African Journal of Biological Sciences

Research Paper   **Open Access**

ENVIRONMENTAL AWARENESS IN SOLID WASTE MANAGEMENT AT A HOSPITAL IN METROPOLITAN LIMA, 2023

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Abstract

The objective of this research was to determine the influence of environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023. The research was of a basic type, with a quantitative approach, using the survey as a technique and questionnaires as instruments for data collection. The population consisted of 245 and the sample consisted of 150 workers of a hospital in Metropolitan Lima, 2023. The results show the influence of environmental awareness on solid waste management in the hospital under study, which is corroborated by the Pseudo R2 test, through the Nagelkerke test that expresses that environmental awareness has an influence of 66.4% with respect to environmental awareness and its dimensions: cognitive, affective, conative and active in the management of solid waste. Finally, it was concluded that an increase in environmental awareness translates directly into a significant improvement in the management of solid waste in a hospital environment.

Keywords: Environmental awareness, cognitive, affective, conative, active, solid waste management.

Resumen

El objetivo de la presente investigación fue determinar la influencia de la conciencia ambiental en la gestión de residuos sólidos de un Hospital de Lima Metropolitana, 2023. La investigación fue de tipo básica, de enfoque cuantitativo, empleando como técnica la encuesta y como instrumentos los cuestionarios para la recolección de datos, la población estuvo constituida por 245 y muestra 150 trabajadores de un hospital de Lima Metropolitana, 2023. Los resultados evidencian la influencia que ejerce la conciencia ambiental sobre la gestión de residuos sólidos en el Hospital materia de estudio, ello está corroborado por la prueba del Pseudo R2, a través de la prueba de Nagelkerke que expresa que la conciencia ambiental influye en 66,4% respecto a la conciencia ambiental y sus dimensiones: cognitiva, afectiva, conativa y activa en la gestión de residuos sólidos. En última instancia, se llegó a la conclusión de que un incremento en la conciencia ambiental se traduce directamente en una mejora significativa en la administración de los residuos sólidos en un entorno hospitalario.

Palabras clave: Conciencia ambiental, cognitiva, afectiva, conativa, activa, gestión de residuos sólidos.

1. Introduction

During the last four decades, interest in environmental preservation has experienced significant growth, capturing the attention of various social strata, who propose actions and plans to address environmental issues (Alvarez et al., 2017). Consistent with the observations of Corral et al. (2019), environmental degradation is directly linked to human behavior, which constantly modifies the environment without considering the biophysical constraints.

In the global health arena, the World Health Organization (WHO) (2018) highlights that there are high-income countries that generate on average 0.5 kg of hazardous medical waste per bed per day, generating a stark contrast with 0.2 kg in low-income nations. This disparity highlights the crucial importance of the use and proper management of solid waste to improve the quality of life, as noted by Freiles (2016).

On the level of environmental awareness, Chancafe (2023) stresses that it not only motivates to be an agent of change, but also to reflect on individual power. Coinciding, Velásquez et al. (2020) argue that the capacity to address environmental problems lies in individual perceptions and behaviors, which are intrinsically linked to values and beliefs about the world. In addition, Vargas et al. (2022) postulate that environmental information should be a priority strategy to effectively cultivate environmental awareness and responsibility at the community level.

Addressing the need for concrete changes, the United Nations (2023) suggests that the implementation of measures aimed at changing the demand for products and services, such as the preference for more sustainable means of transportation or the adoption of plant-based diets, could have a significant impact on changing consumption patterns. This change in approach, projected to reduce greenhouse gas emissions by 40 to 70 % by 2050, highlights the relevance of collective actions.

However, the lack of a transcendental approach, identified by Kumar and Nandini (2013) as the promotion of citizen participation, has been a determining factor in the failure of solid waste management. This lack results in inadequate practices that contribute to the uncontrolled accumulation of waste, thus intensifying environmental problems. Cruz and Ojeda (2013) emphasize that strategies such as reduction, reuse and recycling are recommended, as long as they go hand in hand with awareness programs and responsible consumption, which are essential elements to achieve an effective reduction in waste generation.

Despite efforts and progress in some countries, according to the World Bank report "What a Waste" (2012), the generation of municipal solid waste (MSW) follows an upward trend, posing a growing challenge for its management. In Latin America and the Caribbean, the UN (2018) presents alarming figures of 541,000 tons per day of MSW, with a forecast increase of 25% by 2050. The scarce formalized infrastructure for recycling in the region highlights the urgent need to boost environmental awareness to positively transform solid waste management.

In Peru, the amount of solid waste increased by 20% between 2010 and 2011, from 6 to 7.2 million tons (Minam, 2012). Likewise, the production of these, per capita increased by 17%: from 2010 to 2011 (Minam, 2014). Municipalities have implemented mandatory compliance rules as part of incentive programs established by the government in recent years (Harvey, 2014). Also, the Ministry of Environment (2016) states that municipal solid waste generation exceeds 7 million tons, approximately 20,000 tons per day, and 1,000 tons of solid waste is generated per day.

