What Facilitates Green Team Success in Implementing Environmentally Sustainable Initiatives in Health Care

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Abstract

Objective: To identify the factors that contribute to the success of environmentally sustainable initiatives in health care.
Background: Climate change contributes to severe health consequences for global populations. Despite mandates of nonmaleficence and health promotion, resource intensive health care systems contribute to increasing climate change. Health care professionals have been called to mitigate the environmental impact of the health care system. Nurses are particularly important in this work as they are an integral part of health care systems and are the primary providers of care in hospitals, which are the most resource intensive institutions within health care. Nurses are encouraged to engage in climate action by creating, leading, or participating in green teams to enact environmental sustainability initiatives.
Methods: In this study, an integrative review of the literature was performed. The search strategy employed three electronic databases. After inclusion criteria were considered, 13 studies were included in the final sample. Content analysis was used to analyze these studies for patterns, themes, and relationships.
Results: Policy, external collaboration, organisation, and staff engagement were four main themes of facilitative factors that contributed to the success of environmentally sustainable initiatives in health care.
Conclusion: Knowledge about the facilitative factors identified and examined in this review could guide nurses to reduce health care's environmental impact through successful environmentally sustainable initiatives.

Keywords: environment, sustainability, health care, green team

Climate change is the biggest public health threat around the globe and immediate mitigation efforts are necessary to avoid further human and planetary harm (World Health Organization, 2022). Nurses have a tremendous opportunity to promote population health and social justice through climate action (Canadian Nurses Association, 2017; International Council of Nurses, 2018; Leffers et al., 2017; Nicholas, 2019). One way nurses are encouraged to take climate action is through green teams (McDermott-Levy, 2011; Mejia & Sattler, 2009; Practice Greenhealth, 2008; Waddington, 2016). Green teams are any group of employees who work together to implement principles of environmental sustainability in their work places (United States Department of Agriculture, n.d.) and are a principle instrument employed by health care professionals (HCPs) (Boone, 2012; Mejia & Sattler, 2009; Practice Greenhealth, 2021.

Green teams engage in climate action through environmentally sustainable initiatives (ESIs) that raise awareness about the relationship between climate change and health and reduce the environmental impact of health care (Mejia & Sattler, 2009). Examples of climate action include, education on waste diversion and energy-saving behaviours (Al Sammarai, 2020), and infrastructure changes to reduce resource consumption (Herechuk et al., 2010), and recycling programs and waste reduction (Tsung, 2013). Literature regarding green teams is largely limited to discussion of team function, change management principles (Practice Greenhealth, 2008; Waddington, 2016), specific initiatives (McDermott-Levy, 2011; Mejia & Sattler, 2009), and descriptive case studies (Herechuk et al., 2010; Ryan-Fogarty et al., 2016). It remains unknown what supports the success of green teams in healthcare settings.

Background

Climate change has deleterious human health impacts. Greenhouse gas (GHG) emissions from anthropogenic fossil fuel combustion have accelerated global temperature increases (Intergovernmental Panel on Climate Change [IPCC], 2021). Elevated temperatures result in climatic changes that increase human mortality and morbidity through exposures to severe weather, air pollution, poor water quality, allergens, zoonotic diseases, food scarcity, extreme heat, and environmental degradation (Crimmins et al., 2016; Watts et al., 2021). Global health systems provide health services to populations impacted by these exposures, but also contribute 4.4% of global GHG emissions (Health Care Without Harm & ARUP, 2019). HCPs have a duty to promote health and nonmaleficence by mitigating climate impacts and promoting the environmental sustainability of healthcare systems.

Sustainability can be defined as, “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). Within healthcare, sustainability refers to the ability of a program, intervention, strategy, or individual behavior change to endure and adapt over time while continuing to create positive impacts for individuals or systems (Moore et al., 2017). Environmental sustainability in healthcare involves providing services without creating further harm through GHG emissions and environmental degradation. Climate action involves decarbonisation, pollution reduction, awareness and advocacy, and climate adaptation.

Nurses are encouraged by their professional organisations to promote health and social justice through climate action (Canadian Nurses Association, 2017; International Council of Nurses, 2018) and are support to do so by healthcare sustainability organisations such as The Alliance of Nurses for Healthy Environments and Health Care Without Harm impact (Health Care Without Harm, 2021; Nurses Drawdown, 2021). Nurse academics are developing a body of

knowledge about the role of the nurse in climate action (Adrian, 2020; Harris et al., 2009; Li et al., 2021; Pocock, 2019; Sayre et al., 2010), a planetary health framework for nursing education (Guzmán et al., 2021; Kalogirou et al., 2020b; Polivka et al., 2012), and investigating nursing's perceptions of climate change and health (Anåker et al., 2015; Kallio et al., 2020; Kalogirou et al., 2020a; Polivka et al., 2012). However, much of sustainable health care literature is limited to discussion papers (Brenndorfer, 2020; Gadd, 2018; Kurth, 2017; Leffers et al., 2017; Pocock, 2019; Saber, 2020) and case studies or reports (Herechuk et al., 2010; Ryan-Fogarty et al., 2016; Tsung, 2013).

