

ORIGINAL ARTICLE

Environmental responsibility in hospital care: Findings from a qualitative study

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ABSTRACT

Objective: To identify the key elements of environmental responsibility in hospital care and the stakeholders involved.

Background: Hospital care causes a significant global environmental burden, which threatens human health and wellbeing. Environmental responsibility has been identified as an essential part of patient care with regard to health promotion and wellbeing of humans, but it has often been regarded as a secondary issue in hospitals. In addition, the lack of organizational structures and administrative as well as managerial support inhibit the promotion of environmental responsibility in hospitals.

Methods: We used a qualitative study with semi-structured interviews and document analysis. Our data was drawn from the environmental managers of five Finnish university hospitals and documents on their environmental programs.

Results: We found that the aim of environmental responsibility in hospital care was to avoid unnecessary emissions, and that it was guided by the authorities and by ethical values. It included targets for sustainable use of material, electricity, water and transport. Environmental responsibility required the involvement of several stakeholders, including administrators, environmental manager, immediate leaders, environmental support people, staff and patients. Implementation of environmental responsibility was promoted by collaboration, education, diverse initiatives to motivate staff, and continuously developing practices.

Conclusions: Environmental responsibility extended throughout a hospital organization. Staff was in a key position to implement it, but they needed versatile organizational support, including education, clear procedures, defined roles, and a motivational culture and facilities.

Implications for hospital management: This study yields new knowledge that will provide information for the development of organisational structures with respect to environmental responsibility in hospital care.

Key Words: Environmental manager, Environmental program, Environmental responsibility, Hospital, Key informant

1. INTRODUCTION

Previous studies have indicated that hospital care causes a significant burden on the environment.^[1] This burden refers to indirect emissions which are created by various activities carried out by staff working in diverse roles and departments, as they consume a wide range of medical products, foods, electricity, water, and transportation in hospital care.^[2,3] Staff

indirectly contributes to global warming, as producing energy and materials, transporting^[4] and incinerating waste^[1] produce emissions, such as carbon dioxide, that contribute to climate change. These emissions accelerate global warming, which causes irreversible changes in ecosystems, such as drought and rising ocean temperatures.^[4] These changes then disturb the ecological balance. One consequence of

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this is that animal species who depend on certain environmental conditions have to seek another location when their original habitat is no longer suitable for them in order to survive.^[5] These kinds of consequences have already been seen around the world. As humans are dependent on ecosystem services, such as food production and fresh water resources, climate change is a serious threat for future generations, particularly in the areas close to the equator.^[5] One of the consequences of climate change is an increasing area of regions that are habitable to mosquitoes and the virulence of animal-borne infections, such as malaria.^[5,6] In addition to climate change, the chemicals used in hospitals, such as mercury and medicines, disturb organisms in local habitats and eventually end up in humans through food chains.^[7]

Controlling climate change and chemical emissions is central to environmental responsibility, which is based on ethical demands to protect people's health and wellbeing on Earth.^[8,9] In hospital care, environmental responsibility has traditionally been regarded as a secondary issue that falls outside the core mission.^[10-13] However, it has been identified as an essential part of patient care from a health promotion perspective,^[1,8,9,11] and the role that healthcare professionals play in tackling environmental issues has been emphasized.^[2,9,14] Indeed, environmental responsibility refers to people's behavior,^[3,4] but it also includes the actions taken by organizations to protect the world around them.^[4,15-17] Environmental responsibility is also an important part of occupational wellbeing, as chemical control protects workers' health.^[11,18,19] Health care has been identified as a "high-hazard" work sector because of the pharmaceuticals involved, such as anticancer drugs, sterilizing substances, and other substances used in various forms by its employees.^[18] In addition to the benefits presented in this paper, environmental responsibility has been proved to reduce expenses due to the reduced consumption of material and electricity.^[20-23]

Long-term strategic policies are required to promote environmental responsibility at an organizational level.^[16,17] An environmental program is a strategic organizational policy paper, led by the hospital's senior management team, that defines the framework for systematically providing services without harming the environment.^[17] However, it has been reported that the use of these programs is not approached systematically in the hospital sector.^[24] Strategic work in developing environmental responsibility highlights the role that leaders need to play^[25] and the importance of collaboration between different stakeholders.^[9,17] Some hospitals, for instance in Germany,^[13] have voluntarily hired environmental managers^[26] to oversee the strategic development of such policies and ensure that they are sustainable from an operational point of view.^[25,27] As they work in multi-professional

teams with administrators and staff, they can provide a wider view of both technical solutions and sensible and realistic operations. They can also scrutinize the work of different stakeholders, including leaders' and health care professionals' such as nurses' roles in organizational environmental responsibility. Environmental managers have been reported to contribute to organizations' legal^[27] and profitable operations and represent the organization's sustainable aims to their staff.^[25]

An increasing number of studies are looking at environmental responsibility in hospital care by observing different areas, especially waste management^[19,28,29] and sustainable activities in the operating theater.^[20,23,30] In contrast, very few studies have looked at comprehensive environmental responsibility in hospital organizations^[9] and have merely referred to structural skeletons that promote ecologically sustainable patient care.^[9,16,17] Therefore this topic had been chosen as the main focus in this study, which aims to identify the key elements of environmental responsibility in hospital care and the stakeholders involved. We conducted this research using information from environmental managers and programs in Finnish university hospitals. Our research questions were:

- What are the key elements involved in environmental responsibility in hospital care
- What are the roles of the key stakeholders with regard to that responsibility
- How can environmental responsibility be promoted in hospital care?

