





# BMJ Open Nursing support for breathlessness in patients with cancer: a scoping review

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## ABSTRACT

**Objective** To identify nursing support provided for the relief of breathlessness in patients with cancer.

**Design** A scoping review following a standard framework proposed by Arksey and O'Malley.

**Study selection** Electronic databases (PubMed, CINAHL, CENTRAL and Ichushi-Web of the Japan Medical Abstract Society Databases) were searched from inception to 31 January 2022. Studies reporting on patients with cancer (aged ≥18 years), intervention for relief from breathlessness, nursing support and quantitatively assessed breathlessness using a scale were included.

**Results** Overall, 2629 articles were screened, and 27 were finally included. Results of the qualitative thematic analysis were categorised into 12 nursing support components: fan therapy, nurse-led intervention, multidisciplinary intervention, psychoeducational programme, breathing technique, walking therapy, inspiratory muscle training, respiratory rehabilitation, yoga, acupuncture, guided imagery and abdominal massage.

**Conclusions** We identified 12 components of nursing support for breathlessness in patients with cancer. The study results may be useful to understand the actual state of nursing support provided for breathlessness in patients with terminal cancer and to consider possible support that can be implemented.

## INTRODUCTION

Breathlessness is a subjective symptom defined as 'an unpleasant or uncomfortable sensation during breathing'<sup>1</sup> and is frequently described as a devastating symptom. Breathlessness is one of the most common refractory symptoms to palliate<sup>2</sup> and has substantial implications for quality of life.<sup>3 4</sup> Furthermore, the prevalence and severity of breathlessness in patients with terminal cancer tend to increase as the patient approaches death.<sup>5 6</sup> Therefore, relief from breathlessness is an urgent challenge.

Treating the primary cause of breathlessness in patients with terminal cancer is difficult; hence, a combination of non-pharmacological and pharmacological interventions is recommended, depending on the prognosis.<sup>7</sup> Recent clinical practice guidelines have focused on non-pharmacological

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This is the first scoping review on nursing support for breathlessness in patients with cancer.
- ⇒ Searches were limited to studies published in Japanese and English; therefore, relevant articles published in other languages may have been excluded.
- ⇒ The study was not designed to assess methodological quality.
- ⇒ The search was limited to studies where at least 80% of the participants had cancer.

interventions and have stated several non-pharmacological interventions that serve as first-line treatment options for breathlessness.<sup>8 9</sup> For example, these guidelines recommend fan or air flow therapy, breathing techniques, breathing retraining, education and self-management strategies, rehabilitation, acupressure or reflexology for breathlessness. Fan therapy is reportedly effective for patients with terminal cancer;<sup>10–13</sup> however, evidence accumulated for other non-pharmacological interventions is limited.

Nurses are healthcare workers who provide non-pharmacological therapy, and the support provided is known as nursing support. For example, fan therapy, a simple method of blowing air on the face for 5 min,<sup>14–16</sup> is a support that can be implemented by nurses, physicians, therapists and others; thus, fan therapy is a form of nursing support. In addition, fan therapy has been reported in studies on patients with terminal cancer having breathlessness, and thus, may be implemented in real clinical settings. Nevertheless, few studies have investigated other nursing support for patients with terminal cancer having breathlessness.

Therefore, this study aimed to comprehensively review studies on nursing support for breathlessness in patients with terminal and non-terminal cancers and to understand the nursing support components reported in the literature. The results of this study will clarify



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the actual state of nursing support provided for breathlessness in patients with terminal cancer and allow for the examination of possible support that can be implemented in the future.

## METHODS

We conducted a scoping review to comprehensively explore and map the nursing support provided to reduce breathlessness in patients with cancer. We applied a standard framework proposed by Arksey and O'Malley<sup>17,18</sup> and expanded by the Joanna Briggs Institute.<sup>19</sup> We followed reporting guidelines described in the Preferred Reporting Items for Systematic Reviews and Meta-analyses Statement extension for Scoping Reviews.<sup>20</sup> The scoping review protocol was published prospectively.<sup>21</sup> This study is a scoping review of breathlessness, a symptom addressed in the study protocol. In addition, we conducted a Delphi study on the feasibility of nursing support; the results of the Delphi study will be reported separately. In the protocol paper, nursing support was defined as support that nurses can implement. Although some previous studies have used the term 'nursing intervention', we used the term 'nursing support' in this review. If the care provider was a nurse, the care was identified as nursing support. If the care provider was not stated, the researchers, including nurses and physicians, discussed whether nurses could perform the care in their daily clinical practice; if judged possible, it was identified as nursing care.

