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Hospital Workers' Pro-environmental Behavior: A Qualitative Interview Study

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Abstract

In today's world, there is increasing recognition of the severity of environmental issues that can be addressed via the adoption of more pro-environmental behavior among people. Hospital workers, the guardians of human health, must be fully aware of the negative effects resulted from urgent environmental issues. However, it is unclear that the perception of pro-environmental behavior among hospital workers. To this end, we undertook a qualitative study via in-depth interviews to represent different thoughts of pro-environmental behavior. Four themes, opinion on pro-environmental behavior, level of pro-environmental behavior, hindering factors, and driving factors, were identified. The level of pro-environmental behavior was uneven, some workers had high pro-environmental behavior, while some were insufficient or even missing. Moreover, hindering factors and driving factors of hospital workers' pro-environmental behavior were different from the general public to some extent, specifically, the responsibility of work, standards and regulations in the medical field, organizational barriers, and physical mental feeling were the primary hindering factors, and

demographic characteristics, psychological variables, and organizational facilitators were important driving factors of pro-environmental behavior among hospital workers. Further research should quantify the promotion of pro-environmental behavior by certain factors and identify effective intervention measures to alleviate environmental issues.
Keywords: Pro-environmental Behavior, Qualitative, Interview, Hospital Workers, Influencing Factors

Introduction

Environmental issues are tangled and cover many aspects, such as climate change, air pollution, water resource pollution, biodiversity loss, and land desertification (Kumar et al., 2023; Qi et al., 2020; Sharma et al., 2023). At present, environmental issues emerging at an alarming rate have been regarded as the greatest threat to human health (Mofijur et al., 2021; Ramírez-Malule et al., 2020). There is increasing evidence that perception about today's urgent state of environment can mitigate or even solve crises posed by the environment (Lawrance et al., 2022; Ojala et al., 2021). Hospital workers not only bear the responsibility of safeguarding human health, but also lead to environmental deterioration through releasing waste such as chemicals and plastics, consuming energy including water and electricity (Giakoumakis et al., 2021; Nampewo et al., 2022; Ugoeze et al., 2021; Wu & Cerceo, 2021; Zikhathile et al., 2022). Hence, it is essential to understand the perception of pro-environmental behavior (PEB) among hospital workers who may become the model of protecting the environment.

As a densely populated developing country, Chinese healthcare system primarily composed of hospitals is underdeveloped (Li et al., 2020; Yi et al., 2020; Zhou et al., 2023). In this context, medical resources are significantly limited, how to maximize the utilization of medical resources and achieve harmonious development between humans and nature have become the challenge faced by everyone especially for hospital workers (Wu et al., 2022; Zhu et al., 2020). Hospital workers' PEB can directly or indirectly protect the environment by reducing resource consumption and waste, decreasing air and water pollution, and motivating others to participate in environmental protection efforts, resulting in the improvement of human health (Ateş, 2020; Liu et al., 2020; Thiermann & Sheate, 2020).

To better promote hospital workers' PEB, it is important to understand hospital workers' opinion on PEB (for example, whether they are willing to perform PEB, the advantages and disadvantages of adopting PEB), and to clarify hindering factors and driving factors behind PEB. A number of studies have suggested that PEB is effective to deal with environmental catastrophic events and can be influenced by various factors such as environmental attitude, environmental concern, and related knowledge and information (Ateş, 2020; Díaz et al., 2020; Hansmann & Binder, 2020; Liu et al., 2020; Wang et al., 2020; Wu et al., 2021). For hospital workers, however, the existing literature does not yet conclusively elucidate how unique is the PEB, how PEB occurs and changes, which needs further research to provide fresh empirical data and bridge the knowledge gap.

Therefore, we conducted this qualitative study via in-depth interview among Chinese hospital workers to explore their thoughts and feelings about PEB, to understand the current state of PEB at hospital, and to formulate appropriate intervention measures to protect the environment.

Methods

This study employed qualitative method to describe the perception of PEB and influencing factors related to PEB, which is suitable because qualitative method can provide an in-depth view of the research subject, namely PEB.

Participants

Hospital workers were recruited during the research period, and the number of participants was determined by the purposive sampling. Inclusion criteria were that the participants must be full-time, and the length of employment was greater than one year at hospital. Accordingly, 16 hospital workers from eight departments comprising the emergency department, the surgery department, the internal medicine department, the traditional Chinese medicine department, the medical technology department, the department of hospital infection management, the department of prevention care, and the department of publicity were selected to participate the interview. Before the interview, we sent email to participants to shed light on the study aim, and written consent also were obtained via email. After completing the interview, participants received a cash reward of 100 RMB.