2. METHODS

2.1 Design

We employed a qualitative study design, based on a content analysis design, and used data triangulation^[31] in two stages (see Figure 1). In the first stage, we wanted to gain a diverse insight of the study phenomenon and we did this by interviewing the key informants,^[32] referring to experts who could provide a wide perspective on the study topic.^[33] In the second stage, we completed the data by using document analysis^[34] on environmental programs. We followed a checklist produced by Tong et al. (2007),^[35] which provides consolidated criteria for reporting qualitative research.

2.2 Study setting

Our research settings were all five of Finland's university hospitals as they provide the most highly specialized medical care in their catchment areas. All the other Finnish hospitals and health centers, municipalities and citizens are covered by these five university hospitals^[36] and they lead the network that provides healthcare for the entire Finnish population of approximately 5.5 million citizens.^[37]

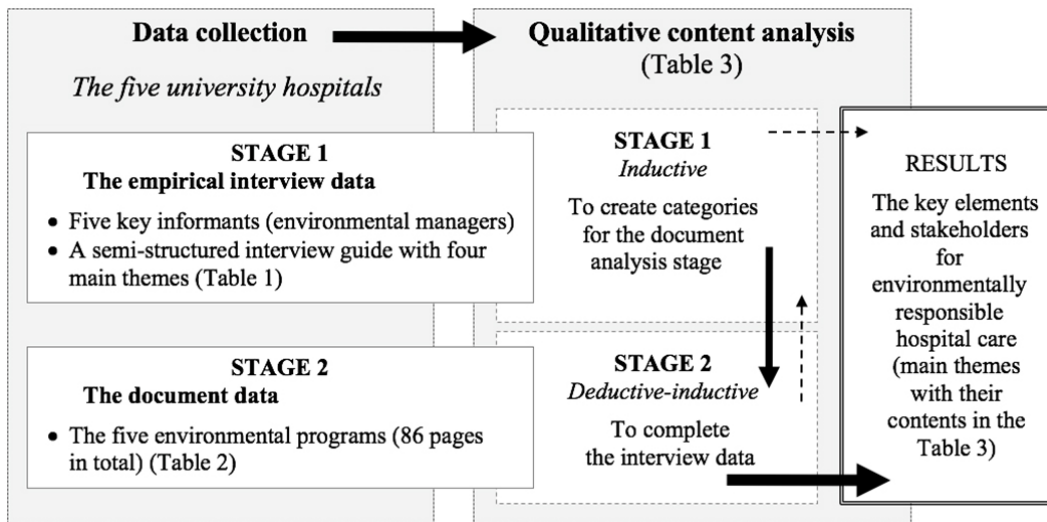


Figure 1. The study data and analysis process

Table 1. The semi-structured interview guide

Main theme	Follow-up questions
What is environmentally responsible hospital care?	<ul style="list-style-type: none"> • What kind of factors does environmentally responsible hospital care consist of? • How do you focus on, and align, various operational issues?
How is environmentally responsible hospital care guided inside and outside your organization?	<ul style="list-style-type: none"> • What are the roles and duties of different stakeholders? • What kind of collaboration and networks are needed? • What kind of external guidance does your organization follow? • What kind of environmental programmes are used in your organization? • How is the environmental communication promoted? • How are environmental operations followed and assessed? • What tools are used to promote and implement energy- and material efficiency and reduce pollutants?
What are your organization's targets for environmentally responsible hospital care?	<ul style="list-style-type: none"> • What potential do different stakeholders, such as nurses, have to promote environmental responsibility? • What is the relevance of hospital's support services, such as transportation and kitchen, for environmental responsibility?
What are the challenges of environmentally responsible hospital care?	<ul style="list-style-type: none"> • What kind of research has been carried out on environmental responsibility in your organization? • How can employees' competency and commitment be promoted? • What are the ethical questions raised by environmentally responsible hospital care?
Is there anything else you would like to add about environmentally responsible hospital care?	

2.3 Recruitment and informants

We recruited a purposeful sample of all the five environmental managers (four male, one female) working in the university hospitals. They worked in technical departments and had different educational backgrounds in chemistry, engineering, horticulture and administrative sciences. After obtaining permission from the university hospital administrators, the researcher (HK) contacted potential participants by email and sent them information about the study, including

its purpose and the fact it was voluntary to take part. All the environmental managers agreed to participate and the researcher (HK) arranged meetings with them by email.

2.4 Data collection

2.4.1 The interview data collection

We used a semi-structured individual face-to-face interview for the data collection. We built the interview guide (see Table 1) based on a literature review. We piloted the guide

with one technical manager who was accountable for the environmental affairs of a central hospital and, based on this, found that the guide was intelligible, logical and comprehensive.^[38] The researcher (HK) conducted interviews at the participants' offices or nearby meeting rooms. They lasted 7.5 hours in total (1.5 hours on average) and were recorded and transcribed verbatim to text for analysis. The researcher made field notes during and after the interviews, so that she could remember the documents a participant referred to and take notes of any points that the participants particularly stressed on during the interviews.

