compared to 40 weeks later. Overall, health promotion needs were increased during or shortly after treatment and decreased over time (Halbach et al., 2016). Future prospective, observational studies could provide more robust evidence on cancer survivors' unmet needs in diet and nutrition, the findings of which could feed in to the development of supportive interventions to improve patients quality of life and wellbeing.

4.1. Strengths and limitations

This review has a number of strengths and limitations. A comprehensive systematic search of the literature was conducted according to the PRISMA guidelines. Searching was performed across six big databases, eligibility criteria were applied and the quality of all included studies was assessed. Any unclear abstracts were included for full-text review. Findings were synthesised using narrative synthesis, which is an effective way of combining results from quantitative and qualitative studies (Popay et al., 2006). Synthesis of findings was conducted in an unbiased manner, although it is acknowledged that thematic analysis may induce personal/researcher bias.

It should be acknolwedged that this review includes cancer diagnoses that share common characteristics (e.g. obesity rates, pelvic radiotherapy) but can also vary considerably. Findings are also limited by the scientific quality of the papers. Quality appraisal showed that cross-sectional studies presented high potential for selection and non-response bias. Furthermore, in most of these studies, the measurement tools were developed by the authors and no information on validity and reliability of these tools was reported. Similarly, most qualitative studies failed to provide adequate evidence of credibility and dependabilty. Data from qualitative studies contributed considerably more to the narrative synthesis compared to the included quantitative studies.

The search was not exhaustive, as it was limited in large databases and grey literature was not explored. The search was also limited to English language publications only due to lack of translation options; however, initial screening did not reveal any non-English publications.

5. Conclusion

This review has highlighted the need for provision of information and support in diet and nutrition after a pelvic cancer diagnosis. Patients sought evidence-based, clear information on how to improve their future wellbeing and manage physical symptoms arising from their diagnosis and treatment. Future observational studies with stronger methodological designs are warranted to provide robust answers to the questions regarding unmet needs in diet and nutrition in survivorship and to inform the development of interventions. Future clinical practice should take into account patients' needs for quality evidence and tailored advice with the aim of sustaining healthy behaviours and overcoming disease problems in the long term. Stronger evidence from prospective studies on the role of diet in outcomes related to cancer survivorship is also needed, in order to support the quality of information and support provided to pelvic cancer populations.

Reference list

Adams, E., Boulton, M. G., Horne, A., Rose, P. W., Durrant, L., Collingwood, M., . . . Watson, E. K. (2014). The Effects of Pelvic Radiotherapy on Cancer Survivors: Symptom Profile, Psychological Morbidity and Quality of Life. *Clinical Oncology, 26*(1), 10-17. doi:10.1016/j.clon.2013.08.003

Adams, S. V., Ceballos, R., & Newcomb, P. A. (2016). Quality of Life and Mortality of Long-Term Colorectal Cancer Survivors in the Seattle Colorectal Cancer Family Registry. *Plos One, 11*(6), 13. doi:10.1371/journal.pone.0156534

Allemani, C., Matsuda, T., Di Carlo, V., Harewood, R., Matz, M., Nikšić, M., . . . Lewis, C. (2018). Global surveillance of trends in cancer survival 2000-14 (CONCORD-3): analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. *The Lancet, 391*(10125), 1023-1075. doi:10.1016/S0140-6736(17)33326-3

Anderson, A. S., Steele, R., & Coyle, J. (2013). Lifestyle issues for colorectal cancer survivors--perceived needs, beliefs and opportunities. *Supportive Care In Cancer: Official Journal Of The Multinational Association Of Supportive Care In Cancer, 21*(1), 35-42. doi:10.1007/s00520-012-1487-7

Andreyev, H. J., Wotherspoon, A., Denham, J. W., & Hauer-Jensen, M. (2011). "Pelvic radiation disease": new understanding and new solutions for a new disease in the era of cancer survivorship. *Scand J Gastroenterol, 46*(4), 389-397. doi:10.3109/00365521.2010.545832

Arends, J., Bachmann, P., Baracos, V., Barthelemy, N., Bertz, H., Bozzetti, F., . . . Preiser, J. C. (2017). ESPEN guidelines on nutrition in cancer patients. *Clin Nutr, 36*(1), 11-48. doi:10.1016/j.clnu.2016.07.015

Avery, K. N., Donovan, J. L., Horwood, J., Neal, D. E., Hamdy, F. C., Parker, C., . . . Lane, A. (2014). The importance of dietary change for men diagnosed with and at risk of prostate cancer: a multi-centre interview study with men, their partners and health professionals. *Bmc Family Practice, 15*, 81.

Beaver, K., Latif, S., Williamson, S., Procter, D., Sheridan, J., Heath, J., . . . Luker, K. (2010). An exploratory study of the follow-up care needs of patients treated for colorectal cancer. *J Clin Nurs, 19*(23-24), 3291-3300. doi:10.1111/j.1365-2702.2010.03407.x

Beaver, K., Wilson, C., Procter, D., Sheridan, J., Towers, G., Heath, J., . . . Luker, K. (2011). Colorectal cancer follow-up: patient satisfaction and amenability to telephone after care. *Eur J Oncol Nurs, 15*(1), 23-30. doi:10.1016/j.ejon.2010.05.006

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. doi:10.1191/1478088706qp063oa

Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin, 68*(6), 394-424. doi:10.3322/caac.21492

Brown, S., Greenfield, D., & Thompson, J. (2016). Knowledge and awareness of long-term and late treatment consequences amongst colorectal cancer survivors: A qualitative study. *European Journal of Oncology Nursing, 20*, 191-198. doi:10.1016/j.ejon.2015.08.005

Burden, S., Jones, D.J., Sremanakova, J., Sowerbutts, A.M., Lal, S., Pilling, M., Todd, C. (2019). Dietary interventions for adult cancer survivors. *Cochrane Database of Systematic Reviews, 11*. Art. No.: CD011287. DOI: 10.1002/14651858.CD011287.pub2.

Caccialanza, R., Lobascio, F., Cereda, E., Aprile, G., Farinac, G., Traclò, F., Borioli, V., Caracciaa, M., Turri, A., Lorenzo, F., Pedrazzoli, P., on behalf of the AIOM-SINPE-FAVO and Fondazione AIOM Working Group. (2020). Cancer-related malnutrition management: A survey among Italian Oncology Units and Patients' Associations, Current Problems in Cancer, https://doi.org/10.1016/j.currproblcancer.2020.100554

Cao, Y., & Giovannucci, E. (2016). Obesity and Prostate Cancer. *Recent Results In Cancer Research. Fortschritte Der Krebsforschung. Progres Dans Les Recherches Sur Le Cancer, 208*, 137-153.

