

Factors affecting environmental sustainability attitudes among nurses – Focusing on climate change cognition and behaviours: A cross-sectional study

Sophia J. Chung¹ | Haeyoung Lee¹  | Sun Joo Jang² 

¹Red Cross College of Nursing, Chung-Ang University, Seoul, Republic of Korea

²College of Nursing & the Research Institute of Nursing Science, Seoul National University, Seoul, Republic of Korea

Correspondence

Sun Joo Jang, College of Nursing & The Research Institute of Nursing Science, Seoul National University, 103 Daehak-ro, Jongno-gu, Seoul, 03080, Republic of Korea.

Email: icedcoffee@hanmail.net; ansley1@snu.ac.kr

Abstract

Aims: To investigate the relationship between climate change cognition and behaviours (awareness, concern, motivation, behaviours at home and behaviours at work), positive and negative future cognition, and environmental sustainability attitudes in nurses and to identify the factors affecting environmental sustainability attitudes.

Design: A cross-sectional study.

Methods: In total, 358 nurses currently working in tertiary hospitals in Korea were recruited. Data were collected using an online questionnaire link from 1 August to 7 August 2022. Climate change cognition and behaviours were measured using the Korean version of the Climate, Health, and Nursing Tool. Positive and negative future cognition were measured using the Korean version of the Future Event Questionnaire. Environmental sustainability attitude was measured using the Korean version of the Sustainability Attitudes in Nursing Survey-2. Multiple regression analysis was used to identify the factors affecting environmental sustainability attitudes.

Results: Motivation, concern and behaviours at work were factors affecting environmental sustainability attitudes. Motivation was a pivotal influencing factor. Better scores for environmental sustainability attitudes were specifically correlated with higher scores for motivation, concern and behaviours at work.

Conclusions: Nurses' motivation, climate change concern and pro-environmental workplace practices should all be considered to improve their attitudes towards environmental sustainability.

Implications for the Profession and/or Patient Care: To enhance nurses' environmental sustainability attitudes and behaviours, nurse educators must educate them to increase their motivation for climate action.

Impact: Nurses are increasingly expected to contribute to environmental sustainability. Hence, awareness of climate change and environmental sustainability among nurses must be improved, and nursing engagement and action encouraged. Nurse educators and managers should explore barriers to pro-environmental behaviour engagement among nurses, examine workplace cultures that encourage pro-environmental

behaviours and develop policies/regulations to develop more environmentally sustainable workplaces.

Reporting Method: We adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Patient or Public Contribution: Neither patients nor the public were involved in our research's design, conduct, reporting or dissemination plans. The nurses partook in this study exclusively as research participants and were not involved in any research process.

KEYWORDS

attitudes, climate change, environment, motivation, nurses

1 | INTRODUCTION

Climate change is the greatest global health threat of the 21st century (Watts et al., 2018). Global warming, rising sea levels and increased carbon dioxide levels caused by climate change increase the occurrence of natural disasters such as droughts, floods, and wildfires, and the resulting damage (Centers for Disease Control and Prevention, 2022). Moreover, these factors amplify exposure to known carcinogens that cause cancer or increase the prevalence of various diseases, including infectious diseases, resulting in public health crises (Dickman et al., 2022; Hiatt & Beyeler, 2020; Rocque et al., 2021; Salas et al., 2020). Because climate change has been linked with various health problems, it provides a strong justification for healthcare professionals, including nurses, to participate in climate change solutions (Dickman et al., 2022).

Nurses have an ethical responsibility to achieve the Sustainable Development Goals (Meleis, 2019) and help control and prevent climate change-related health problems (Kalogirou et al., 2020), which can improve human health (Dickman et al., 2022). Moreover, the International Council of Nurses' (2018) position statement on nurses, climate change and health emphasized the need for all nurses to receive ongoing education on sustainability and climate change. Understanding the impact of climate change on environmental and population health is now required as curriculum content in professional nursing education at the basic levels, according to the American Association of Colleges of Nursing's recently approved Essentials: Core Competencies for Professional Nursing Education (American Association of Colleges of Nursing, 2021).

There are growing expectations for nurses' contributions to environmental sustainability; however, little is known about nurses' views and the variables influencing them. It is thus meaningful to evaluate nurses' climate change cognition and behaviour levels to improve their capabilities to cope with climate change and environmental sustainability. In addition, nurses' predictions of future events could influence their environmental sustainability interest (Chung et al., 2023) and pro-environmental behaviours (Stanley et al., 2021), reflecting their attitudes towards environmental sustainability. With the growing importance of environmental sustainability, it is crucial

to understand how nurses perceive and engage with this topic to provide sustainable improvements in their daily care practices (Osingada & Porta, 2020). Therefore, this study aimed to investigate the relationship between nurses' climate change cognition and behaviours, future cognition (positive and negative), and attitudes towards environmental sustainability.

2 | BACKGROUND

Nurses can engage in more environmentally sustainable practices when they are more aware of climate change and environmental sustainability (Anåker & Elf, 2014). However, in their review of nurses' perspectives on global warming and sustainability in healthcare, Griggs et al. (2017) found the following barriers to nursing engagement and action: inconsistency and ambiguity surrounding the meaning and focus of sustainability; disconnection between local actions and global consequences; psychological, individual and social barriers to action; and environmental issues were indicated as a lower priority in high-paced environments. Despite several challenges, such as environmental sustainability content not being commonly addressed in nursing and the limited focus of nurses' roles in this context, integrating environmental sustainability into nursing (Leffers et al., 2017) by providing environmental sustainability education could change the attitudes and practices among nurses, leading to enhanced care for climate change-related health problems (Richardson et al., 2016).

Tools must be developed to clearly define and measure the concepts and categories of environmental sustainability attitudes to change nurses' perspectives. The Sustainability Attitudes in Nursing Survey-2 (SANS-2), designed for nursing students, assesses attitudes towards climate change and sustainability in nursing and nursing curricula (Richardson et al., 2016). It has also been translated into German, Spanish and French (Richardson et al., 2016). Furthermore, a recent study has developed and validated the Korean version of the SANS-2 specifically for use with Korean nurses (Chung et al., 2024). Therefore, this study used scores from the Korean version of the SANS-2 as a proxy variable

for measuring nurses' attitudes towards environmental sustainability in nursing and nursing curricula.

Several studies have been conducted to investigate the perceptions and attitudes of nursing students (Álvarez-Nieto et al., 2022; Chen & Price, 2020), nursing faculty (Amerson et al., 2022) and nurses (Anåker et al., 2015) on climate change and sustainability. Although all countries share the common goal of environmental sustainability education, the educational needs for greater awareness and frequent pro-environmental practices in nursing may vary because climate change affects each country differently (Álvarez-Nieto et al., 2022). In addition, the factors related to nurses' attitudes towards environmental sustainability still need to be precisely determined, and nurses' participation and actions should be promoted.