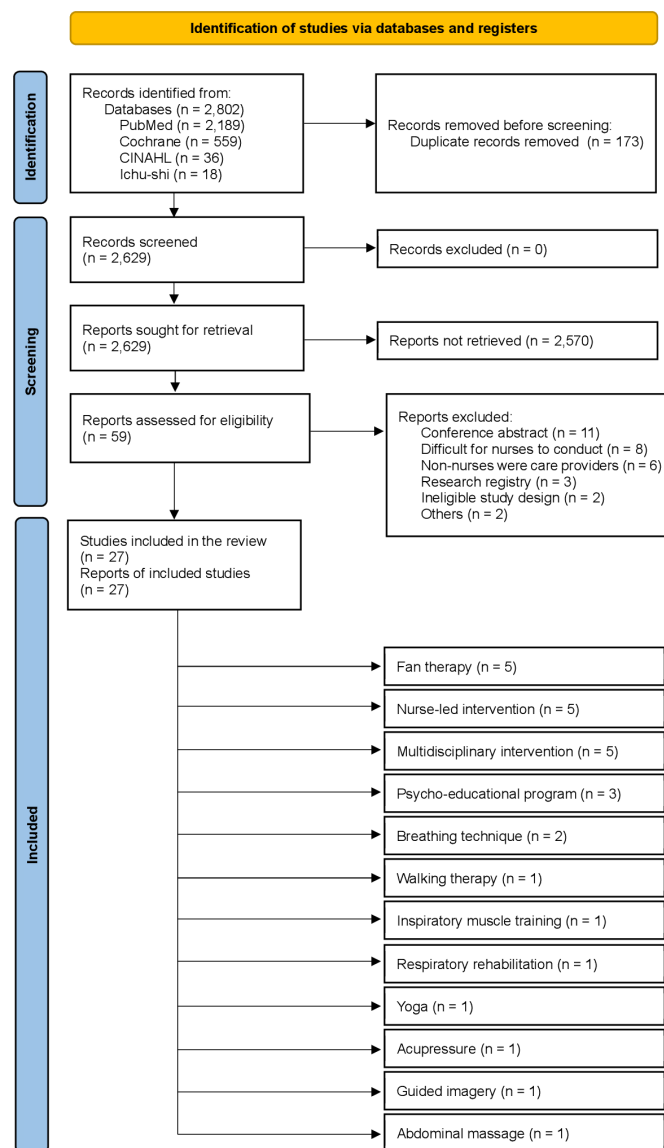
### Identifying the research question

A systematic literature search was conducted on nursing support for breathlessness in patients with cancer. The research question for this study was as follows: What types of nursing support are provided to alleviate breathlessness in patients with cancer?

### Identifying relevant studies

We searched PubMed, Cumulative Index to Nursing and Allied Health Literature, Cochrane Central Register of Controlled Trials in the Cochrane Library and Ichushi-Web of the Japan Medical Abstract Society Databases from their inception to 31 January 2022. We also assessed relevant studies from the article list and manually searched them through key journals. Search formulas were first created in PubMed as an initial search. Subsequently, search formulas were created to match other databases (see the protocol paper<sup>21</sup> or online supplemental file 1 for details of the search formula). JK and MM completed this initial search in consultation with the librarian.

The eligibility criteria were determined by physicians and nurses specialising in symptom management of patients with cancer, details of which are described in the review protocol.<sup>21</sup> Briefly, the inclusion criteria were (a) articles on patients with cancer aged 18 years or older, (b) intervention studies for relief from breathlessness, (c) nursing support articles and (d) articles



**Figure 1** PRISMA flow diagram. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-analyses.

that quantitatively assessed breathlessness using a scale. Moreover, we excluded papers involving more than 20% of participants without cancer, secondary analyses, and papers in languages other than Japanese and English.

### Study selection process

Two authors (JK and MM) independently assessed the titles and abstracts of all studies, followed by full-text screening against the eligibility criteria. Any discrepancies in study selection were resolved by discussion. The study selection process is summarised in figure 1.