Cesario, S., Morin, K., & Santa-Donato, A. (2002). Evaluating the level of evidence of qualitative research. *Jognn-Journal of Obstetric Gynecologic and Neonatal Nursing, 31*(6), 708-714. doi:10.1177/0884217502239216

Cha, R., Murray, M. J., Thompson, J., Wall, C. R., Hill, A., Hulme-Moir, M., . . . Findlay, M. P. N. (2012). Dietary patterns and information needs of colorectal cancer patients post-surgery in Auckland. *The New Zealand Medical Journal, 125*(1356), 38-46.

Clark, L. H., Ko, E. M., Kernodle, A., Harris, A., Moore, D. T., Gehrig, P. A., & Bae-Jump, V. (2016). Endometrial Cancer Survivors' Perceptions of Provider Obesity Counseling and Attempted Behavior Change: Are We Seizing the Moment? *International Journal Of Gynecological Cancer: Official Journal Of The International Gynecological Cancer Society, 26*(2), 318-324. doi:10.1097/IGC.0000000000000596

Cleeland, C. S., Allen, J. D., Roberts, S. A., Brell, J. M., Giralt, S. A., Khakoo, A. Y., . . . Skillings, J. (2012). Reducing the toxicity of cancer therapy: recognizing needs, taking action. *Nat Rev Clin Oncol, 9*(8), 471-478. doi:10.1038/nrclinonc.2012.99

Coa, K. I., Smith, K. C., Klassen, A. C., Caulfield, L. E., Helzlsouer, K., Peairs, K., & Shockney, L. (2014). Capitalizing on the "teachable moment" to promote healthy dietary changes among cancer survivors: the perspectives of health care providers. *Supportive Care in Cancer, 23*(3), 679-686.

Collaco, N., Rivas, C., Matheson, L., Nayoan, J., Wagland, R., Alexis, O., . . . Watson, E. (2018). Prostate cancer and the impact on couples: a qualitative metasynthesis. *Support Care Cancer, 26*(6), 1703-1713. doi:10.1007/s00520-018-4134-0

Demark-Wahnefried, W., Peterson, B., McBride, C., Lipkus, I., & Clipp, E. (2000). Current health behaviors and readiness to pursue life-style changes among men and women diagnosed with early stage prostate and breast carcinomas. *Cancer, 88*(3), 674-684.

Dempsey, S. E., Findlay, N., & MacDonald-Wicks, L. (2011). Increasing nutritional support for patients undergoing radiation therapy: the radiation therapist perspective. *Journal of Radiotherapy in Practice, 10*(3), 181-189. doi:10.1017/S1460396910000257

des Bordes, J., Abdel-Wahab, N., Suarez-Almazor, M., Lopez-Olivo, M., des Bordes, J. K. A., & Lopez-Olivo, M. A. (2016). Assessing information needs on bone health in cancer survivors. *Journal of Cancer Survivorship, 10*(3), 480-488. doi:10.1007/s11764-015-0491-6

Dieperink, K. B., Hansen, S., Wagner, L., Johansen, C., Andersen, K. K., & Hansen, O. (2012). Living alone, obesity and smoking: Important factors for quality of life after radiotherapy and androgen deprivation therapy for prostate cancer. *Acta Oncologica, 51*(6), 722-729. doi:10.3109/0284186x.2012.682627

Downes, M. J., Brennan, M. L., Williams, H. C., & Dean, R. S. (2016). Development of a critical appraisal tool to assess the quality of cross-sectional studies (AXIS). *Bmj Open, 6*(12), 7. doi:10.1136/bmjopen-2016-011458

Dunn, J., Lynch, B., Rinaldis, M., Pakenham, K., McPherson, L., Owen, N., . . . Aitken, J. (2006). Dimensions of quality of life and psychosocial variables most salient to colorectal cancer patients. *Psychooncology, 15*(1), 20-30. doi:10.1002/pon.919

Er, V., Lane, J. A., Martin, R. M., Persad, R., Chinegwundoh, F., Njoku, V., & Sutton, E. (2017). Barriers and facilitators to healthy lifestyle and acceptability of a dietary and physical activity intervention among African Caribbean prostate cancer survivors in the UK: a qualitative study. *Bmj Open, 7*(10), e017217-e017217. doi:10.1136/bmjopen-2017-017217

Evans, M. A., Shaw, A. R. G., Sharp, D. J., Thompson, E. A., Falk, S., Turton, P., & Thompson, T. (2007). Men with cancer: is their use of complementary and alternative medicine a response to needs unmet by conventional care? *European Journal of Cancer Care, 16*(6), 517-525. doi:10.1111/j.1365-2354.2007.00786.x

Fitch, M., Gray, R. E., & Franssen, E. (2000). Perspectives on living with ovarian cancer: young women's views. *Canadian Oncology Nursing Journal = Revue Canadienne De Nursing Oncologique, 10*(3), 101-108.

Fitch, M. I., Gray, R. E., & Franssen, E. (2001). Perspectives on living with ovarian cancer: older women's views. *Oncology Nursing Forum, 28*(9), 1433-1442.

Fletcher, C., Flight, I., Chapman, J., Fennell, K., & Wilson, C. (2017). The information needs of adult cancer survivors across the cancer continuum: A scoping review. *Patient Education and Counseling, 100*(3), 383-410. doi:10.1016/j.pec.2016.10.008

Halbach, S. M., Ernstmann, N., Kowalski, C., Pfaff, H., Pfortner, T. K., Wesselmann, S., & Enders, A. (2016). Unmet information needs and limited health literacy in newly diagnosed breast cancer patients over the course of cancer treatment. *Patient Educ Couns, 99*(9), 1511-1518. doi:10.1016/j.pec.2016.06.028

Hannes, K. (2011). Critical appraisal of qualitative research. In *Supplementary Guidance for Inclusion of Qualitative Research in Cochrane Systematic Reviews of Interventions*: Cochrane Collaboration Qualitative Methods Group.