In-depth Interview

The interview was semi-structured, and interview topics primarily included perception and influencing factors of PEB. To allow hospital workers' perspectives to guide our understanding on PEB, interview questions were comprehensive and exploratory. The interview outlines roughly included six sections:

1. How do you think about PEB?
2. What are the common PEB practices at hospital?
3. Which advantages and disadvantages can appear when adopting PEB at hospital?
4. What are the main factors hindering workers from adopting PEB?
5. What are the main factors driving workers to adopt PEB?
6. How to promote more adoption of PEB at your hospital?

We conducted one-on-one interviews to collect data through the Tencent Meeting. After completing the interview, we translated the record from audio to the transcript, and contacted the participant to confirm the information collected.

Analysis

Without prior assumptions, the qualitative study can be used to capture and interpret the subjective experiences of hospital workers in response to interview questions. Consequently, we did not make any specific hypotheses, and conducted coding analysis based on interview manuscripts.

The coding analysis comprises three stages, namely open coding, axial coding, and selective coding. Specifically, in the first stage, we summarized the interview data to ensure the integrity of targeted contents, and analyzed and compared the collected data sentence by sentence to obtain preliminary categories. Second, we established various connections between the categories obtained in the first stage, and analyzed these connections to thoroughly understand the data. Ultimately, we extracted core categories and elucidated the

relationship between categories. To ensure the reliability of analysis, we used the software, namely NVivo 14.0, to conduct the coding analysis process.

Results

Sixteen hospital workers participated in interviews, and the basic information of participants is shown in Table 1. The interview length was about 20 minutes, and every interview was recorded and transcribed into the manuscript with consents. We finally obtained an interview transcript of approximately 41,600 words.

Table 1
Information table

Identification number	Gender	Length of employment	Employment department
1	Female	4	Emergency department
2	Male	5	Emergency department
3	Female	10	Surgery department
4	Male	12	Surgery department
5	Female	3	Internal medicine department
6	Male	3	Internal medicine department
7	Female	20	Traditional Chinese medicine department
8	Male	23	Traditional Chinese medicine department
9	Female	3	Medical technology department
10	Male	4	Medical technology department
11	Female	8	Hospital infection management department
12	Male	7	Hospital infection management department
13	Female	9	Prevention care department
14	Male	8	Prevention care department
15	Female	5	Publicity department
16	Male	6	Publicity department

Themes

There were 178 initial codes in the final framework, leading to 13 preliminary categories and 4 main categories, namely opinion on PEB, level of PEB, hindering factors, and driving factors. The corresponding coding process is shown in Table 2.

Table 2
Coding analysis

Selective coding	Axial coding	Open coding
Perception of PEB	Opinion on PEB	Advantages of PEB
		Disadvantages of PEB
		Necessity of adopting PEB
	Level of PEB	High level
		Medium level
		Low level
	Hindering factors	Responsibility of work
		Standards and regulations in the medical field
		Organizational barriers
		Physical and mental feeling
	Driving factors	Demographic characteristics
		Psychological variables
		Organizational facilitators

Opinion on PEB

Advantages of PEB

Against the backdrop of frequent environmental issues, it is necessary to perform PEB by people from all walks of life to actively respond to challenges. The advantages of PEB are noticeable, which was repeatedly mentioned by all interviewed hospital workers. For example, PEB can reduce environmental pollution and protect ecosystems of the earth. To mitigate the impact of climate change and to reduce harmful substance emissions were also significant advantages of performing PEB. Sustainable development was also a concern of hospital workers, they indicated that PEB can optimize the effective utilization of resources and reduce waste. Due to the responsibility of hospital workers, the advantage of promoting human health was emphasized. In addition, the economic benefit and social status and reputation from protecting the environment was also considerable. The specific statements are as follows:

“PEB can directly reduce the generation of medical waste and the waste of energy and water resources, leading to positive impacts and then promoting sustainable development.”

“Environmental behavior can greatly promote the physical and mental health of oneself and patients”

“PEB such as energy conservation and waste classification can reduce hospital operating costs and bring considerable economic benefits to the hospital.”

“PEB is a manifestation of hospital social responsibility, it can improve hospital social status and reputation and meanwhile contribute to patients’ satisfaction.”

Disadvantages of PEB

The disadvantages of PEB also were obvious. Time-consuming was the most prominent shortcoming, in general, the implementation of PEB is more complex than ordinary behavior.

