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The Impact of Environmental Awareness on Sustainable Water Conservation Behavior among Postgraduate Students: Field Study

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Abstract

Environmental awareness has become an essential factor in promoting sustainable behaviors related to natural resource conservation, particularly water resources. Universities and higher education institutions play a critical role in developing environmental knowledge and responsible behaviors among postgraduate students, who are expected to contribute to future scientific research and decision-making processes. This study aims to investigate the relationship between environmental awareness and sustainable water behavior among postgraduate students. The study adopted a descriptive-analytical approach using an electronic questionnaire distributed to a sample of 102 participants. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). The results revealed a high level of environmental awareness among the participants, with 79.4% expressing a strong belief in the importance of conserving water resources for future generations, while 69.6% confirmed that environmental awareness contributes to solving water-related problems. The findings also showed that the majority of participants practice positive water conservation behaviors, such as turning off water taps when not needed 73.5% and reporting water leakages 55.9%. The study concluded that there is a positive relationship between the level of environmental awareness and behaviors related to the conservation of water resources. This highlights the importance of strengthening environmental awareness programs and community initiatives to support water sustainability.

Keywords: Environmental awareness, water conservation, sustainable development, water resources, SPSS, postgraduate students.

أثر الوعي البيئي على السلوك المستدام لترشيد استهلاك المياه لدى طلبة الدراسات العليا: دراسة ميدانية

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الملخص

أصبح الوعي البيئي عاملاً أساسياً في تعزيز السلوكيات المستدامة المرتبطة بالحفاظ على الموارد الطبيعية، ولا سيما الموارد المائية. وتؤدي الجامعات ومؤسسات التعليم العالي دوراً محورياً في تنمية المعرفة البيئية والسلوكيات المسؤولة لدى طلبة الدراسات العليا، الذين يُتوقع منهم الإسهام في البحوث العلمية المستقبلية وعمليات صنع القرار. هدفت هذه الدراسة إلى استقصاء العلاقة بين الوعي البيئي والسلوك المائي المستدام لدى طلبة الدراسات العليا. واعتمدت الدراسة المنهج الوصفي التحليلي باستخدام استبانة إلكترونية وُزعت على عينة مكونة من 102 مشاركاً. وتم تحليل البيانات المجمعة باستخدام SPSS. أظهرت النتائج ارتفاع مستوى الوعي البيئي لدى المشاركين، حيث عبّر 79.4% منهم عن إيمانهم القوي بأهمية المحافظة على الموارد المائية للأجيال القادمة، في حين أكد 69.6% أن الوعي البيئي يسهم في معالجة المشكلات المرتبطة بالمياه. كما بينت النتائج أن غالبية المشاركين يمارسون سلوكيات إيجابية للحفاظ على المياه، مثل إغلاق صنابير المياه عند عدم الحاجة

إليها 73.5% والإبلاغ عن تسربات المياه 55.9%. ولُخصت الدراسة إلى وجود علاقة إيجابية بين مستوى الوعي البيئي والسلوكيات المرتبطة بالمحافظة على الموارد المائية، مما يؤكد أهمية تعزيز برامج التوعية البيئية والمبادرات المجتمعية الداعمة لاستدامة الموارد المائية.
الكلمات المفتاحية: الوعي البيئي، ترشيد استهلاك المياه، التنمية المستدامة، الموارد المائية، طلبة الدراسات العليا.

1. Introduction

Environmental issues have become among the most significant global challenges facing humanity in recent decades due to rapid population growth, industrialization, urban expansion, and climate change. These factors have contributed to increasing pressure on natural resources, especially water resources, which are considered essential for human survival, economic development, and environmental sustainability. Water scarcity and water pollution are now recognized as major threats to sustainable development in many countries worldwide.

Environmental awareness refers to the level of knowledge, understanding, attitudes, and concern individuals possess regarding environmental issues and the importance of protecting natural resources. Environmental awareness is closely associated with environmentally responsible behaviors, including water conservation practices and sustainable resource management. Individuals with higher levels of environmental awareness are generally more likely to adopt positive environmental behaviors and support sustainable development initiatives.

Higher education institutions play a fundamental role in promoting environmental awareness and sustainability practices among students. Postgraduate students, in particular, represent an important segment of society because they are future researchers, policymakers, educators, and professionals who can influence environmental decision-making and public awareness. Therefore, examining the relationship between environmental awareness and sustainable water behavior among postgraduate students is important for understanding how educational systems contribute to sustainable resource management.

Several studies have emphasized the importance of environmental education in improving water conservation behavior. Sustainable water behavior includes actions such as reducing water waste, reporting water leakage, encouraging others to conserve water, and using water efficiently in daily life. Understanding the factors influencing such behavior can help educational institutions and policymakers design effective awareness programs and sustainability initiatives.

Therefore, water awareness and water education are considered among the strategic approaches for rationalizing water resource consumption and represent important issues of public concern due to their significance. Responsibility for water conservation extends to all individuals across different age groups, emphasizing the need to adopt appropriate and sustainable practices in dealing with water resources in order to guide both present and future generations, who are expected to face various water-related challenges. Among the most critical of these challenges is ensuring the availability of freshwater resources to meet the demand for safe drinking water suitable for human use. Since water management begins at the household level and extends to agricultural fields, industrial institutions, and tourism facilities, emphasizing environmental education and the importance of sustainable development among school and university students has become a fundamental necessity regarding the optimal use of water resources. This approach is considered a key entry point for addressing issues related to water scarcity and water resource pollution (Al-Hayali, 2022). This study aims to investigate the relationship between environmental awareness and sustainable water behavior among postgraduate students. It also seeks to identify the level of environmental awareness and sustainable water practices.