Pro-environmental behaviours refer to the act of protecting the environment through human activities (Koger & Winter, 2011). They have been defined as a set of environmental responsibilities that encompass improving environment-related knowledge, creating green products and processes and reviewing harmful actions to the environment (Graves & Sarkis, 2018). Furthermore, Stern (2000) divided pro-environmental behaviours into private (e.g., purchase, use and disposal of personal services and products) and public behaviours (e.g., pro-environmental rules and policies, encouraging people to engage in green activities and addressing environmental issues). For nurses to acquire an attitude towards environmental sustainability that results in pro-environmental behaviours, their motivation must be increased (Tian et al., 2020). Therefore, assessing their cognitive-behavioural levels and environmental awareness is paramount (Osingada & Porta, 2020). To measure the cognitive-behavioural level of nurses regarding the health impact of climate change, the Climate, Health, and Nursing Tool (CHANT) was developed (Schenk et al., 2019). The CHANT is aimed at nurses and measures their awareness, concern, motivation and behaviours at work and home about climate change in general situations (Schenk et al., 2019). Although the validity and reliability of the Korean version of the CHANT have been recently verified (Jeong et al., 2022), few studies have been conducted to evaluate the level of cognitive behaviour of nurses utilizing this tool.

Future cognition refers to concerns about predicting the outcomes of future events (Thom & Clayton, 2016) and comprises two sub-domains: negative and positive future cognition (Miranda & Mennin, 2007). Researchers have recognized the ability to predict the future as being central to human cognition (Marroquín et al., 2016). An individual's prediction of a future event, positive or negative, is associated with negative emotions such as anxiety (Hyeon et al., 2018; Miranda & Mennin, 2007). People anxious about climate change are more likely to engage in pro-environmental behaviours (Stanley et al., 2021) because a specific level of anxiety could lead people to deal with climate change appropriately (Clayton & Karazsia, 2020). In addition, future cognition is associated with environmental sustainability interest (Chung et al., 2023), which in turn could be associated with an improved awareness of environmental sustainability (Niankara & Zoungrana, 2018), one of the antecedents

of environmental sustainability in nursing (Anåker & Elf, 2014). Therefore, future cognition could be a potential influencing factor in attitudes towards environmental sustainability. However, limited research has been undertaken to examine the direct association between future cognition and attitudes towards environmental sustainability; thus, examining the impact of future cognition could be helpful to understand the nurses' attitudes towards environmental sustainability.

3 | THE STUDY

3.1 | Aims

This study had the following aims: (1) to investigate the relationship between climate change cognition and behaviours, positive and negative future cognition, and environmental sustainability attitudes among nurses; and (2) to identify the factors affecting environmental sustainability attitudes among nurses.

4 | METHODOLOGY

4.1 | Design

A cross-sectional study design was used.

4.2 | Participants and data collection

Among the 457,849 nurses in Korea, 234,876 work in medical institutions, and 64,557 of them work in tertiary hospitals (Health Insurance Review and Assessment Service & National Health Insurance Service, 2022). A self-selection sampling method was utilized. Despite non-probability sampling for data collection, to obtain the minimum number of samples, we used the G*Power program (Version 3.1.9.2) (Heinrich Heine University, Dusseldorf, Germany). Based on a multiple linear regression analysis, 316 participants were calculated with an effect size (f^2) of 0.15 (medium), a significance level of 0.01, a power of 0.99 and 15 predictor variables. An online survey was conducted with a target number of 352 participants, accounting for a 10% dropout rate. Data were collected online from 1 August to 7 August 2022, using a questionnaire link. Data collection reached the target number and was completed in 7 days. Posts to promote study participation were registered on the groupware board of tertiary hospitals and an online community, which nurses primarily used. The survey link served as an open call to ensure that only those willing to voluntarily participate in the study were included. The eligibility criteria for this study were as follows: employed for at least 1 month in a tertiary hospital in Korea, and no major difficulties in understanding and completing the online link-based survey. The exclusion criteria were those diagnosed with or currently being treated for a mental health problem, or not engaged

in direct and indirect nursing care. Data were collected from 365 people; however, the data of seven people (six with mental health problems and one currently not working) were excluded. Thus, data from 358 participants were analysed. The study adheres to the STROBE reporting guidelines.

4.3 | Measurements

Information on participants' general characteristics (age, sex, marital status, religion, educational level, socioeconomic status, residential area and health status); work-related characteristics (total work experience, position and current department); and the presence of climate change-related education completion was collected through a self-report questionnaire developed by the researchers. The main variables – climate change cognition and behaviours, positive and negative future cognition, and environmental sustainability attitude – were measured using the following tools that guaranteed validity and reliability.

4.3.1 | Climate change cognition and behaviours

The participants' climate change cognition and behaviours were measured using the Korean version of the CHANT developed by Schenk et al. (2019) and validated in Korean by Jeong et al. (2022). The CHANT measures nurses' awareness, motivation, concern and behaviours at work and home regarding climate change in general situations. It comprises 20 items rated on a five-point Likert-type scale, ranging from 1 (never) to 5 (always), and five sub-domains (awareness, concern, motivation, behaviours at home and behaviours at work). An example item is "I use non-fossil fuel-based energy sources" in the behaviours at home sub-domain. Scores range from 20 to 100, with higher scores indicating higher climate change cognition and behaviours. The construct validity at the time of tool development (Schenk et al., 2019) was verified with a comparative fit index of .95, root mean square error of approximation of .04, standardized root mean square residual of .09, and Cronbach's α of .69–.91. In the Korean version (Jeong et al., 2022), Cronbach's α was .81. In this study, Cronbach's α was .68–.85 (all items .91).

4.3.2 | Positive and negative future cognition

The positive and negative future cognition were measured using the Korean version (Hyeon et al., 2018) of the Future Event Questionnaire developed by Miranda and Mennin (2007). It is a five-point Likert-type scale consisting of two sub-domains (negative and positive future cognition), each with 17 items, totaling 34 items. A higher score in each sub-domain (scoring range: 17–85 points) indicates a higher degree of cognition of negative or positive events, respectively. At the time of development (Miranda

& Mennin, 2007) and in the Korean version (Hyeon et al., 2018), Cronbach's α was .87 and .94, respectively, while Cronbach's α in this study was .93 and .93 for negative and positive cognition, respectively.