According to Orihuela (2018), 70% of unsorted solid waste is collected and generated in households. In Lima, where consumption is higher and therefore the amount of solid waste produced is greater, only 1.9% of this is recycled, and the most populated areas have the highest ranking of solid waste (SINIA, 2018; Defensoría del Pueblo, 2019).

In the local area of Metropolitan Lima, there is a hospital that, despite having solid waste management plans and systems, faces a significant problem. The data reveal the persistence of a critical point of waste accumulation, generating environmental contamination and violating regulations, such as Ministlerial Resolution No. 1295-2018 MINSA and Technical Health Standard No. 144-2018 MINSA/DIGESA. Despite the existence of nine rooms for intermediate storage of solid waste, the environmental health area, responsible for supervising its management, faces challenges in raising awareness among administrative, cleaning and care staff. The research focuses on the lack of effective environmental awareness among hospital employees, reflected in inadequate solid waste management practices, and the urgent need to comply with national and international standards to address this issue.

For the above mentioned, the following general problem is posed: What is the influence of environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023? Similarly, the specific problems are: i) What is the influence of cognitive environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023? ii) What is the influence of affective environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023? iii) What is the influence of conative environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023? iv) What is the influence of active environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023?

This research is theoretically justified under the theory of environmental awareness and can clearly explain the problems that exist in the reality of the study area. From a practical perspective, this research contributes value because by identifying potential problems and their causes, it can help to take adequate solid waste management measures. As for the social justification, it aims to raise awareness about the importance of selecting waste and depositing it in appropriate areas to avoid contamination in the future. Finally, as methodological justification, the validity and reliability criteria applied to the instruments are considered, as well as the elaboration of a measurement instrument for the variables environmental awareness and solid waste management.

The general objective was to determine the influence of environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023. And the specific objectives will be: i) To determine the influence of cognitive awareness on solid waste management in a hospital in Metropolitan Lima, 2023; ii) To determine the influence of affective awareness on solid waste management in a hospital in Metropolitan Lima, 2023; iii) To determine the influence of conative awareness on solid waste management in a hospital in Metropolitan Lima, 2023; iv) To determine the influence of active awareness on solid waste management in a hospital in Metropolitan Lima, 2023; v) To determine the influence of active awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

The general hypothesis was: There is a significant influence of environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023. And as specific hypotheses: i) There is a significant influence of cognitive environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023; ii) There is a significant influence of affective environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023; iii) There is a significant influence of conative environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023; iv) There is a significant influence of active awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

2. General Objective

To determine the influence of environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023..

3. Method

The study was aligned with the positivist paradigm, whose perspective is oriented towards the objective search for facts or causes in social phenomena, disregarding individual subjective states (Martínez, 2013). In addition, it adopted a quantitative approach, characterized by the collection of data that are subjected to rigorous analysis through numerical measurements. This process allows the identification of statistical patterns with outstanding precision (Hernández et al., 2018). Likewise, this was an explanatory level study, according to the perspective of Hernández and Mendoza (2018) inquiries of this nature transcend mere description or the establishment of relationships between concepts, focusing instead on the exploration of the causes underlying physical or social events. In this approach, the fundamental purpose is to elucidate why certain phenomena manifest themselves and under what specific conditions they occur. On the other hand, it was founded on the scientific method, conceived by positivists as the ideal tool to reach the truth, this method operates from both deductive and inductive logic, providing a robust framework for reasoning and exploring social phenomena (Berardì, 2015).

3.1 Research type and design

The present research was configured as a basic type of study, oriented towards the expansion of knowledge regarding the variables under consideration, with the purpose of generating new knowledge and theories (Hernández and Mendoza, 2018 and Reigosa et al., 2020). It is oriented towards obtaining a more holistic understanding, highlighting the understanding of the fundamentals inherent to the phenomena studied, the observable facts and the complex relationships between the entities involved (CONCYTEC, 2021).

On the other hand, the design was non-experimental, which is based on the observation of phenomena in their natural environment, without deliberate interventions in the variables, Likewise, it focuses on analyzing the phenomena as they manifest themselves spontaneously, providing a deeper understanding of their dynamics and complexity in a real context in which they unfold (Hernández et al., 2018). In addition, it should be noted that data collection was carried out in a cross-sectional manner, covering a specific temporal period, according to the proposed methodology (Hernández et al., 2018).

3.2 Population, sample and sampling

3.2.1 Population

The population can be understood as the universe in which the study is developed (Pastor, 2019). Therefore, the population for this study was 245 hospital workers in metropolitan Lima.

Lima Metropolitan Hospital			
Category	**Men**	**Women**	**Total**
Physicians	30	35	65
Nurses	25	30	55
Administrative Staff	20	25	45
Laboratory Technicians	15	20	35
Other (maintenance, security)	25	20	45
Total by Gender	**115**	**130**	**245**
Total Percentage	47%	53%	100%

Table 1. Composition of the study population

3.2.2 Sample

Regarding the sample, a collection selected from a study population was considered (Pastor, 2019). For the research there was a sample of 150 collaborators. It should be noted that, in accordance with the regulations, a 95% confidence level with a margin of error of 5% is considered for this population..