2. Problem Statement

Despite growing global concern regarding environmental sustainability and water resources, many societies continue to face challenges related to excessive water consumption, water pollution, and unsustainable environmental practices. Universities are expected to contribute to environmental awareness and sustainable development through education and research. However, there is still limited understanding regarding the extent to which environmental awareness among postgraduate students influences their sustainable water behavior.

Therefore, this study attempts to answer the following main question:

Is there a significant relationship between environmental awareness and sustainable water behavior among postgraduate students?

3. Research Objectives

The objectives of this study are:

1. To identify the level of environmental awareness among postgraduate students.
2. To assess the level of sustainable water resources behavior among postgraduate students.
3. To examine the relationship between environmental awareness and sustainable water behavior in higher education institutions.

4. Research Questions

1. What is the level of environmental awareness among postgraduate students?
2. What is the level of sustainable water behavior among postgraduate students?
3. Is there a statistically significant relationship between environmental awareness and sustainable water behavior among postgraduate students?

5. Research Hypothesis

There is a statistically significant positive relationship between environmental awareness and sustainable water behavior among postgraduate students.

6. Significance of the Study

This study is significant for several reasons:

- It contributes to the growing body of literature concerning environmental awareness and sustainability.
- It highlights the importance of environmental education in promoting sustainable water practices.
- It provides useful information for universities and policymakers to improve environmental awareness programswithin educational institutions.
- It encourages postgraduate students to adopt sustainable behaviors toward water conservation.

7. Literature Review

7.1 Environmental Awareness

Environmental awareness refers to the understanding of environmental issues and the recognition of the importance of environmental protection. According to Gifford and Nilsson (2014), environmental awareness includes environmental knowledge, attitudes, values, and concern regarding environmental problems. Environmental awareness is considered a major determinant of pro-environmental behavior. Environmental education programs are essential tools for increasing awareness and encouraging environmentally responsible practices. Universities and educational institutions are increasingly integrating sustainability concepts into curricula to prepare students for addressing environmental challenges.

Environmental awareness is defined as individuals' perception and understanding of environmental aspects based on their knowledge of the environment and the reality in which they live. Environmental education encompasses all programs and activities directed toward all groups or specific segments of society with the aim of clarifying a particular environmental issue or problem and highlighting the importance of the surrounding environment. This is

because environmental education seeks to achieve a range of objectives, most importantly enhancing individuals with opportunities through knowledge and skills to improve and preserve the environment, as well as achieving sustainable development by strengthening the role of society in participation in decision-making and promoting positive individual behaviors in dealing with essential environmental components (Abdul-Amir Al-Hayali et al., (2021); Baghdadi, Susan, (2013)).

7.2 Sustainable behavior in Water resources Management.

Sustainable water behavior encompasses practices and actions intended to preserve water resources and minimize water wastage. These behaviors include the efficient use of water, prevention of water pollution, prompt repair of water leakages, and enhancing public awareness regarding water conservation. Access to safe and clean water is essential for disease prevention and the maintenance of public health. Furthermore, water plays a fundamental role in agriculture and food security through its use in irrigation, livestock production, and aquaculture systems, thereby ensuring adequate crop productivity and reducing the risk of food shortages according to the United Nations (2023). In addition, water is a critical resource for numerous industrial sectors, where it is utilized in production activities, cooling systems, and cleaning processes. This highlights its significance in industries such as manufacturing, energy generation, and mining. Water resources also support a wide range of ecosystems, including rivers, lakes, and oceans, which provide essential environmental services such as climate regulation and habitats for diverse species, thus contributing significantly to environmental sustainability and biodiversity, (Caretta & Mukherji, (2022).

However, in the twenty-first century, water scarcity and water pollution have become major environmental challenges worldwide. According to the UNESCO report (2023), approximately 2 billion people, representing around 26% of the global population, still lack access to safe drinking water. Increasing global pressure on water resources, driven by population growth and economic development and intensified by climate variability and climate change, has further exacerbated water scarcity issues. As water demand continues to increase while available resources remain limited, promoting sustainable water use has become increasingly important. This requires implementing water-efficient technologies and conservation practices across agricultural, industrial, and domestic sectors. To address these global challenges, the United Nations established the 17 Sustainable Development Goals (SDGs) in 2015 under the 2030 Agenda for Sustainable Development. These goals are interconnected, where progress in one area can positively influence achievements in others. According to UNESCO (2024), sustainable water management plays a vital role in achieving the SDGs, particularly SDG 6, which aims to ensure the availability and sustainable management of water and sanitation for all Hassan, M.S & Omara, S.O. (2025).

7.3 Relationship Between Environmental Awareness and Sustainable Behavior

Previous studies have shown that individuals with higher environmental awareness are more likely to engage in sustainable environmental behaviors. For example, Hunt and Shahab (2021) found that postgraduate students with higher environmental awareness demonstrated more responsible water consumption behaviors.

Similarly, Gherheș and Cernicova-Buca (2025) reported that awareness campaigns significantly contributed to reducing water consumption among university students.

In the Arab context, Ali (2024) found that postgraduate students demonstrated moderate to high environmental awareness levels, but there remained a need for stronger practical environmental engagement. Another study conducted by Hashim et al. (2021), among upper secondary school students in Pasir Mas, Kelantan, Malaysia, involving 242 sixth-form students, aimed to assess students' levels of knowledge, attitudes, and practices regarding water resource sustainability.

8. Methodology

8.1 Research Design

This study adopted a descriptive-analytical research design to examine the relationship between environmental awareness and sustainable water behavior among postgraduate students using SPSS.