4.3.3 | Environmental sustainability attitude

Environmental sustainability attitude was measured using the Korean version (Chung et al., 2024) of the SANS-2 (Richardson et al., 2016). The Korean version of the SANS-2 was specifically developed to measure nurses' environmental sustainability attitudes "in the nursing curriculum and nursing practice." It comprises a seven-point Likert-type scale (1=strongly disagree, 7=strongly agree), a total of five items, and the score ranges from 5 to 35. As previously mentioned, the scores were specifically related to the context of environmental sustainability in the nursing curriculum and nursing practice. Participants were asked how much they agreed with each statement, with an example item being "Issues about climate change should be included in the nursing curriculum." Higher scores indicate a higher environmental sustainability attitude in the specific context of the nursing curriculum and nursing practice. Cronbach's α at the time of development (Richardson et al., 2016) and the Korean version (Chung et al., 2024) were .82 and .86, respectively. In this study, Cronbach's α was .86.

4.4 | Data analysis

Data were analysed using SPSS Statistics software version 26.0 (IBM Corp., Armonk, NY, United States). The participants' general and work-related characteristics, climate change cognition and behaviours, positive and negative future cognition, and environmental sustainability attitude were analysed using descriptive statistics. The difference in sustainability attitude according to participants' characteristics was analysed using a t-test and one-way analysis of variance. The correlation between variables was analysed using Pearson's correlation coefficients. A multiple regression analysis was used to determine the factors affecting sustainability attitudes. The residuals' normality and homogeneity of variance were tested using the Kolmogorov-Smirnov and Breusch-Pagan tests, respectively. The significance level of all analyses was <0.05 .

4.5 | Ethical considerations

This study was performed after obtaining approval from the Institutional Review Board of the university to which the authors belong (No. 1041078-202205-HR-115, approval date: 18 July 2022). Information that could identify individuals and departments was not collected in the survey, and there were no data

for researchers to identify the study participants. The study participants were provided with explanations about the purpose of the study, methods, anonymity guarantee and the possibility of withdrawing participation at any time if desired. They submitted the electronic informed consent only if they wished to participate voluntarily, and the survey was subsequently conducted using the survey link of this study.

5 | RESULTS

5.1 | Participants' general and work-related characteristics

The median age of the 358 participants was 32.00 years (interquartile range, 28.00–38.00 years). Of the total, 331 participants were women (92.5%), 189 (52.8%) were unmarried, 269 (75.1%) had a bachelor's degree, 214 (59.8%) had a mid-socioeconomic status, and 283 (79.1%) were living in large cities. The median total work experience was 6.41 years (interquartile range, 3.50–10.35 years); 284 (79.3%) staff nurses and 206 (57.5%) nurses currently working in the ward formed the majority. Of the participants, 302 (84.4%) had no experience receiving climate change-related education within the last year (Table 1).

Participants' mean score for climate change cognition and behaviours was 74.46 (SD 12.17). Among the five sub-domains, awareness was the highest, with a mean score of 4.11 (SD 0.79) out of five points, and behaviours at work were the lowest, with a mean score of 3.39 (SD 0.78). For negative and positive future cognition, the mean score (SD) was 2.14 (0.66) and 3.41 (0.70), respectively, out of five points. Environmental sustainability attitudes had a mean score of 4.82 (1.18) out of seven points (Table 2).

5.2 | Comparison of environmental sustainability attitudes according to general and work-related characteristics

We evaluated the differences in environmental sustainability attitudes according to the general and work-related characteristics of the participants and found a difference only by sex. Specifically, women had a higher environmental sustainability attitude score than men ($t=2.30$, $p=.022$) (Table 3).

5.3 | Correlation among major variables

Pearson's correlation analysis showed that awareness ($r=.35$, $p<.001$), concern ($r=.46$, $p<.001$), motivation ($r=.52$, $p<.001$), behaviours at home ($r=.32$, $p<.001$), behaviours at work ($r=.30$, $p<.001$), and positive future cognition ($r=.16$, $p=.002$) were significantly correlated with environmental sustainability attitudes (Table 4).

5.4 | Factors affecting environmental sustainability attitudes

A multiple regression analysis was performed to identify the factors affecting the environmental sustainability attitudes of nurses. Variables with a significant difference based on $p<.10$ in the test for the differences in environmental sustainability attitudes according to the participants' characteristics (sex, marital status and religion) and variables that demonstrated a significant relationship in the correlation analysis between major variables (positive future cognition, five sub-domain scores of climate change cognition and behaviours) were input as the enter method during the multiple regression analysis. The variance inflation factor was 1.03–2.42, and there was no multicollinearity between the independent variables. The Durbin–Watson index was 1.93, identifying the independence between error terms. According to the results, this regression model explained 30.0% of the variance in environmental sustainability attitudes. Specifically, the factors affecting environmental sustainability attitudes were in the order of motivation ($\beta=.32$, $p<.001$), concern ($\beta=.21$, $p=.003$) and behaviours at work ($\beta=.11$, $p=.045$). Among them, motivation was found to be the most influential factor. In other words, higher scores for motivation, concern and behaviours at work were correlated with higher environmental sustainability attitude scores (Table 5).

6 | DISCUSSION

In this study, Korean nurses' attitudes towards environmental sustainability were considered positive based on a previous study that considered a mean item score of four or higher as indicative of a positive attitude (Chen & Price, 2020). Furthermore, mean scores for every item in SANS-2 were greater than four in this study. Specifically, Item 3 ("Sustainability is an important issue for nursing") and Item 4 ("Sustainability should be included in the nursing curriculum") were higher than others. Previous studies encountered similar results among nursing and midwifery students in the United Kingdom (Richardson et al., 2019) and China (Chen & Price, 2020). In this study, the mean score overall of SANS-2 was lower than those of undergraduate nursing students from European (Álvarez-Nieto et al., 2022), Arabian (Cruz et al., 2018) and Chinese (Chen & Price, 2020) studies and higher than nursing educators in the United States (Amerson et al., 2022). Younger consider climate change and sustainability as serious problems (Hickman et al., 2021). Therefore, young nursing students perceived climate change and environmental sustainability as more important and showed greater agreement with including these aspects in the nursing curriculum. Although nurses' levels of agreement differed, their attitudes towards environmental sustainability could improve over time (Álvarez-Nieto et al., 2022). Moreover, "positive, strong, and stable attitudes" are considered antecedents of behavioural change (Verplanken & Orbell, 2022) and influence pro-environmental behaviours within organizations (Tian

TABLE 1 General and work-related characteristics (N = 358).

