Presented by
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ICU or I See Waste?

A Critical Look at Sustainability in Intensive Care

A Systematic Review

Artist: Maria Koijck

4.4% of global net greenhouse gas emissions originate from the health sector

5th among the world's largest emitters, the global health sector would rank if it were a country

Sources: Pichler et al., 2019; Lenzen et al., 2020

1.3 times more **solid waste** per bed day are produced by ICUs compared with non-ICU hospital wards

88–178kg of **carbon dioxide equivalent** (CO_2-e) per patient per day can be emitted on average

Sources: Bardoult et al., 2025; See et al., 2023

Nurses’ sustainable clinical pratice

Daily clinical decisions

Resource use, waste segregation, procurement and adherence to sustainability policies

Knowlede, attitudes and behaviors

Affect immediate practices but also shape the organizational culture

Barriers

Competing clinical priorities, infection controlo policies, limited infrastracure, lack of education

Starting point

Moderators

Outcomes

Progressive but uneven diffusion of ecological awareness

Limited conceptual clarity

K

A

B

Tension between safety and quality

Individual level

Confidence
Peer influence and modeling

Organizational level

Leadership engagement
Presence of clear protocols
Managerial encouragement
Accessible waste management systems

Cultural & Contextual level

External event (e.g. COVID-19 pandemic)
Social norms (e.g. generational differences)

Patient care

Reduces noise and light pollution, with implications for delirium and circadian rhythm regulation

Healthcare workers

Rational use of material and improved environmental conditions can reduce stress and enhance professional satisfaction

Organizational level

Cost containment
Resource efficiency

Systemic level

Reductions in waste and emissions contribute to healthcare decarbonization

Systematic Review

Aims

01

Knowledge

Identify the current level of knowledge and awareness of sustainability among critical care nurses

02

Attitudes

Explore nurses’ attitudes toward environmentally sustainable clinical practices within intensive care settings

03

Behaviors

Assess reported behaviors and practices related to sustainability in critical care

Systematic Review

Methods

Design

PRISMA 2020

The Systematic Review was conducted and reported following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 checklist.
The Systematic Review is registered on PROSPERO.

Databases

Comprehensive search on:

PubMed, Scopus, Web of Science, PsycInfo, CINHAL, Eric

Inclusion and/or exclusion criteria

No filters applied

(a) RCTs, quasi-RCT, qualitative studies, cross-sectional studies, cohort studies, quasi-experimental studies
(b) studies that mentioned knowledge, attitudes and behaviors of critical care nurses regarding sustainable clinical pratice

Data extraction and quality appraisal

Study selection and methodological quality

EndNote 21.5 was used as a computer based reference management software program.
RYYAN software was used to remove duplicates, screen and select articles.
The critical appraisal of the quality of the studies was carried out using Joanna Briggs Institute's (JBI) checlists