### Charting the data

A form was created to extract study characteristics, including the first author's name, publication year, country of publication, study design, aims, sample size, age, sex, primary cancer sites, type of nursing support, provider, outcome measurement tools and results of the interventions for breathlessness. Data were extracted

independently by the same two authors. Studies were excluded at this phase if they did not meet the eligibility criteria.

### Collating, summarising and reporting the results

The nursing support reported in the articles extracted from the literature review was categorised by care component using qualitative thematic analysis, which was performed via the following steps.<sup>22 23</sup> First, we extracted the nursing support data described in the included studies as raw data into Excel, read the data for possible support patterns and made notes as initial codes that would lead to the categorisation of nursing support components. Second, we created the initial codes based on the support providers and care delivery system. Third, we searched for patterns and grouped potential components of nursing support. Fourth, we reviewed the initial codes to find common nursing support components. Finally, we identified and clearly named each component. We used some nursing support terms defined in the included studies as references. In the analysis, the classification of nursing support by one author (JK) was examined by another author (MM), followed by the study group for validity.

### Patient and public involvement

Patients or the public were not involved in the study design, data collection and analysis, decision to publish or preparation of the manuscript.

## RESULTS

### Search results

Figure 1 shows the literature screening process and results. Overall, 2802 articles were identified based on the eligibility criteria. After removing 173 duplicates, we screened the titles and abstracts of 2629 articles and further excluded 2570 articles. In addition, we assessed 59 full-text articles for eligibility and excluded 32 articles for the following reasons: conference abstract (n=11), difficult for nurses to conduct (n=8), non-nurses were care providers (n=6), research registry (n=3), ineligible study design (n=2) and others (n=2). The studies excluded because of 'difficult for nurses to conduct' interventions such as aromatherapy, reflexology and meditation performed by aromatherapists, reflexologists and mind-body practitioners, respectively, all of whom are licensed practitioners.

Online supplemental file 2 presents the characteristics and care components of nursing support as well as its design and main results. The 27 articles that were finally included were categorised into 12 care components of nursing support following the qualitative thematic analysis. They included articles reporting fan therapy (n=5),<sup>14 15 24–26</sup> nurse-led intervention (n=5),<sup>27–31</sup> multidisciplinary intervention (n=5),<sup>32–36</sup> psychoeducational programme (n=3),<sup>37–39</sup> breathing technique (n=2),<sup>40 41</sup> walking therapy (n=1),<sup>42</sup> inspiratory muscle training (n=1),<sup>43</sup> respiratory rehabilitation (n=1),<sup>44</sup> yoga

(n=1),<sup>45</sup> acupuncture (n=1),<sup>46</sup> guided imagery (n=1)<sup>47</sup> and abdominal massage (n=1).<sup>48</sup> Eight articles were reported from the UK, followed by three from the USA and two each from China, Japan, Spain, Taiwan and Turkey. Of the 27 studies, 23 were randomised controlled trials (RCTs), and the remaining 4 were prospective studies. Seven studies included patients with terminal cancer in the study population and involved fan therapy,<sup>14 15 24–26</sup> guided imagery<sup>47</sup> and abdominal massage.<sup>48</sup> Overall, 19 articles reported improvement in breathlessness after intervention.<sup>14 15 24–28 30 32 33 35 37–39 41 43 44 46 47</sup> These articles included fan therapy, nurse-led intervention, multidisciplinary intervention, psychoeducational programme, breathing technique, inspiratory muscle training, respiratory rehabilitation, acupuncture and guided imagery.

## DISCUSSION

Our research question involved identification of nursing support categories for alleviating breathlessness in patients with cancer. We categorised the 27 included articles into 12 nursing support components.

The nursing support components for patients with terminal cancer were fan therapy, guided imagery<sup>47</sup> and abdominal massage.<sup>48</sup> As expected, fan therapy was the nursing support component with the most number of included studies; moreover, it is the highest rated recommendation by both the American Society of Clinical Oncology and the European Society for Medical Oncology clinical guidelines.<sup>8 9</sup> Guided imagery was defined as a 'range of techniques from simple visualisation and direct imagery-based instructions through metaphor or storytelling'. Guided imagery is likely to be implemented in patients with terminal cancer because it is less invasive; however, access to knowledge and information on its implementation is likely to be a challenge. Abdominal massage is feasible and routinely used in constipation management. Nevertheless, it may be difficult in patients with intra-abdominal lesions, and invasiveness can be an issue.