Characteristics	Categories	N (%)	M (interquartile range)
Age (years)			32.00 (28.00~38.00)
Sex	Female	331 (92.5)	
	Male	24 (7.5)	
Marital status	Single	189 (52.8)	
	Married	169 (47.2)	
Religious	No	185 (51.7)	
	Yes	173 (48.3)	
Educational level	Diploma	60 (16.8)	
	Bachelor's degree	269 (75.1)	
	≥Master's degree	29 (8.1)	
Socioeconomic status	Low	48 (13.4)	
	Middle	214 (59.8)	
	High	96 (26.8)	
Residence	Rural	2 (0.5)	
	Small and medium city	73 (20.4)	
	Large city	283 (79.1)	
Health status	Bad	26 (7.3)	
	Moderate	134 (37.4)	
	Good	198 (55.3)	
Total working years			6.41 (3.50~10.35)
Position	Staff nurse	284 (79.3)	
	≥Charge nurse	74 (20.7)	
Current working unit	Ward	206 (57.5)	
	Intensive care unit	29 (8.1)	
	Outpatient department	72 (14.2)	
	Other	51 (33.0)	
Climate change-related education	No	302 (84.4)	
	Yes	56 (15.6)	

Note: Other: operation room, emergency room, clinical research centre.

Abbreviation: M, mean.

et al., 2020). Considering the importance of climate change and its increasing impact on health (World Health Organization, n.d.), continuously examining nurses' attitudes towards environmental sustainability and their need for an environmental sustainability protocol in nursing is important.

As measured by the CHANT, motivation was the biggest influencing factor for environmental sustainability attitudes among Korean nurses in this study. An earlier study discovered a positive correlation between motivation and attitudes regarding sustainability (Chen et al., 2021). Attitudes reflect an individual's motivation, especially intrinsic motivation, to protect the environment (Kaiser et al., 2017). Accordingly, an individual with higher motivation displayed positive attitudes. This showed their perceived importance

of climate change and environmental sustainability and highlighted the need to include sustainability in the nursing curriculum. Furthermore, increasing nurses' motivation could be more important for their attitude towards environmental sustainability, leading to pro-environmental behaviours (Tian et al., 2020). Thus, nurse educators should explore how to increase nurses' motivation as a strategy to enhance environmentally friendly practices when teaching the necessary curriculum.

Concerns regarding the diverse impact of climate change were another influential factor for attitudes towards environmental sustainability. A study examining renewable energy as sustainability found that people concerned about climate change reported a positive attitude, desiring to avoid the negative impacts of climate

TABLE 2 Participants' climate change cognition and behaviours, future cognition and sustainability attitudes ($N=358$).

Variables	Subdomains ^a	Total scores	Mean rating scores
		M (SD)	M (SD)
Climate change cognition and behaviours	Awareness (4)	16.42 (3.14)	4.11 (0.79)
	Concern (5)	19.07 (3.89)	3.81 (0.78)
	Motivation (3)	10.61 (2.68)	3.54 (0.89)
	Behaviours at home (4)	14.80 (3.10)	3.70 (0.77)
	Behaviours at work (4)	13.56 (3.10)	3.39 (0.78)
	Total (20)	74.46 (12.17)	3.72 (0.61)
Future cognition	Negative future cognition	36.36 (11.24)	2.14 (0.66)
	Positive future cognition	58.01 (11.94)	3.41 (0.70)
Environmental sustainability attitudes		24.09 (5.90)	4.82 (1.18)
Mean scores of each item of environmental sustainability attitudes			
1. Climate change is an important issue for nursing			4.72 (1.48)
2. Issues about climate change should be included in the nursing curriculum			4.52 (1.59)
3. Sustainability is an important issue for nursing			5.15 (1.39)
4. Sustainability should be included in the nursing curriculum			5.11 (1.44)
5. I apply sustainability principles in my nursing practice			4.58 (1.49)

^aFigures in brackets: number of items in each sub-domain.**TABLE 3** Comparison of sustainability attitudes according to participants' characteristics ($N=358$).

Characteristics	Categories	N	M (SD)	t/F	p
Sex	Female	331	24.30 (5.75)	2.30	.022
	Male	24	21.59 (7.17)		
Marital status	Single	189	23.52 (5.97)	1.94	.054
	Married	169	24.73 (5.77)		
Religious	No	185	23.51 (5.92)	1.95	.053
	Yes	173	24.72 (5.82)		
Educational level	Diploma	60	23.48 (6.13)	0.39	.676
	Bachelor's degree	269	24.23 (5.79)		
	≥Master's degree	29	24.07 (6.51)		
Socioeconomic status	Low	48	23.79 (5.38)	0.13	.883
	Middle	214	24.07 (6.11)		
	High	96	24.30 (5.72)		
Residence	Rural	2	28.00 (8.49)	0.61	.546
	Small and medium city	73	24.42 (5.67)		
	Large city	283	23.98 (5.95)		
Health status	Bad	26	24.15 (5.33)	0.22	.805
	Moderate	134	23.83 (5.82)		
	Good	198	24.26 (5.90)		
Position	Staff nurse	284	23.89 (5.85)	0.21	.206
	≥Charge nurse	74	24.86 (6.06)		
Current working unit	Ward	206	24.29 (5.44)	1.22	.301
	Intensive care unit	29	23.31 (7.25)		
	Outpatient department	72	24.71 (5.28)		
	Other	51	22.88 (7.45)		
Climate change-related education	No	302	23.96 (6.04)	1.01	.314
	Yes	56	24.82 (5.03)		

Note: Other: operation room, emergency room, clinical research centre.

Abbreviations: M, mean; SD, standard deviation.

TABLE 4 Correlation among major variables (N = 358).

	Age	Working years, <i>r</i> (<i>p</i>)	Climate change cognition and behaviours					Behaviours at work	Negative future cognition	Positive future cognition	Environmental sustainability attitudes, <i>r</i> (<i>p</i>)
			Awareness, <i>r</i> (<i>p</i>)	Concern, <i>r</i> (<i>p</i>)	Motivation, <i>r</i> (<i>p</i>)	Behaviours at home, <i>r</i> (<i>p</i>)					
Age	1										
Working years		1									
Climate change cognition and behaviours			1								
	Awareness	.08(.122)									
	Concern	.07(.222)	.65(<.001)	1							
	Motivation	.14(.008)	.45(<.001)	.63(<.001)	1						
	Behaviours at home	-.02(.782)	.43(<.001)	.54(<.001)	.54(<.001)	1					
Behaviours at work	.09(.087)	.10(.054)	.18(.001)	.31(<.001)	.45(<.001)	.59(<.001)	1				
Negative future cognition		.07(.161)	-.20(<.001)	.02(.781)	.02(.702)	-.05(.309)	.03(.528)	1			
Positive future cognition		-.04(.513)	.20(<.001)	.22(<.001)	.29(<.001)	.25(<.001)	.17(.002)	-.25(<.001)	1		
Environmental sustainability attitudes		.05(.377)	.35(<.001)	.46(<.001)	.52(<.001)	.32(<.001)	.30(<.001)	.01(.820)	.16(.002)	1	

change and to ensure sustainability (Lucas et al., 2022). However, more evidence for the relationship between concerns and attitudes is needed among nurses. In an earlier study related to concerns and behaviours, those worried about climate change engaged in environmentally friendly behaviours because they felt responsible for reducing its impact (Bouman et al., 2020). Given that pro-environmental behaviours were related to concern (Chuvienco et al., 2018; Kautish & Sharma, 2020) and attitudes (Tian et al., 2020), further studies evaluating the influence of nurses' concerns on attitudes could help identify the underlying mechanisms for attitude formation regarding environmental sustainability.