3.2.3 Sampling

It was determined by probability sampling - Simple random sampling, according to Hernandez and Carpio (2019) is a sample selection technique in which every element of the population has the same probability of being included, ensuring representativeness and minimizing biases based on the formula for finite populations.

3.3 Data collection techniques and instruments

The technique used was the survey, regarding this, Hernandez et al. (2018) stated that it is a means used by researchers or authors to collect data in order to obtain results. For their part, the instrument was a questionnaire, in relation to this, Hernandez and Mendoza (2018) point out that they are resources used to obtain or collect data necessary for the research, thus being able to obtain information.

The validity of the instruments was meticulously examined through the critical evaluation conformed by three experts in the research field, who provided their specialized judgment. These professionals not only endorsed the adequacy of the questionnaires, but also highlighted their relevance and practical usefulness. The inclusion of subject matter experts in this process further strengthened the credibility and robustness of the instruments used in the research, thus providing a solid basis for data collection and analysis.

Nª	Grade	Experts	Opinion
1	Doctor	Medina Sotelo Cristian	Adequate and applicable
2	Doctor	Bravo Nuñez, Carmen	Adequate and applicable
3	Doctor	Mantinez Heredia, Javier	Adequate and applicable

Table 2. Validation of environmental awareness and solid waste management questionnaires.

In the case of reliability, a pilot test was conducted with 24 workers in the study area, using Cronbach's Alpha statistic, it was found that for the variable Environmental Awareness the Cronbach's Alpha calculation was 0.901 and for the variable Solid Waste Management it was 0.977, which indicates that the reliability of the instruments is high and they are applicable.

	Cronbach's alpha	Item
Environmental awareness	,901	30
Solid Waste Management	,977	30

Table 3. Reliability of environmental awareness and solid waste management questionnaires

4. Results

4.1 Descriptive analysis

Levels	f	%
Low	58	38,70%
Medium	62	41,30%
High	30	20,0%
Total	150	100,00%

Table 4. Levels of the environmental awareness variable

Table 4 shows that the environmental awareness variable, after the application of the data collection instrument, reveals a significant distribution in the levels of environmental awareness among hospital workers in Metropolitan Lima in 2023.

First, 41.30% of the employees exhibited a medium low level of environmental awareness, this suggests that workers may have certain perceptions and attitudes towards the environment, but still face challenges in fully understanding and applying sustainable practices in their daily lives; 38.70% of the participants reflected a low level, indicating that a significant proportion of the workforce presents limitations in cognitive, affective and active aspects related to the preservation of the environment. Finally, 20.00% of the workers demonstrated a high level of environmental awareness.

Taken together, these results underscore the need to implement strategies aimed at the majority of employees in order to foster a positive change in their attitudes and behaviors towards environmental conservation.

Levels	f	%
Low	68	45,30%
Medium	67	44,70%

High	15	10,0%
Total	150	100,00%

Table 5. Levels of the solid waste management variable.

Table 5 shows that the study sample was mostly located at an inadequate level in terms of solid waste management, with 45.30%, most of the workers have limitations in the development of effective strategies related to the reduction, reuse, recycling and other fundamental practices for the proper management of solid waste.

In addition, 44.70% of the sample was at a medium level of solid waste management, denoting an intermediate position, indicating that some employees may be applying certain management practices, but there is still room for improvement and progress towards more sustainable strategies. And the remaining 10.0% stood out by placing themselves at a high level in solid waste management, this minority segment reflects that some workers have developed advanced and efficient practices in terms of reduction, reuse and other strategies, contributing significantly to the responsible management of solid waste. The results indicate that most workers have not developed good strategies in terms of reduction, reuse, recycling, revaluation, redistribution, repair and restructuring as part of solid waste management.

			Variable: Management of Solid Residues			
			Inadequate	Regular	Adequate	Total
Variable: Environmental awareness	Low	Recount	58	0	0	58
		% of total	38,7%	0,0%	0,0%	38,7%
	Medium	Recount	10	52	0	62
		% of total	6,7%	34,7%	0,0%	**41,3%**
	High	Recount	0	15	15	30
		% of total	0,0%	10,0%	10,0%	20,0%
Total		Recount	68	67	15	150
		% of total	**45,3%**	44,7%	10,0%	100,0%

Table 6. Levels of the environmental awareness variable and the solid waste management variable

The results presented in Table 6 show that 41.3% of the participants show an average level of environmental awareness, which suggests a moderate knowledge and concern for environmental issues. Contrasting with this finding, it is observed that 45.3% of the workers exhibit an inadequate level of solid waste management. This result implies that, despite having a medium level of environmental awareness, a large portion of the workforce has not effectively translated this awareness into sustainable practices with respect to solid waste management.

These results indicate a gap between moderate environmental awareness and insufficient implementation of solid waste management practices.

			Variable: Solid Waste Management			
			Inadequate	Regular	Adequate	Total
Dimension 1. Cognitive Awareness	Low	Recount	40	0	0	40
		% of total	26,7%	0,0%	0,0%	26,7%
	Medium	Recount	28	58	0	86
		% of total	18,7%	38,7%	0,0%	**57,3%**
	High	Recount	0	9	15	24
		% of total	0,0%	6,0%	10,0%	16,0%
Total		Recount	68	67	15	150
		% of total	**45,3%**	44,7%	10,0%	100,0%

Table 7. Levels of cognitive awareness and the variable solid waste management.