8.2 Population and Sample

The study population consisted of postgraduate students enrolled in higher education institutions. A random sample of postgraduate students participated in the study.

8.3 Data Collection Tool

A structured questionnaire was designed based on previous literature and related studies. The questionnaire consisted of three sections:

1. Demographic information.
2. Environmental awareness items.
3. Sustainable water behavior items.

The questionnaire used a five-point Likert scale ranging from strongly agree to strongly disagree.

8.4 Data Analysis

The collected data were analyzed using SPSS.

9. Results and Discussion

The descriptive analysis showed that postgraduate students had a relatively Intermediate level of environmental awareness. Most participants agreed that environmental protection and water conservation are important responsibilities. The findings also revealed that participants generally practiced sustainable water behaviors such as reducing water waste and encouraging others to conserve water. The Pearson correlation analysis demonstrated a positive statistically significant relationship between environmental awareness and sustainable water resources behavior. This finding indicates that students with higher environmental awareness tend to engage more frequently in sustainable water practices.

These findings are consistent with previous studies that emphasized the role of environmental education in shaping sustainable behaviors. The results suggest that increasing environmental awareness among postgraduate students may contribute positively to sustainable water management.

The results starts with Table 1, which summarizes the gender distribution of the respondents. Table 2 provides the distribution of age groups according to gender, indicating that the participants ranged in age from less than 25 years to more than 35 years as shown in Figure 1, the percentage distribution of participants across age groups by gender.

Table 1. Frequency and Percentage Distribution of Participants According to Gender.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	51	50.0	50.0	50.0
	Male	51	50.0	50.0	100.0
	Total	102	100.0	100.0	

Table 2. Frequency and Percentage Distribution of Participants According to Age Group.

Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25–30 years	11	10.8	10.8	10.8
	31-35 years	1	1.0	1.0	11.8
	31–35 years	25	24.5	24.5	36.3
	Less than 25 years	3	2.9	2.9	39.2
	More than 35 years	62	60.8	60.8	100.0
	Total	102	100.0	100.0	

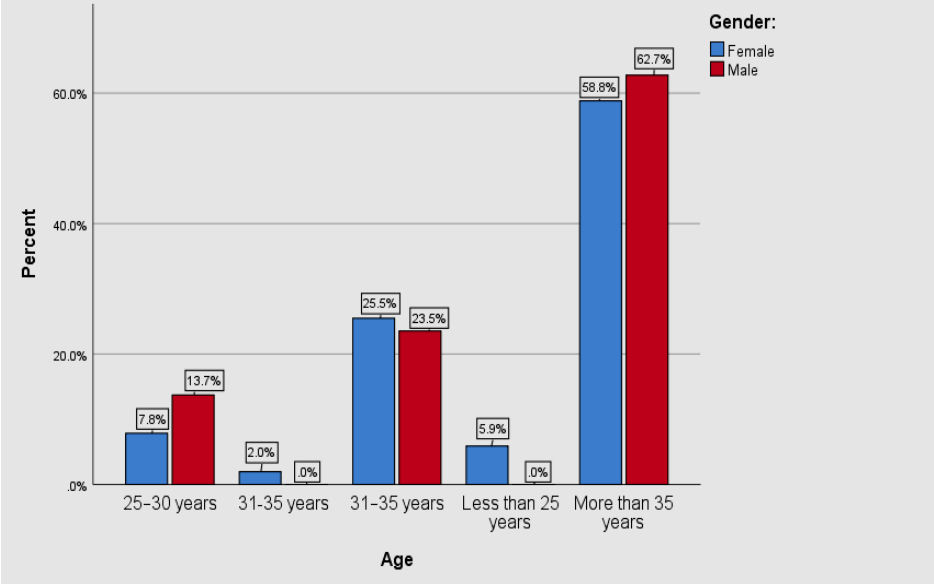


Figure 1. Shown the percentage distribution of participants across age groups by gender

On the other hand, Table 3 shown the percentage distribution of participants across age groups by gender Frequency and Percentage Distribution According to Academic Specialization.

Table 3. Frequency and Percentage Distribution of Participants According to Academic Specialization.

Academic Specialization		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agricultural Economics	1	1.0	1.0	1.0
	Applied Sciences	1	1.0	1.0	2.0
	Arabic Language	3	2.9	2.9	4.9
	Biomedical Engineering	1	1.0	1.0	5.9
	Chemistry	3	2.9	2.9	8.8
	Economics	1	1.0	1.0	9.8
	Electrical Engineering	2	2.0	2.0	11.8
	Engineering	1	1.0	1.0	12.7
	Engineering Project Management	2	2.0	2.0	14.7

	Environmental Engineering	11	10.8	10.8	25.5
	Environmental Sciences	22	21.6	21.6	47.1
	Genetice	3	2.9	2.9	50.0
	Health Administration	6	5.9	5.9	55.9
	Human Sciences	1	1.0	1.0	56.9
	Literature	1	1.0	1.0	57.8
	Management	1	1.0	1.0	58.8
	Mathematics	1	1.0	1.0	59.8
	MBA	5	4.9	4.9	64.7
	Mechanical Engineering	7	6.9	6.9	71.6
	Medical Laboratory Sciences	1	1.0	1.0	72.5
	Medical Technology	1	1.0	1.0	73.5
	Microbiology	1	1.0	1.0	74.5
	Petrolem Engineering	2	2.0	2.0	76.5
	Physics	3	2.9	2.9	79.4
	Public Law	2	2.0	2.0	81.4
	Radiology	2	2.0	2.0	83.3
	Sciences	9	8.8	8.8	92.2
	Sociology	1	1.0	1.0	93.1
	Water Resources	7	6.9	6.9	100.0
	Total	102	100.0	100.0	

Also in Table 4, the frequency and percentage distribution of participants according to Educational Level of the respondents the higher of respondents were Master's Degree 63.7%, while 27.45% were PhD (Doctorate) and for Higher Diploma was 8.8% as shown in Figure 2.