The final influential factor included behaviours at work, although scores for behaviours at work were the lowest. People who engaged in pro-environmental workplace behaviours had a higher intention to act, which was primarily associated with attitudes towards such behaviours (Blok et al., 2015). Thus, nurses engaging in more pro-environmental workplace behaviours (e.g., attempting to reduce waste) have higher agreement with the importance of environmental sustainability in nursing and the necessity of related discussions in nursing education and practice. As climate change is a globally important issue (United Nations, n.d.), organizations, including hospitals, also have a responsibility to achieve environmental sustainability in the workplace (Senay & Landrigan, 2018), and employees' behaviours at work are important for achieving this (Unsworth et al., 2021). However, in this study, nurses' scores on their behaviours at work were the lowest compared to other aspects of climate change cognition and behaviours. A previous review of environmental sustainability in healthcare identified a lack of knowledge as a barrier to workplace sustainability and suggested education as a solution (Sherman et al., 2020). Richardson et al. (2017) emphasized the importance of educational interventions by confirming nursing students' enhanced attitudes and willingness to challenge unsustainable practices at work. These attitudes were maintained at the follow-up study (Richardson et al., 2019). Examining perceived workplace culture (Pinzone et al., 2019) and organizational policies or regulations regarding sustainability (Magill et al., 2020) is also helpful because it can influence an individual's attitude and behaviours.

Motivation, concern and behaviours at work should be the focus for achieving environmental sustainability in nursing. From clinical nurses' perspectives, hospital programmes, resources for sustainability and unit-specific guidance motivate environmental sustainability in nursing (Kallio et al., 2020). Specifically, providing education related to environmental sustainability in nursing for undergraduates (Richardson et al., 2017) and continuing education (Sherman et al., 2020) helps increase motivation (Baid et al., 2022). Moreover, detailed guidance is also needed to promote nurses' sustainable behaviours at work. This includes guidelines on reducing waste in clinical settings, such as saving unused linen and properly sorting pharmaceutical and medical waste (Wohlford et al., 2020). Redulla (2022) recommended that nurses, especially in gastroenterology, could reduce the use of unnecessary gloves if they followed complete hand hygiene. Finally, policies and regulations, law and

TABLE 5 Factors affecting environmental sustainability attitudes (N=358).

							95% confidence interval		
Variables		B	SE	β	t	p	VIF	Lower	Upper
(Constant)		5.68	2.14		2.66	.008		1.49	9.88
Sex ^a		1.02	1.05	.05	0.98	.330	1.12	-1.04	3.08
Marital status ^a		0.29	0.53	.03	0.55	.582	1.04	-0.76	1.35
Religion ^a		0.92	0.53	.08	1.72	.086	1.03	-0.13	1.96
Climate change cognition and behaviours	Awareness	0.15	0.11	.08	1.29	.196	1.83	-0.08	0.37
	Concern	0.32	0.11	.21	3.01	.003	2.42	0.11	0.52
	Motivation	0.71	0.14	.32	5.11	<.001	2.05	0.44	0.99
	Behaviours at home	-0.16	0.12	-.09	-1.32	.190	2.13	-0.40	0.08
	Behaviours at work	0.22	0.11	.11	2.01	.045	1.64	0.01	0.43
Positive future cognition		-0.01	0.02	.01	0.27	.780	1.18	-0.04	0.05
Adjusted R ² = .30, F = 17.78, p < .001									
Durbin-Watson's d = 1.93 (du = 1.88, 4-du = 2.12),									
Kolmogorov-Smirnov test (Z = 0.06, p = .100), Breusch-Pagan test (χ^2 = 14.62, p = .102)									

Abbreviations: SE, standard error; VIF, variance inflation factor.

^aDummy variable (reference): Sex (male), Marital status (single), Religion (no).

national environmental programmes could promote environmental sustainability in nursing (Kallio et al., 2020).

6.1 | Limitations

This study has several limitations. First, because this study was cross-sectional, the causal links between the variables could not be established. Second, the self-selected sampling method employed in this study may lead to self-selection bias; this implies that the study participants were not fully representative of the population under scrutiny, making it impossible to generalize the findings. Third, because self-administered questionnaires were employed in this study, recollection bias might have existed. Finally, there is no study in the literature validating the optimal cut-off value for a positive attitude in SANS-2, thereby limiting the discussion of attitudes towards environmental sustainability. Considering the findings and limitations of this study, future longitudinal investigations are required to establish the causal links among climate change cognition and behaviours, positive and negative future cognition, and environmental sustainability attitudes. Repeated research with representative participants and geographic locations that may affect participants' experiences with climate change are also required to improve the evidence.

6.2 | Implications for practice and research

Based on the findings of this study, stakeholders could focus their discussions about environmental sustainability in nursing on ways to motivate nurses regarding the topic, to deal with their concerns about climate change and its impacts, and to encourage them to engage in environmentally friendly behaviours at work. Nurse

educators should include climate change and environmental sustainability in nursing education, not only in the undergraduate/graduate curriculum but also in continued education for nursing practitioners. This could be helpful to improve nurses' attitudes towards environmental sustainability by increasing their knowledge of climate change and sustainability and the related impacts on the planet and human health. Nurse managers or administrators should explore nurses' motivation towards environmental sustainability and related topics and behaviours. Exploring nurses' views of environmental sustainability in the workplace is necessary. This includes whether they perceive the workplace culture as favourable towards environmental sustainability and whether there are sufficient resources or appropriate equipment to support related behaviours. Specific guidance for practices should be discussed and disseminated. To understand this issue more deeply, further research on positive attitudes towards sustainability in nursing is warranted; possible research avenues include a concept analysis of attitudes towards sustainability in nursing or a validation of the optimal cut-off point for positive attitudes towards sustainability in SANS-2. Nursing researchers could further explore the association between concerns and attitudes to provide more in-depth knowledge of nurses' attitudes towards environmental sustainability. In addition, because this study considered only individual factors, there may be other influential factors in this context, such as organizational- or policy-related factors pertaining to environmental sustainability, which warrant further investigation.