Nine of the 12 nursing support components have not been reported in patients with terminal cancer. First, the nursing support components included complex interventions, which were categorised as nurse-led and multidisciplinary interventions as well as psychoeducational programmes. We classified care components according to whether they are primarily nurse led or whether nurses are included in the support provided by multidisciplinary professionals. Subsequently, care provided by multidisciplinary professionals was categorised in terms of multidimensional or specialised care regarding psychological aspects. Nurse-led intervention is a package of interventions provided by nurses, including assessment of breathlessness, provision of information about breathlessness, and training in breathing and management techniques, with progressive muscle relaxation as needed over several weeks. Multidisciplinary intervention is a package of interventions provided by multiple professions, with



nurses providing a base of assessment, information on breathlessness, and nursing care as needed and coordinating with other professions to ensure that the necessary support is provided. In addition, the package of interventions provides a combination of support categories, such as pharmacotherapy, diet and exercise instruction, mindfulness, breathing instruction, acupressure and education on managing breathlessness, as needed, for several weeks. Psychoeducational programme is a package of interventions provided by a nurse and a psychiatrist or psychologist working together, which includes relaxation/distraction, stress management, instruction on managing breathing difficulties, meditation, yoga, activity scheduling and psychoeducation, in combination as needed, over several weeks. The first feature common to all of these components of nursing support is that they provide a combination of interventions. Breathlessness is a symptom that is caused or aggravated by a complicated influence of multidimensional factors.<sup>1 49–51</sup> Recently, the breathing, thinking, functioning (BTF) clinical model has been developed to manage breathlessness.<sup>52 53</sup> The BTF model is used in the education of healthcare providers to promote effective symptom management by viewing breathlessness from the perspective of breathing, thinking and functioning. Therefore, multimodal interventions may further contribute to the management of breathlessness. The second feature common to these nursing support categories is targeting patients with cancer in the treatment phase of their disease. These nursing support categories aim to successfully manage breathlessness, thereby enabling patients with cancer to continue their anticancer treatment. Hence, it is inferred that no studies have been conducted on patients with terminal cancer.

Breathing techniques, inspiratory muscle training and respiratory rehabilitation have been reported in the field of non-cancerous respiratory diseases<sup>54–56</sup>; nevertheless, few studies have been conducted in the field of oncology. Future studies should assess these nursing support components in patients with cancer, as research evidence is being established in fields other than oncology. Walking therapy, a programme involving the gradual increase of walking distances, is administered for several weeks, depending on the patient's medical condition.<sup>42</sup> Thus, we assume that the nursing support is aimed at gradually improving the activities of daily living in patients with breathlessness. This type of support is difficult to apply to patients with terminal cancer; it is likely to be specific to patients undergoing anticancer treatment.

In terms of study design, 23 of the 27 included studies were RCTs. We identified RCTs that reported nursing support components other than guided imagery. However, one included study reported seven nursing support components, and hence, it is difficult to ascertain the accumulation of research evidence. The applicability of these nursing support components in patients with terminal cancer may vary depending on patient prognosis. Providing nursing support may be burdensome for

highly vulnerable persons, such as patients with terminal cancer. Although fan therapy and guided imagery may be less invasive, respiratory rehabilitation and walking therapy are potentially burdensome to patients. For example, patients with terminal cancer with a prognosis of months have a relatively stable disease and small changes in breathlessness intensity.<sup>57</sup> Therefore, less invasive nursing support components may be applicable. Conversely, patients with cancer with a prognosis of weeks experience rapid deterioration in performance status<sup>57</sup> and an increase in breathlessness intensity.<sup>6 57 58</sup> Many nursing support components are likely to be more invasive for patients with a prognosis of weeks than for those with a prognosis of months. In the field of palliative care, nurses play an important role as care providers.<sup>59</sup> Accumulation of evidence in nursing care is expected in the future.

### Strengths and limitations of the study

To the best of our knowledge, this is the first scoping review on nursing support for breathlessness in patients with cancer. We extensively searched multiple electronic databases from inception to 31 January 2022. Our selection criteria included all interventional studies, which enabled collection of evidence within the available literature. This scoping review has some limitations. First, searches were limited to studies published in Japanese and English, and hence, relevant articles published in other languages may have been excluded. Second, this scoping review was not designed to assess methodological quality. Therefore, our conclusion is not based on the synthesis of evidence regarding nursing support for reducing breathlessness. Third, the search was limited to studies where at least 80% of the participants had cancer; thus, studies conducted primarily on breathlessness in patients without cancer were not included. Therefore, it is possible that nursing support components not included in the results of this study are provided in clinical practice.