Hardcastle, S. J., Glassey, R., Salfinger, S., Tan, J., & Cohen, P. (2017). Factors influencing participation in health behaviors in endometrial cancer survivors. *Psycho-Oncology, 26*(8), 1099-1104. doi:10.1002/pon.4288

Hardcastle, S. J., Maxwell-Smith, C., Hagger, M. S., O'Connor, M., & Platell, C. (2018). Exploration of information and support needs in relation to health concerns, diet and physical activity in colorectal cancer survivors. *European Journal of Cancer Care, 27*(1). doi:10.1111/ecc.12679

Hawkins, M. L., Buys, S. S., Gren, L. H., Simonsen, S. E., Kirchhoff, A. C., & Hashibe, M. (2017). Do cancer survivors develop healthier lifestyle behaviors than the cancer-free population in the PLCO study? *Journal of Cancer Survivorship, 11*(2), 233-245. doi:10.1007/s11764-016-0581-0

Hoedjes, M., de Kruif, A., Mols, F., Bours, M., Beijer, S., Winkels, R., . . . Kampman, E. (2017). An exploration of needs and preferences for dietary support in colorectal cancer survivors: A mixed-methods study. *Plos One, 12*(12), e0189178-e0189178. doi:10.1371/journal.pone.0189178

Hong, Q. N., Pluye, P., Bujold, M., & Wassef, M. (2017). Convergent and sequential synthesis designs: implications for conducting and reporting systematic reviews of qualitative and quantitative evidence. *Syst Rev, 6*(1), 61. doi:10.1186/s13643-017-0454-2

Independent Cancer Taskforce. (2015). *Achieving world-class outcomes. A strategy for England 2015-2020*. Retrieved from

Jang, I., Kim, J. S., Kim, M., & Lee, E. (2019). Assessing Information Needs Regarding Metabolic Syndrome Among Gynecological Cancer Survivors: A Concurrent Mixed Method. *Cancer Nurs, 42*(2), E48-e60. doi:10.1097/ncc.0000000000000598

Jochems, S. H. J., Van Osch, F. H. M., Bryan, R. T., Wesselius, A., van Schooten, F. J., Cheng, K. K., & Zeegers, M. P. (2018). Impact of dietary patterns and the main food groups on mortality and recurrence in cancer survivors: a systematic review of current epidemiological literature. *Bmj Open, 8*(2), 12. doi:10.1136/bmjopen-2016-014530

Kassianos, A. P., Coyle, A., & Raats, M. M. (2015). Perceived influences on post-diagnostic dietary change among a group of men with prostate cancer. *European Journal of Cancer Care, 24*(6), 818-826. doi:10.1111/ecc.12357

Kotronoulas, G., Papadopoulou, C., Burns-Cunningham, K., Simpson, M., & Maguire, R. (2017). A systematic review of the supportive care needs of people living with and beyond cancer of the colon and/or rectum. *European Journal Of Oncology Nursing: The Official Journal Of European Oncology Nursing Society, 29*, 60-70. doi:10.1016/j.ejon.2017.05.004

Koutoukidis, D. A., Beeken, R. J., Lopes, S., Knobf, M. T., & Lanceley, A. (2017). Attitudes, challenges and needs about diet and physical activity in endometrial cancer survivors: a qualitative study. *European Journal of Cancer Care, 26*(6). doi:10.1111/ecc.12531

Koutoukidis, D. A., Knobf, M. T., & Lanceley, A. (2015). Obesity, Diet, Physical Activity, and Health-Related Quality of Life in Endometrial Cancer Survivors. *Nutrition Reviews, 73*(6), 399-408. doi:10.1093/nutrit/nuu063

Koutoukidis, D. A., Lopes, S., Fisher, A., Croker, H., Williams, K., & Beeken, R. J. (2017). Lifestyle advice to cancer survivors: A qualitative study on the perspectives of health professionals. *Proceedings of the Nutrition Society. Conference: Winter Conference, 77*(OCE1).

Lee, P. Y., Ng, C. J., Ong, T. A., Lee, Y. K., Khatijah Lim, A., Cheong, A. T., & Azad Hassan, A. R. (2017). Post-treatment impact and needs of prostate cancer survivors in Malaysia; a qualitative study. *Malaysian family physician : the official journal of the Academy of Family Physicians of Malaysia, 12*(3), 18-24.

Lee, Y., Shin, H., Bae, E., & Lim, H. (2016). Aspects of Health-Related Factors and Nutritional Care Needs by Survival Stage among Female Cancer Patients in South Korea. *Plos One, 11*(10), e0163281-e0163281. doi:10.1371/journal.pone.0163281

Lemstra, M., Bird, Y., Nwankwo, C., Rogers, M., & Moraros, J. (2016). Weight loss intervention adherence and factors promoting adherence: a meta-analysis. *Patient Preference and Adherence, 10*, 1547-1559. doi:10.2147/PPA.S103649

Mohamad, H., McNeill, G., Haseen, F., N'Dow, J., Craig, L. C. A., & Heys, S. D. (2015). The Effect of Dietary and Exercise Interventions on Body Weight in Prostate Cancer Patients: A Systematic Review. *Nutrition and Cancer-an International Journal, 67*(1), 43-60. doi:10.1080/01635581.2015.976313

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med, 6*(7), e1000097. doi:10.1371/journal.pmed.1000097

Mosher, C. E., Sloane, R., Morey, M. C., Snyder, D. C., Cohen, H. J., Miller, P. E., & Demark-Wahnefried, W. (2009). Associations Between Lifestyle Factors and Quality of Life Among Older Long-Term Breast, Prostate, and Colorectal Cancer Survivors. *Cancer, 115*(17), 4001-4009. doi:10.1002/cncr.24436

Nikoletti, S., Young, J., Levitt, M., King, M., Chidlow, C., & Hollingsworth, S. (2008). Bowel problems, self-care practices, and information needs of colorectal cancer survivors at 6 to 24 months after sphincter-saving surgery. *Cancer Nursing, 31*(5), 389-398. doi:10.1097/01.NCC.0000305759.04357.1b

Pekmezi, D. W., & Demark-Wahnefried, W. (2011). Updated evidence in support of diet and exercise interventions in cancer survivors. *Acta Oncologica, 50*(2), 167-178. doi:10.3109/0284186x.2010.529822

Perl, G., Nordheimer, S., Lando, S., Benedict, C., Brenner, B., Perry, S., . . . Ben-Aharon, I. (2016). Young patients and gastrointestinal (GI) tract malignancies - are we addressing the unmet needs? *Bmc Cancer, 16*, 630-630. doi:10.1186/s12885-016-2676-4

Popay, J., Roberts, H. M., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., & Britten, N. (2006). *Guidance on the conduct of narrative synthesis in sytematic reviews*. Retrieved from http://hdl.handle.net/10149/133990

Protani, M. M., Nagle, C. M., & Webb, P. M. (2012). Obesity and Ovarian Cancer Survival: A Systematic Review and Meta-analysis. *Cancer Prevention Research, 5*(7), 901-910. doi:10.1158/1940-6207.Capr-12-0048

Pullar, J. M., Chisholm, A., & Jackson, C. (2012). Dietary information for colorectal cancer survivors: an unmet need. *The New Zealand Medical Journal, 125*(1356), 27-37.

Puts, M. T. E., Papoutsis, A., Springall, E., & Tourangeau, A. E. (2012). A systematic review of unmet needs of newly diagnosed older cancer patients undergoing active cancer treatment. *Supportive Care in Cancer, 20*(7), 1377-1394. doi:10.1007/s00520-012-1450-7

Rozmovits, L., Rose, P., & Ziebland, S. (2004). In the absence of evidence, who chooses? A qualitative study of patients' needs after treatment for colorectal cancer. *Journal of Health Services Research & Policy, 9*(3), 159-164.