2.4.2 The document data

Our document data consisted of the environmental program policies of Finnish university hospitals. The environmental managers or their assistants provided the documents to the researcher in electronic form between October 2016 and January 2017. When they were printed, they produced a total of 86 pages of data. The length of the documents varied from 4 to 52 pages and their planned coverage ranged in duration from three to seven years. The duration was not reported in one of the documents. In one organization, the environmental program was integrated into the general responsibility strategy. This program included 11 pages and environmental issues covered approximately two pages. The main content areas in the environmental programs varied and are described in Table 2.

2.5 Data analysis

We conducted the analyses in two stages (see Figure 1) and used qualitative content analysis^[39] to create descriptive categories. During the first stage, we inductively^[39] analyzed the interview texts, to create categories for the document analysis. In the second stage, we deductively^[39] analyzed the document data, utilizing the categories formulated during the first stage. The data from the documents provided details on a number of areas (see Figure 2 and Table 3), such as energy saving practices. We began both the interview and document data analysis with a preparation phase that aimed to build up a picture of the whole texts. We chose to use meaning units of a sentence or part of it (see Figure 2). The next phase was to organize the data and this included extracting all the meaning units from the interview data. A researcher (HK) allocated codes to the participants and extracted their quotations from the transcripts. After this, she abstracted the interview data by manually grouping the parallel meaning units under representative sub-categories. HK and MK organized the sub-categories to form broader upper categories (see Figure 2 and Table 3).^[39] After we analyzed the interview data, we proceeded to organize the document data (see Figure 1).^[34] HK coded this data according to the categories identified in the interview data analysis. HK also analyzed the document data inductively, but this process did not identify any new themes.^[39] The sources of information are itemized in the Table 3.

Table 2. The main content areas of the documents (H = hospital)

Content areas	H #1	H #2	H #3	H #4	H #5
Energy efficiency					
• Construction and premises	x	x	x	x	x
• Devices and lights	x		x	x	x
• Logistics, transportation arrangements, commutes	x	x		x	x
• Water use	x	x		x	x
Sustainable material use (including food)					
• Sustainable purchases	x	x	x	x	x
• Reducing consumption and waste	x	x	x	x	
• Waste management development (e.g. recycling)	x		x	x	x
Chemical control (including medicines)					
• Cleaning chemicals and alternative techniques	x				
• Proper chemical disposal and sewage control	x		x	x	x
• Purchasing toxic-free products		x	x	x	
Environmental collaboration					
• Staff's role and their education	x	x	x	x	x
• Environmental leadership		x	x	x	
• Environmental support people network	x	x	x	x	
• External cooperation, partners and networks	x	x		x	x
• Environmental communication	x	x	x	x	x

Table 3. Environmental responsibility in hospital care: themes and categories identified from interviews (i) and documents (d) in the analysis

Sub-categories	Upper categories	Main themes
Promoting government policy (i,d) Promoting waste management orders (i,d)	Authoritative tutelage	Guiding principles
Encouraging social responsibility (i,d) Providing good care (i,d) Promoting professionalism (i)	Ethical values	
Encouraging sustainable purchasing (i,d) Minimizing waste generation (i,d) Recycling waste (i,d) Controlling risky materials (i,d)	Sustainable use of all material	The targets
Exploiting modern technology (i,d) Designing efficient architecture (i,d) Using devices properly (i,d)	Effective use of electricity	
Using modern, maintained technology (i,d) Revising daily routines (i,d) Agreeing the administrative alignments (i,d)	Effective use of water	
Optimizing material transports (i,d) Optimizing passenger transports (i,d)	Optimized transportation	
Overseeing and supporting environmental work (i,d) Making fundamental decisions (i,d) Creating the basis for pro-environmental culture (i)	Administrators	Roles of the stakeholders
Developing and coordinating environmental affairs (i,d) Being responsible for documents and general guidelines (i,d) Arranging education and information (i,d) Connecting administration and practice (i,d)	Environmental manager	
Achieving environmental responsibility in hospital departments (i) Nominating environmental support staff (i,d) Guiding and recognizing department-specific processes (i,d) Involving staff (i,d)	Immediate leaders	
Facilitating environmental practices in hospital departments (i,d) Providing trained support on environmental responsibility (i,d) Answering questions on department-specific instructions (i) Arranging functional facilities (i,d) Acting as intermediaries between practice and administration (i,d) Networking with each other (i,d)	Environmental support people	
Using material, water and electricity reasonably (i,d) Observing and highlighting practical improvements (i,d) Using public transport or cycling when commuting (i,d)	Staff	
Avoiding using cars when visiting (i,d) Sorting waste (i) Using water reasonably (i)	Patients	
Fostering intra-organizational collaboration (i,d) Fostering extra-organizational collaboration (i,d)	Multi-professional collaboration	Tools for implementation
Creating general awareness (i,d) Providing focused training (i,d)	Educated staff	
Providing functional facilities (i,d) Creating a positive atmosphere (i,d) Providing inducements (i,d)	Motivated staff	
Addressing aims/indicators (i,d) Following the indicators (i,d) Assessing progress (i,d) Allocating interventions (i,d)	Continuous development of practices	