Table 4. Frequency and Percentage Distribution of Participants According to Educational Level.

Educational Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Higher Diploma	9	8.8	8.8	8.8
	Master's Degree	65	63.7	63.7	72.5
	PhD (Doctorate)	28	27.5	27.5	100.0
	Total	102	100.0	100.0	

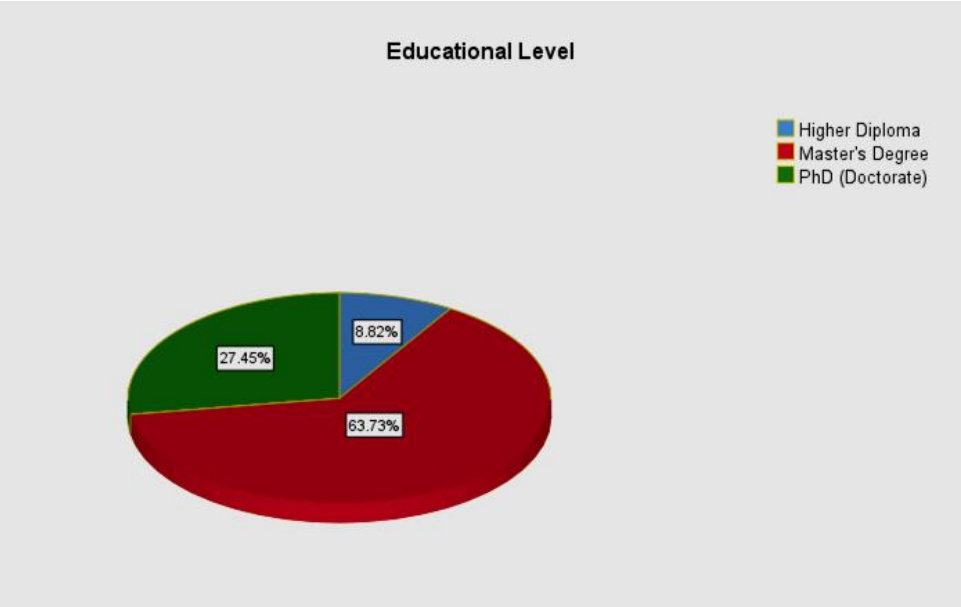


Figure 2. Frequency and Percentage Distribution of Participants According to Educational Level

The findings also in Table 5, indicated that 69.6% of the participants believed that environmental awareness contributes to solving water-related problems, which confirms the effective role of awareness programs in promoting positive environmental behavior as shown in figure 3.

Table 5. Frequency and Percentage Distribution of Participants According to Attendance of Environmental Training Programs.

Have you ever attended training courses or workshops related to the Environment or Water?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	55	53.9	53.9	53.9
	Yes	47	46.1	46.1	100.0
	Total	102	100.0	100.0	

Figure 3. Distribution of Participants According to Attendance of Environmental Training Programs

Table 6. Frequency and Percentage Distribution of Participants According to Their Knowledge of Contemporary Environmental Issues

I have good knowledge of contemporary Environmental Issues.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	50	49.0	49.0	49.0
	Disagree	9	8.8	8.8	57.8
	Neutral	25	24.5	24.5	82.4
	Strongly Agree	18	17.6	17.6	100.0
	Total	102	100.0	100.0	

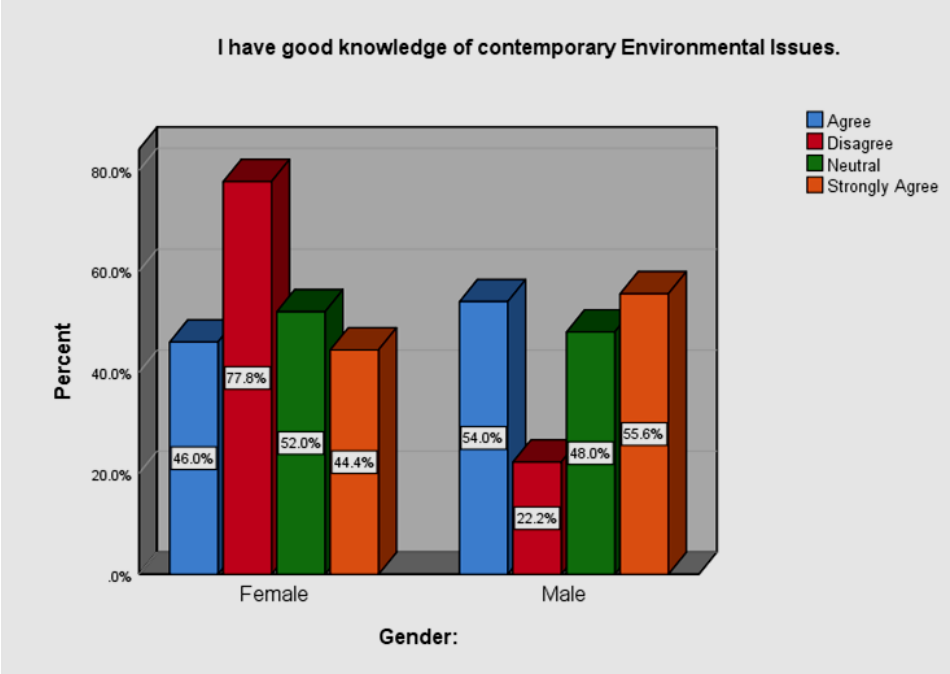


Figure 4. Distribution of Participants According to Their have good Knowledge of Contemporary Environmental Issues

Table 7 Shows that between 40.2% and 50.0% of the participants either agreed or remained neutral regarding their understanding of the risks of pollution on water resources, as illustrated in Figure 5.