### CONCLUSIONS

In this scoping review, we categorised nursing support for breathlessness in patients with cancer into 12 components. Future research should examine the feasibility of implementing these nursing support categories for breathlessness in patients with cancer with a prognosis of months or weeks and explore effective prognosis-based nursing support categories.

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#### REFERENCES

- Parshall MB, Schwartzstein RM, Adams L, *et al.* An official American Thoracic Society statement: update on the mechanisms, assessment, and management of dyspnea. *Am J Respir Crit Care Med* 2012;185:435–52.
- Díez-Manglano J, Isasi de Isasmendi Pérez S, García Fenoll R, *et al.* Palliative sedation in patients hospitalized in internal medicine departments. *J Pain Symptom Manage* 2020;59:302–9.
- Mularski RA, Campbell ML, Asch SM, *et al.* A review of quality of care evaluation for the palliation of dyspnea. *Am J Respir Crit Care Med* 2010;181:534–8.
- Hutchinson A, Barclay-Klingbe N, Galvin K, *et al.* Living with breathlessness: a systematic literature review and qualitative synthesis. *Eur Respir J* 2018;51:1701477.
- Booth S, Silvester S, Todd C. Breathlessness in cancer and chronic obstructive pulmonary disease: using a qualitative approach to describe the experience of patients and Carers. *Palliat Support Care* 2003;1:337–44.
- Currow DC, Smith J, Davidson PM, *et al.* Do the trajectories of dyspnea differ in prevalence and intensity by diagnosis at the end of life? A consecutive cohort study. *J Pain Symptom Manage* 2010;39:680–90.
- NCCN. Palliative care version 1. 2022. Available: [https://www.nccn.org/professionals/physician\\_gls/pdf/palliative.pdf](https://www.nccn.org/professionals/physician_gls/pdf/palliative.pdf) [Accessed 11 Oct 2022].
- Hui D, Maddocks M, Johnson MJ, *et al.* Management of breathlessness in patients with cancer: ESMO clinical practice guidelines. *ESMO Open* 2020;5:e001038.
- Hui D, Bohlke K, Bao T, *et al.* Management of dyspnea in advanced cancer: ASCO guideline. *J Clin Oncol* 2021;39:1389–411.
- Gupta A, Sedhom R, Sharma R, *et al.* Nonpharmacological interventions for managing breathlessness in patients with advanced cancer: a systematic review. *JAMA Oncol* 2021;7:290–8.
- Kako J, Kobayashi M, Oosono Y, *et al.* Immediate effect of fan therapy in terminal cancer with dyspnea at rest: a meta-analysis. *Am J Hosp Palliat Care* 2020;37:294–9.
- Swan F, Newey A, Bland M, *et al.* Airflow relieves chronic breathlessness in people with advanced disease: an exploratory systematic review and meta-analyses. *Palliat Med* 2019;33:618–33.
- Yu S, Sun K, Xing X, *et al.* Fan therapy for the relief of dyspnea in adults with advanced disease and terminal illness: a meta-analysis of randomized controlled trials. *J Palliat Med* 2019;22:1603–9.
- Kako J, Morita T, Yamaguchi T, *et al.* Fan therapy is effective in relieving dyspnea in patients with terminally ill cancer: a parallel-arm, randomized controlled trial. *J Pain Symptom Manage* 2018;56:493–500.
- Kako J, Morita T, Yamaguchi T, *et al.* Evaluation of the appropriate washout period following fan therapy for dyspnea in patients with advanced cancer: a pilot study. *Am J Hosp Palliat Care* 2018;35:293–6.
- Galbraith S, Fagan P, Perkins P, *et al.* Does the use of a handheld fan improve chronic dyspnea? A randomized, controlled, crossover trial. *J Pain Symptom Manage* 2010;39:831–8.
- Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology* 2005;8:19–32.
- Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci* 2010;5:69.
- Peters M, Godfrey C, McInerney P, *et al.* *The Joanna Briggs Institute Reviewers' Manual 2015: Methodology for JBI Scoping Reviews*. Adelaide, SA Australia: The Joanna Briggs Institute, 2015.
- Tricco AC, Lillie E, Zarin W, *et al.* PRISMA extension for scoping reviews (PRISMA-SCR): checklist and explanation. *Ann Intern Med* 2018;169:467–73.
- Kako J, Kobayashi M, Kanno Y, *et al.* Nursing support for symptoms in patients with cancer and caregiver burdens: a scoping review protocol. *BMJ Open* 2022;12:e061866.
- Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Med Res Methodol* 2008;8:45.
- Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology* 2006;3:77–101.
- Wong SL, Leong SM, Chan CM, *et al.* The effect of using an electric fan on dyspnea in Chinese patients with terminal cancer. *Am J Hosp Palliat Care* 2017;34:42–6.
- Ting FI, Estrella S, Strebel HMJ. The FAFA trial: a phase 2 randomized clinical trial on the effect of a fan blowing air on the face to relieve dyspnea in Filipino patients with terminal cancer. *Asian Journal of Oncology* 2020;6:03–9.
- Kocatepe V, Can G, Oruç Ö. Lung cancer-related dyspnea: the effects of a handheld fan on management of symptoms. *Clin J Oncol Nurs* 2021;25:655–61.
- Bredin M, Corner J, Krishnasamy M, *et al.* Multicentre randomised controlled trial of nursing intervention for breathlessness in patients with lung cancer. *BMJ* 1999;318:901–4.
- Moore S, Corner J, Haviland J, *et al.* Nurse led follow up and conventional medical follow up in management of patients with lung cancer: randomised trial. *BMJ* 2002;325:1145.



