



**Non-medical devices for chronic breathlessness: use,  
barriers and facilitators for patients, carers and clinicians  
- a scoping review**

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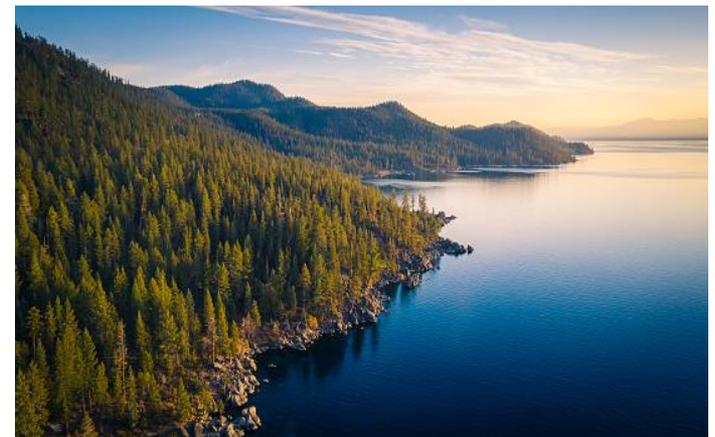
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# Overview of presentation

- 🌀 Background; what's the problem?
- 🌀 Aims
- 🌀 Research questions
- 🌀 Methods
- 🌀 Eligibility criteria; Design, Population, Exposure, Outcomes
- 🌀 Searches
- 🌀 Results; PRISMA, study characteristics, summary
- 🌀 Conclusions



# What's the problem?

We know that evidence supports the benefits of “non-medical devices” such as;

- hand-held fans
  - wheeled mobility aids
  - and Inspiratory Muscle Training (IMT) devices
- for patient management of chronic breathlessness

**BUT**

1. No reviews that explore implementation
2. Little is known about the experiences of those who use or recommend the fan, IMT devices and mobility aids for the management of chronic breathlessness.



# Aims of scoping review

- To examine the published evidence about **patient, carer and clinician** use of the **fan, mobility aids** and **IMT devices** for the management of chronic breathlessness
- To identify the potential **barriers** and **facilitators** to day-to-day use in a range of settings.

# Research questions

1. How are non-medical devices (fan, mobility aids, IMT devices) used for the management of chronic breathlessness by patients, carers and clinicians?
2. What are the potential barriers and facilitators for patients, carers and clinicians to the use of these non-medical devices for the management of chronic breathlessness?

## Design

	Inclusion criteria	Exclusion criteria
Design	<ul style="list-style-type: none"><li>• Any design, quantitative and qualitative including randomised controlled trials (RCTs), observational, qualitative interviews.</li><li>• Studies of <b>both</b> primary and secondary analyses of data</li><li>• Secondary analyses were included if the study presented unpublished or additional data not included in the primary paper</li></ul>	<ul style="list-style-type: none"><li>• Guidelines.</li><li>• Reviews.</li><li>• Opinion pieces.</li></ul>

## Population

	Inclusion criteria	Exclusion criteria
Population	<ul style="list-style-type: none"> <li>• Patients; adults with chronic breathlessness</li> <li>• Including COPD, lung cancer, interstitial lung disease, chronic heart failure, motor neuron disease.</li> <li>• Studies included if the majority of participants were living with a cardiorespiratory or neurological disease.</li> <li>• Carers or caregivers or informal carers</li> <li>• Clinicians of any discipline</li> </ul>	<ul style="list-style-type: none"> <li>• Paediatric patients.</li> </ul>

## Exposure

	Inclusion criteria	Exclusion criteria
Exposure	<ul style="list-style-type: none"> <li>• Fan (handheld battery operated)</li> <li>• Mobility aids (three or four wheeled walker or rollator with or without a seat)</li> <li>• Inspiratory Muscle Training (IMT) devices</li> <li>• “Complex interventions” any of the above if reported separately from the other components.</li> </ul> <p><b>Context of exposure;</b></p> <ul style="list-style-type: none"> <li>• Patients &amp; carers – use/experience at home and outside in the community e.g. shopping.</li> <li>• Clinicians – use/experience in the community, primary and secondary care; hospitals including Specialist Palliative Care Units (SPCU) e.g. hospice.</li> </ul>	<ul style="list-style-type: none"> <li>• Spacers - high prevalence of studies in the paediatric population.</li> </ul>