It is well known that hospital workers are busy with their daily work, resulting in the fact that they do not have extra time and energy to concern for environmental issues and carry out environmental protection actions. Additionally, the introduction of new technologies related to PEB requires high costs, money-consuming became an obvious disadvantage. Moreover, the leakage of personal information was also an important consideration of hospital workers.

"The main disadvantage of adopting PEB is cost, whether in money or time. For money, environmentally friendly instruments such as electronic medical record systems require high costs to purchase and introduce. As for time, we must spend a chunk of time to adapt and learn new environmental practices."

"The implementation process of PEB is complex and time-consuming. I'm quite tired from work and don't want to spend time on these things."

"The digital medical system including self-service registration system and electronic medical record system can cause the leak of personal information, so I am not willing to overly rely on them."

Necessity of adopting PEB

For the necessity of adopting PEB, there were two opposing views. One was that carrying out PEB is necessary, another viewpoint was that there is no need to adopt PEB. People holding positive attitude emphasized the importance of environmental protection for the sustainable development of our descendants, and they also indicated that PEB and human health are closely related. On the contrary, there was people holding negative attitude towards environmentally friendly actions, the main reason was that their actions are insufficient to alleviate the current environmental crisis. Moreover, they also suggested that economic development is the top priority, and protecting the environment should be considered only when the economy reaches a certain level of development.

"It is absolutely necessary to carry out PEB. Because PEB helps to protect the earth and human health, and to ensure our future survival and quality of life."

"Protecting the environment is a collective, national, and even global responsibility, individual's PEB may be negligible in improving global environmental issues."

"There is no need to perform PEB. The current environmental problems, such as climate change and severe air pollution, mainly stem from industrialization and urbanization, overfishing and exploitation, which are the pillars of rapid economic development. Economic development and environmental protection are contradictory. Today, we still prioritize rapid economic development."

To sum up, hospital workers presented their primary insights and thoughts on environmental protection, and emphasized the importance and necessity of adopting PEB.

Level of PEB

The level of PEB at hospital varies from low to high, and we found the level of PEB is related to the work department and gender. Fortunately, except for a few workers, the overall level of PEB was moderate and high.

High level

Most participants had positive attitude towards environmental protection, and in their daily work, they also do their best to adopt actual PEB, such as sorting and recycling medical waste, energy conservation, green procurement, and green transportation. There was a remarkable phenomenon, for the question, "what are the common PEB practices at hospital," the answers of hospital workers from different departments had significant differences. The worker of surgery department emphasized surgical waste management, operating room energy efficiency, and selection of anesthetic drugs. Traditional Chinese Medicine doctors focused on traditional Chinese medicine therapy and the cultivation and procurement of herbal, and elucidated how to perform PEB in traditional medical practices. The worker from internal medicine department placed drug management in priority position. As for infection management's workers, they attached importance to environmental monitoring and reporting.

"I have integrated PEB into my daily work, which may maintain the balance between nature and human, and also have a positive impact on patients' health."

"We have many surgeries every day that use anesthesia drugs, using environmentally friendly anesthesia drugs can reduce pollution of water and soil. Moreover, the classification and recycling of surgical waste including disposable surgical instruments and packaging materials, can also reduce the adverse impact on the environment."

"The cultivation of herbs can reduce excessive exploitation of herbal resources and promote sustainable use of plant resources. The procurement of local herbs can also reduce the carbon footprint of remote drug transportation. Traditional Chinese medicine emphasizes and applies the concept of unity between heaven and man, which is consistent with protecting the environment."

"Drugs have a huge negative impact on the environment. It is necessary to appropriately dispose drug waste to avoid the contamination of water and soil. It is also obligatory to reduce drug waste through advisable recycling system. As a doctor, I am very willing to do these things."

"To ensure that the hospital's environment meets hygiene, we need to strictly monitor and regularly report the internal environment of the hospital. In this regard, PEB is consistent with our job responsibilities, so it is confirmed that our department's workers have high levels of PEB."

Medium Level

Several workers indicated that they sometimes performed PEB, while did not perform PEB on occasion, whether to execute or not mainly depended on organizational driving and hindering factors, such as the convenience of infrastructure, the influence of colleagues, and incentives.

It is reasonable to infer that if these factors are all positive, hospital workers will exhibit a high level of PEB.