There are strong calls to action for nurses to create or join green teams, but little understanding about how they can successfully implement and maintain ESI. Successful ESI are those that demonstrate a reduction in mitigation metrics such as GHG emissions or an increase in awareness and advocacy around climate change and health. The purpose of this integrative review is to identify factors that contribute to the success of ESI in healthcare systems by reviewing research literature related to health care ESI implementation. Specifically, ESI involving climate change mitigation and awareness will be examined. Climate adaptation and resilience will not be addressed in this review. An understanding of these factors can support and guide nurses who are starting, joining, and leading green teams to reduce the environmental impact of healthcare systems.

Methods

An integrative review of the literature was performed using Whittemore and Knafl's (Whittemore & Knafl, 2005) framework of identifying and analyzing relevant studies. This framework has five distinct phases: 1) problem formation, 2) literature search, 3) data evaluation, 4) data analysis, and 5) presentation of results. Our question was: What contributes to the successful implementation of ESI in health care?

A health sciences librarian provided guidance for the literature search and development of search terms. The EBSCOhost Cumulative Index to Nursing and Allied Health Literature Plus with full text, Ovid Medline, and Scopus databases were searched using three search concepts each with multiple search terms (Table 1).

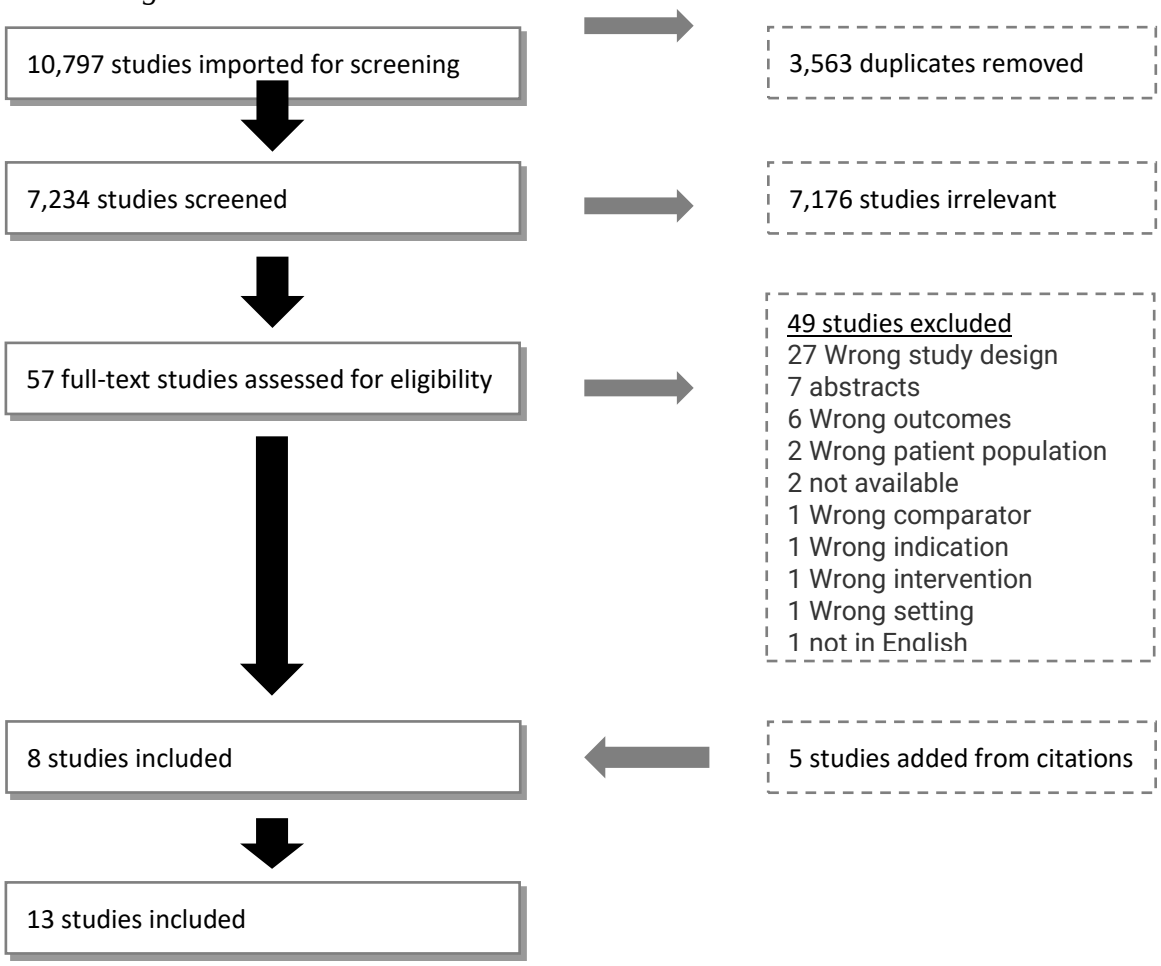
Table 1

Search Terms

Environmentally Sustainable Initiatives		Health Care		Successful Implementation	
"Environmental sustainability" OR "environmentally friendly" OR "environmental impact" OR "environmental health" OR environmentalism OR green OR "eco-friendly" OR "climate change" OR "global warming"	AND	"Health care" OR healthcare OR medical OR nursing OR nurses OR "health system" OR clinic OR hospital OR "green team".	AND	Facilitate* OR promot* OR support* OR assist* OR enable* OR challenges OR barrier* OR difficulties OR difficulty OR obstacle*	OR hurdle* OR barricade* OR hindrance* OR obstruct* OR disparit* OR inequi* OR inequal* OR impede* OR impediment