Table 7. Frequency and Percentage Distribution of Participants According to Their Understand the Risks of Pollution on Water Resources

I understand the risks of pollution on water resources.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	41	40.2	40.2	40.2
	Neutral	10	9.8	9.8	50.0
	Strongly Agree	51	50.0	50.0	100.0
	Total	102	100.0	100.0	

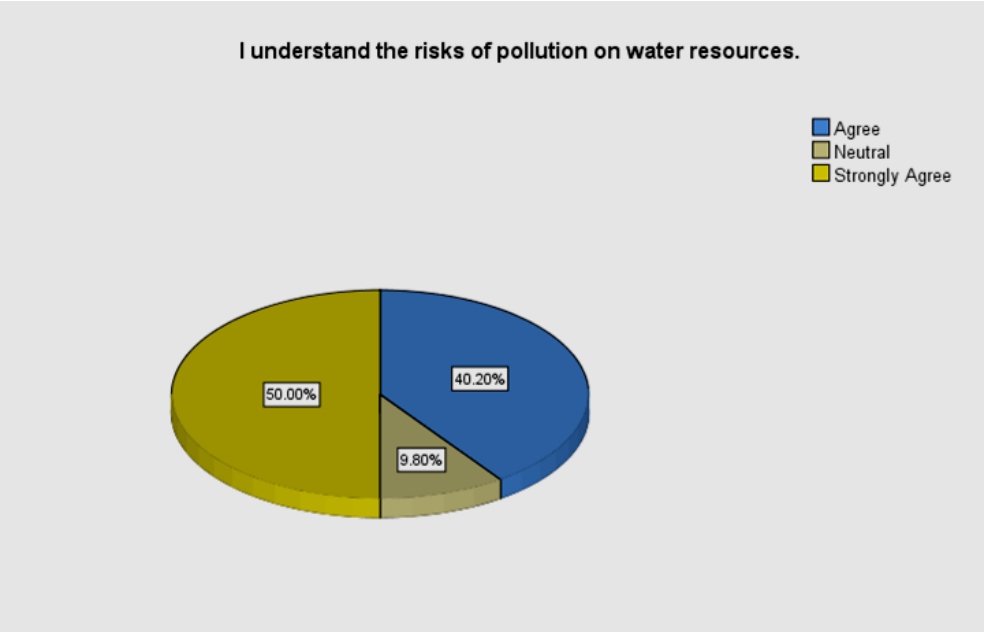


Figure 5. Frequency and Percentage Distribution of Participants According to Their Understand the Risks of Pollution on Water Resources

Furthermore, Table 8 indicates that between 30.0% and 62.0% of both male and female participants agreed and that between 31.6% and 68.4% remained neutral regarding their tendency to follow news and information related to environmental and water issues, as shown in Figure 6.

Table 8. Frequency and Percentage Distribution of Participants According to Their follow news and information related to the environment and water

I follow news and information related to the environment and water.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	50	49.0	49.0	49.0
	Disagree	9	8.8	8.8	57.8
	Neutral	19	18.6	18.6	76.5
	Strongly Agree	24	23.5	23.5	100.0
	Total	102	100.0	100.0	

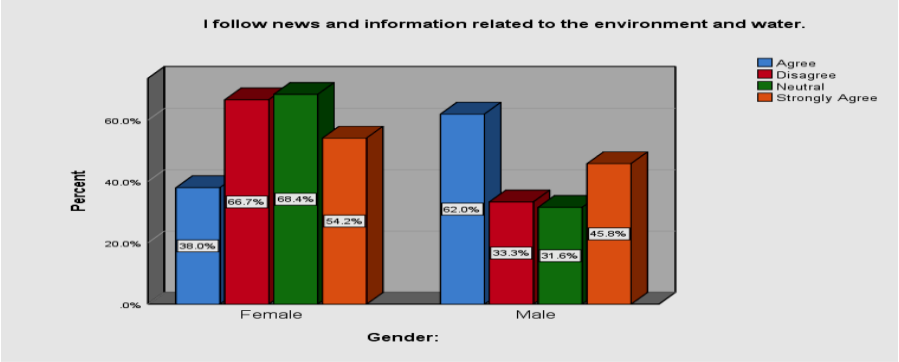


Figure 6. Frequency and Percentage Distribution of Participants According to Their follow news and information related to the environment and water

In Table 9. Frequency and percentage distribution of participants according to their believe in the importance of conserving water resources for future generations, that's way the following

table, the respondents seek to their encourage other to conserve water resources as shown in Table 10.

Table 9. Frequency and Percentage Distribution of Participants According to Their believe in the importance of conserving water resources for future generations

I believe in the importance of conserving water resources for future generations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	16	15.7	15.7	15.7
	Neutral	5	4.9	4.9	20.6
	Strongly Agree	81	79.4	79.4	100.0
	Total	102	100.0	100.0	

Table 10. Frequency and Percentage Distribution of Participants According to Their encourage other to conserve water resources

I encourage other to conserve water resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	60	58.8	58.8	58.8
	Never	2	2.0	2.0	60.8
	Often	20	19.6	19.6	80.4
	Rarely	4	3.9	3.9	84.3
	Sometimes	16	15.7	15.7	100.0
	Total	102	100.0	100.0	

In Figure 7. The results revealed that 79.41% of the participants strongly agreed that they possess to their believe in the importance of conserving water resources for future generations, that's way the following 58.82% of the respondents always seek to their encourage other to conserve water resources as shown in Figure 8.