“For PEB, I adopted it sometimes. The placement of garbage bins in our hospital is not very reasonable. Sometimes I want to classify the garbage, but cannot find the garbage bins. Additionally, it’s all central air conditioning now. When there’s no people in the office, I want to turn it off, but I cannot find the remote control. If the hospital’s infrastructure configuration is reasonable, I can sort garbage anytime and anywhere, and I can also turn off the air conditioning.”

“When my colleagues perform PEB, for into the collective, I will also perform PEB. But if everyone does not value PEB, I will not adopt PEB, otherwise it may cause discomfort for colleagues and myself.”

“Compared to ordinary behavior, PEB is relatively more complex. I am willing to actively participate in PEB that the hospital have clear rewards, such as environmental knowledge competitions. I tend to overlook PEB without rewards, such as turning off lights or turning off faucets.”

Low Level

The workers from the emergency department and the surgery department showed low level PEB. For hospital workers, their primary responsibility was to heal the wound and rescue the dying, and to render services for human health, which is inconsistent with environmental protection. Accordingly, they cannot perform PEB when completing their own work such as surgical operation that needs a large amount of disposable item and strict disinfection procedures. Moreover, the daily work of hospital workers was busy and sophisticated, leading to that they do not have enough time to adopt PEB. Although the attitude and intention towards environmental protection were positive, the actual PEB can be hindered by the lack of infrastructure such as waste bin.

“Our daily work is very stressful, and primary task is to treat patients. PEB is not our basic consideration in this high-pressure and fast-paced work. Hence, PEB is missing.”

“I am aware of the benefit and necessity of PEB and am willing to adopt it. However, I just adopt very few actual PEB due to the lack of infrastructure, cost and time-consuming, and busy work.”

The level of PEB was also influenced by gender, the low PEB was presented by a male hospital worker. Consistent with previous studies, they have demonstrated that women are more willing to adopt environmentally friendly behaviors (Aboramadan, 2022; Anwar et al., 2020; Patel et al., 2017; TM et al., 2021; Xie & Huang, 2021). For female, PEB is seen as a way to realize their own values and society responsibility. They are more concerned about the health and future development of their family members, and are more susceptible to social pressure and cultural influence, which can greatly promote their PEB. These factors, however, cannot significantly affect male workers, explaining relatively low level of PEB among males.

"I am unwilling to adopt PEB. Even if it is convenient like turning off lights or air conditioning, I will not adopt them as it is not my responsibility and does not benefit me in any way."

In brief, the level of actual PEB was uneven, some workers had high level of PEB, while others PEB were insufficient or even missing.

Hindering Factors

Responsibility of Work

Hospital workers are committed to protecting and improving people's health, specifically including diagnosing and treating diseases, providing nursing services, providing health education, and developing and implementing disease prevention and control strategies (Corvalan et al., 2020; Smallwood et al., 2022; Søvold et al., 2021). In view of this, environmental protection was regarded as unimportant affair by hospital workers. For workers at clinical laboratory, their responsibilities were to provide the necessary information for clinical diagnosis through laboratory testing and analysis, and to ensure the quality and accuracy of laboratory operations, which highly dependents on various energy-consuming instruments (Garcia, 2024; Simundic et al., 2020; Vandenberg et al., 2020).

"Treating diseases and saving lives is very urgent, and a slight delay may result in irreversible harm to health, even losing life. In this situation, we have no time to consider environmental behavior and are solely focused on saving lives."

"The daily work of the laboratory department relies on various instruments. Whether the detection of biochemical items such as blood lipids and blood sugar, or the routine blood test, we have used the assembly line from sample entry to result output. The normal operation of the assembly line requires high temperature and humidity in the environment. In order to ensure the normal operation of the instrument and the stability of the inspection results, we must use air conditioning and humidifiers 24 hours a day, which is contrary to environmental protection."

Standards and Regulations in the Medical Field

The standards and regulations in the medical field are diverse, covering various medical specialties and fields. For example, to guide surgeons on surgical procedures, there are specific surgical procedure specifications such as American Society of Surgeons (ACS), leading to that surgeons may not engage in environmentally friendly behavior in operating room. For the sake of better carrying out diagnosis and treatment activities, the hospital is extremely energy-consuming, how to improve the energy efficiency of hospital was a problem that we must earnestly consider. Furthermore, handing of medical waste was also contradictory to environmental protection to a certain extent, specific statements are as follows:

"The operating room must be strongly cleanliness and disinfection, which requires the regular use of disposable items such as disposable surgical clothing, disposable gloves, disposable syringes, and disposable dressings and gauze in surgery. It is well known that using disposable items is not in line with environmental protection principles, but reusing these items is not allowed for the sake of patient and personal health."