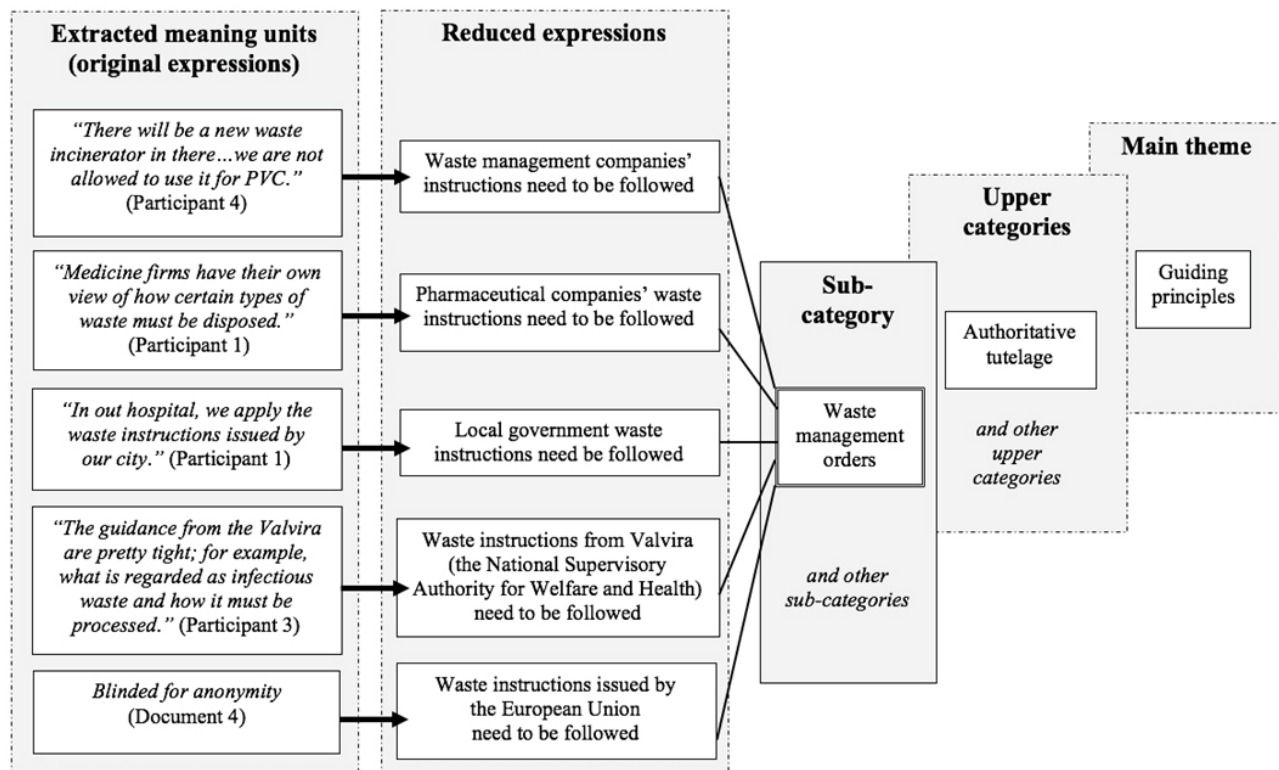


Figure 2. An example of developing a sub-category ("Waste management orders")

2.6 Ethics

We followed the research principles of integrity and honesty in this study.^[40] When we were planning the study, we ensured that the participants' integrity was not at risk, and according to Finnish law, ethical committee approval is not needed if there is no risk.^[41] In addition, the participants took part in their capacity as professional environmental managers and not as private individuals. We obtained written permission from each university hospital science service center before we conducted the interviews. The researchers (HK) told the participants about the purpose of the study, stressed the voluntary nature of their participation, stated that they had the right to withdraw at any time and obtained written consent. The environmental programs were provided by the environmental managers or their assistants, and, as they were public documents, we did not need separate approval to use them. We have reported all the data anonymously. In order to protect the anonymity of participants, we have limitedly reported demographic data of them, and we have reported their quotations without codes.

3. RESULTS

Based on our analysis, environmental responsibility in hospital care aimed to provide services without unnecessary consumption and, therefore, without creating a burden on the environment. The content of environmental responsibility

in hospital care included four main elements: (1) guiding principles, (2) targets, (3) the roles of the stakeholders, and (4) tools for implementation (see Table 3).

3.1 Guiding principles for environmentally responsible hospital care

Based on our analysis, two principles that provided the foundations for environmental responsibility in hospital care were authoritative tutelage and ethical values (see Table 3).

3.1.1 Authoritative tutelage

Authoritative tutelage consisted of national government policy and waste management orders from different organizations. National legislation guided sustainable development on a general level, but it was abstract and needed to be interpreted and contextualized by administrators. Also the aims of the European Union (EU) towards sustainable energy use were highlighted in an environmental program and, according to the EU regulations, the public sector is expected to set a good example in purchasing and energy efficiency. Waste management was the most frequently guided area of environmental responsibility in hospitals, as the waste management and pharmaceutical companies, municipalities, the National Supervisory Authority for Welfare and Health, and the EU all instructed hospitals at various levels.

"Legislation can direct operations on a general level, but not

in detail.”

3.1.2 Ethical values

The ethical values that guided environmental responsibility were social responsibility, good care, and professionalism. Social responsibility referred to securing the wellbeing of citizens, society, and future generations. Hospitals were large and public institutions and they were seen to act as role models and forerunners in decreasing carbon footprints.