## Outcomes

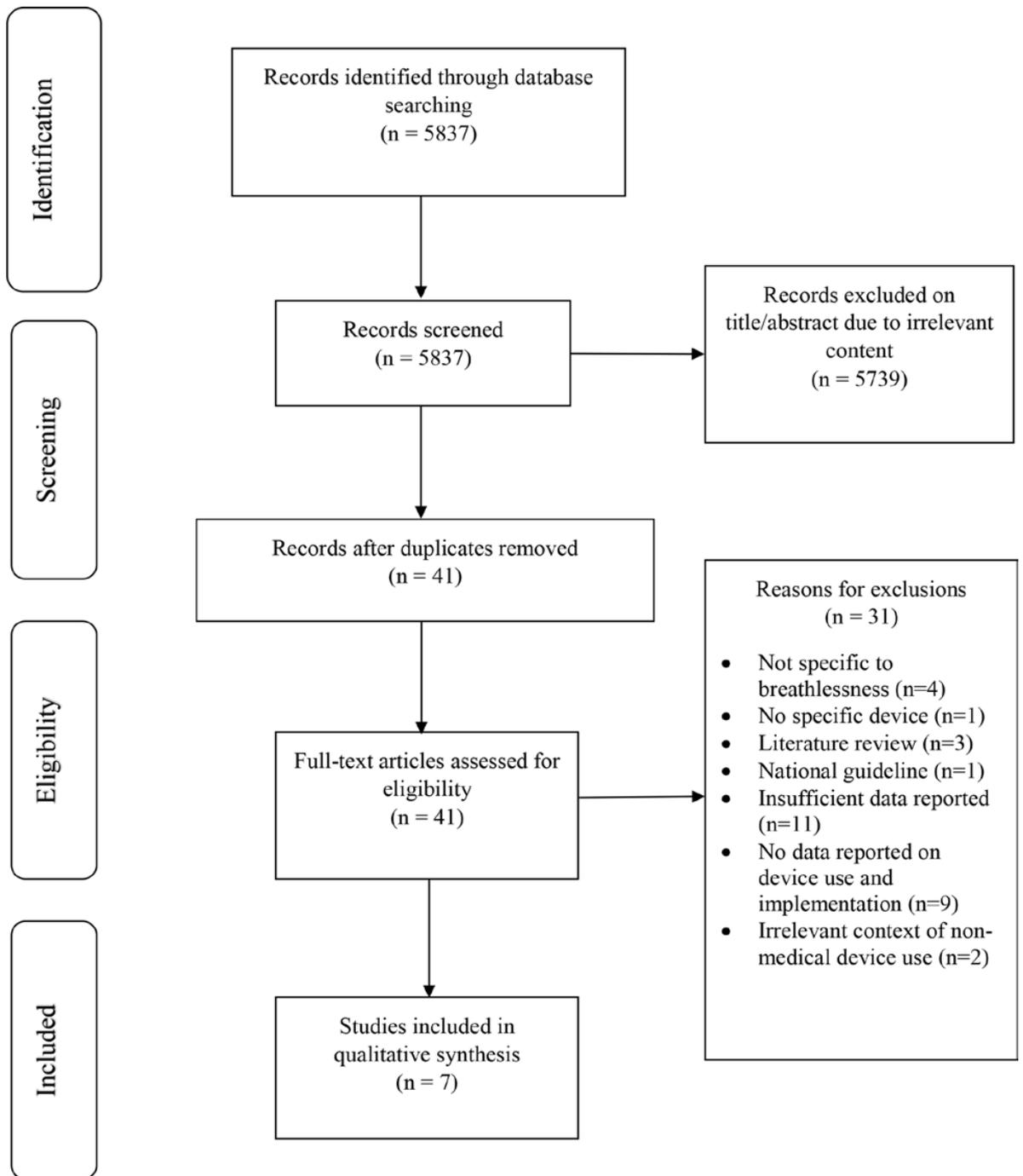
	Inclusion criteria	Exclusion criteria
Outcome	<ul style="list-style-type: none"><li>• Quantitative data</li><li>• Qualitative data</li><li>• Details of non-medical device use and experience</li><li>• Details of potential barriers and facilitators to use for the management of chronic breathlessness.</li></ul>	

# Methods

- Search strategy developed from a Cochrane review protocol (Respiratory interventions for breathlessness in adults with advanced diseases)
- Searches (April-June 2020) MEDLINE, Embase, Scopus, EBSCO and the Cochrane Database of Systematic Reviews
- Papers imported into EndNote and Rayyan
- Papers reviewed against *a priori* eligibility criteria.
- Outcome data relevant to use and experience of non-medical device extracted
- Categorised as potential barriers and facilitators
- Narrative synthesis exploring reasons for similarities and differences.