"Many high energy consuming devices are also essential, such as lighting systems, air conditioning systems, anesthesia and ventilation machines, and monitoring equipment. Energy efficiency should be considered when designing the hospital."

"Handing medical waste is very complex, especially infectious waste. We must strictly follow hygiene standards, otherwise may seriously threaten the environment and public health. One example is the usage of plastic bags, to prevent the leakage of waste, it is compulsory to use disposable yellow plastic bags to packaging waste. However, from the perspective of environmental protection, disposable plastic bags are not advocated."

Organizational Barriers

Organizational barriers impeding PEB also been emphasized by hospital workers. The importance of infrastructure in implementing PEB has been repeatedly highlighted, moreover, the diversity of infrastructure at hospital is also noticeable. Specifically, to safely and effectively manage medical waste, it was necessary to establish a waste classification and recycling system, and to equip adequate equipment such as garbage bins and high-pressure sterilization pots. As for the using of electric energy, lighting equipment and air conditioning systems were the focus of hospital workers. Additionally, learning activities related to environmental protection and economic rewards have also been mentioned. As long as there are sufficient learning and rewards, PEB may be widely adopted by hospital workers. Moreover, the role of hospital managers was crucial, they can formulate environmental laws and regulations to promote environmental protection.

"I reckon PEB is very important, and am willing to adopt PEB such as refuse classification whether at home or at hospital. But the number of waste bin is inadequate, classifying waste into appropriate bins requires me to walk a long distance to do so, which are the main barrier of performing PEB."

"Hospital should install energy-saving lighting equipment, such as LED lamps, and regularly inspect and maintain them to reduce energy consumption. Hospital also needs to use efficient air conditioning systems, adjust the settings and operating modes of air conditioning equipment, and then reduce energy consumption"

"At hospital, we rarely hear the term environmental protection, we also rarely talk about environmental issues and protection. It seems to indicate that there is no relationship between environmental protection and hospital. The fact, however, is that protecting the environment is our primary responsibility, hospital should take action such as providing environmental training and establishing reward mechanism to promote PEB."

"The management has not formulated relevant environmental policies and measures, and lacks advocacy and support for environmental behavior, leading to negative effects on PEB of medical workers. Moreover, the management is accustomed to traditional practices and processes, and holds a conservative attitude towards change and innovation, resulting in deep resistance to PEB among all the workers."

Physical and Mental Feeling

The impediment from physical and mental feeling of hospital workers was crucial. In terms of physical health, hospital workers are exposed to various pathogens, which can easily lead to infectious diseases such as influenza and tuberculosis (Baker et al., 2022; Ong et al., 2020; Zemouri et al., 2020). Prolonged standing work may lead to occupational injuries such as bone and muscle fatigue, and lumbar disc herniation (Goradia & Shimpi, 2023; Jakaria & Kuan, 2024). Long term irregular work may increase the risk of cardiovascular disease (Boivin et al., 2022; Foster, 2020; Wang et al., 2021). As for mental health, hospital workers often face high-pressure clinical environments such as emergencies and severe patient conditions, leading to mental health problems such as anxiety and depression (Afshari et al., 2023; Ooms et al., 2022). In these situations, the PEB was significantly impeded.

"The working at hospital is very tense, and we do not even have time to drink water, we are very tired and stressful, so there is no time and energy to pay attention to PEB. We need rest rather than considering how to protect the environment after work."

"Busy work makes us overlook the health and regularity of our diet, as well as the lack of appropriate physical activity, leading to metabolic problems such as weight gain. Long term irregular work and night shift work may disrupt the body's biological clock, affect sleep quality, and increase the risk of cardiovascular disease. In the presence of these health issues, we also have no time to consider environmental protection."

"At hospital, there may be significant emotional changes. When I am about to start the night shift, I become particularly anxious resulting from the worried about unexpected situations. When I see my patient pass away, I feel particularly sad and have a deep sense of powerlessness. Facing life and death, environmental protection is nothing."

In short, the responsibility of work, standards and regulations in the medical field, organizational barriers, physical mental feeling are the hindering factors of PEB.

Driving Factors

Demographic Characteristics

Demographic characteristics including gender and education played conspicuous roles in promoting actual PEB among hospital workers. Numerous studies have demonstrated that women are more willing to adopt environmentally friendly behavior, which can be explained by the difference between female and male regarding the social role, cultural factors, sense of social responsibility, empathy ability, and social identity and pressure (Chwialkowska et al., 2020; Kumar et al., 2021; Rustam et al., 2020; TM et al., 2021; Zhao et al., 2021). The importance of environmental education has also been emphasized by several workers, and learning how to engage in environmental behavior was a prerequisite for implementing PEB. During the learning process, it was necessary to note that PEB should be tailored to local conditions.