“Thinking in a westerner way, we should provide a lead. . . we pretty well conceive our own mistakes and those shouldn’t be replicated in developing countries.”

In addition, having a good reputation for environmental responsibility was considered to be beneficial for employee recruitment and marketing for patients. Good care particularly referred to ensuring asepsis when making environmental improvements. As a guiding ethical value, professionalism referred to the staff’s individual decisions in their daily work. For example, they were able to select between reusable and disposable items and to decide whether to sort their waste or not.

3.2 The targets for environmentally responsible hospital care

According to our analysis, the targets for environmental responsibility in hospital care were the sustainable use of materials, effective use of electricity and water, and optimized transportation (see Table 3).

3.2.1 Sustainable use of all material

The sustainable use of material included considering purchases, waste and risky materials. Hospitals’ buyers were able to decrease the environmental impact by making justified purchase decisions. This included assessing the total environmental impact of the life-span of an item, from the raw material acquisition to disposal. The life-span assessment was found to be highly challenging because of long and multidimensional delivery chains. Buyers’ decisions also included considering the total ramifications before changing to a new product. One quoted example was switching to a different copy paper that had caused unexpected problems with the printers. One solution to promoting sustainable purchasing was to centralize procurement between the hospital departments. Sustainable material use also included considering the safety, durability, recyclability, and reusability of a product. Recycling was considered crucial, because using recycled materials requires less energy than using new raw materials. Reusability referred to whether it was possible to wash a product rather than dispose of it. Washable textiles were preferred over disposable ones, but guidance would be needed for other products. Sustainable purchasing moreover

included intangible wares such as renewable energy forms and different services.

“Literature guiding the selection between re-usable and disposable products is sparse.”

The main aim for sustainable material use was minimizing waste. For example, medical product waste could be minimized by limiting unnecessary orders and preventing products expiring. Avoiding product contamination also decreased waste. In addition, opened or expired sterile products could be used for non-sterile activities.

“In patient care, some staff members use to take all kinds of bandages and gauzes to their patients’ rooms just in case. . . we should only use what is necessary.”

Organic food waste could be reduced by using standardized menus and sectional food preparation in hospital kitchens. On the wards, organic waste was avoided by maintaining updated food orders for patients. It was crucial to investigate the real sources of food waste and there should be focused interventions to help reduce waste. Suggestions to avoid paper waste included developing electronic programs, services, and learning environments, double-sided printing and only printing updated pages rather than whole documents. To avoid furniture waste, permanent office furniture was purchased and reused for other purposes when no longer required.

Sustainable material use included the systematic control of risk materials, namely hazardous waste, chemicals, and toxic materials. The best practice to prevent toxic waste was to minimize buying hazardous substances, including PVC. When disposing pharmaceuticals and dangerous materials, they needed to be packed and stored properly, and shipped for appropriate disposal. It was reminded that pharmaceuticals should never be released down the drain or to landfill where they could end up in groundwater. It was moreover important to adulterate detergents according to the instructions.

3.2.2 Effective use of electricity

The effective use of electricity included using energy-effective technology and architecture in hospitals. Use of automated devices was found to decrease the consumption of electricity. For example, automated air conditioning units could keep the temperature at an optimum level, which achieved an effective use of electricity, but they required expertise to adjust the settings. It was also suggested that fluorescent lights and light-emitting diode lamps could help to decrease the consumption of electricity. The routines and daily use of different devices and lights had a notable effect on electricity consumption in patient care. This referred to avoiding using medical devices unnecessarily and not keeping them switched on or standby. This also included avoiding

the use of unnecessary electronic lights during the day. However, it was noted that traditional fluorescent lights can be damaged if they are switched on and off too often. This highlighted the need to ensure that the staff was instructed in the correct use of technology.

“Over one third of the hospital’s electric costs goes to lighting, so there is a lot to do in it!”

“All the examinations with this device are carried out in less than one hour, but despite that, it is turned on all day long!”

3.2.3 Effective use of water

The effective use of water was linked to energy consumption. The main factor was choosing and maintaining modern water saving taps, toilet seats, and kitchen equipment. It was noted that carelessness and leaky sanitary wear often increased water consumption in hospitals. In addition to technological solutions, daily routines affected water use and staff should avoid leaving water running and washing textiles unnecessarily. Administrative alignments referred to hospitals’ policies and reducing the periods of treatment with day surgery or shorter surgery.

“In an emergency, they (staff) give patients hospital clothes to wear, even if they could wear their own (referring to unnecessary use of hospital clothes, which increases consumption of water in textile washing).”

3.2.4 Optimized transportation

Optimizing transportation promoted sustainable energy use and reduced emissions. With regard to patient care related material transports, hospitals had used firms with environmentally friendly equipment, fuel, and driving patterns. The use of software to calculate optimized transport routes, as well as shared transport with other institutions, enabled them to avoid unnecessary journeys. Furthermore, delivering frozen food to the wards decreased the frequency of journeys and food waste. With regard to passenger traffic to the hospitals, good public transport with warm places to wait and real-time screens providing updated information about buses decreased the usage of private vehicles. These improvements also promoted safety and clean air in the areas surrounding the hospitals. To reduce motoring and thus hospital-related emissions, the staff was encouraged to commute actively to work, for example by walking or cycling. Arranging collective taxis and using tele-medicine services also cut the number of patient journeys.