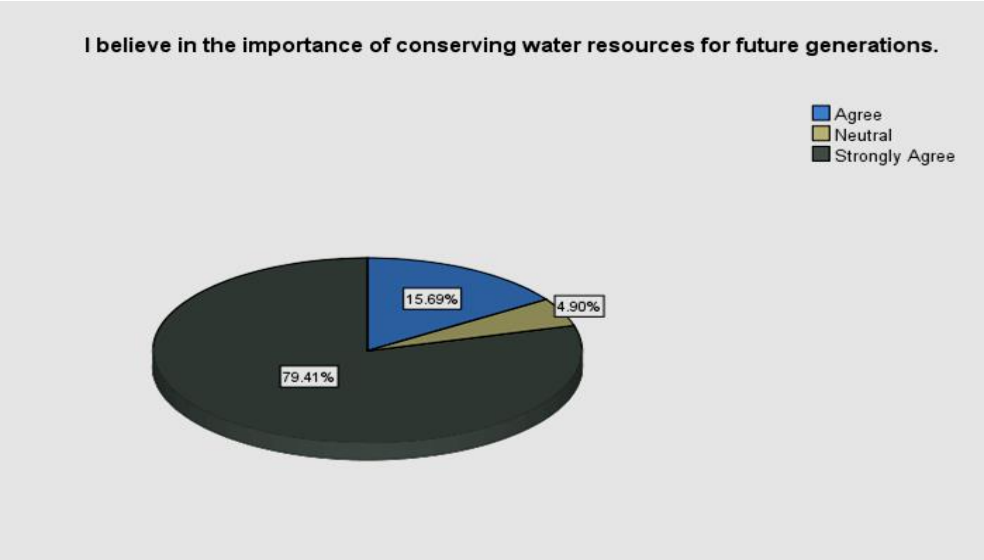


Figure 7 . Frequency and Percentage Distribution of Participants According to Their believe in the importance of conserving water resources for future generations

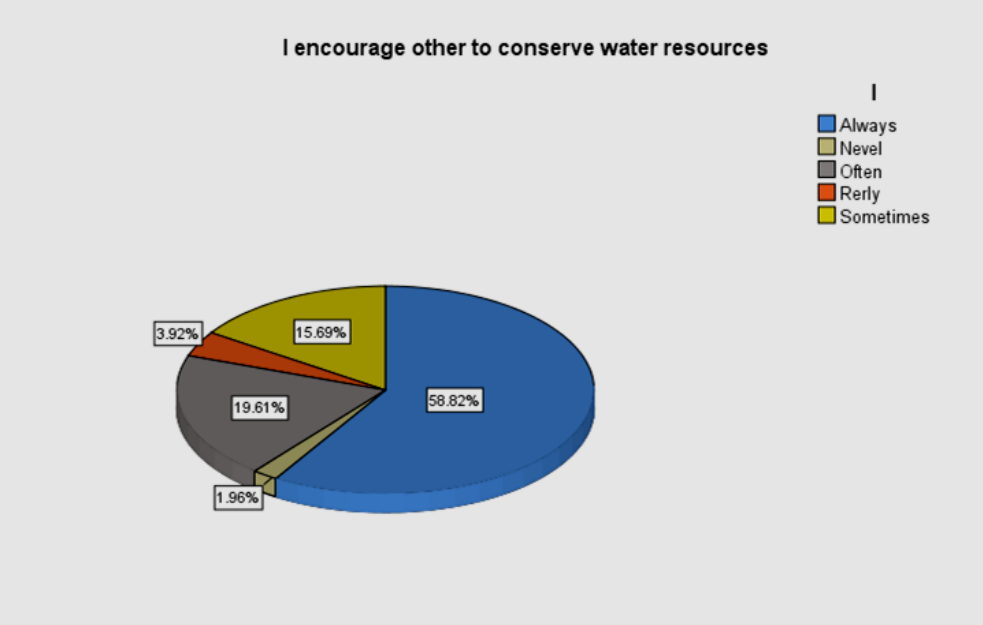


Figure 8. Frequency and Percentage Distribution of Participants According to Their encourage other to conserve water resources

Based on the Likert scale analysis presented in Table 11, the findings revealed that 49.2% of the participants agreed that they possess knowledge of the concept of sustainable development, while 19.61% strongly agreed with this statement. Conversely, only 0.98% of the respondents indicated a lack of knowledge regarding the concept of sustainable development. As shown in Figure 9.

Table 11. Frequency and Percentage Distribution of Participants According to Their have knowledge of the concept of sustainable development

I have knowledge of the concept of sustainable development..