Samuelsson, K. S., Egenvall, M., Klarin, I., Lökk, J., Gunnarsson, U., & Iwarzon, M. (2018). The older patient's experience of the healthcare chain and information when undergoing colorectal cancer surgery according to the ERAS concept. *Journal of Clinical Nursing*. doi:10.1111/jocn.14328

Secord, A. A., Hasselblad, V., Von Gruenigen, V. E., Gehrig, P. A., Modesitt, S. C., Bae-Jump, V., & Havrilesky, L. J. (2016). Body mass index and mortality in endometrial cancer: A systematic review and meta-analysis. *Gynecologic Oncology, 140*(1), 184-190. doi:10.1016/j.ygyno.2015.10.020

Smits, A., Lopes, A., Das, N., Bekkers, R., Massuger, L., & Galaal, K. (2015). The effect of lifestyle interventions on the quality of life of gynaecological cancer survivors: A systematic review and meta-analysis. *Gynecologic Oncology, 139*(3), 546-552. doi:10.1016/j.ygyno.2015.10.002

Sutton, E., Hackshaw-McGeagh, L. E., Aning, J., Bahl, A., Koupparis, A., Persad, R., . . . Lane, J. A. (2017). The provision of dietary and physical activity advice for men diagnosed with prostate cancer: a qualitative study of the experiences and views of health care professionals, patients and partners. *Cancer Causes & Control: CCC, 28*(4), 319-329. doi:10.1007/s10552-017-0861-7

Teo, M. T. W., Sebag-Montefiore, D., & Donnellan, C. F. (2015). Prevention and Management of Radiation-induced Late Gastrointestinal Toxicity. *Clinical Oncology, 27*(11), 656-667. doi:10.1016/j.clon.2015.06.010

Terranova, C. O., Lawler, S. P., Spathonis, K., Eakin, E. G., & Reeves, M. M. (2017). Breast cancer survivors' experience of making weight, dietary and physical activity changes during participation in a weight loss intervention. *Support Care Cancer, 25*(5), 1455-1463. doi:10.1007/s00520-016-3542-2

Torre, L. A., Bray, F., Siegel, R. L., Ferlay, J., Lortet-Tieulent, J., & Jemal, A. (2015). Global cancer statistics, 2012. *CA Cancer J Clin, 65*(2), 87-108. doi:10.3322/caac.21262

Tseng, J. H., Long Roche, K., Jernigan, A. M., Salani, R., Bristow, R. E., & Fader, A. N. (2015). Lifestyle and weight management counseling in uterine cancer survivors: A study of the uterine cancer action network. *International Journal of Gynecological Cancer, 25*(7), 1285-1291.

van Mossel, C., Leitz, L., Scott, S., Daudt, H., Dennis, D., Watson, H., . . . Purkis, M. E. (2012). Information needs across the colorectal cancer care continuum: scoping the literature. *European Journal of Cancer Care, 21*(3), 296-320. doi:10.1111/j.1365-2354.2012.01340.x

van Zutphen, M., Kampman, E., Giovannucci, E. L., & van Duijnhoven, F. J. B. (2017). Lifestyle after Colorectal Cancer Diagnosis in Relation to Survival and Recurrence: A Review of the Literature. *Current Colorectal Cancer Reports, 13*(5), 370-401. doi:10.1007/s11888-017-0386-1

World Cancer Research Fund/American Institute for Cancer Research. (2018). *Diet, nutrition, physical activity and cancer : a global perspective : a summary of the Third expert report*.

Zaleta, A. K., Neff, R., McCann, G. A., O'Malley, D. M., & Carpenter, K. M. (2017). Perceptions of weight management counseling among gynecologic cancer survivors: opportunities for enhancing survivorship care. *Supportive Care in Cancer, 25*(5), 1537-1545.

Table 1: Characteristics of the selected studies, grouped according to cancer diagnosis (colorectal, prostate, gynaecological) and study design (qualitative, cross sectional, mixed)

First author and country	Design & study duration	Aim of study	Sample, N, sex, age	Response rate	Inclusion criteria	Cancer type	Treatment
Anderson (UK)	Qualitative, NS	To explore patient needs for advice on diet, activity and lifestyle; patient beliefs about the role of diet, activity and lifestyle for reducing disease risk; and preferred formats, timings and routes of delivery for such guidance	N=40, 50.0% women; mean age (SD) 60 (12.2) years; range 27-84	NS	Diagnosed with and treated for colorectal cancer and not undertaking active cancer treatment	Colorectal	NS
Beaver (UK)	Qualitative, NS	To explore patient perceptions of their experiences of follow-up care after treatment for colorectal cancer	N=27, 48.1% women; mean age 72 years; range 59-86	NS	Patients diagnosed with colorectal cancer who completed active treatment and had no current clinical problems	Colorectal	Surgery (n=27), RT (n=4), CT (n=7)
Brown (UK)	Qualitative, 3 months	To explore awareness of long-term and late treatment consequences of colorectal cancer survivors when they are nearing discharge from oncology	N=19, 42.1% women; mean age 67.1 years; range 37-84	NS	Participants with a colorectal cancer diagnosis, at least 12 months post treatment, over 18 years old, able to communicate in English and without a terminal diagnosis or dementia	Colorectal	Surgery (n=19), RT (n=5), CT (n=10)
Dunn (Australia)	Qualitative, NS	To examine quality of life and psychosocial variables most salient to colorectal cancer patients	N=20, 60% women; mean age and range not reported	28%	Diagnosed with colorectal cancer within the past 18 months, under 80 years old, spoke English, and had no mental or intellectual impairment	Colorectal	NS
Evans (UK)	Qualitative, NS	To investigate why men choose to use Complementary and Alternative Medicine (CAM), and the extent to which CAM is used to fill 'gaps' in conventional care provision	Total sample N=34. Prostate cancer survivors: N=10; colorectal cancer survivors N=10; Mean age and range not reported for the subsamples	NS	Men with a cancer diagnosis and Complementary and Alternative Medicine (CAM) users	Prostate and colorectal	NS
Hardcastle (Australia)	Qualitative, 3 months	To explore colorectal cancer survivors' information and support needs in relation to health concerns and the promotion of healthy eating and physical activity	N=24, 45.8% women; mean age 69.4 years; range 63-77	19%	Colorectal cancer diagnosis within the past two years and presence of comorbidities which put them at high risk for cardiovascular disease	Colorectal	RT (n=3), CT (n=10), combination of RT and CT (n=3)
Rozmovits (UK)	Qualitative, 12 months	To describe current hospital follow-up policy and to explore patients' needs and preferences for follow-up	N=39; 48.7% women; mean age 60.1 years; range 33-87	NS	People with a colorectal cancer diagnosis	Colorectal	Surgery (n=15), surgery plus RT and/or CT (n=21), CT only (n=3)
Samuelsson (Sweden)	Qualitative, NS	To describe older patients' experiences from diagnosis of colorectal cancer, to recovery and aftercare and evaluate how information provision was perceived by patients	N=16, 50% women, median age 82.5 years; range 76-89 years	84%	People aged 75 years and above who had undergone elective CRC surgery with curative intent at least 3 months prior to the interview	Colorectal	Surgery (n=16), no information on adjuvant therapies