“It would be unreasonable to deliver one item here and one there. Thus, material deliveries into our hospital’s center warehouse are always conducted by the collective transports with the other institutions of the city.”

“Our traffic center arranges collective transports for patients.”

3.3 Roles of the stakeholders in environmentally responsible hospital care

Based on our analysis, environmental responsibility in hospital care required the involvement of six groups of stakeholders: administrators, environmental managers, immediate leaders, environmental support people, staff, and patients (see Table 3).

3.3.1 Administrators

The administrator’s role in environmental responsibility was to oversee and support the environmental program and to make regulatory decisions when environmental aspects were considered, for example in investments. They had a responsibility to create a framework for environmental work in an organization and, for example, to appoint a committee with an environmental manager or managers and sufficient resources to operate. The strong and visible commitment to environmental responsibility required from administrators was highly emphasized in the data, as they were the key people who created a positive culture towards environmental responsibility.

“It is brilliant that our administration supports environmental work. Otherwise we wouldn’t have any progress.”

3.3.2 Environmental manager

The environmental manager’s role was to develop and coordinate environmental affairs in an organization. They formed environmental programs and assessed and reported on achievements. They prepared and presented environmental issues to the administration personnel, created and updated general guidelines and arranged education and information for staff. The environmental manager acted as a link between the administrative personnel and the staff, and played a key role in the development and promotion of environmental responsibility.

“We (environmental managers) are also support services and help people to work (responsibly).”

3.3.3 Immediate leaders

Immediate leaders referred to the managers close to the staff, such as head nurses on the wards. They were responsible for the environmental performance in the hospital departments. This included nominating environmental support people and providing comprehensive guidance on the processes, so that environmental elements became integrated into the staff’s working practices. Their duty was to involve the staff by leading shared discussions and decisions and managing workshops to decide how to apply the organization’s strategic priorities to create practical solutions. Their

central duty was to create favorable cultures in the department for environmental responsibility.

“Leaders should create a kind of atmosphere in the work community that gives permission to do things better than we used to.”

3.3.4 Environmental support people

The environmental support people were nurses and other professionals who were nominated and educated to facilitate environmental practices in their departments. Their duties included investigating ward-specific waste and creating department-specific instructions and practices for sorting and recycling. In addition, they were intermediaries between ward-level practice and the managerial level, informing staff, leaders and an environmental manager about what their wards needed and what changes were required to achieve that. Having a network of support people in a hospital was seen as a tool for shared knowledge and practices in environmental issues. Their approachability and position as part of a work community in departments were considered beneficial.

“People in a hospital department may contact people more easily, if someone familiar is taking care of environmental issues.”

“In many places the environmental support person is a nurse. This is an extremely good thing because they have credibility in their work community.”

3.3.5 Staff

The role of staff, particularly those working close to patients, was considered fundamental in achieving environmental responsibility in hospital care practice, because they were considered central in minimizing the use of materials, water and electricity. Participants also brought up the staff’s potential to avoid hospital-related emissions by commuting with public transport or biking instead of driving. They also highlighted that the staff is in a key position to highlight practical opportunities for environmental improvement. Participants emphasized a particular challenge in achieving environmental responsibility in hospitals, namely getting the commitment of staff, especially physicians. They linked not committing to such attitudes that environmental responsibility was meaningless and that people were indifferent to the environment.

“Attitude is a great challenge. I guess there is nothing greater.”

“Some people do not think that this is a common good and they do not care about it.”

“I went to a leading doctors’ meeting and environment was

the last issue. . . and half of the doctors marched out.”

3.3.6 Patients

Participants mainly highlighted the patients’ role in environmental responsibility in avoiding driving to medical appointments in order to avoid hospital-related emissions. Participants also stated that patients could sort out waste and use water sparingly in the shower.

“It is irrational to build enormous parking garages in hospitals. Instead, it is important to have good public transport connections.”

3.4 The tools for implementing environmentally responsible hospital care

Our analysis suggested that there were four types of tools for implementing environmental responsibility: multi-professional collaboration, educating staff, motivating staff, and continuous practice development (see Table 3).

3.4.1 Multi-professional collaboration

Multi-professional collaboration was perceived as a tool for sharing expertise and extending environmental practices to all parts of patient care. On an intra-organizational level, administrators established environmental groups to develop environmental strategies and these brought together different professionals and departments. It was important to engage the expertise of nursing professionals, physicians, cleaning and transport services, technical departments, pharmacies, and the hospital’s communication and media department in decision-making. In addition, collaboration with hygiene experts was important in order to ensure that the environmental adjustments did not threaten asepsis.

“The hygiene department arrange training and visit hospital units, providing a kind of invisible support. If I built an organization, I would put environmental issues and the hygiene department together.”

On an extra-organizational level, the initial work on how to use and share knowledge was carried out with different consultants and designers, particularly with regards to construction and logistics. Collaboration with municipality and governmental officers was also conducted when designing waste programs, along with different waste treatment agencies concerning the transportation and incineration of waste. On top of that, other public services and healthcare organizations were contacted to share knowledge and develop consistent environmental practices between the hospital districts. The Association of Finnish Hospital Engineering proved to be a central forum in this regard.