## Preferred Reporting Items for Systematic Reviews and Meta-Analysis flow diagram of study selection and retrieval.

- Screened n=5837
- Full text articles n=41
- Included n=7



# Results

## Study characteristics

### 7 papers met inclusion criteria

- ▶ Fan: 5 papers
- ▶ Mobility aids: 2 papers
- ▶ IMT Devices: 0 papers



### Fan papers:

3 feasibility phase II clinical trials;

- ▶ a 6-month RCT (n=70)
- ▶ three-arm RCT (FAB) (n=43)
- ▶ a 2×2 factorial RCT (CHAFF) (n=40)

2 secondary analyses;

- ▶ 3 clinical trials multimethod analysis interview data (BIS, FAB, CHAFF) (n=133)
- ▶ 2 clinical trials survey data (FAB, CHAFF) (n=41)

### Mobility aid papers:

- ▶ a phase III RCT (n=31)
- ▶ a cross-sectional observational study (n=27)



# Results

## Study characteristics

- ⌚ All studies regarding **patient** perceptions
- ⌚ No studies of **clinicians or carers**
- ⌚ If carers were included in the study very few data on their experience or use of the devices.
- ⌚ None of the studies that tested a complex intervention such as the Breathlessness Intervention Service (BIS) studies were included
- ⌚ Too **few data** reported on the individual non-medical devices
- ⌚ Fan **secondary analyses studies included** in addition to the two primary papers
- ⌚ Reported fan data not published in the primary papers and in-depth exploration of the benefits and factors associated with fan use.

# Results

- All of the studies presented **patient** use of non-medical devices only.
- Patients found the fan easy to use at home.
- Mobility aids were used mainly for outdoor activities.
- Outdoor use for both devices were associated with embarrassment.

## Key barriers included:

- appearance;
- credibility;
- self-stigma;
- technical specifications.



## Common facilitators included:

- ease of use,
- clinical benefit
- feeling safe with the device.

# Results Summary

1. Limited data on non-medical device use for the management of chronic breathlessness
2. All focussed on the fan and mobility aids rather than IMT devices
3. All focussed on the perspective of patients rather than carers or clinicians.
4. None of the studies applied implementation science theory.



# Conclusions

## What are the new findings?

- 🌀 Fan and mobility aids are easy for patients to use, but barriers DO exist.
- 🌀 No implementation studies or data on carers, clinicians, or IMT devices.

## What is their significance?

- 🌀 **Clinical:** Clinicians should assess for barriers to non-medical device use.
- 🌀 **Research:** Future studies should be underpinned by Implementation Science Theory.

# References

- ▶ Bausewein C, Booth S, Gysels M, Kuhnbach R, *et al.* Effectiveness of a hand-held fan for breathlessness: a randomised phase II trial. *BMC Palliative Care* 2010;9:22.
- ▶ Johnson MJ, Booth S, Currow DC, Lam LT, Phillips JL. A Mixed-Methods, Randomized, Controlled Feasibility Trial to Inform the Design of a Phase III Trial to Test the Effect of the Handheld Fan on Physical Activity and Carer Anxiety in Patients With Refractory Breathlessness. *Journal of Pain and Symptom Management*. 2016;51(5):807-15
- ▶ Lockett T, Phillips J, Johnson MJ, *et al.* Contributions of a hand-held fan to self-management of chronic breathlessness. *European Respiratory Journal* 2017; 50: 1700262
- ▶ Swan F, English A, Allgar V, Hart SP, Johnson MJ. The Hand-Held Fan and the Calming Hand for People With Chronic Breathlessness: A Feasibility Trial. *Journal of Pain and Symptom Management*. 2019.
- ▶ Barnes-Harris, M, Allgar V, Booth S, *et al.* Battery operated fan and chronic breathlessness: does it help? *BMJ Supportive & Palliative Care* 2019;9:478–81.
- ▶ Gupta RB, Brooks D, Lacasse Y, *et al.* Effect of rollator use on health-related quality of life in individuals with COPD. *Chest* 2006;130:1089–95.
- ▶ Hill K, Goldstein R, Gartner EJ, *et al.* Daily utility and satisfaction with rollators among persons with chronic obstructive pulmonary disease. *Archives Phys Med Rehabilitation* 2008;89:1108–13.



Thank you

Any questions?

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