Table 7 shows that the cognitive awareness dimension was medium level for 57.3% of the sample, while solid waste management was inadequate level for 45.3% of the participants. The results indicate that medium level of cognitive awareness has an inadequate level in solid waste management. These results indicate a discrepancy between moderate cognitive knowledge about environmental issues and inadequate implementation of solid waste management practices. This suggests that, despite having an intermediate understanding of the cognitive dimension of environmental awareness, a significant portion of the sample has not effectively translated this knowledge into sustainable waste management practices.

			Variable: Management of Solid Waste			
			Inadequate	Regular	Adequate	Total
Dimension 2. Affective Consciousness	Low	Recount	66	0	0	66
		% of total	44,0%	0,0%	0,0%	**44,0%**
	Medium	Recount	2	60	0	62
		% of total	1,3%	40,0%	0,0%	41,3%
	High	Recount	0	7	15	22
		% of total	0,0%	4,7%	10,0%	14,7%
Total		Recount	68	67	15	150
		% of total	**45,3%**	44,7%	10,0%	100,0%

Tabla 8. Niveles de conciencia afectiva y la variable gestión de residuos solidos

La Tabla 8 revela que, el 44,0% de la muestra presenta un nivel bajo en la dimensión de conciencia afectiva, indicando una conexión emocional limitada o poco marcada con las cuestiones ambientales. Al mismo tiempo, el 45,3% de los trabajadores exhibe un nivel inadecuado en la gestión de residuos sólidos. Estos resultados sugieren que la baja conciencia afectiva, caracterizada por una conexión emocional limitada con el medio ambiente, se correlaciona con una implementación insuficiente de prácticas de gestión de residuos sólidos. Esto podría indicar que la falta de una conexión emocional fuerte con las cuestiones ambientales puede influir en la disposición de los trabajadores para adoptar comportamientos más sostenibles en la gestión de residuos sólidos.

			Variable: Gestión de Residuos Solidos			
			Inadecuada	Regular	Adecuada	Total
Dimension 3. Conative Consciousness	Low	Recount	68	4	0	72
		% of total	45,3%	2,7%	0,0%	**48,0%**
	Medium	Recount	0	48	0	48
		% of total	0,0%	32,0%	0,0%	32,0%

High	Recount		0	15	15	30
	% of total		0,0%	10,0%	10,0%	20,0%
Total	Recount		68	67	15	150
	% of total		**45,3%**	44,7%	10,0%	100,0%

Tabla 9. Niveles de conciencia conativa y la variable gestión de residuos solidos

La Tabla 9 revela que, el 48,0% de la muestra presenta un nivel bajo en la dimensión de conciencia conativa, indicando una disposición y compromiso limitados en la adopción de comportamientos sostenibles. Simultáneamente, el 45,3% de los trabajadores exhibe un nivel inadecuado en la gestión de residuos sólidos. Estos resultados sugieren que la baja conciencia conativa, caracterizada por una disposición limitada para tomar acciones sostenibles, se asocia con una implementación insuficiente de prácticas de gestión de residuos sólidos. Esto podría indicar que la disposición y compromiso limitados para llevar a cabo acciones sostenibles influyen en la adopción de prácticas efectivas de gestión de residuos sólidos.

			Variable: Solid Waste Management			
			Inadequate	Regular	Adequate	Total
Dimensión 4. Active Consciousness	Low	Recount	61	0	0	61
		% of total	40,7%	0,0%	0,0%	**40,7%**
	Medium	Recount	7	49	0	56
		% of total	4,7%	32,7%	0,0%	37,3%
	High	Recount	0	18	15	33
		% of total	0,0%	12,0%	10,0%	22,0%
Total		Recount	68	67	15	150
		% of total	**45,3%**	44,7%	10,0%	100,0%

Table 10. Levels of active awareness and the variable solid waste management.

Table 10 reveals that 40.7% of the sample presents a low level in the dimension of active awareness, indicating limited participation and action in sustainable practices. Simultaneously, 45.3% of the workers exhibit an inadequate level in solid waste management. These results suggest that low active awareness, characterized by limited participation and action in sustainable practices, correlates with insufficient implementation of solid waste management practices. This could indicate that lack of active participation and taking concrete actions affect the adoption of effective solid waste management practices.

Normality test

This research recognized the importance of performing a normality test to establish whether the data of the variables follow a specific distribution, such as the normal distribution. Since the sample size exceeds 50, the Kolmogorov-Smirnov Test was chosen to be used. This test was used to examine whether the data collected on environmental awareness and solid waste management fit a normal distribution.

Ho: Environmental awareness and solid waste management conform to a normal distribution.

H1: Environmental awareness and solid waste management do not conform to a normal distribution

	Kolmogorov-Smirnov[a]		
	Statistician	gl	Sig.
Variable: Environmental Awareness	0,249	150	0,000
Variable: Solid Waste Management	0,291	150	0,000

a. Lilliefors significance correction

Table 11. Normality test

Table 11, the normality test was performed using the Kolmogorov-Smirnov test. According to the significance level of less than 0.05, so p=0.000 values for the variables indicated that the data were not normally distributed, leading to the rejection of H0 and acceptance of H1, which corresponds to nonparametric testing.