3.4.2 Educated staff

Educating the staff was a key tool for implementing environmental responsibility in a hospital. Education comprised of focused training and improving general awareness. The latter included easily accessible Internet guidelines, emails, regularly distributed fact sheets, leaflets, brochures, stickers, campaign posters, exhibitions and interactive information sessions. In addition, introducing new employees and students to environmental practices was highlighted.

“Our nurses come from a university of applied sciences and it is important to get the message about environmental responsibility out there.”

“There should always be at least one short practical lesson on sustainable development during medical education.”

Information should be up-to-date, justifiable, easy to understand, visual, and interesting. Staff had particularly liked campaigns with a humorous character and concrete energy consumption volumes. Hospital canteens were considered particularly suitable places to spread general information. Focused training mainly referred to educating environmental support people. When conducted regularly, this was an effective way to update practices in the various departments. Focused training included environmental managers' visits to different hospital departments, which was popular because it enabled department-specific training to be given to staff. Environmental managers also found these visits beneficial enabling them to maintain their touch on practice. Training for hospital support services was also mentioned, namely for the staff who provided purchasing, catering, and transport services.

3.4.3 Motivated staff

Motivating staff was considered to be the tool that strengthened the continuity of pro-environmental behavior. Staff motivation had been promoted by providing them functional and meaningful facilities, particularly for waste management. For example, it was seen beneficial to remove and sort extra packing material before delivering medical products to patient care departments.

“If sorting different wrapping materials requires a lot of effort from nursing staff or doctors, then it is a bad thing. The work environment should automatically guide you to sort waste.”

Immediate leaders and environmental support people also played a key role in motivating staff by presenting environmental issues in a positive way. In addition, different inducements were considered as a way of promoting staff motivation, such as rewarding staff for their environmental progress.

“Getting publicity for progress could help other people to become interested.”

The importance of variously promoting environmentally-friendly commuting was highlighted. The use of public transport was supported by offering free tickets for the staff and arranging functional bus connections to the hospital. The staff was also motivated to cycle by providing proper shower facilities, bicycle tracks, locked storage, and free annual bicycle maintenance. In addition, a light-hearted communal contest at one hospital had motivated staff opt for cycling. To reduce unnecessary travelling, people were encouraged to work from home when possible.

3.4.4 Continuous development

Continuous development of practices was a tool to ensure that the methods of executing environmental responsibility in a hospital remained up to date. The importance of measuring environmental work to enable objective analysis of development was highlighted.

“I think measuring progress is essential in everything. If we don't measure it, we can't discover what we have gained.”

It was crucial to set realistic and measurable aims for reducing consumption, purchasing, transportation and, for example, the amount of environmental support people and training hours. The aims were both numeric targets and time frames, were addressed every few years, and were often published in environmental programs. Realistic aims were defined as being both sensible and practical, as they enabled detailed follow-ups and effective interventions. For example, electricity and water consumption was building-specific and material consumption and waste generation was department-specific. Thus, the information was beneficial for all the stakeholders. Results in achieving organizations' aims were evaluated periodically and used to set targets for the next evaluation period.

4. DISCUSSION

4.1 Scrutiny of the results

Our study provides an organizational insight into environmental responsibility and how it is promoted in hospital care. According to our results, environmental responsibility was based on national and international guidelines by authorities and ethical values of social responsibility, good care and professionalism. The targets of environmental responsibility were the sustainable use of materials, effective use of electricity and water, and minimized traffic. Putting environmental responsibility into practice required the involvement of six groups of stakeholders. The administrators' role was to oversee and support the realization of the environmental program as well as responding to regulatory decisions. The

environmental managers' role was to develop environmental issues, such as planning and evaluating environmental programs and education. Immediate leaders were responsible for guiding environmentally responsible practices in the hospital departments and environmental support people provided the expertise to facilitate them. It was the staff's duty to execute environmental responsibility according to given guidelines. In addition, patients could participate in environmental responsibility by minimizing the environmental harm resulting from their treatment period. The implementation of environmental responsibility could be promoted by multi-professional collaboration, education and motivation for the staff, and continuous development of practices.

The findings in our study highlighted the fact that there are two particular areas of environmental responsibility in hospital care that need to be addressed to make any environmental programs a success. They both deserve closer scrutiny. Firstly, working towards environmental responsibility required systematic and committed leadership. Administrators have a key role in leading initiatives because without their contribution hospital staff is less likely to act responsibly.^[12,42] In addition to providing resources, it is an administrators' duty to clearly define roles in the organization to help people recognize their responsibilities and to stop them from passing them on to others. Administrators need to perceive sustainability as an inseparable basis of patient care and support people's endeavors with environmental managers leading the way.^[26] It is not possible to separate hospital care and environmental responsibility as they have a bidirectional relationship: hospitals contribute to the environmental burden due their consumption, and diseases that are caused by climate change are treated in hospitals.^[1,5] This is why administrators should seriously consider integrating environmental goals into their organization's general strategy.^[43]

Secondly, our findings underlined the need to engage all hospital staff in pro-environmental behavior and this point was in line with earlier studies.^[24] Engaging nursing professionals is particularly crucial, as they have wide opportunities to minimize unnecessary consumption, and physicians, who can avoid unnecessary treatment days. Recent studies have reported that nurses saw pro-environmental behavior as secondary to other job requirements^[12,15] and even the term health care professionals' environmental numbness has been used.^[10] This has been explained with medical procession, along with which health care professionals have increasingly concentrated on patients' immediate needs rather than preventative scope including protection of environmental health.^[44] In a globalized world, however, sustainable procedures are a necessary characteristic of patient care.^[44] Along

the topicality and general debate of climate change, health care professionals have become more aware of their environmental burden. Despite of this, recent study has reported that nurses seldom expressed pro-environmental attitudes because they were afraid of conflict and stigmatization among their work communities.^[12] This supports our findings of the need for strong environmental leadership and culture in hospital organizations.