Figure 1

PRISMA Figure



The results were screened; first by title, then by abstract, and finally by a reading of the entire article by the first two authors. Inclusion criteria was research studies involving health care facilities and an analysis of sustainability efforts in any country. Exclusion criteria was discussion or theoretical papers, or research related to private offices, dental or veterinary clinics, or post-secondary education. After the article screening, the mixed methods appraisal tool (Hong et al., 2018) was employed to critically assess the articles (Table 2). Table 3 provides the data extraction table from and a Preferred Reporting Items for Systematic Reviews figure (Group et al., 2015) was created to outline the review process (Figure 1). Data from the articles that met the inclusion criteria were analysed using content analysis to identify patterns, themes, or relationships in the literature. The aim of content analysis is to interpret the data staying as close to the data as possible (Graneheim & Lundman, 2004; Hsieh & Shannon, 2005; Vaismoradi et al., 2016).

Table 2

Mixed-Methods Appraisal Tool Table

	Screening Questions		1. Qualitative Studies				
Citation	**S1. Are there clear research questions?**	**S2. Do the collected data allow to address the research questions?**	**1.1. Is the qualitative approach appropriate to answer the research question?**	**1.2. Are the qualitative data collection methods adequate to address the research question?**	**1.3. Are the findings adequately derived from the data?**	**1.4. Is the interpretation of results sufficiently substantiated by data?**	**1.5. Is there coherence between qualitative data sources, collection, analysis, and interpretation?**
Krüger et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sari, V., & Camponogara, S. (2014)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Seifert, C. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Screening Questions		**3. Non-Randomized Studies**				
Citation	**S1. Are there clear research questions?**	**S2. Do the collected data allow to address the research questions?**	**3.1. Are the participants representative of the target population?**	**3.2. Are the measurements appropriate regarding both the outcome and the intervention (or exposure)?**	**3.3. Are there complete outcome data?**	**3.4. Are the confounders accounted for in the design and analysis?**	**3.5. During the study period, is the intervention administered (or exposure occurred) as intended?**
Furukawa et al. (2017)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pinzone et al.(2019).	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Screening Questions		**4. Quantitative Descriptive Studies**				
	S1. Are there clear research questions?	**S1. Are there clear research questions?**	**4.1. Is the sampling strategy relevant to address the**	**4.2. Is the sample representative of the target population?**	**4.3. Are the measurements appropriate?**	**4.4. Is the risk of nonresponse bias low?**	**4.5. Is the statistical analysis appropriate to answer the**

			research question?				**research question?**
Ahsan, K., & Rahman, S. (2017)	Yes	Yes	Yes	No	Yes	No	Yes
Ali et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Atia et al. (2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kim et al. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Screening Questions		**5. Mixed Methods Studies**				
Citations	**S1. Are there clear research questions?**	**S1. Are there clear research questions?**	**5.1. Is there an adequate rationale for using a mixed methods design to address the research question?**	**5.2. Are the different components of the study effectively integrated to answer the research question?**	**5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?**	**5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?**	**5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?**
Charlesworth et al. (2012)	Yes	Yes	Yes	Yes	Can't tell	Not applicable	Yes
Kaplan et al. (2016)	Yes	Yes	Yes	Yes	Yes	Not applicable	No
Manika et al. (2016)	Yes	Yes	Yes	Yes	Yes	Yes	No
Tudor et al. (2007)	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3

Data Extraction Table

Author, year, and origin	Aim	Method and sample	Findings	Implications
Ahsan, K., Rahman, S. (2017) Australia	Identify key challenges of implementing green public procurement in the Australian public health care sector.	Quantitative descriptive study using analytic hierarchy process to identify critical challenges facing green procurement. Interview (health care procurement professionals recruited through purposeful sampling and snowballing).	The most critical challenges facing green public procurement in Australian public health care are government legislation, government incentive, top management support for green, and allocation of resources.	It is necessary for the health care sector to collaborate closely with government to create legislation and policy that will allow for resources and incentives required for green public procurement to be implemented.
Ali, M., Wang, W., Chaudhry, N. (2016) Pakistan	Determine the relationship, if any, between reputation, liability, and expense and hospital waste management (HWM)	Quantitative descriptive study using a five-point Likert scale questionnaire administered to 244 nurses from 11 hospitals in Gujranwala.	Perceptions that HWM will result in improved reputation and reduced liability positively impact HWM adoption. And the perception that HWM will increase burden on the facility negatively influences HWM adoption. Financial burden and liability concerns vary with location and size of hospital, whereas reputation is more consistent.	Managers and policy makers can improve implementation of HWM practices by applying this understanding of non-economic social influencers to create better practices from staff.
Atia, N. G., Bassily, M. A., Elamer, A. A. (2020) Egypt	Determine if the integration of life cycle costing (LCC) and life cycle assessment (LCA) through the value change improves environmental and economic performance and efficiency.	Quantitative descriptive study using a seven-point Likert scale survey completed by 209 managers, and accounting and auditing staff employed at central Egyptian government hospitals.	The LCC and LCA integration framework is shown to be reliable in supporting decision making towards sustainable development.	The integration of LCC and LCA can help to better inform government regulators, management accountants, investors, analysts, researchers, and managers to make economically and environmentally advantageous purchasing policies and decisions.
Charlesworth, K. E., Ray, S., Head, F.,	Describe the implementation and	Mixed methods study employing both a four-point Likert scale	There were statistically significant improvements in awareness and	Future initiatives can incorporate knowledge about