4.2 Inferential analysis

Testing the general hypothesis

Hg. There is a significant influence of environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

H0. There is no significant influence of environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

Model	Log likelihood logarithm-2	Chi-square	gl	Sig.
Intersection only	231,385			
Final	99,944	131,441	2	0,000

Liaison function: Logit.

Table 12. General hypothesis model fit information

Table 12 shows that the likelihood ratio test confirmed the significance of the logistic model (p=0.000), a value of less than 0.05. This result supports the existence of an influence of environmental awareness on solid waste management. The data collected indicate that those individuals with greater environmental awareness tend to participate more actively in various practices related to solid waste management. This commitment is evidenced by actions such as the reduction of solid waste, the reuse of products, the promotion of recycling and the revaluation of materials to prevent their premature disuse. In addition, participation in redistribution processes, repairing objects instead of discarding them, and restructuring consumption habits towards more sustainable options are also highlighted. Taken together, these findings suggest a strong connection between environmental awareness and effective solid waste management.

Cox and Snell	,584
Nagelkerke	,664
McFadden	,416

Liaison function: Logit.

Table 13. Pseudo R-squared general hypothesis

Table 13 shows the Pseudo R-squared values, using the Nagelkerke index (0.664), it has been calculated that the environmental awareness variable has a significant influence on the solid waste management variable, representing 66.4%. This percentage highlights the importance of the influence observed between environmental awareness and waste management practices. However, it is critical to recognize that the remaining 33.6% of the variability may be subject to other factors, highlighting the inherent complexity of this phenomenon and underscores the need to consider multiple influences in fully understanding solid waste management practices.

Contrasting Specific Hypothesis 1.

H1. There is a significant influence of cognitive environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

H01. No significant influence of cognitive environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

Model	Log likelihood logarithm -2	Chi-square	gl	Sig.
Intersection only	187,706			
Final	178,219	9,487	2	0,009

Liaison function: Logit.

Table 14. Model fit information specific hypothesis 1

Table 14 reveals that the likelihood ratio test has confirmed the significance of the logistic model with p=0.009, which is less than 0.05. This result supports the presence of the influence of cognitive environmental awareness on solid waste management. The data obtained highlight that cognitive environmental awareness, which involves individual understanding and perception of environmental problems, plays a key role in decisions and actions related to solid waste management. That is, individuals exhibiting this type of more developed awareness tend to adopt a more proactive and reflective approach to waste management.

Cox and Snell	,061
Nagelkerke	,720
McFadden	,033

Liaison function: Loglit.

Table 15. Pseudo R-squared specific hypothesis 1

In Table 15, the values of Pseudo R-squared, through the Nagelkerke analysis (0.720), it has been calculated that cognitive environmental awareness exerts a substantial influence, representing 72% in the variability of solid waste management. This result underscores the relevance and strength of the connection between cognitive understanding of environmental issues and practices related to waste management. However, it is imperative to address the remaining 28% of the variability, as it suggests the existence of other factors that also impact these practices. Consequently, although cognitive environmental awareness explains a significant portion of the variability, the remaining percentage highlights the need to holistically consider various aspects to fully understand the dynamics involved in sustainable solid waste management.

Specific Hypothesis Testing 2

H2. There is a significant influence of affective environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

H02. There is no significant influence of affective environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

Modelo	Log likelihood logarithm -2	Chi-cuadraldo	gl	Sig.
Intersection only	254,757			
Final	33,28	221,477	2	0,000

Liaison function: Loglit

Table 16. Model fit information specific hypothesis 2

Table 16 reveals that the likelihood ratio test has confirmed the significance of the logistic model with $p=0.000$, which is less than 0.05. This result supports the presence of the influence of affective environmental awareness on solid waste management. The collected data reveal that affective environmental awareness, related to emotional attitudes and emotional connections towards the environment, plays a significant role in waste management practices. Those individuals who manifest greater affective environmental awareness tend to show deeper and more committed engagement in solid waste management. This emotional connection translates concretely into behaviors such as more conscious waste reduction, an inclination toward product reuse, more active participation in recycling initiatives, and thoughtful consideration of the revaluation of materials to avoid premature disposal.

Cox and Snell	,772
Nagelkerke	,890

McFadden	,732

Liaison function: Loglit.

Table 17. Pseudo R-squared specific hypothesis 2

Table 17 shows the Pseudo R-squared values, through the Nagelkerke index (0.890) it has been calculated that affective environmental awareness exerts an outstanding influence, representing 89% of the variability in solid waste management. This finding emphasizes the importance of emotional attitudes and affective connections to the environment in the adoption of environmentally responsible management practices.

Hypothesis testing specifies three

H3. There is significant influence of conative environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

H03. There is no significant influence of conative environmental awareness on solid waste management in a hospital in Metropolitan Lima, 2023.

Model	Likelihood logarithm -2	Chi-square	gl	Sig.
Intersection only	221,759			
Final	41,857	179,903	2	0,000

Liaison function: Loglit.