"Our director brought up environmental issues during the daily morning meeting, which can become the focus of female discussion, whilst male colleagues pay very little attention to them. This gender difference is very universal, women are more aware of the severity of environmental issues and actively take environmental action, while men are indifferent."

"PEB at hospital is unique, an example is the garbage classification, many colleagues cannot distinguish household waste and medical waste, and do not know what should be thrown into yellow bags and what should be thrown into black bags. Professional training is the foundation for integrating PEB into medical practices."

"Generally, PEB at hospital is even more unique and multifarious, sometimes we do not know how to implement environmental behavior. Environmental protection should be tailored to local conditions and cannot indiscriminately imitate the others practices.

Psychological Variables

There were several psychological variables comprising environmental attitude, environmental concern, and health conscious can contribute to PEB of hospital workers. Environmental attitude is an individual's understanding, evaluation, and attitude towards environmental issues, a positive attitude can directly encourage people to take proactive environmental actions (Dhir et al., 2021; Liu et al., 2020). Environmental concern refers to the level of concern about environmental issues including environmental pollution, climate change, resource consumption, and biodiversity loss (Cruz & Manata, 2020; Saari et al., 2021). Health conscious is a high level of attention and importance to personal health. People with high health conscious usually actively pay attention to their physical health and the influencing factors, such as diet, exercise, sleep, and mental health (Castellini et al., 2023; Xu et al., 2020).

"Traditional Chinese medicine emphasizes the unity of heaven and man, and environmental protection is an important part of maintaining overall health. And our medical practice relies on Chinese herbs, promoting the sustainable collection and use of herbs is an important measure to protect the ecological environment. In short, environmental protection is very important for future generations."

"I am very concerned about environmental issues, such as climate change, air and water pollution, species extinction, and land degradation, which are all catastrophic. We must try our best to protect the environment to ensure that earth can sustainably provide good living conditions for humans and other organisms."

"Climate change directly results in severe heatstroke comprising thermoplegia, heat cramp, and heat exhaustion, and affect the transmission patterns and distribution range of infectious diseases, posing the great threat to physical and mental health for healthcare workers and the general public."

Organizational Facilitators

Organizational facilitators were also significant regarding to PEB. Economic rewards were the most important driving factor, but the effect was limited in promoting PEB. To better protect the environment, it is essential to combine economic incentives with other policy measures to form a diversified environmental policy system (Lades et al., 2021; Odhiambo et al., 2023). The support of hospital leaders for environmental protection behavior also promoted the environmental behavior of employees. In addition, employee training also played important roles in facilitating PEB.

"Our hospital has established various rewards for PEB, such as energy conservation and emission reduction rewards, waste recycling bonuses, more and more people are willing to adopt PEB and show actual PEB in daily life."

"The support of leaders is the foundation for implementing PEB since they can provide sufficient infrastructure and optimize workflow to promote the widespread appearance of PEB at hospital. In addition, if they demonstrate their concern for environmental protection, it can also stimulate our enthusiasm for environmental behavior."

"Through training and educational activities, our understanding and awareness of environmental issues can be significantly enhanced, leading to our sense of social responsibility and actively participating in PEB."

Hence, for driving factors, there are demographic characteristics, psychological variables, and organizational facilitators. These factors have significant effects on actual PEB, we should pay more attention to clarify the influencing factor of PEB within hospital.

Discussion

The current study focusing on hospital workers' PEB corroborates that the majority of them are well informed and adopt more actual PEB to cope with increasingly severe environmental issues. Consistent with previous researches, they demonstrate high level of involvement of healthcare workers in environmental issues from a range of countries such as Italian Pinzone et al (2019), Pakistan Xu et al (2022), Australia and the UK Singleton et al (2021), and Indonesia (Widianto et al., 2021). However, most of study was not conducted at Chinese hospital and did not thoroughly report the potential influencing factors of PEB among hospital workers. Additionally, most scholars use quantitative methods to study environmental behavior (Alzubaidi et al., 2021; Carducci et al., 2021; Lange & Dewitte, 2019; Yuriev et al., 2020). It is acknowledged that quantitative methods have many advantages, such as objectivity, accuracy, and repeatability (Mohajan, 2020; Sürücü & Maslakçi, 2020). Meanwhile, the shortcomings of quantitative methods are obvious, such as ignoring background information and lacking deep understanding (Rahman, 2020; Strijker et al., 2020). Hence, we chose the qualitative research method to conduct this study. As guardians of human health, the PEB of hospital workers is crucial, resulting in exploring the influencing factors of PEB and formulating appropriate intervention measures become a hot topic in present and future research.