Pencheon, D. (2012) United Kingdom	evaluation of an educational intervention regarding environmental sustainability.	survey of 166 participants of the education intervention and semi-structured interviews with 26 of these participants.	advocacy based on the self-reports. Five out of the 26 interviewed had delivered their own workshop and three of the 26 interviewed had set a date. In combination with the interview data, barriers to further engagement of health care professionals include scepticism of what is new, workload, tendency to be reactive instead of proactive, and moral offset.	the potential barriers to transforming awareness and advocacy into action and the suggestions to overcome them into meaningful discussion and debate.
Furukawa, P. de O., Cunha, I. C. K. O., Pedreira, M. da L. G., Marck, P. B. (2017) Brazil	To determine the correlation between professional demographics and sustainable actions in nurses and if training and awareness interventions promote sustainability practices.	Before and after designed (quasi-experimental) non-randomized study which used interviews to collect demographic data and direct observation of medication administration practices in a 41 bed ICU in São Paulo.	Higher education was positively associated with sustainable actions. The training and awareness intervention resulted in a statistically significant increase in sustainable actions.	Health care facilities should promote higher education of nurses and provide environmental sustainability training to nursing staff.
Kaplan, S., Ai, N., Orris, P., Sriraj, P. S. (2016) United States of America	Understand barriers and best practice for greener commuting among health care providers.	Mixed methods study involving a survey administered to 135 hospital staff across five Chicago hospitals and a structured interview with five key sustainable transportation contacts.	Interventions such as financial incentives, solutions to crime and safety concerns, and increasing convenience reduce barriers to green commuting.	Those working to promote green commuting should consider the importance of location specific interventions and community collaboration in their initiatives.
Kim, J. R., Jeon, E. C., Cho, S., Kim, H. (2018) South Korea	Evaluate the eco-efficiencies of 21 hospitals over a three-year period.	Quantitative descriptive study using mandatory reporting data provided by the 21 hospitals through the Environmental Information Disclosure System and	Mandatory policy measures were more effective than voluntary agreements for improving eco-efficiencies.	This study highlights the importance of policy and regulation on improving eco-efficiencies in South Korean hospitals. This knowledge can

		a five-point Likert scale questionnaire administered to 29 hospital staff.		be used to further eco-efficient practices in South Korea.
Krüger, J., Araújo, C., Curi, G. (2017) Brazil	Investigate the motivation of hospital managers for implementing environmental responsibility programs and identify their actions.	Qualitative study using case study methodology and employing 13 semi-structured interviews with two to five managers from each of four hospitals (two private and two public).	Competitive, ethical, and regulatory drivers were all positively associated with the adoption of environmental responsibility programs.	Future regulatory drivers may create a higher baseline of environmental performance. If this occurs, health care will need to progress from mitigation measures (the "low hanging fruit") to strategic action.
Manika, D., Gregory-Smith, D., Wells, V. K., Comerford, L., Aldrich-Smith, L. (2016) United Kingdom	Evaluate the success and challenges of implementing an environmentally sustainable social marketing behaviour change intervention.	Mixed methods study using secondary data of both hospital energy data and 14 interviews with hospital employees.	Benefits from the intervention to the hospital organisation, staff, and patients were recognized. Important factors in the implementation of the intervention include organisational culture, communication of expected benefit, the need for internal green champions, and the use of feedback.	Social marketing interventions can result in increased energy saving behaviours from staff. Important implementation factors can inform future interventions and sustainable initiatives.
Pinzone, M., Guerci, M., Lettieri, E., Huisingh, D. (2019) Italy	Determine and understand the relationship between green training and voluntary pro-environmental behaviours and between green training and job satisfaction.	Non-randomized quantitative study using a survey administered to 260 health care professionals during a mandatory green training program.	Green training is positively mediated by green goal difficulty to result in both increased organisation-focused and co-worker focused Organisational Citizenship Behaviours toward the Environment. It also has a positive effect on job satisfaction.	Suggests green training contributes to the successful implementation of sustainable products and practices. It also demonstrates the importance of green goals that are appropriately challenging in creating successful changes.
Sari, V., Camponogara, S. (2014) Brazil	Identify the challenges of environmental education in a hospital.	Descriptive exploratory case study using documentary research and semi-structured individual interviews of employees directly involved in the planning and/or	Challenges of environment education in a hospital include lack of institutional environmental policy, need for a dedicated environmental sustainability team, lack	It is necessary for health care institutions to foreground environmental sustainability and incorporate it into policies and organisational