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	50	49.2	49.0	49.0
	Disagree	12	11.8	11.8	60.8
	Neutral	19	18.6	18.6	79.4
	Strongly Agree	20	19.6	19.6	99.0
	Strongly Disagree	1	1.0	1.0	100.0
	Total	102	100.0	100.0	

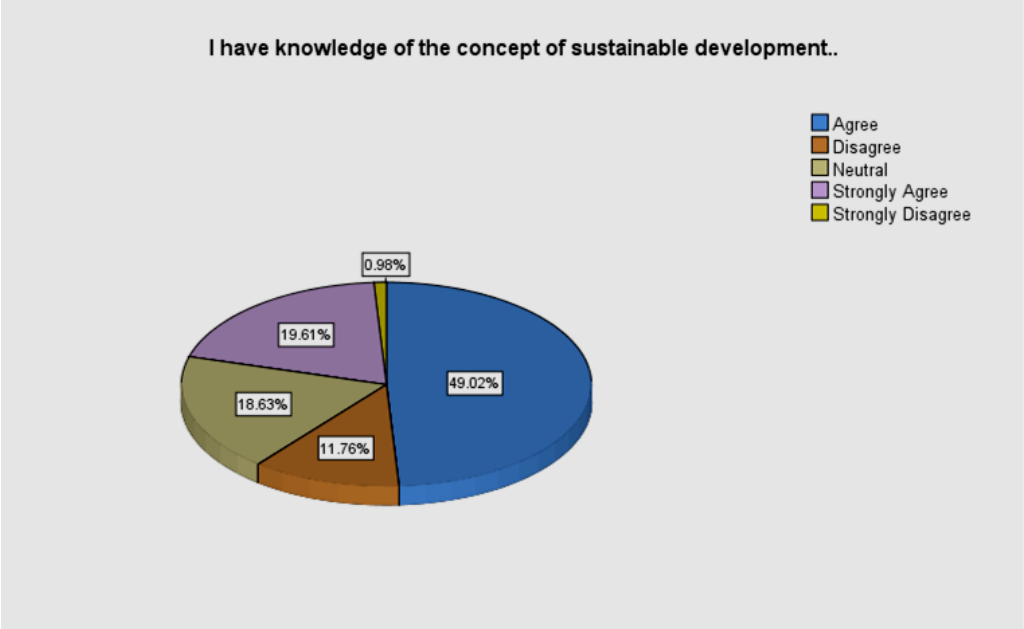


Figure 9. Frequency and Percentage Distribution of Participants According to Their have knowledge of the concept of sustainable development

Furthermore, in Table 12, the results demonstrated that 55.9% of the respondents reported water leakages when noticed, which is considered a positive indicator of responsibility toward conserving water resources, while 28.43% of the respondents indicated that they often report water leakages as shown in Figure 10.

Table 12. Frequency and Percentage Distribution of Participants According to Their report water leaks when I notice them and attempt to minimize water loss

I report water leaks when I notice them and attempt to minimize water loss

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	57	55.9	55.9	55.9
	Never	1	1.0	1.0	56.9
	Often	29	28.4	28.4	85.3
	Rarely	3	2.9	2.9	88.2
	Sometimes	12	11.8	11.8	100.0
	Total	102	100.0	100.0	

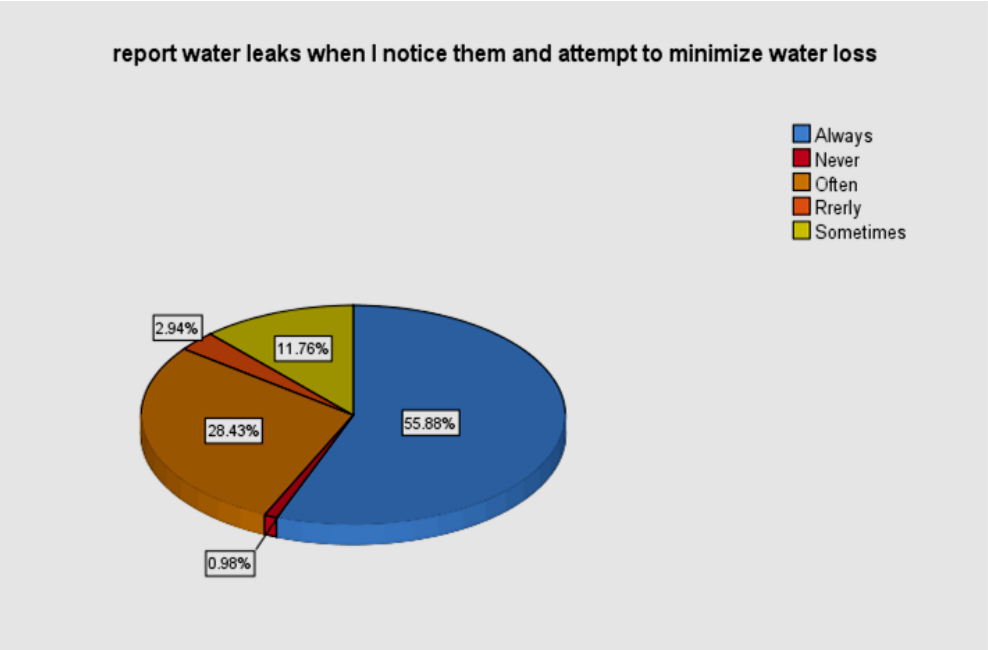


Figure 10. Frequency and Percentage Distribution of Participants According to Their report water leaks when I notice them and attempt to minimize water loss

Regarding practical behaviors related to water conservation, the results in table 13, showed that 73.5% of the participants were always keen to turn off water taps when not needed, in other hand 18.6% of the participants often and only 0.98% were never keen to turn off water taps when not needed, as shown in Figure 11, indicating the widespread adoption of daily practices associated with water preservation.