Table 18. Model fit information specific hypothesis 3

Table 18 reveals that the likelihood ratio test has confirmed the significance of the logistic model with p=0.000, which is less than 0.05. This result supports the influence of conative environmental awareness on solid waste management. The data collected highlight that conative environmental awareness, related to disposition and action, plays a determining role in the implementation of effective waste management practices. In this sense, individuals with a more pronounced conative environmental awareness not only possess favorable knowledge and attitudes, but also actively translate these elements into tangible behaviors.

Cox and Snell	,699
Nagelkerke	,799
McFadden	,577

Liaison function: Loglit.

Table 19. Pseudo R-squared specific hypothesis 3

Table 19 shows the Pseudo R-squared values. Using the Nagelkerke index (0.799), it was determined that conative environmental awareness exerts a substantial influence, accounting for

79.9% of the variability in solid waste management. This result highlights the importance of individual willingness and action in the implementation of effective environmental management practices.

Specific Hypothesis Testing 4

H4. There is a significant influence of active awareness in solid waste management in a hospital in Metropolitan Lima, 2023.

H04. There is no significant influence of active awareness on solid waste management in a hosplital of lLima Metropolitana, 2023.

Modelo	Likelihood Logarithm -2	Chi-square	gl	Sig.
Intersection only	222,907			
Final	71,158	151,749	2	,000

Liaison function: Loglit

Table 20. Specific hypothesis four model fit information

Table 20 reveals that the likelihood ratio test has confirmed the significance of the logistic model with p=0.000, which is less than 0.05. This result supports the influence of active environmental awareness on solid waste management. The collected data reveals that active environmental awareness, which involves proactive and committed participation in environmental issues, plays a crucial role in the implementation of effective waste management practices. Therefore, individuals with active environmental awareness are not only informed and conscious, but also actively engaged in concrete actions.

Cox and Snlell	,636
Nagellkerke	,722
MlcFadden	,474

Liaison function: Loglit

Table 21. Pseudo R-squared specific hypothesis four

Table 21 shows the values of Pseudo R-squared, through the application of the Nagelkerke index (0.722), it has been demonstrated that active environmental awareness exerts a notable influence, representing 72.20% of the variability in solid waste management. This result highlights the importance of active and committed participation of individuals in the adoption of sustainable practices in waste management. Therefore, while active environmental awareness explains a significant part of the variability, the remaining percentage highlights the need for a comprehensive approach to address various dimensions and fully understand the dynamics associated with sustainable solid waste management.

5. Discussion

The overall objective of the study was to determine the influence of environmental awareness on solid waste management in a hospital in Metropolitan Lima in the year 2023. The results strongly support the presence of a significant relationship between environmental awareness and solid waste management. The likelihood ratio test yielded a p=0.000 value of less than 0.05, conclusively confirming the significance of this influence. Likewise, using the Nagelkerke index, it was calculated that the environmental awareness variable exerts a substantial influence on the solid waste management variable, accounting for 66.4%.

Taken together, these findings suggest a strong influence between environmental awareness and an integrated approach to solid waste management. This approach is not limited only to reduction, reuse and recycling, but encompasses broader aspects such as revaluation, redistribution, repair and restructuring. All of these elements are fundamental to effective solid waste management in the hospital setting suggesting the need to incorporate strategies that foster this awareness to improve sustainable practices in this specific context.

This finding underscores the critical relevance of the supply chain in waste management, aligning closely with the needs identified in previous studies. Specifically, it connects with the work of Moreno et al. (2021), who explored the influence of the supply chain on the efficiency of the solid waste management system in a specific company, their results revealed deficiencies in management efficiency indicators, especially in waste collection, which was at an average level concluding that supply chains play a crucial role in protecting the environment and an optimal collection level of 31,547 tons of waste per day was established.

It is crucial to highlight that while Moreno et al. focused their findings on deficiencies in the supply chain and the need for strategies based on quality and service guidelines, the present research focused on environmental awareness as a key factor for integrated solid waste management in a hospital setting. The present results underline the need for a holistic approach to solid waste management in the hospital setting, and not only in efficient reduction and collection, the incorporation of practices such as revaluation, redistribution and repair is presented as essential. In addition, the importance of actively involving the population, in this case the hospital staff, in the promotion of environmental policies and proper waste management is highlighted. Although both studies identify problems in solid waste management, they differ in their approaches; however, both studies agree on the need for effective strategies to address these challenges and improve the environmental situation.

Likewise, when comparing the results of the present research with those obtained by Espinoza et al. (2021) who also investigated the correlation between environmental awareness and solid waste management, important similarities and differences are observed. In the research by Espinoza et al. conducted in a secondary school context with a sample of 474 students, a significant relationship was found, supported by a significance value of 0.000 according to the chi-square. A key difference between the two studies lies in the setting investigated and the target population, despite these differences, both studies support the existence of a significant relationship between environmental awareness and solid waste management. Although the contexts and populations studied differ, the results converge in highlighting the importance of promoting environmental awareness to improve solid waste management in various settings, whether in a hospital or in an educational context.