		implementation of environmental education in a hospital group in Rio Grande do Sul.	management support, discouragement, difficulty in measuring impacts, and lack of inclusion of environmental education in formal education.	goals for successful implementation of environmental education initiatives.
Seifert, C. (2018) Germany	Identify the challenges hospitals encounter when planning, implementing, and maintaining voluntary environmental management initiatives.	Qualitative study with 14 telephone interviews of responsible environmental managers or the environmental management representatives, each representing a different hospital validated by the Eco-Management and Audit Scheme.	Barriers were found at organisational, group, and individual levels. These include financial and temporal costs, inexperience with Eco-Management and Audit Scheme and environmental issues, low knowledge levels about environmental issues, and negative attitudes towards bureaucratic management system.	The results of this study can help future initiatives to proactively address these barriers and contribute to the successful implementation of the Eco-Management and Audit Scheme in more German hospitals.
Tudor, T. L., Barr, S. W., Gilg, A. W. (2007) United Kingdom	Examine strategies for improving recycling behaviour at Cornwall National Health Service.	Mixed methods study employing waste bin analysis of 353 bags of waste, ethnographic observations of more than 70 sites, 566 questionnaires of randomly selected staff, and eight structured interviews of senior managers.	Staff and management claims of environmental consciousness, and recycling and conservations behaviours were not evident in the quantitative and qualitative data that monitored their behaviours. Staff behaviour was mainly influenced by individual attitudes and circumstances and the culture of the organisation.	Sustainability practices need to be incorporated into organisation policies, communication needs to be enhanced, training and development programs should be initiated, and benefits of sustainable practice promoted.

Results

The initial search revealed 7,234 articles, 57 of which were included in the full-text review; ultimately eight articles met the inclusion criteria. An additional five articles were included from a review of the reference lists of included articles, resulting in a total of 13 articles included in this review.

Green teams occurred at three levels in the articles. There was a green team unit as part of a national health authority (Charlesworth et al., 2013; Tudor et al., 2007) and one as part of a state-wide health authority department (Ahsan & Rahman, 2017). Two hospital green team groups were discussed, one focused on environmental education (Sari & Camponogara, 2014) and the other was a formal working team promoting sustainable logistics (Krüger et al., 2017).

Four themes were developed from analysis: policy, external collaboration, organisation, and staff engagement. Within these themes the authors identified both facilitators and barriers to environmentally sustainable change.

Policy

Policy emerged as an important factor in ESI success. Policy absence was found to inhibit ESI efforts (Ahsan & Rahman, 2017; Krüger et al., 2017; Sari & Camponogara, 2014; Tudor et al., 2007) while public regulation, top-down mandates, and obligatory policy measures were associated with successful ESI. Hospitals federally mandated to adopt a Greenhouse Gas and Energy Target Management System experienced increased eco-efficiency, whereas hospitals with voluntary environmental sustainability agreements experienced decreased eco-efficiencies (Kim et al., 2018). Centralized policies that focused on the environment, instead of cost (Tudor et al., 2007) or patient primacy (Manika et al., 2016; Tudor et al., 2007), served as major drivers of local level action. Perception of ESI as policy fostered employee behaviour change. (Manika et al., 2016). Policies that promoted mandatory standards of environmental sustainability contributed ESI success.

External Collaboration

Three articles discussed external collaboration as an important part of successful ESI. In Manika et al. (2016), an environmental charity successfully developed, implemented, and evaluated energy saving initiatives at two hospitals. Another hospital collaborated with public transportation agencies to optimize transit services and successfully decreased the use of high-carbon transportation (Kaplan et al., 2016). In Seifert (2018), hospitals benefitted from each other's experience in adopting Environmental Management Systems (EMS). However, early adopters of EMS had difficulty finding consultants with expertise in environmental issues and the health care context.

Organisational Factors

There were several facilitative factors at an organisational level. They included: (1) a formal dedicated team; (2) effective communication**;** (3) infrastructure, context, and governance; (4) data, monitoring, and auditing; and (5) financial benefits.

Formal Dedicated Team. Five of the studies stressed the importance of a dedicated, formal environmental team or position. The organisation of an environmental team was identified by Kim et al. (2018) as high priority for promoting environmental sustainability and was shown by Krüger et al. (2017) to institutionalize sustainable logistic processes and contribute to ESI success. A formal position was essential in bridging communication among experts, organisations, and employees and in operationalizing ESI (Seifert, 2018). Ahsan and

Rahman (2017) recognized the role that a dedicated Carbon Management Unit played in increasing awareness and developing and implementing an eco-efficiency program. Without organisational support, Sari and Camponogara (2014) found that environmental initiatives were fragmented and localized around individuals. These individual environmental champions desired a formal, dedicated team to focus exclusively on ESI and provide legitimacy and permanency to the work.

Effective Communication. Effective, two-way communication was identified by four studies to support ESI. Kaplan et al. (2016) found that consistent two-way communication increased executive support and allowed for employee input to address the heterogeneous needs and settings within an organisation. Tudor et al. (2007) noted that effective communication strategies to improve recycling included both formal and informal measures such as posters and collegial discussions. A large number of employees and high turnover rates were major challenges to effective communication (Manika et al., 2016; Seifert, 2018).

Infrastructure, Context, and Governance. Eight articles discussed health care infrastructure, context, and governance as a factor that influenced green initiative implementation. Greater uptake of low-carbon transportation occurred convenience was increased through interventions such as increasing public transport availability (Kaplan et al., 2016). Conversely, infrastructure impeded green changes when equipment did not work effectively or infrastructure was unsuitable for simple energy saving interventions (Manika et al., 2016). Organisational infrastructure also hindered sustainability efforts through power structures (Krüger et al., 2017), bureaucracy, paperwork, and difficulty integrating environmental issues into existing strategies and structures (Seifert, 2018). Additionally, critical challenges for ESI included a lack of vision and strategy (Ahsan & Rahman, 2017; Kim et al., 2018), a reactive approach (Krüger et al., 2017; Manika et al., 2016), and ingrained organisational culture and norms (Manika et al., 2016; Seifert, 2018; Tudor et al., 2007).