- 29 Choratas A, Papastavrou E, Charalambous A, *et al.* Developing and assessing the effectiveness of a nurse-led home-based educational programme for managing breathlessness in lung cancer patients. A feasibility study. *Front Oncol* 2020;10:1366.
- 30 Yates P, Hardy J, Clavarino A, *et al.* A randomized controlled trial of a non-pharmacological intervention for cancer-related dyspnea. *Front Oncol* 2020;10:591610.
- 31 Zhang C, Guo H, Shen M, *et al.* Comparison of clinical effectiveness of nurse led care among Chinese patients with cancer: a prospective study evaluating effective patient care compared to consultant oncologist. *J Infect Public Health* 2020;13:159–63.
- 32 Corner J, Plant H, A'Hern R, *et al.* Non-pharmacological intervention for breathlessness in lung cancer. *Palliat Med* 1996;10:299–305.
- 33 Farquhar MC, Prevost AT, McCrone P, *et al.* Is a specialist breathlessness service more effective and cost-effective for patients with advanced cancer and their carers than standard care? Findings of a mixed-method randomised controlled trial. *BMC Med* 2014;12:194.
- 34 Yorke J, Lloyd-Williams M, Smith J, *et al.* Management of the respiratory distress symptom cluster in lung cancer: a randomised controlled feasibility trial. *Support Care Cancer* 2015;23:3373–84.
- 35 Bayati M, Molavynjad S, Taheri N, *et al.* Investigating the effect of integrated educational program on the quality of life among cancer patients: a clinical trial study. *Asian Pac J Cancer Prev* 2019;20:3457–63.
- 36 Ruiz-Vozmediano J, Löhnchen S, Jurado L, *et al.* Influence of a multidisciplinary program of diet, exercise, and mindfulness on the quality of life of stage IIA–IIB breast cancer survivors. *Integr Cancer Ther* 2020;19:1534735420924757.
- 37 Arving C, Sjöden P-O, Bergh J, *et al.* Individual Psychosocial support for breast cancer patients: a randomized study of nurse versus psychologist interventions and standard care. *Cancer Nurs* 2007;30:E10–9.
- 38 Greer JA, MacDonald JJ, Vaughn J, *et al.* Pilot study of a brief behavioral intervention for dyspnea in patients with advanced lung cancer. *J Pain Symptom Manage* 2015;50:854–60.
- 39 McDonnell KK, Gallerani DG, Newsome BR, *et al.* A prospective pilot study evaluating feasibility and preliminary effects of breathe easier: a mindfulness-based intervention for survivors of lung cancer and their family members (dyads). *Integr Cancer Ther* 2020;19:1534735420969829.
- 40 Barton R, English A, Nabb S, *et al.* A randomised trial of high vs low intensity training in breathing techniques for breathless patients with malignant lung disease: a feasibility study. *Lung Cancer* 2010;70:313–9.
- 41 Johnson MJ, Kanaan M, Richardson G, *et al.* A randomised controlled trial of three or one breathing technique training sessions for Breathlessness in people with malignant lung disease. *BMC Med* 2015;13:213.
- 42 Bade BC, Gan G, Li F, *et al.* Randomized trial of physical activity on quality of life and lung cancer biomarkers in patients with advanced stage lung cancer: a pilot study. *BMC Cancer* 2021;21:352.
- 43 Molassiotis A, Charalambous A, Taylor P, *et al.* The effect of resistance Inspiratory muscle training in the management of Breathlessness in patients with Thoracic malignancies: A feasibility randomised trial. *Support Care Cancer* 2015;23:1637–45.