First author and country	Design & study duration	Aim of study	Sample, N, sex, age	Response rate	Inclusion criteria	Cancer type	Treatment
Beaver (UK)	Cross sectional survey, NS	To explore patient satisfaction on different aspects of follow-up service provision following treatment for colorectal cancer	N=187, 43.3% women; mean age (SD) 72.8 (8.5) years; range 46-90	63%	Adults (>18 years) who had received resection with curative intent for either cancer of the colon or rectum	Colorectal	Surgery (n=145), RT (n=20), CT (n=43)
Cha (New Zealand)	Cross sectional survey, NS	To describe dietary intakes and dietary patterns of colorectal cancer patients in the Auckland region, and to investigate what the current information resources are, and patient satisfaction with these resources	N=29, 31% women; Age band most frequently selected 70+ years	73%	Participants with a diagnosis of colorectal cancer who had received surgical resection (with curative intent) of their tumour in the last 1-4 months	Colorectal	Surgery (n=29), no information on RT or CT
Nikoletti (Australia)	Cross sectional survey, NS	To explore long-term information needs and self-care practices relating to bowel management after sphincter-saving colorectal surgery	N=101, 29.7% women; mean age 66.2 years; range 40-88	56-86% across different settings	Adults (>18 years of age), diagnosed with a colorectal cancer, undergoing sphincter-saving surgery in the past 6-24 months and able to speak and understand English	Colorectal	Surgery only (n=57), CT and surgery (n=43), RT and surgery (n=18)
Perl (Israel)	Cross sectional survey, NS	To characterize gastrointestinal cancer patients' specific physical and psychosocial needs and quality of life concerns	Total sample N=50. Colorectal cancer N=40, 50% women. Mean age and range not reported for the subsample	94%	Young adults (18-40 years old) diagnosed with cancer of the GI tract (oesophagus, gastric, colon, rectum, anal) between 6 months and two years prior to enrolment; had a Karnofsky Performance Status of 80 or above or an Eastern Cooperative Oncology Group (ECOG) score of 0 or 1	Colorectal	Information for subsample unavailable
Pullar (New Zealand)	Cross sectional survey, 2 months	To establish the dietary patterns of colorectal cancer patients, the level of dietary advice they currently received and its impact on their behaviour	N=40, 47.5% women; 70% were 60 years or older	NS	Adults (>18 years of age), diagnosed with colorectal cancer (stages II, III or IV), with sufficient literacy to comprehend the survey	Colorectal	Surgery only (n=5), CT only (n=3), surgery and CT (n=32)
Hoedjes (the Netherlands)	Mixed, NS	To explore needs and preferences for dietary support among colorectal cancer survivors	Survey: N=1198; 40.0% women; mean age (SD) 69.1 (9.5). Focus groups: N=16; 37.5% women; mean age and range not reported for the qualitative arm	Survey: 68%; focus groups: 27%	Survey: a colorectal cancer diagnosis between 2000-2009 and no cognitive impairments. Focus groups: at least one year after a colorectal cancer diagnosis and a Body Mass Index >27 kg/m^2	Colorectal	For survey sample only: surgery only (n=820), surgery and RT (n=419), surgery and CT (n=379), surgery and RT and CT (n=147)
Avery (UK)	Qualitative, 4 years	To explore views about diet and motivations for and barriers to dietary change in men at elevated risk and those diagnosed with PC	At elevated risk: N=21, all men; mean age 65.4 years; range 52.5-72.3. Diagnosed with cancer: N=37, all men; mean age 66.5 years; range 54.4-75.4)	95% (58/61 in phase 1), 56% (5/9 in phase 2)	At elevated risk: prostate specific antigen (PSA) level of 2.0-2.9 ng/ml or ≥3.0 ng/ml with a negative biopsy. Diagnosed with cancer: diagnosis (PSA ≥3.0 ng/ml) and either treatment of prostate cancer, active monitoring or active surveillance	Prostate	Active surveillance (n-15), RT (n=12), surgery (n=9)

First author and country	Design & study duration	Aim of study	Sample, N, sex, age	Response rate	Inclusion criteria	Cancer type	Treatment
Er (UK)	Qualitative, 12 months	To explore the facilitators and barriers to dietary and lifestyle changes and the acceptability of a dietary and physical activity intervention among African Caribbean prostate cancer survivors	N=14, all men; mean age 69.6 years; range 52-80.	NS	Men aged 18 and above who self-identified as African Caribbean and had a clinically confirmed prostate cancer diagnosis	Prostate	RT/HT (n=9), surgery (n=3)
Kassianos (UK)	Qualitative, NS	To identify factors that are believed to be associated with changes in diet following diagnosis	N=8, all men; mean age 64.9 years; range 55-76	NS	A prostate cancer diagnosis and resident in the UK	Prostate	RT (n=4), surgery (n=2), NS (n-2)
Lee (2017). (Malaysia)	Qualitative, 3 months	To explore the post-treatment impact and related needs of prostate cancer survivors in Malaysia	N=24, all men; mean age not reported, range 58-79 years	NS	Diagnosis of prostate cancer	Prostate	NS
Sutton (UK)	Qualitative, 6 months	To explore the opinions about, and experiences of men with prostate cancer, and their partners on the provision of dietary and physical activity advice following diagnosis of, and treatment for, prostate cancer	N=16, all men; age range 53-79 years	NS	Men diagnosed with prostate cancer, who had recently undergone radical prostatectomy or were undergoing radiotherapy for localised prostate cancer	Prostate	Surgery (n=12), RT (n=4)
Demark-Wahnefried (USA)	Cross sectional survey, 5 weeks	To assess health behaviours among cancer survivors; readiness to make changes and interest in lifestyle interventions	Total sample N=978. Prostate cancer survivors N=447, all men; mean age and range not reported for the prostate cancer subsample	60%	Patients with early stage (in situ or localized) prostate carcinoma diagnosed between January 1, 1992 and December 31, 1997	Prostate	NS
Des Bordes (USA)	Mixed, 7 months	To assess information needs on bone health in survivors of prostate and breast cancer and identify the preferred method to deliver health information	Survey: Total sample N=20; prostate cancer survivors N=10, all men. Interviews: Total sample N=20; prostate cancer survivors N=10, all men. Mean age and range not reported for the prostate cancer subsample	31%	Diagnosed with prostate cancer, adults and no cognitive deficit, English speaking and access to telephone	Prostate	NS
Hardcastle (Australia)	Qualitative, NS	To investigate survivors' recollections regarding the content of lifestyle advice received following cessation of their active treatment and explore the factors that impact on lifestyle behaviour change	N=22, all women; mean age 62.6 years; range 49-72	20%	Adult (25-80 years old) participants who had completed active treatment of endometrial cancer within the preceding 3 years and were deemed to be in remission; had at least one risk factor for CVD (i.e. body mass index [BMI] of 30 or more; hypertension; hypercholesterolemia; and diabetes mellitus); and were able to speak and comprehend English	Endometrial	NS