Data, Monitoring, and Auditing. Three articles highlighted the importance of good data, monitoring, and auditing. Hospitals with successful ESI reported self-regulative mechanisms such as external audits or certification (Krüger et al., 2017). Information obtained from audits increased the power, legitimacy, and relevance of organisational calls for action (Seifert, 2018). A lack of good data and monitoring hampered informed sustainable purchasing decisions (Seifert, 2018) and ESI evaluation (Sari & Camponogara, 2014).

Financial Benefits. Potential financial co-benefits of ESI were identified in six studies. Co-benefit is a term used to describe the benefits of ESI to society, such as cost reduction, air quality improvements, and ameliorated health outcomes (IPCC, 2007). In one study, financial benefits drove operational improvements and leadership support, while reduced environmental impact was a, “welcome side-effect” (Krüger et al., 2017, p. 506). Manika et al. (2016) found that financial co-benefits of ESI bolstered staff support when they identified opportunity to redirect resources to areas in need . Similarly, decision making related to ESI was supported by integrating life cycle costing (the analysis of the economic cost of a product over its lifespan) and life cycle assessment (a method of evaluating the environmental impact of a product over its lifespan) (Atia et al., 2020). However, fiscal concerns were also a disincentive for ESI adoption (Ahsan & Rahman, 2017; Ali et al., 2016) and auditing (Seifert, 2018). After the implementation of cost-saving ESI, the possibilities for additional financial savings through new ESI became increasingly limited (Seifert, 2018).

Staff Engagement

Staff engagement was discussed as a facilitator and a barrier to ESI in five studies. Three subthemes to staff engagement include (1) perceived benefit, (2) education, and (3) attitudes and beliefs.

Perceived Benefit. Staff engagement was important for the success of ESI in five studies. Perceived benefit engaged staff and encouraged behaviour changes. Some benefits were concrete, like the financial incentive offered to employees who used low-carbon transportation (Kaplan et al., 2016). Increased engagement and behaviour change was noted in staff when they noticed improved work and patient environments resulting from dimming or turning off lights and closing doors during a post-lunch quite time (Manika et al., 2016). Environmental education improved job satisfaction and increased employee investment in the organisation (Pinzone et al., 2019). Additionally, employee green behaviours increased when they were directed towards the organisation or other colleagues (Manika et al., 2016; Pinzone et al., 2019). Concerns about hospital reputation (Ali et al., 2016) and the desire to improve stakeholder perceptions (Krüger et al., 2017) functioned as incentives to develop and implement ESIs.

Education. Education contributed to successful implementation of ESI in five studies. Higher educational level was associated with increased sustainable practices (Furukawa et al., 2017). The workshop Charlesworth et al. (2012) implemented increased awareness and advocacy, and resulted in some participants delivering subsequent workshops. Multiple communication platforms were successful in improving awareness and knowledge about ESI (Manika et al., 2016) which resulted in increased participation (Kaplan et al., 2016) and sustainable behaviours (Pinzone et al., 2019).

There were specific characteristics of educational interventions that remediated a lack of awareness, knowledge, and experience. Regular education with novel approaches was found to be effective (Furukawa et al., 2017). Content that clarified terminology and climate change science, focused on achievable individual actions and the message of sustainability was effective when the message was tailored to specific audiences (health professionals were more interested in health co-benefits and social justice, while executives tend to be more interested in financial savings and reputation) (Charlesworth et al., 2012). Specific learning needs were identified around a lack of awareness of the relationship between local behaviour and organisational environmental performance (Seifert, 2018; Tudor et al., 2007) and a lack of understanding, familiarity, and knowledge of green products (Ahsan & Rahman, 2017). Academic preparation lacked the complexities of a real-life environment (Sari & Camponogara, 2014) and a dearth of experience impeded estimation of the effort required to implement ESI (Seifert, 2018).

Attitudes and Beliefs. Staff attitudes and beliefs influence on ESI implementation was discussed in seven articles. The perception of climate change mitigation as a moral duty served as an ethical driver to promote ESI for some hospital groups (Krüger et al., 2017). Existing pro-environmental attitudes begot pro-environmental behaviours in the workplace. However, poor personal environmental practices also extended into the workplace (Seifert, 2018). Negative attitudes towards the bureaucracy, lack of interest, and reliance on organisational routines impeded sustainability efforts (Seifert, 2018). Some staff believed it was not their role to engage in environmental impact mitigation (Charlesworth et al., 2012; Tudor et al., 2007) due to the primacy of patient care (Manika et al., 2016; Sari & Camponogara, 2014; Seifert, 2018). Staff perceived insufficient time to perform patient-care duties and engage in ESI (Charlesworth et al., 2012; Manika et al., 2016; Seifert, 2018). They considered ESI to be an increased workload (Seifert, 2018) that overburdened them (Ali et al., 2016).

Discussion

This review's findings offer guidance to nurses and green teams about ESI. Policy, external collaboration, organisational, and staff engagement factors can both facilitate and hinder ESI implementation (see table 4 for a summary of these factors). Knowledge of barriers to ESI will help nurses avoid common macro, meso, and micro level issues in creating green teams and implementing ESI.