Hospital workers elucidated various advantages of implementing PEB, such as reducing environmental pollution, protecting ecosystems, achieving sustainable development, and promoting human health, which is consistent with previous research from (Lange and Dewitte, 2019; Pirmoradi et al., 2021; Yuriev et al., 2020; Sheng et al., 2023). Meanwhile, it is evident regarding to the disadvantages of PEB, time-consuming and money-consuming were the two most obvious shortcomings. The study of Corrado et al (2022) and Grilli and Curtis (2021) indicated that environmental protection is usually time-consuming compared to ordinary behavior. As for money-consuming, numerous studies emphasized it and regarded it as the primary impediment of PEB (Meyer et al., 2022; Nowakowska & Rönnlund, 2023; Qadri et al., 2022; Shafiei & Maleksaeidi, 2020; Szczepaniak & Szulc-Obłoza, 2024). It is

reasonable to infer that PEB can be widely implemented by people from all walks of life in society without these drawbacks.

The result of this study indicated that the current situation of PEB among hospital workers is not optimistic, some peopled it as priority, while others place it in a trifling position. Theoretically, hospital workers are more concerned about environmental issues and their impacts on overall health than the public, they, however, cannot always perform actual PEB owing to complex and diverse factors (Dunphy, 2014; Kallio et al., 2018; Pinzone et al., 2019). Pinzone et al (2019) pointed out that green training has significant effect on employees' PEB, which can be partially mediated by green goal difficulty. The study of Kallio et al (2018) demonstrated that the organizational support comprising collaboration, education, explicit procedures and roles, environmentalist culture, and motivational facilities can contribute the implement of environmental actions throughout a hospital organization. Hence, comprehensively elucidating the influencing factors of hospital workers' PEB is a prerequisite for promoting actual behaviors including the sustainable use of energy and materials, unnecessary emissions of greenhouse gases.

The hospital workers' perceptions about hindering factors of PEB are accordant with several previously determined factors including the responsibility of work Shimoda et al (2020); Widianto et al (2021), standards and regulations in the medical field Ul Mateen et al (2023); Xu et al (2022), organizational barriers (Hasan et al., 2024; Lee et al., 2023), and physical and mental feeling (Ozkan et al., 2024; Shimoda et al., 2020). Furthermore, the study of Huang et al (2020) considered personal norm, perceived efficacy, and personal habits as barriers from conducting PEB. Cleveland et al (2020) put forward that ecological dispositions comprising internal environmental locus of control and perceptions of situational factors can significantly affect individual's PEB. Moreover, climate change knowledge, attitudes toward environmental protection, self-efficacy, and trust in information can shape university students' PEB in developing countries (Díaz et al., 2020). It is noticeable that these factors are identified at the context of household, can result in the behavioral change among the general public, and cannot be defined as impediments of hospital workers' PEB.

The driving factors resulting from this study comprised demographic characteristics, psychological variables, and organizational facilitators. For demographic characteristics, our finding was consistent with the study of Meyer (2016) suggesting that gender impacts PEB and females are more willing to engage in environmental behavior such as energy conservation and recycling. In addition, education related to environmental protection can contribute to adopting of PEB, which proves the importance and inevitability of education in building an environmentally friendly society (Meyer, 2016). As for psychological variables, they were multifarious and included environmental attitude, environmental concern, and health conscious. The relationship between attitude and PEB (Corrado et al., 2022; Langenbach et al., 2020; Liu et al., 2020), between concern and PEB (Gu et al., 2020; Kulin & Johansson Sevä, 2021; Zeng et al., 2023), and between health conscious and PEB (Castellini et al., 2023; Martin et al., 2020; Shimoda et al., 2020) have been demonstrated by numerous studies. Consistent with the study of Silvi and Padilla (2021), it emphasized that economic rewards can serve as an organizational facilitator to promote the execution of PEB.