7 | CONCLUSIONS

In this study, motivation, concern and behaviours at work were found to influence attitudes towards environmental sustainability among nurses in South Korea. When developing educational programmes

or policies for nurses to achieve environmental sustainability, several factors should be considered to improve attitudes towards environmental sustainability. These factors include how to encourage nurses to engage in pro-environmental behaviours, manage their concerns about climate change and enhance their behaviours at work concerning environmental sustainability.

AUTHOR CONTRIBUTIONS

Sophia J. Chung: Conceptualization, methodology, validation, investigation, data curation, writing – original draft preparation, writing – review and editing, visualization, supervision and project administration.

Haeyoung Lee: Conceptualization, validation, investigation, data curation, writing – original draft preparation, writing – review and editing, supervision and project administration.

Sun Joo Jang: Conceptualization, methodology, software, validation, formal analysis, investigation, data curation, writing – original draft preparation, writing – review and editing, visualization, supervision and project administration.

ACKNOWLEDGEMENTS

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

FUNDING INFORMATION

None.

CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interests to declare.

PEER REVIEW

The peer review history for this article is available at <https://www.webofscience.com/api/gateway/wos/peer-review/10.1111/jan.16205>.

DATA AVAILABILITY STATEMENT

The data presented in this study are available upon request from the corresponding author and with permission of the Institutional Review Board of Chung-Ang University.

ETHICS STATEMENT

This study was approved by the Institutional Review Board at Chung-Ang University (Approval Number: 1041078-202205-HR-115, approval date: 18 July 2022).

STATISTICS

The authors have checked to make sure that our submission conforms as applicable to the Journal's statistical guidelines described here.

ORCID

Haeyoung Lee  <https://orcid.org/0000-0001-6024-0039>

Sun Joo Jang  <https://orcid.org/0000-0002-7655-1744>

REFERENCES

- Álvarez-Nieto, C., Richardson, J., Navarro-Perán, M. Á., Tutticci, N., Huss, N., Elf, M., Anåker, A., Aronsson, J., Baid, H., & López-Medina, I. M. (2022). Nursing students' attitudes towards climate change and sustainability: A cross-sectional multisite study. *Nurse Education Today*, 108, 105185. <https://doi.org/10.1016/j.nedt.2021.105185>
- American Association of Colleges of Nursing. (2021). The essentials: Core competencies for professional nursing education. December 10, 2022. <https://www.aacnnursing.org/Portals/42/AcademicNursing/pdf/Essentials-Final-Draft-2-18-21.pdf>
- Amerson, R. M., Boice, O., Mitchell, H., & Bible, J. (2022). Nursing faculty's perceptions of climate change and sustainability. *Nursing Education Perspectives*, 43, 277–282. <https://doi.org/10.1097/01.NEP.0000000000000991>
- Anåker, A., & Elf, M. (2014). Sustainability in nursing: A concept analysis. *Scandinavian Journal of Caring Sciences*, 28(2), 381–389. <https://doi.org/10.1111/scs.12121>
- Anåker, A., Nilsson, M., Holmner, Å., & Elf, M. (2015). Nurses' perceptions of climate and environmental issues: A qualitative study. *Journal of Advanced Nursing*, 71, 1883–1891. <https://doi.org/10.1111/jan.12655>
- Baid, H., Holland, J., & Pirro, F. (2022). Environmentally sustainable orthopaedics and trauma: Systems and behaviour change. *Orthopaedics and Traumatology*, 36(5), 256–264. <https://doi.org/10.1016/j.mporth.2022.07.002>
- Blok, V., Wesselink, R., Studynka, O., & Kemp, R. (2015). Encouraging sustainability in the workplace: A survey on the pro-environmental behaviour of university employees. *Journal of Cleaner Production*, 106, 55–67. <https://doi.org/10.1016/j.jclepro.2014.07.063>
- Bouman, T., Verschoor, M., Albers, C. J., Böhm, G., Fisher, S. D., Poortinga, W., Whitmarsh, L., & Steg, L. (2020). When worry about climate change leads to climate action: How values, worry and personal responsibility relate to various climate actions. *Global Environmental Change*, 62, 102061. <https://doi.org/10.1016/j.gloenvcha.2020.102061>
- Centers for Disease Control and Prevention. (2022). Climate effects on health. December 10, 2022. <https://www.cdc.gov/climateandhealth/effects/default.htm#factsheets>
- Chen, M., Jeronen, E., & Wang, A. (2021). Toward environmental sustainability, health, and equity: How the psychological characteristics of college students are reflected in understanding sustainable development goals. *International Journal of Environmental Research and Public Health*, 18, 8217. <https://doi.org/10.3390/ijerph18158217>
- Chen, M. J., & Price, A. M. (2020). Comparing undergraduate student nurses' understanding of sustainability in two countries: A mixed method study. *Nurse Education Today*, 88, 104363. <https://doi.org/10.1016/j.nedt.2020.104363>
- Chung, S. J., Jang, S. J., & Lee, H. (2023). Eco-anxiety and environmental sustainability interest: A secondary data analysis. *International Journal of Mental Health Nursing*, 32(6), 1462–1472. <https://doi.org/10.1111/inm.13150>
- Chung, S. J., Jang, S. J., & Lee, H. (2024). Validation of the sustainability attitudes in nursing survey-2 for nurses: A cross-sectional study. *Nurse Education in Practice*, 75, 103898. <https://doi.org/10.1016/j.nepr.2024.103898>
- Chuvieco, E., Burgui-Burgui, M., Da Silva, E. V., Hussein, K., & Alkaabi, K. (2018). Factors affecting environmental sustainability habits of university students: Intercomparison analysis in three countries (Spain, Brazil and UAE). *Journal of Cleaner Production*, 198, 1372–1380. <https://doi.org/10.1016/j.jclepro.2018.07.121>
- Clayton, S., & Karazsia, B. T. (2020). Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology*, 69, 101434. <https://doi.org/10.1016/j.jenvp.2020.101434>
- Cruz, J. P., Felicilda-Reynaldo, R. F. D., Alshammari, F., Alquwez, N., Alicante, J. G., Obaid, K. B., Rady, H. E. A. E. A., Qtait, M., & Silang, J.