First author and country	Design & study duration	Aim of study	Sample, N, sex, age	Response rate	Inclusion criteria	Cancer type	Treatment
Koutoukidis (UK)	Qualitative, 3 months	(1) To examine the perceived importance of health behaviours after endometrial cancer treatment, and the factors influencing adherence to a healthy lifestyle after treatment and (2) to explore the information that endometrial cancer survivors obtain after treatment, and their preferred method of information delivery	N=16, all women; median age 57 years; range 33-84	47%	Endometrial cancer survivors within 5 years post-active treatment	Endometrial	Surgery (n=7), surgery and RT (n=5), surgery and RT and CT (n=4)
Clark (USA)	Cross sectional survey, 2 months	(1) To assess patient's knowledge of the role of obesity in endometrial cancer and to determine patient perceptions of provider's counselling with regard to obesity, weight loss and health improvement and (2) to characterize lifestyle changes made by patients after diagnosis and barriers to change	N=108, all women; mean age 66.0 years; range 41-91	46%	Any patient with a diagnosis of endometrial cancer between June 2011 and June 2012 and without evidence of active disease	Endometrial	NS
Fitch (Canada)	Cross sectional survey, 6 weeks	To investigate the experiences of younger women with ovarian cancer	N=39, all women; mean age 38 years; range 21-45	NS	Women under 45 years old with a diagnosis of ovarian cancer and ability to read either English or French	Ovarian	NS
Fitch (Canada)	Cross sectional survey, 6 weeks	To investigate the experiences of older women with ovarian cancer	N=146, all women; mean age 70 years; range 61-93	NS	Women over 61 years old with a diagnosis of ovarian cancer and ability to read either English or French	Ovarian	NS
Lee (2016) (South Korea)	Cross sectional survey, 2 months	To investigate diet-related problems and nutritional care needs according to the survival stage among female cancer survivors in South Korea	Total sample N=186; gynaecological cancer survivors N=82. Extended stage (2-5 years since diagnosis) mean age (SD) 49.7 (8.0) years; long-term stage (>5 years since diagnosis) mean age (SD) 51.2 (7.3) years	NS	Adult women (18-65 years old) at least 2 years after a gynaecological cancer diagnosis who have finished active treatment (Except for hormone treatment)	Uterine, endometrial, in situ of uterine, uterine cervical, or ovarian cancer	NS
Tseng (USA)	Cross sectional survey, 2 months	(1) To describe the experiences, attitudes, and perceived barriers of uterine cancer survivors related to weight loss and lifestyle counselling and (2) to characterize survivor preferences for physician intervention in this regard	N=180, all women; median age 58 years; range 29-76	28.3%	Women diagnosed with uterine cancer	Uterine	NS
Zaleta (USA)	Cross sectional survey, 3 months	To examine perceptions of weight management counselling among gynaecologic cancer survivors	N=244, all women; mean age (SD) 57.1 (12.4) years	NS	All women diagnosed with a gynaecological cancer diagnosis presenting at the clinic for a follow up visit	Endometrial, ovarian, cervical, vaginal, vulvar	Surgery (n=201), CT (n=160), RT (n=59), HT (n=3)

First author and country	Design & study duration	Aim of study	Sample, N, sex, age	Response rate	Inclusion criteria	Cancer type	Treatment
Jang (South Korea)	Mixed, 10 weeks	To evaluate the information requirements for knowledge and self-management health behaviours related to metabolic syndrome	Survey: N=70, all women, mean age (SD) 58.7 (9.2) years, range 36-81. Interviews: N=27, all women, mean age (SD) 58.3 (10.1) years, range 36-75	36% (survey), 39% (interviews)	Women older than 18years with a diagnosis of ovarian or endometrial cancer, and diagnosis of MetS according to the NCEP-ATP III criteria, capacity to communicate and understand the questionnaire and ability to provide informed consent with no cognitive deficits	Ovarian and endometrial	NS

NS: Not stated; SD: Standard Deviation; RT: radiotherapy, CT: chemotherapy; HT: hormone therapy

Table 2: Summary of diet and nutrition information and support needs.

Study first author	Tool used	Description of provision (or lack of) of information and identification of needs	Themes
Anderson	Focus groups	Diarrhoea and flatulence were daily problems for which patients sought simple practical dietary advice on foods to avoid. Participants reported mixed messages which created anxiety and confusion, such as messages opposite to general healthy eating (e.g. counter intuitive to 5-a-day) and eating high fat, low quality foods. Participants were advised to adopt a "trial and error" approach while they were looking for solid advice/parameters to work with. Some participants also expressed the need for dietary advice to reduce disease recurrence or progression; however, others were sceptical about how diet could reduce the risk of disease in the future, since it did not prevent the development.	Content of dietary information Views on the role of diet in survivorship
Beaver	Face-to-face interviews	A commonly expressed concern was related to diet and what specific type of diet would be appropriate following removal of part of the bowel.. There was an expectation that specific dietary advice was important and should be provided. Support and advice are not mentioned by participants.	Content of dietary information
Brown	Face-to-face interviews	Respondents highlighted gaps in information provision and support services, the biggest of which was related to changes in bowel habit and diet adaptation. Bowel changes and their associations with diet had the biggest impact in patients' life. Input from a dietitian was regarded as helpful.	Content of dietary information
Dunn	Face-to face interviews and focus groups	A difficulty reported by participants was about obtaining information about what they could expect in the long term. The most frequent concern expressed was that they did not receive any information on diet. Most found that they had difficulty digesting a number of foods after their treatment, yet they had not been advised about what they should and should not be eating. Although a nutritionist visited some of them in hospital, there was no follow up.	Content of dietary information
Evans	Face-to-face interviews	As part of a more holistic approach, participants wanted advice on diet and lifestyle, so that they could keep themselves as fit as possible and reduce the chance of disease recurrence. Emphasis was also given to mental wellbeing. These topics were rarely discussed in their conventional consultation.	Content of dietary information Views on the role of diet in survivorship
Hardcastle	Face-to-face interviews	Participants felt unsupported regarding bowel changes and management of bowel movements, especially the ones without stoma. They didn't know what kinds of foods they should or should not be eating, so they had to use trial and error to work out which foods are appropriate. Some participants mentioned receiving conflicting and inconsistent information after discharge in relation to bowel management. They also reported lack of knowledge as to what constitutes a healthy diet (classification of foods and portion sizes). Some participants wanted to know why some foods are not very healthy. Participants needed knowledge of nutrition and calorie intake in order to understand food labels. Monitoring would be beneficial to sustain a healthy behaviour.	Content of dietary information Sustaining dietary change
Rozmovits	Face-to-face interviews	Respondents reported being given little or no advice after surgery. Some had severe difficulties readjusting their eating and bowel habits. Patients described needs for realistic and non-contradictory information about diet, as they reported receiving contradictory and even inappropriate advice to eat "a high fibre diet". There is confusion on what constitutes an appropriate diet post-surgery to manage bowel function and no one had such knowledge.	Content of dietary information
Samuelsson	Face-to-face interviews	Older patients expressed concerns related to diet and nutrition during recovery and follow up. Most of them perceived nutritional support during recovery from surgery as inadequate to match their individual requirements. They also reported not being given guidance on how to manage side effects. On follow up, a lot of participants experienced difficulty regaining weight after surgery but very few received dietetic support. Older people ask for individually tailored information throughout the entire process (diagnosis to follow up).	Content of dietary information Sustaining dietary change
Beaver	Questionnaire	Most (59%) respondents stated they received all information they needed about diet in relation to their disease and 56% were satisfied. Those who didn't receive information expressed a need of getting advice on the role of diet and how diet could help from now on.	Content of dietary information
Cha	Questionnaire	43% of the participants reported that they had received dietary information after surgery. 50% of participants suggested that they would like to have had more information provided to them.	Content of dietary information