Table 13. Frequency and Percentage Distribution of Participants According to Their turn off the water tap when it is not needed

I turn off the water tap when it is not needed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	75	73.5	73.5	73.5
	Never	1	1.0	1.0	74.5
	Often	19	18.6	18.6	93.1
	Rarely	2	2.0	2.0	95.1
	Sometimes	5	4.9	4.9	100.0
	Total	102	100.0	100.0	

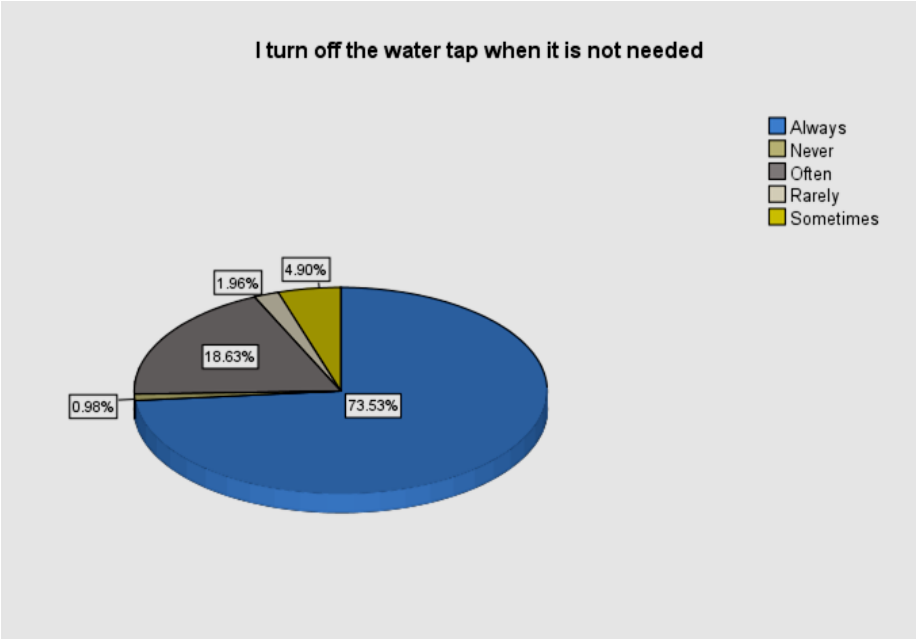


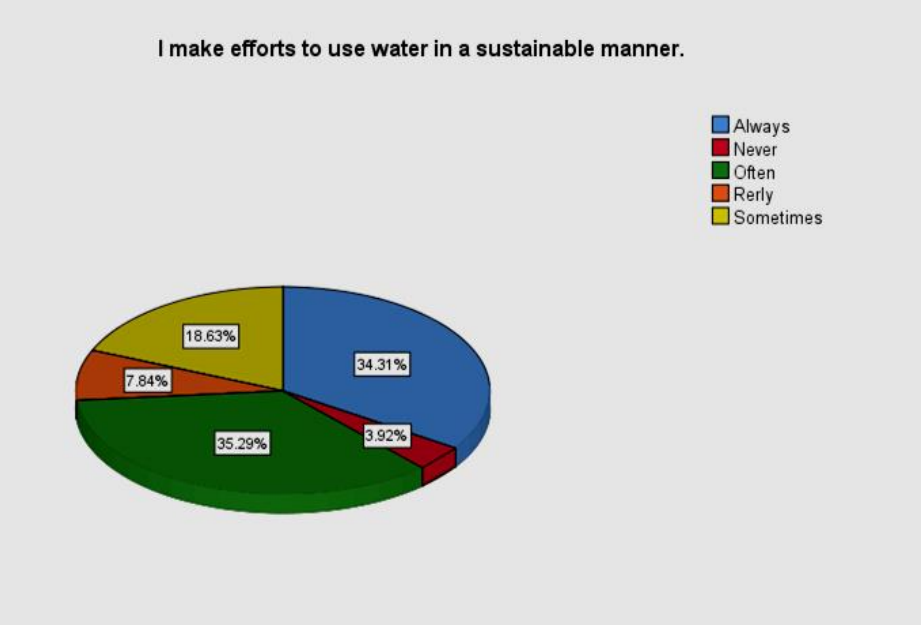
Figure 11. Frequency and Percentage Distribution of Participants According to Their turn off the water tap when it is not needed

Finally, based on the Likert scale analysis presented in Table 14, the findings revealed that 34.31% of the participants agreed that they always possess make efforts to use water in a sustainable manner, while 35.3% often agreed with this statement. Conversely, Only 7.84% of the respondents reported that they rarely engage in efforts to use water sustainably. As shown in Figure 12.

Table 14. Frequency and Percentage Distribution of Participants According to Their Make Efforts to Use Water in a Sustainable Manner

I make efforts to use water in a sustainable manner					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Always	35	34.3	34.3	34.3
	Never	4	3.9	3.9	38.2
	Often	36	35.3	35.3	73.5
	Rarely	8	7.8	7.8	81.4
	Sometimes	19	18.6	18.6	100.0
	Total	102	100.0	100.0	

Figure 12. Frequency and Percentage Distribution of Participants According to Their Make Efforts to Use Water in a Sustainable Manner



10. Conclusion

Environmental awareness plays an important role in promoting sustainable water behavior among postgraduate students. The study results revealed a high level of environmental awareness among the study sample, as 79.4% of the participants expressed a strong belief in the importance of conserving water resources, reflecting a high level of awareness regarding the importance of water sustainability. Overall, the findings revealed a positive relationship between the level of environmental awareness and behaviors related to sustainable water conservation among postgraduate students

11. Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. Integrate environmental education and sustainability topics into postgraduate curricula.
2. Organize environmental awareness campaigns and workshops.
3. Encourage student participation in environmental activities and water conservation programs.
4. Promote sustainable water management practices within universities.
5. Conduct further studies on environmental awareness and sustainable behavior in different educational contexts.

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