- P. B. T. (2018). Factors influencing Arab nursing students' attitudes toward climate change and environmental sustainability and their inclusion in nursing curricula. *Public Health Nursing*, 35(6), 598–605. <https://doi.org/10.1111/phn.12516>
- Dickman, E., Backler, C., Berg, C. D., Komandt, M., & Schiller, J. (2022). Climate change and oncology nursing: A call to action. *Clinical Journal of Oncology Nursing*, 26, 109–113. <https://doi.org/10.1188/22.CJON.109-113>
- Graves, L. M., & Sarkis, J. (2018). The role of employees' leadership perceptions, values, and motivation in employees' pro environmental behaviors. *Journal of Cleaner Production*, 196, 576–587. <https://doi.org/10.1016/j.jclepro.2018.06.013>
- Griggs, C., Fernandez, A., & Callanan, M. (2017). Nursing and the barriers to sustainable health care: A literature review. *British Journal of Nursing*, 26, 1230–1237. <https://doi.org/10.12968/bjon.2017.26.22.1230>
- Health Insurance Review and Assessment Service, & National Health Insurance Service. (2022). 2021 National health insurance statistical yearbook. July 22, 2023 <https://www.hira.or.kr/bbsDummy.do?pgmid=HIRAA020045020000&brdScnBltno=4&brdBltno=2314&pageIndex=1&pageIndex2=1#none>
- Hiatt, R. A., & Beyeler, N. (2020). Cancer and climate change. *The Lancet Oncology*, 21, e519–e527. [https://doi.org/10.1016/S1470-2045\(20\)30448-4](https://doi.org/10.1016/S1470-2045(20)30448-4)
- Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. *The Lancet Planetary Health*, 5, e863–e873. [https://doi.org/10.1016/S2542-5196\(21\)00278-3](https://doi.org/10.1016/S2542-5196(21)00278-3)
- Hyeon, H., Kim, J. S., & Lee, J. (2018). Validation study of the Korean version of the future event questionnaire (K-FEQ). *Cognitive Behavioral Therapy Korea*, 18, 467–486. <https://doi.org/10.33703/cbtk.2018.18.4.467>
- International Council of Nurses. (2018). Position Statement: Nurses, climate change and health. December 10, 2022 <https://www.icn.ch/sites/default/files/inline-files/ICN%20PS%20Nurses%252c%20climate%20change%20and%20health%20FINAL%20pdf>
- Jeong, D. W., Kim, G. S., & Park, M. K. (2022). Validity and reliability of the Korean version of the climate, health, and nursing tool. *Journal of Korean Academy of Nursing*, 52, 173–186. <https://doi.org/10.4040/jkan.21211>
- Kaiser, F. G., Kibbe, A., & Arnold, O. (2017). Self-determined, enduring, ecologically sustainable ways of life: Attitude as a measure of individuals' intrinsic motivation. In G. Fleury-Bahi, E. Pol & O. Navarro (Eds.), *Handbook of Environmental Psychology and Quality of Life Research*, International Handbooks of Quality-of-Life. (pp. 185–195). Springer. https://doi.org/10.1007/978-3-319-31416-7_10
- Kallio, H., Pietilä, A. M., & Kangasniemi, M. (2020). Environmental responsibility in nursing in hospitals: A modified Delphi study of nurses' views. *Journal of Clinical Nursing*, 29(21–22), 4045–4056. <https://doi.org/10.1111/jocn.15429>
- Kalogirou, M. R., Dahlke, S., Davidson, S., & Yamamoto, S. (2020). Nurses' perspectives on climate change, health and nursing practice. *Journal of Clinical Nursing*, 29(23–24), 4759–4768. <https://doi.org/10.1111/jocn.15519>
- Kautish, P., & Sharma, R. (2020). Determinants of pro-environmental behavior and environmentally conscious consumer behavior: An empirical investigation from emerging market. *Business Strategy and Development*, 3, 112–127.
- Koger, S. M., & Winter, D. D. (2011). *The psychology of environmental problems: Psychology for sustainability* (3rd ed.). Taylors & Francis Group.
- Leffers, J., Levy, R. M., Nicholas, P. K., & Sweeney, C. F. (2017). Mandate for the nursing profession to address climate change through nursing education. *Journal of Nursing Scholarship*, 49(6), 679–687. <https://doi.org/10.1111/jnu.12331>
- Lucas, P. U., Gamborg, C., & Lund, T. B. (2022). Sustainability concerns are key to understanding public attitudes toward woody biomass for energy: A survey of Danish citizens. *Renewable Energy*, 194, 181–194. <https://doi.org/10.1016/j.renene.2022.05.075>
- Magill, M. S., Yost, P. R., Chighizola, B., & Stark, A. (2020). Organizational climate for climate sustainability. *Consulting Psychology Journal: Practice and Research*, 72(3), 198–222. <https://doi.org/10.1037/cpb0000163>
- Marroquín, B., Boyle, C. C., Nolen-Hoeksema, S., & Stanton, A. L. (2016). Using emotion as information in future-oriented cognition: Individual differences in the context of state negative affect. *Personality and Individual Differences*, 95, 121–126. <https://doi.org/10.1016/j.paid.2016.02.033>
- Meleis, A. I. (2019). Afaf Meleis' transitions theory. In M. C. Smith (Ed.), *Nursing theories and nursing practice* (5th ed., pp. 353–370). F. A. Davis Company.
- Miranda, R., & Mennin, D. S. (2007). Depression, generalized anxiety disorder, and certainty in pessimistic predictions about the future. *Cognitive Therapy and Research*, 31, 71–82. <https://doi.org/10.1007/s10608-006-9063-4>
- Niankara, I., & Zougrana, D. T. (2018). Interest in the biosphere and students environmental awareness and optimism: A global perspective. *Global Ecology and Conservation*, 16, e00489. <https://doi.org/10.1016/j.gecco.2018.e00489>
- Osingada, C. P., & Porta, C. M. (2020). Nursing and sustainable development goals (SDGs) in a COVID-19 world: The state of the science and a call for nursing to lead. *Public Health Nursing*, 37(5), 799–805. <https://doi.org/10.1111/phn.12776>
- Pinzone, M., Guerri, M., Lettieri, E., & Huisingh, D. (2019). Effects of 'green' training on pro-environmental behaviors and job satisfaction: Evidence from the Italian healthcare sector. *Journal of Cleaner Production*, 226, 221–232. <https://doi.org/10.1016/j.jclepro.2019.04.048>
- Redulla, R. (2022). Climate change, sustainability, and health: What can nurse do? *Gastroenterology Nursing*, 45(6), 393–394. <https://doi.org/10.1097/SGA.0000000000000710>
- Richardson, J., Clarke, D., Grose, J., & Warwick, P. (2019). A cohort study of sustainability education in nursing. *International Journal of Sustainability in Higher Education*, 20(4), 747–760.
- Richardson, J., Grose, J., Bradbury, M., & Kelsey, J. (2017). Developing awareness of sustainability in nursing and midwifery using a scenario-based approach: Evidence from a pre and post educational intervention study. *Nurse Education Today*, 54, 51–55.
- Richardson, J., Heidenreich, T., Álvarez-Nieto, C., Fasseur, F., Grose, J., Huss, N., Huynen, M., López-Medina, I. M., & Schweizer, A. (2016). Including sustainability issues in nurse education: A comparative study of first year student nurses' attitudes in four European countries. *Nurse Education Today*, 37, 15–20. <https://doi.org/10.1016/j.nedt.2015.11.005>
- Rocque, R. J., Beaudoin, C., Ndjaboue, R., Cameron, L., Poirier-Bergeron, L., Poulin-Rheault, R. A., Fallon, C., Tricco, A. C., & Wittman, H. O. (2021). Health effects of climate change: An overview of systematic reviews. *BMJ Open*, 11, e046333. <https://doi.org/10.1136/bmjopen-2020-046333>
- Salas, R. N., Shultz, J. M., & Solomon, C. G. (2020). The climate crisis and COVID-19—A major threat to the pandemic response. *The New England Journal of Medicine*, 383, e70. <https://doi.org/10.1056/NEJMp2022011>
- Schenk, E. C., Cook, C., Demorest, S., & Burduli, E. (2019). CHANT: Climate, health, and nursing tool: Item development and exploratory factor analysis. *Annual Review of Nursing Research*, 38, 97–112. <https://doi.org/10.1891/0739-6686.38.97>
- Senay, E., & Landrigan, P. J. (2018). Assessment of environmental sustainability and corporate social responsibility reporting by large health care organizations. *JAMA Network Open*, 1, e180975. <https://doi.org/10.1001/jamanetworkopen.2018.0975>