Study first author	Tool used	Description of provision (or lack of) of information and identification of needs	Themes
Nikoletti	Questionnaire	53% of respondents expressed a need to receive dietary information to manage bowel function and this was rated as important. Most participants who did receive advice perceived it as inadequate. Respondents expressed a particular need for information on what foods to eat when they dine out to avoid bowel problems (28%).	Content of dietary information
Perl	Questionnaire	As part of an overall needs assessment, 70% respondents expressed a need for nutritional counselling after diagnosis and it was highlighted significantly more by women rather than men.	Content of dietary information
Pullar	Questionnaire	33% of respondents received advice on dietary change. Most of them felt they had not received enough information in relation to their condition. Half of the respondents received advice in relation to survivorship (reducing red/processed meat and increasing fruit and vegetables) and half in relation to their treatment (formation of a stoma, future weight gain and managing low appetite). No participant classified as obese reported any discussions around diet and nutrition. They would be interested in getting more information and would more likely consider changing habits, particularly people with a higher Body Mass Index.	Content of dietary information
Hoedjes	Questionnaire and focus groups	17% reported the need for dietary support, which was significantly higher in participants classified as overweight or obese. Focus groups highlighted that individuals with treatment-related complaints expressed a need for advice for appropriate nutrition to reduce side effects, such as lack of strength and energy, stoma-related problems and bowel changes. Some participants needed information and individually-tailored advice on lifestyle-related issues, such as appropriate nutrition and use of dietary supplements, in order to make an informed, autonomous decision on adapting their lifestyle or not. Some wanted feedback on their lifestyle and how healthy or unhealthy it is and what areas may need improvement. A gastrointestinal oncology nurse, an oncology dietitian and a stoma nurse specialist were regarded the most appropriate providers for dietary advice and support.	Content of dietary information Sustaining dietary change
Avery	Face-to-face and telephone interviews and a focus group	Irrespective of whether they made changes, most men expressed confusion and dissatisfaction with available dietary information and/or its contradictory nature. Some men described unreliable information as a barrier to making dietary changes. Men said they would welcome scientific and evidence-based dietary advice from authoritative sources (primary care physician, consultant or nurse) but information needs varied according to treatment success and disease status.	Content of dietary information Views on the role of diet in survivorship
Er	Face-to-face interviews	Participants reported mistrust of dietary messages from media, because they were conflicting. They preferred receiving information from HPs who they regarded as experts and a trusted source of health information and that had a positive influence on their health behaviour. A small amount of men were sceptical about the role of diet in cancer progression, especially if treatment was effective.	Content of dietary information Views on the role of diet in survivorship
Kassianos	Telephone interviews	Participants had high expectations but felt health professionals' did not have sufficient knowledge on diet and nutrition support for future health. They felt that lack of/conflicting information could lead them to get wrong messages and inappropriate action. Credible, evidence-based information was considered important for the management of their condition and for reducing the risk of recurrence. Some participants expressed uncertainty about the nature of the relationship between dietary change and recurrence. The health professionals' advice was an important trigger for dietary change and health action.	Content of dietary information Sustaining dietary change Views on the role of diet in survivorship
Lee (2017)	Focus groups and one interview	Patients wanted information on diet and supplements tailored to their disease, in order to prevent recurrence and improve overall health. The advice they got about healthy eating was perceived as generic and therefore not helpful to prevent recurrence.	Content of dietary information
Sutton	Face-to-face and telephone interviews	Men (who did not participate in a Lifestyle coaching program) did not recall any discussions about diet with health professionals. They would have valued an assessment of their diet or evidence-based advice that could be beneficial long term. Few patients believed that dietary changes would not be necessary successful removal of the prostate. A trusted healthcare professional, regardless of the role, was viewed as a credible source of information. Some men were given leaflets which were hard to read.	Content of dietary information Sustaining dietary change Views on the role of diet in survivorship