Regarding specific objective one, aimed at determining the influence of cognitive awareness on solid waste management, the results revealed significance using the likelihood ratio test (p=0.009, below 0.05). Furthermore, Nagelkerke analysis (0.720) indicated that cognitive environmental awareness exerts a substantial influence, accounting for 72% of the variability in solid waste management. These findings conclude that cognitive environmental awareness has a significant influence on solid waste management in the hospital studied, highlighting that this awareness is not

only related to perception, but also translates into concrete behaviors that contribute significantly to sustainable solid waste management. Therefore, it suggests the importance of considering cognitive environmental awareness in waste management strategies to improve sustainable practices in this specific environment.

This finding contrasts with the distribution of levels found by Carlín (2020) who set out to establish the relationship between variables associated with environmental awareness. In his research, he found that 59.1% of the variables linked to environmental awareness were located at poor levels. On the other hand, environmental sensitivity was at a normal level, with 53.9%, while the willingness to act in accordance with ecological standards showed a poor level of 39.1%, suggesting that cognitive awareness is not only related to perception, but also translates into concrete behaviors. In this sense, the present research highlights that cognitive environmental awareness is not only a matter of perception, but also significantly influences concrete behaviors that contribute to sustainable solid waste management in a hospital setting, it is meritorious to consider the specificity of the setting in which the research is conducted. While Carlín focused on a general population, the present research focused on a hospital, suggesting that cognitive environmental awareness may have particular manifestations and effects in specific contexts such as health care.

Moreover, the results of the present research align with the study by Huere (2019) established a connection between solid waste management and environmental awareness in the City of Ninacaca. Huere focused on cognitive variables and used Spearman's correlation to demonstrate a positive and significant relationship between environmental awareness and solid waste management. The key result was a correlation coefficient of 0.550 with a bilateral significance value of 0.000, indicating a strong and statistically significant association.

The convergence in the results highlights the consistency in the importance of environmental awareness in solid waste management. Both studies, both Huere (2019) and the present research, underscore the need to consider environmental awareness as a key component to implement sustainable practices and improve solid waste management in different contexts, whether in a specific community or hospital setting.

In relation to specific objective two, focused on evaluating the influence of affective awareness on solid waste management, the results indicate the level of significance through the likelihood ratio test (p=0.000, less than 0.05). Furthermore, through the Nagelkerke index (0.890) it is calculated that affective environmental awareness exerts a prominent influence, accounting for 89% of the variability in solid waste management. These findings highlight that affective environmental awareness transcends mere cognitive perception and plays an essential role in the adoption of concrete practices that support sustainable solid waste management. Furthermore, they suggest the importance of considering the affective dimension of environmental awareness when designing strategies to improve waste management in hospital settings.

This finding is echoed in the proposal of Saldívar et al. (2021), who advocated the implementation of a solid waste management system with economic, social and environmental benefits, thus highlighting the need to consider emotional aspects in effective waste management. The results of Saldívar et al. indicate that 70% of the total waste generated is recyclable, and point to the existence of accumulations of solid waste in the open air. In contrast, the findings of the present investigation reveal that affective environmental awareness exerts an important influence, accounting for 89% of the variability in solid waste management in a hospital.

These discrepancies suggest that, although both studies address solid waste management, the focus is on different aspects. While Saldívar et al. focus on the implementation of a management system with emphasis on waste classification and treatment, which focuses on economic, social and environmental benefits derived from the implementation of a management system, the present

research highlights the importance of affective environmental awareness in the adoption of concrete practices to support sustainable solid waste management in a hospital context, emphasizing that affective environmental awareness transcends mere cognitive perception and plays an essential role in solid waste management.

As for specific objective three, which sought to evaluate the influence of conative awareness on solid waste management. The results strongly underline that conative environmental awareness significantly impacts solid waste management in a hospital in Metropolitan Lima in 2023. The likelihood ratio test confirms the significance of the logistic model, with a value of p=0.000, less than 0.05. Furthermore, using the Nagelkerke index (0.799), it is determined that conative environmental awareness exerts a substantial influence, accounting for 79.9% of the variability in solid waste management. These findings highlight that conative environmental awareness plays a crucial role in the practical implementation of solid waste management principles in a hospital setting, underscoring its importance in fostering sustainable behaviors and contributing to environmental stewardship.

This highlights the importance of addressing the conative dimension of environmental awareness when designing strategies and policies aimed at improving waste management in hospitals, suggesting that actions based on conative motivation and disposition can have a significant positive impact on the environmental sustainability of these institutions in the future.

Contrasting with López & Rodríguez (2022), who evaluated formative initiatives, the present research highlights that, despite the 53.13% institutional motivation identified, conative awareness has an even more pronounced influence on solid waste management in the hospital studied. These findings underline that not only general motivation, but the willingness to act, is essential for the effective implementation of sustainable waste management practices in a hospital setting. In comparison to Huamaní et al. (2020), who characterized waste management factors at the national level, the present research highlights that 72% of municipal solid waste is recyclable, but conative awareness has a significantly greater influence (79.9%) on waste management in the hospital context. This suggests that willingness to act may be a more important determinant of effective solid waste management in specific hospital settings.