Implications

There are several significant implications resulted from the findings of this study. At the theoretical level, this research differentiates several influencing factors (i.e. responsibility of work, standards and regulations in the medical field, organizational barriers and facilitators, demographic characteristics, and psychological variables) of hospital workers' PEB via the qualitative procedure. Up to now, there are a large number of studies dedicated to PEB and its influencing factors that mainly comprise psychological variables such as self-interest(Lee & Lee (2021); Tan et al (2022), environmental attitude and intention Corrado et al (2022); Liu et al (2020), environmental concern Kulin & Sevä (2021); Zeng et al (2023), and social norms Helferich et al (2023); Perry et al (2021), while a few research try to shed light on organizational impacts on actual PEB. Moreover, the targeted population of PEB related research is the student Díaz et al (2020), the traveler Gao et al (2021), the farmer Xie & Huang (2021), the children Liu & Green (2024), little research takes a unique perspective to explore which factors can shape hospital workers' PEB. Considering the supplementation of influencing factors and target population, the theoretical meaning of current study is significant.

At the practical level, for the sake of promoting environmental behavior of hospital workers, organizational factors whether are barriers (e.g. accessibility of infrastructure) or drivers (e.g. economic rewards, the support of hospital leaders, and employee training) should be earnestly considered by the management and policy-makers. The results manifest that economic rewards and hospital leaders' support are crucial regarding the implement of PEB among hospital workers. Consequently, the formulation of effective intervention measures aiming to encouraging PEB should be in line with these two key variables. A desirable recommendation is to develop appropriate reward measures, particularly economic incentives, leading to the extensive adoption of PEB (Odhiambo et al., 2023; Vorobeva et al., 2022; Zabala, 2015). In addition to economic rewards, incentive-based program should take pro-social (e.g. whether to integrate into social networks and whether to comply with social norms) and pro-environmental factors (e.g. environmental awareness and environmental knowledge) into consideration (Authelet et al., 2021). Moreover, our results also demonstrate that the support from hospital leaders is essential to promote the implementation of PEB, which has been proven by a great deal of studies, such as the study of (Deng et al., 2022; Peng et al., 2022; Molnár et al., 2021; Pinzone et al., 2019).

Environmental issues are increasingly severe and greatly threaten human health, encouraging hospital workers to participate in environmental activities is beneficial for the environment and also promotes health (Mousa & Othman, 2020; Shimoda et al., 2020; Xu et al., 2022). Several hospital workers participating in interviews, however, hold a negative attitude towards their own and hospital's ability to solve environmental problems, and do not know how to adopt actual PEB. Hence, training on how to implement environmental behavior is indispensable. Moreover, the exemplary and leading role of hospital workers in terms of environmental protection should be valued, to hearken the voice of them and amplify these voices are necessary for policy-makers (Anwar et al., 2020; Hanse et al., 2016; Ranjbari et al., 2022). All in all, policy-makers and hospital management should pay more attention to providing proper solutions to mitigate climate change, meanwhile, the incentive measures to promote these measures should also be emphasized seriously, instead of just providing information about causes and consequences of environmental issues.

Limitations and Future Research

Although the theoretical and practical implications are significant, there are some apparent limitations. First, the interview was conducted online via the Tencent Meeting, it is definite that the results between online and face-to-face methods are somewhat different, and the accuracy of online interviews is not as good as face-to-face interviews. In further, we should conduct face-to-face interviews to verify the results of online interviews and search for new influencing factors that cannot be identified at present research. Second, hospital workers participating in this study are from China, viewpoints of hospital workers from other countries are not explored and presented. The medical level and healthcare workers' quality obviously vary in different countries (Corallo et al., 2014; Endeshaw, 2020; Shin et al., 2012), and the environmental problems faced by different countries are also diverse including climate change Bradley et al (2020); Ogunbode et al (2022), soil and water loss Savari et al (2021); Xie & Huang (2021), pollution Ming et al (2022); Soares et al (2021), and forced migration (Risi et al., 2020; Zuo et al., 2023). Therefore, it is imperative to conduct country- specific and region-specific investigations. Finally, this study focuses on common behaviors, PEB only appearing at hospital such as the selection and use of anesthetic drugs are not be particularly emphasized. Subsequent research should explore hospital-specific PEB and point out which type of PEB will be promoted by specific measures.

Conclusion

To sum up, we obtain more comprehensive information about PEB and its influencing factors of hospital workers via qualitative method. The finding demonstrates that the thought of PEB among hospital workers is different from the general public, which compensates the shortcomings of current research and proves the necessity of studying hospital workers' PEB. Additionally, the influencing factors of PEB comprising hindering factors and driving factors also have unique characteristics, economic incentives and the support from hospital leaders can effectively promote the implementation of PEB, providing direction for developing effective intervention measures focusing on hospital workers to relieve the increasingly severe environmental issues.

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