At the macro level, mandatory environmental policy facilitates successful health care ESI implementation (Kim et al., 2018; Krüger et al., 2017; Manika et al., 2016; Sari & Camponogara, 2014; Tudor et al., 2007) and is reflected in the wider literature on climate policy effectiveness (Aragón-Correa et al., 2020; Lyon et al., 2004; Martin & Saikawa, 2017). Healthcare policy analysis has demonstrated localized conceptualisations of safety (Kalogirou et al., 2021) which ignores the health and safety risks to patients and workers from the environmental and climate impacts of the supply chain. Green teams may encounter this in the form of hospital policies limiting medical supply reuse (Mejia & Sattler, 2009). Nurses are well-suited for policy and leadership roles (Nicholas & Breakey, 2017) and have a strong foundation in advocacy (Walker et al., 2015), but need to expand conceptualisations of the environment from the individual or community to a planetary health framework (Kalogirou et al., 2020b).

External collaborations with sustainability organisations, consultants, and regional agencies were present in successful healthcare ESI (Kaplan et al., 2016; Manika et al., 2016; Seifert, 2018). This finding is consistent with the horizontal and vertical multiparty collaboration necessary to address climate change adaptation at provincial (Feist et al., 2020), regional (Baird et al., 2016), and municipal levels (Barton et al., 2015). Collaboration with sustainability organisations and experts can assist green teams to engage in sector-specific environmental benchmarking practices (The Canadian Coalition for Green Health Care, 2019) which are important for change management (Dixon-Woods et al., 2012) and to avoid unintended harms (Mortimer et al., 2018). In this review, monitoring created power, legitimacy, relevance (Seifert, 2018), diminished staff discouragement (Sari & Camponogara, 2014), and contributed to successful ESI (Kim et al., 2018; Krüger et al., 2017). Nurses are skilled collaborators, who mobilize a diverse and dynamic network of spatially and temporally distributed professionals, products, and services to insure optimal patient care (Allen, 2014). These skills make nurses well-equipped to lead the collaborative relationships necessary for successful ESI (Law et al., 2021).

At the meso level, our findings identified difficulties in maintaining green team morale and longevity (Sari & Camponogara, 2014). Short-lived, low impact successes (Reeves et al., 2014) and difficulties maintaining momentum are common for grassroots movements that rely on volunteers and low budgets (Herechuk et al., 2010; Mariam et al., 2019). However, grassroots movements have created the impetus for the formation of dedicated green teams or positions (Herechuk et al., 2010; Krüger et al., 2017), which are important to ESI success (Ahsan & Rahman, 2017; Kim et al., 2018; Krüger et al., 2017; Sari & Camponogara, 2014; Seifert, 2018). Nurses' skills in mediating across and creating coherence among multiple other actors to insure quality health services (Allen, 2014; Arnon et al., 2018) makes nurses well-suited to create, lead, and participate in both grassroot and formal green teams (Law et al., 2021).

In this review, targeting diverse audiences through tailored (Charlesworth et al., 2012; Tudor et al., 2007), two-way communication,(Kaplan et al., 2016) and a proactive (Kim et al., 2018; Manika et al., 2016), future-oriented (Krüger et al., 2017) outlook contributed ESI success.

Scholars have identified these same strategies as important in facilitating change management and ESI outside of the healthcare sector (Malek & Yazdanifard, 2012; Rieg et al., 2021; Zdunek et al., 2021). Green teams are encouraged to begin with low-effort ESI (Carpenter, 2008; Rivers, 2010), however, our findings suggest it is important to also look beyond these types of ESI. Not all ESI have similar magnitudes of climate change mitigation impacts. For example, regions dependent on high carbon energy sources should consider decarbonising through power use reduction, whereas regions that use renewable energy should focus on supply chain and circular economy to have the greatest mitigation impact on climate change.

This review identified that physical and organisational infrastructure and financial priorities can influence ESI success. Green behaviours increase when they are made convenient (DiGiacomo et al., 2018; Kaplan et al., 2016), and decrease when physical infrastructure made them inconvenient (Manika et al., 2016). Organisational infrastructure can inhibit ESI (Dixon-Woods et al., 2012) through power structures (Krüger et al., 2017), bureaucracy, paperwork, and difficulty integrating the ESI with existing structures (Guillaumie et al., 2020; Seifert, 2018). Cost savings was one of the main drivers behind ESI implementation (Krüger et al., 2017; Manika et al., 2016). By integrating cost management analysis with environmental analysis, sustainable decisions are supported (Atia et al., 2020) through financial legitimisation. Green teams can highlight the financial co-benefits of ESI to garner stakeholder support. Health care green teams are encouraged to become familiar with the organisational structures and administrative procedures of their organisations.