That is to say, the findings of the present research reinforce the importance of conative awareness in solid waste management in a hospital, and although some patterns resemble previous research, the specific perspective of the present research enriches the understanding of how to approach waste management in hospital settings from a more practical and concrete dimension.

Specific objective four explored the influence of active awareness on solid waste management. The results highlight the importance of the logistic model, confirmed by the likelihood ratio test with p=0.000, less than 0.05. Furthermore, by applying the Nagelkerke index (0.722) accounting for 72.20% of the variability in solid waste management supports the influence of active environmental awareness on solid waste management. These findings underline that active environmental awareness is not limited to perception and knowledge, but translates into practical commitment, highlighting its essential importance in promoting sustainable behaviors and its significant contribution to responsible solid waste management in a hospital in Metropolitan Lima in 2023.

In this sense, the results suggest that active environmental awareness plays a crucial role in hospital solid waste management, highlighting the relevance of considering proactive actions and practices in promoting environmental awareness to effectively improve environmental management in specific hospital settings. These data find consistency with the research of Velez et al. (2019) where solutions were proposed for the Waorani Gareno community, fundamental similarities and differences are found. Although both investigations share the general objective of improving waste management, they diverge in the specific contexts and in the results obtained. Velez et al. evidenced

local practices, such as burning (66%) and burying (31%) of waste in a community, while the present research highlights that active environmental awareness has a substantial 72.20% influence on the variability of solid waste management in a hospital in Metropolitan Lima. These differences underline the importance of considering contextual particularities when designing strategies to improve waste management.

In this order of ideas, the present research on solid waste management in hospital environments is nourished by fundamental theoretical currents, supported by outstanding authors in the academic and scientific fields. Febles (2004), within the framework of Environmental Psychology, has provided a key definition by conceptualizing it as the system of experiences, knowledge and experiences that individuals actively use in their relationship with the environment. This perspective has been essential to understand cognitive awareness, highlighting its key role in decision making related to hospital solid waste management. In turn, Naess' (1995) theory of Deep Ecology has provided a solid conceptual framework by postulating that a profound change in attitudes and values, through a deeper awareness of the interconnectedness between humans and nature, is crucial to address environmental problems. This theory supports the importance of cognitive awareness identified in our research.

In the realm of affective awareness, we highlight the influence of Normative Focus Theory developed by Cialdini et al. (1990), which suggests that social norms and group expectations play a key role in the formulation of environmental attitudes and behaviors. This perspective reinforces the relevance of the affective dimension in solid waste management, contributing to a more holistic understanding.

The convergence of our results with international and national antecedents, supported by diverse theories, such as Environmental Psychology, Deep Ecology Theory, Environmental Education Theory, among others, strengthens the validity and applicability of the findings in solid waste management. The integration of these theoretical perspectives offers a comprehensive approach to understand and address environmental awareness and its impact on solid waste management practices, therefore, this study not only contributes to academic knowledge, but also establishes a solid foundation for sustainable management practices in hospital environments, promoting citizen awareness and participation in the search for environmentally responsible solutions.

6. Conclusions

First: Regarding the general objective, it is confirmed that there is a significant influence of environmental awareness on solid waste management in a hospital in Metropolitan Lima in the year 2023. The confirmation of this influence is supported by the asymptotic significance condition (bilateral) evidenced by a value (p=0.000, below 0.05) and a Nagelkerke level of 66.4%, further consolidating the magnitude of the observed influence.

Second: Referring to specific objective one, the presence of a significant influence of cognitive environmental awareness on solid waste management in the hospital of Metropolitan Lima in the year 2023 is confirmed. It is supported by meeting the asymptotic significance condition (bilateral), evidenced by a value (p=0.009, below 0.05). Furthermore, Nagelkerke of 72.0%, underlining the significant magnitude of the relationship identified between cognitive environmental awareness and solid waste management in the hospital context studied.

Third: In relation to specific objective two, the existence of a significant influence of affective environmental awareness on solid waste management in the hospital of Metropolitan Lima in the year 2023 is ratified. It is supported by verifying that it meets the condition of asymptotic significance

(bilateral) evidenced by a value (p=0.000, below 0.05). Furthermore, a Nagelkerke of 89% is highlighted, underlining the considerable magnitude of the relationship identified between affective environmental awareness and effectiveness in solid waste management in the hospital environment studied.

Fourth: In relation to specific objective three, the existence of a significant influence of conative environmental awareness on solid waste management in the hospital in Metropolitan Lima in the year 2023 is confirmed. It is supported by verifying that it meets the condition of asymptotic significance (bilateral) evidenced by a value (p=0.000, below 0.05) and a Nagelkerke index 79.9% highlighting the incidence of conative environmental awareness and hospital solid waste management.

Fifth: In relation to specific objective four, the existence of a significant influence of active environmental awareness on solid waste management in the hospital of Metropolitan Lima in the year 2023 is confirmed. It is supported by verifying that it meets the condition of asymptotic significance (bilateral) evidenced by a value (p=0.000, below 0.05). In addition, a Nagelkerke of 72.2% stands out, highlighting the incidence of active environmental awareness and hospital solid waste management.

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