- 44 Fernández Rodríguez EJ, Rihuete Galve MI, Cruz Hernández JJ. Impact of a comprehensive functional rehabilitation programme on the quality of life of the oncological patient with dyspnoea. *Med Clin (Barc)* 2021;157:10–6.
- 45 Lötze D, Wiedemann F, Rodrigues Recchia D, *et al.* Iyengar-yoga compared to exercise as a therapeutic intervention during (Neo) Adjuvant therapy in women with stage I–III breast cancer: health-related quality of life, mindfulness, spirituality, life satisfaction, and cancer-related fatigue. *Evid Based Complement Alternat Med* 2016;2016:5931816.
- 46 Doğan N, Taşçı S. The effects of acupressure on quality of life and dyspnea in lung cancer: a randomized, controlled trial. *Altern Ther Health Med* 2020;26:49–56.
- 47 Lai W-S, Chao C-SC, Yang W-P, *et al.* Efficacy of guided imagery with theta music for advanced cancer patients with dyspnea: a pilot study. *Biol Res Nurs* 2010;12:188–97.
- 48 Wang T-J, Wang H-M, Yang T-S, *et al.* The effect of abdominal massage in reducing malignant ascites symptoms. *Res Nurs Health* 2015;38:51–9.
- 49 Tanaka K, Akechi T, Okuyama T, *et al.* Factors correlated with dyspnea in advanced lung cancer patients: organic causes and what else? *J Pain Symptom Manage* 2002;23:490–500.
- 50 Currow DC, Chang S, Reddel HK, *et al.* Breathlessness, anxiety, depression, and function—the BAD-F study: a cross-sectional and population prevalence study in adults. *J Pain Symptom Manage* 2020;59:197–205.
- 51 Lovell N, Etkind SN, Bajwah S, *et al.* Control and context are central for people with advanced illness experiencing breathlessness: a systematic review and thematic synthesis. *J Pain Symptom Manage* 2019;57:140–55.
- 52 Spathis A, Booth S, Moffat C, *et al.* The breathing, thinking, functioning clinical model: a proposal to facilitate evidence-based breathlessness management in chronic respiratory disease. *NPJ Prim Care Respir Med* 2017;27:27.
- 53 Spathis A, Burkin J, Moffat C, *et al.* Cutting through complexity: the breathing, thinking, functioning clinical model is an educational tool that facilitates chronic breathlessness management. *NPJ Prim Care Respir Med* 2021;31:25.
- 54 Bruton A, Lee A, Yardley L, *et al.* Physiotherapy breathing retraining for asthma: a randomised controlled trial. *Lancet Respir Med* 2018;6:19–28.
- 55 Rochester CL, Vogiatzis I, Holland AE, *et al.* An official American Thoracic Society/European Respiratory Society policy statement: enhancing implementation, use, and delivery of pulmonary rehabilitation. *Am J Respir Crit Care Med* 2015;192:1373–86.
- 56 Lista-Paz A, Bouza Cousillas L, Jácome C, *et al.* Effect of respiratory muscle training in asthma: a systematic review and meta-analysis. *Ann Phys Rehabil Med* 2023;66:101691.
- 57 Seow H, Barbera L, Sutradhar R, *et al.* Trajectory of performance status and symptom scores for patients with cancer during the last six months of life. *J Clin Oncol* 2011;29:1151–8.
- 58 Reuben DB, Mor V. Dyspnea in terminally ill cancer patients. *Chest* 1986;89:234–6.
- 59 Ferrell BR, Chung V, Koczywas M, *et al.* Dissemination and implementation of palliative care in oncology. *J Clin Oncol* 2020;38:995–1001.