At the micro level, staff engagement was key to successful ESI. HCPs with personal pro-environmental attitudes (Tudor et al., 2007) perceived a moral duty (Krüger et al., 2017). However, other scholars have identified that HCPs are limited by restricted resources, fears about conflict, lack of insight into the connections between professional roles and climate change, and feeling unable to translate their personal views into the professional arena (Anåker et al., 2015; Dunphy, 2014; Griggs et al., 2017; Kalogirou et al., 2020a; Polivka et al., 2012). Green teams can foster staff engagement providing incentives (Casey & Sieber, 2016; Galpin et al., 2015), positive feedback (Manika et al., 2016), leadership support in the form of environmental education or skills development (Casey & Sieber, 2016; Pinzone et al., 2019), and by identifying and working with green champions to create support throughout the organisation (Practice Greenhealth, 2008). Improved work environment and co-benefits to patient health and wellness (Manika et al., 2016) are two facilitators of staff engagement unique to the health care setting identified in this review. This is likely due to values of patient primacy among HCPs and can be applied by green teams to increase staff engagement. Looking to the future, green teams can promote the integration of environmental sustainability (Gandhi et al., 2020; Leffers et al., 2017) and the planetary health education framework (Guzmán et al., 2021) into HCPs' education both at post-secondary institutions and within the organisation.

Table 4

Facilitators and Barrier to Successful ESI

FACILITATOR	BARRIER
POLICY	
Mandatory Policies ○ Top-down mandates ○ Central policies ○ Hospital policy ○ Public regulation	Voluntary Policies Absence of Policy Policy Focus • Focus on cost • Focus on health outcomes/patient primacy
EXTERNAL COLLABORATION	
Community Agencies Environmental Agencies Other Hospitals	Lack of Consultant Experience and Knowledge
ORGANISATION	
Formal Dedicated Team • Institutionalise ESI • Increases awareness, and develops and implements ESI • Bridges communication between employees and the experts and management	Grassroots Movement Only • Fragmented ESI • Difficulties maintaining momentum
Communication • Two-way communication • Employee input • Formal and informal communication methods	Communication • Difficult to reach all employees • High rates of staff turn over
Infrastructure and Governance • Make the green choice the convenient choice • Proactive, future-oriented approaches	Infrastructure and Governance • Inability of existing infrastructure to accommodate some ESI • Poorly functioning equipment • Patient numbers, behaviours, and weather

	• Difficulty integrating ESI into existing organisational structures • Existing organisational culture and norms
Data, Monitoring, and Auditing • Creates power, legitimacy, and relevance	Absence of Data / Difficulty Monitoring • Product information unavailable • Unable to evaluate ESI
Financial Co-benefits	Financial Resources • Cost of ESI may inhibit adoption • Difficult to maintain financial benefit with each additional ESI
STAFF ENGAGEMENT	
Perceived Benefit • Financial benefits • Improved work environment • Patient/health benefits • Social benefits (reputation, stakeholder perceptions, behaviours directed toward organisation or colleagues)	
Education and Training Characteristics of successful education: ○ Regularity and new approaches ○ Clarifying the science and terminology ○ Tailored message ○ Focus on achievable individual actions ○ Be positive – focus on sustainability instead of climate change ○ Use of visual materials	Lack of Awareness, Knowledge, and Experience • Unclear link between individual behaviour and environmental consequences • Staff turnover • Education is too theoretical
Staff Attitudes and Beliefs • Moral duty • Existing pro-environmental attitudes	Staff Attitudes and Beliefs • Poor environmental practices at home • Negative attitudes towards the bureaucracy

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The findings of this review suggest that the facilitative factors and barriers in ESI implementation in other sectors and in change management are also applicable to ESI in the healthcare sector. Further nuance about ESI in health care include insights into the role of both grassroots and formal green teams, improved work environment and patient benefit as co-benefits to encourage staff engagement, and educational preferences specific to health care staff.

Limitations

The articles were heterogenous in their contexts, interventions, and evaluations. Although there were common factors that contributed to ESI success among the articles, there may be other setting specific facilitators or challenges that are not apparent in the articles. Healthcare systems are diverse globally, which may impede the transferability of these factors. We were also limited to English-language articles.

Implications

The results of this review provide guidance for nurses engaging in climate action. Concepts applicable to change management processes and knowledge translation apparent in evidence-based practice are also applicable to ESI. This review made apparent the evidence around health care ESI such as the importance of grassroots initiatives leading to formalisation of ESI, centralised environmental policies, external collaboration with sustainability experts, formal dedicated sustainability position(s), and staff engagement. Nurses and green teams can apply the facilitative factors and barriers identified in this review to make informed decisions about how to implement ESI and allocate limited resources. There are opportunities for nurses in clinical, educational, and leadership positions to leverage existing skills and knowledge around evidence-based practice, interprofessional collaboration, and advocacy to engage in ESI and help reduce healthcare organisations' environmental footprint. These opportunities will require nurses to think critically about conceptualisations of the environment and planetary health, collaborate with experts outside the healthcare system and implement a future-oriented approach. The results of the review demonstrate the responsibility of governments, organisations, facilities, and individuals to contribute to successful ESI. Nurses are needed at all these levels to advocate for evidence-based changes to support ESI success.

Conclusion

There is a need for environmental impact reduction in health care to mitigate climate change and its negative health impacts. Nurses are urged to engage in reduction and mitigation efforts and encouraged to start or join green teams. Green teams should be advocating for centralized, mandatory environmental policies, formal dedicated green teams and external collaboration. It is important for green teams to establish two-way effective communication, convenient infrastructure, available data, monitoring of ESI, and financial co-benefits. And finally, staff engagement can be encouraged by presenting the co-benefits of ESI and providing effective, tailored education and training. Nurses can use this information to inform and direct their efforts to reduce the negative environmental and health impacts of healthcare systems.

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