Systematic Review

Results

13 studies satisfied the inclusion and quality criteria

1 prospective cross-sectional point prevalence study

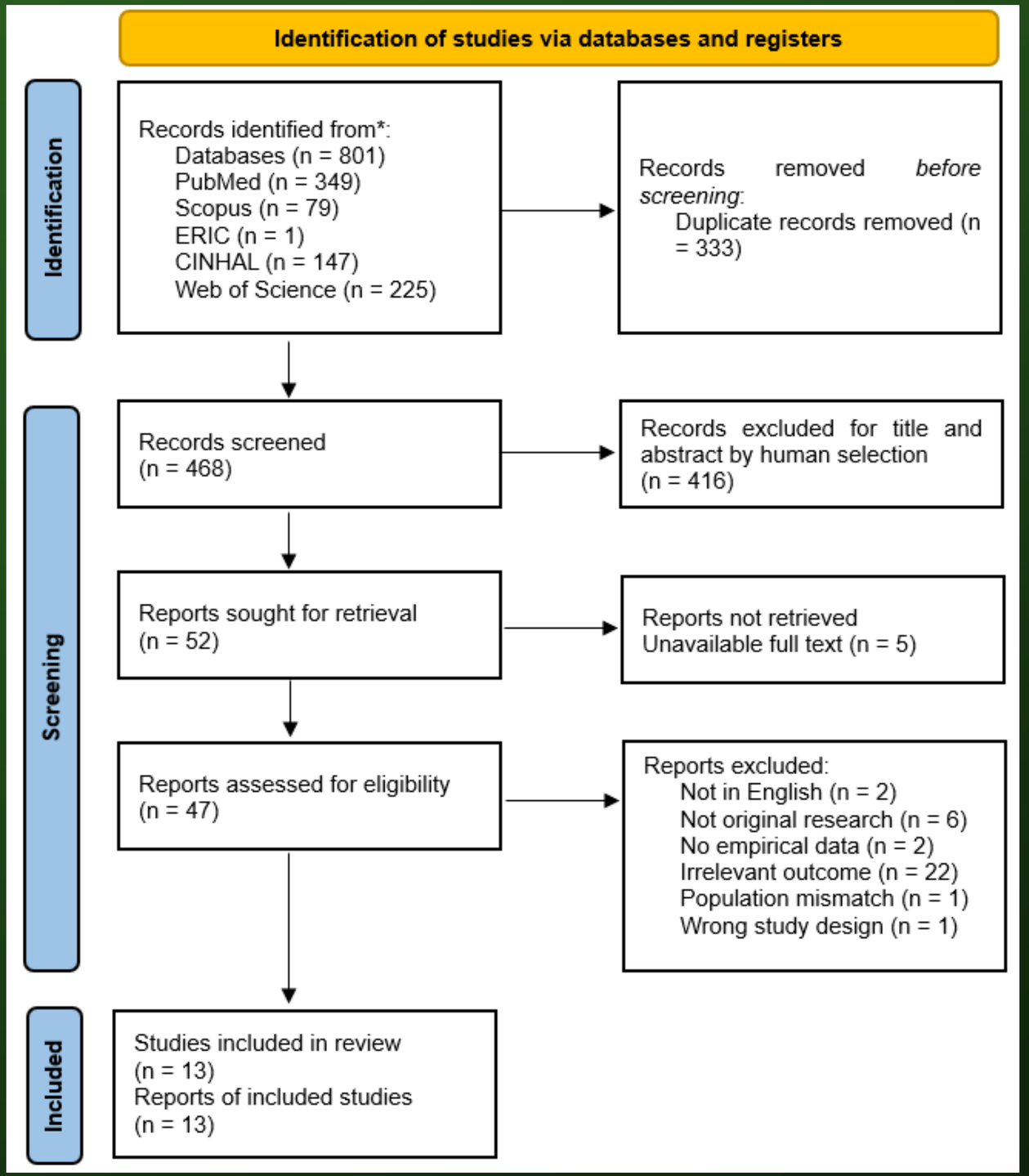
1 cross-sectional exploratory survey

1 monocentric prospective longitudinal study

4 pre-post intervention studies (before-and-after, field experiment, quality improvement designs)

1 nationwide online survey

5 qualitative studies



Systematic Review

Knowledge

Fragmented

Narrow focus

High-income countries

Broader ecological awareness

Middle-income countries

Framed around cost and waste reduction

Systematic Review

Attitudes

Generally positive

↖

Patient safety & infection control

›

Sustainability

↖

Cost savings

=

Strong motivator

Systematic Review

Behaviors

Inconsistent

Context-dependent

Structured interventions

Effective

Nudges or impractical tech

Little effect

Systematic Review

Barriers

Infection prevention policies

Heavy workloads & time pressure

Limited infrastructure & training

Organizational culture

Facilitators

Leadership engagement

Financial savings

Education & training

Team-based initiatives


Embed sustainability in nursing curricula & training
Invest in infrastructure & procurement policies
Reinvest cost savings into care & green initiatives
Need long-term, scalable research

Systematic Review

Limitations

Heterogeneous study designs/outcomes ↙

Reliance on self-reported data ↙

Mostly single-center, small samples ↙

English-only studies ↙

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Thanks

Questions?

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