- Sherman, J. D., Thiel, C., MacNeill, A., Eckelman, M. J., Dubrow, R., Hopf, H., Lagasse, R., Bialowitz, J., Costello, A., Forbes, M. G., Standcliffe, R., Anastas, P., Anderko, L., Baratz, M., Barna, S., Bhatnagar, U., Burnham, J., Cai, Y., Cassels-Brown, A., ... Bilec, M. M. (2020). The green print: Advancement of environmental sustainability in healthcare. *Resources, Conservation and Recycling*, 161, 104882.
- Stanley, S. K., Hogg, T. L., Leviston, Z., & Walker, I. (2021). From anger to action: Differential impacts of eco-anxiety, eco-depression, and eco-anger on climate action and wellbeing. *The Journal of Climate Change and Health*, 1, 100003. <https://doi.org/10.1016/j.joclim.2021.100003>
- Stern, P. C. (2000). New environmental theories: Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues*, 56(3), 407–424. <https://doi.org/10.1111/0022-4537.00175>
- Thom, J. M., & Clayton, N. S. (2016). Evolutionary perspectives on prospective cognition. In K. Michaelian, S. B. Klein, & K. K. Szpunar (Eds.), *Seeing the future: Theoretical perspectives on future-oriented mental time travel* (pp. 287–305). Oxford University Press. <https://doi.org/10.1093/acprof:oso/9780190241537.003.0014>
- Tian, H., Zhang, J., & Li, J. (2020). The relationship between pro-environmental attitude and employee green behavior: The role of motivational states and green work climate perceptions. *Environmental Science and Pollution Research*, 27, 7341–7352. <https://doi.org/10.1007/s11356-019-07393-z>
- United Nations. (n.d.). Climate Change. December 10, 2022 <https://www.un.org/en/global-issues/climate-change>
- Unsworth, K. L., Davis, M. C., Russell, S. V., & Bretter, C. (2021). Employee green behaviour: How organizations can help the environment. *Current Opinion in Psychology*, 42, 1–6. <https://doi.org/10.1016/j.copsyc.2020.12.006>
- Verplanken, B., & Orbell, S. (2022). Attitudes, habits, and behavior change. *Annual Review of Psychology*, 73, 327–352. <https://doi.org/10.1146/annurev-psych-020821-011744>
- Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Berry, H., Bouley, T., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Chambers, J., Daly, M., Dasandi, N., Davies, M., Depoux, A., Dominguez-Salas, P., Drummond, P., Ebi, K. L., ... Costello, A. (2018). The 2018 report of the lancet countdown on health and climate change: Shaping the health of nations for centuries to come. *The Lancet*, 392, 2479–2514. [https://doi.org/10.1016/S0140-6736\(18\)32594-7](https://doi.org/10.1016/S0140-6736(18)32594-7)
- Wohlford, S., Esteves-Fuentes, N., & Carter, K. F. (2020). Reducing waste in the clinical setting. *The American Journal of Nursing*, 120(6), 48–55. <https://doi.org/10.1097/01.NAJ.0000668744.36106.24>
- World Health Organization. (n.d.). Ten threats to global health in 2019. December 10, 2022 <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Chung, S. J., Lee, H., & Jang, S. J.

(2026). Factors affecting environmental sustainability attitudes among nurses – Focusing on climate change cognition and behaviours: A cross-sectional study. *Journal of Advanced Nursing*, 82, 2863–2874. <https://doi.org/10.1111/jan.16205>

The *Journal of Advanced Nursing (JAN)* is an international, peer-reviewed, scientific journal. JAN contributes to the advancement of evidence-based nursing, midwifery and health care by disseminating high quality research and scholarship of contemporary relevance and with potential to advance knowledge for practice, education, management or policy. JAN publishes research reviews, original research reports and methodological and theoretical papers.

For further information, please visit JAN on the Wiley Online Library website: www.wileyonlinelibrary.com/journal/jan

Reasons to publish your work in JAN:

- High-impact forum: the world's most cited nursing journal, with an Impact Factor of 2.561 – ranked 6/123 in the 2019 ISI Journal Citation Reports © (Nursing; Social Science).
- Most read nursing journal in the world: over 3 million articles downloaded online per year and accessible in over 10,000 libraries worldwide (including over 6,000 in developing countries with free or low cost access).
- Fast and easy online submission: online submission at <http://mc.manuscriptcentral.com/jan>.
- Positive publishing experience: rapid double-blind peer review with constructive feedback.
- Rapid online publication in five weeks: average time from final manuscript arriving in production to online publication.
- Online Open: the option to pay to make your article freely and openly accessible to non-subscribers upon publication on Wiley Online Library, as well as the option to deposit the article in your own or your funding agency's preferred archive (e.g. PubMed).