Study first author	Tool used	Description of provision (or lack of) of information and identification of needs	Themes
Demark-Wahnefried	Questionnaire	Few respondents reported discussions with HPs regarding increasing F&V or reducing fat. 48% of respondents were very or extremely interested for diet-related programs, particularly the younger ones.	Content of dietary information
Des Bordes	Questionnaire and interviews	Patients expressed a need for information on nutrition, particularly nutritional supplements, to maintain or improve bone health. Most of them didn't know the negative effects of salt and alcohol on bone health while few prostate cancer survivors knew the optimal calcium requirement in diet.	Content of dietary information
Hardcastle	Face-to-face interviews	Most participants do not recall receiving lifestyle advice, including dietary information. Oncologists are viewed as an authoritative and trustworthy source of information and they would feel obliged to follow their advice on healthy eating and weight loss. Apart from advice, regular monitoring was expressed as a need, because it motivates patients to stick to a healthier diet and a lower weight.	Content of dietary information Sustaining dietary change
Koutoukidis	Telephone interviews and focus groups	None of the participants received any lifestyle advice from a health professional post-treatment. Those who underwent radiotherapy received dietary advice for bowel symptom management during treatment, but there was no follow up. Participants prompted discussions with health professionals but received unsatisfactory advice. Health professionals were unaware of support groups or just advised to eat healthy. Participants searched for information on their own e.g. online, but it was difficult to find reliable information. They would welcome tailored advice regarding recovery, symptom management and healthy lifestyle overall.	Content of dietary information Sustaining dietary change Views on the role of diet in survivorship
Clark	Questionnaire	52% reported weight loss counselling from a primary care physician and 35% from a gynae-oncologist. 47% reported dietary advice from a primary care physician and 25% from a gynae-oncologist. Receipt of weight loss counselling was significantly associated with attempting weight loss. Provider counselling and encouragement can help overcome motivation barriers.	Content of dietary information
Fitch (2000)	Questionnaire	Several respondents reported changes in diet (eating healthy foods and taking supplements, especially vitamins C & E). 79% of women rated diet and nutrition as important discussions in the survivorship phase. However, not all were satisfied with the information they received.	Content of dietary information
Fitch (2001)	Questionnaire	66% of women rated diet and nutrition as important discussions in the survivorship phase. However, not all were satisfied with the information they received.	Content of dietary information
Lee (2016)	Questionnaire	Most respondents demanded nutritional care and education in a variety of topics; mainly foods to avoid, appropriate nutrition to prevent recurrence, information on how to improve nutritional status, healthy recipes, and nutritional guidance for the patient's family.	Content of dietary information
Tseng	Questionnaire	50% of respondents reported weight management or lifestyle counselling, primarily from a gynaecologic oncologist or a primary cancer provider. Providers discussed the need for weight loss but did not make specific recommendations regarding how to achieve this. However, most found the counselling motivating to make a change. In terms of duration, of those who got support (50%), 28% had less than 1-minute discussions, 59% between 1 and 5 minutes and 14% more than 5 minutes. In terms of frequency, of those who got support (50%), 38% had discussions during one clinic visit, 28% in less than half visits, 11% in more than half visits and 24% in every visit. Of those who did not receive counselling, most believe would have been motivated to set goals and make positive lifestyle changes. Several of them expressed a desire to discuss weight and lifestyle during most clinic visits. Oncologists and nutritionists were the most preferable sources of information.	Content of dietary information Sustaining dietary change
Zaleta	Questionnaire	Most women have attempted weight loss thought diet restriction but only few under guidance and even fewer routinely. Although most agree that oncologists should discuss weight loss with the patients, only very few reported this sort of counselling, in contrast with counselling for smoking cessation. Most respondents believe that weight management counselling would prompt them to attempt weight loss. The oncologist was viewed the most reliable source for information.	Content of dietary information Sustaining dietary change

Jang	Survey and face-to-face interviews	As part of the information needs assessment, 27% of participants requested information/education on diet in relation to metabolic syndrome and 14% information on weight management (survey data). Requests on dietary information were also expressed in interviews. Participants consider diet management as an important self-management tool for controlling metabolic syndrome.	Content of dietary information

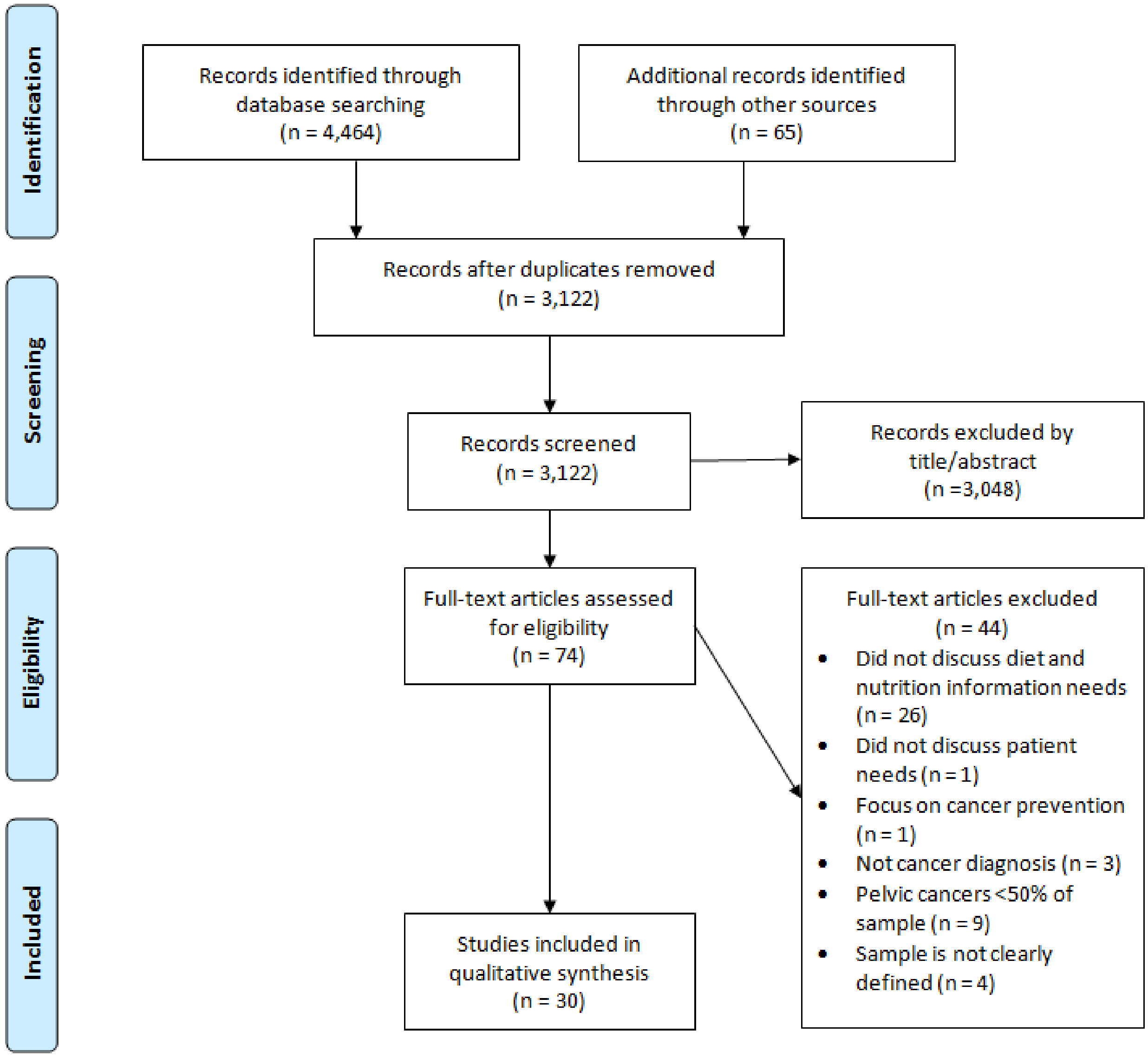

Figure 1: PRISMA flow diagram (Moher, Liberati, Tetzlaff, & Altman, 2009).