We found that engaging staff in pro-environmental behavior can and should be promoted using several methods. In line with earlier studies, education plays a key role^[2,45] and educating health care professionals has been found to produce clear improvements in waste management.^[29] Education should not be limited to just waste issues. The wider topic of environmental responsibility should be included in nursing and medical curriculums to help health care professionals to understand the connection between their practices, resource scarcity and climate change.^[2,45,46] Information needs to be up-to-date,^[16] usable, interesting, reasonable and easy to understand. This relates to both formal and in-service training.^[45] Also guidance given to the staff from different sources must be consistent. For example, the staff may be advised to turn off devices, but computers may need to be left on because of software updates. Therefore, official instructions need to be formulated through multi-professional collaboration before being disseminated to staff.

Based on a recent study, it is possible to improve people's attitudes towards sustainability with education.^[45] This is encouraging, as in our data and earlier study,^[10] staff's attitudes were considered to be a substantial barrier to progress in environmental responsibility. On the other hand, another study^[47] found that a pro-environmental attitude was not necessarily required, as favorable work structures, systems, cultures and rewards, and staff's awareness of practical sustainable actions, may already be enough to change their behavior. This supports our findings about the need for diverse organizational support in environmental work. In addition to receiving education, people also need to be motivated to behave in an environmentally friendly way^[14] by other approaches.^[16] Administrators could, for example, give work communities feedback on their performance^[29] and reward their success financially^[43,47] and publicly. Also, a sense of community motivates people to act pro-environmentally,^[48] particularly if it benefits their private life.^[49] A strong and visible sustainability culture and environmental collaboration in an organization promote joint responsibility and staff engagement. One way of signaling the importance of staff's commitment to sustainability objectives, is to express them as early as during the recruitment stage.^[43]

It is clear that leadership and staff engagement are tightly

linked together.^[43] Our participants emphasized the importance of common discussions and agreements in hospital departments. Environmental faults and aims should be discussed as well as the other topics in patient care and the departments' leaders should play a central role in making this happen. Staff and department leaders need to be well aware of their organization's environmental policy.^[16,43] Also setting concrete targets was highly emphasized in our data. It is necessary at an organizational level, with regard to the environmental work and program, but also at the practical grass roots level where initiatives are put into practice. Health care professionals need to have a clear understanding of the specific needs of why, what and how to carry out environmental initiatives. They must be able to implement their duties with profound knowledge, helpful leadership, inspiring team spirit, and proper resources.

4.2 Trustworthiness of the study

The central question regarding the trustworthiness of our study concerned the small sample and, therefore, its dependability.^[50] We considered it important to pursue homogeneity for the consistency of data and focus on the most advanced health institutions. The university hospitals were the only hospital network with official environmental managers. On the other hand, we reached data saturation in the interviews, as participants described the same contents when they discussed the categories developed during the analysis (see Figure 2). The preliminary analysis was sent to the participants for their comments but they didn't add anything. We strengthened the evidence using data triangulation.^[33,34] The interview guide, data analysis, and research report were produced in close collaboration and discussion between the research group members, carefully considering the influence of preconceptions and other possible biases. The data was collected by the researcher HK, who was a masters-student. She had earlier experience of interviewing research participants with a semi-structured technique and of working as a nurse and an environmental support person in a university hospital department.

4.3 Implications for hospital management, knowledge development and education

This study has important implications for hospital management as it offers an organizational framework and beneficial tools for planning and developing structures for environmental responsibility in a hospital. Carrying out this qualitative study was also very necessary in helping to develop knowledge on this subject. The findings can be used as the basis for further research and quantitative studies, for example when developing more specific frameworks in different fields of patient care. Furthermore, this framework could also be used to help educate health care professionals.

5. CONCLUSIONS

Environmental responsibility extends throughout hospital organizations, from administrative and technical departments to patient care units. Health care professionals play a key role in minimizing unnecessary consumption on a daily basis, but they cannot achieve this in isolation. Instead, hospital administrators and department managers need to support them, so that environmental responsibility becomes an intrinsic part of patient care. If implementation of environmental responsibility is the tip of the iceberg, then there are various supportive factors that are needed beneath the surface, including clear organizational aims and strategies, clear descriptions of roles, procedures and guidance, proper facilities, and motivational factors. Hence, the key element in environmentally responsible hospital care is strong leadership and its ways of achieving diverse engagement. Environmental responsibilities are constantly changing and evolving and hospital management need to develop strategies that respond to them in an effective and inclusive way. In this study, expert interviews and program documents helped to identify environmental responsibility in a hospital organization. In future, more knowledge is needed about hospital managers' and health care professionals' experiences about effective implementation and engagement practices.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare they have no conflicts of interest.

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