Multidisciplinar (Montevideo). 2023; 1:22
doi: 10.62486/agmu202322
ISSN: 3046-4064

ORIGINAL

Institutional contamination produced by student waste at the Universidad de las Fuerzas Armadas ESPE Latacunga campus during the may-september 2023 semester

Contaminación institucional producida por los residuos de los estudiantes de la Universidad de las Fuerzas Armadas ESPE Sede Latacunga en el semestre mayo-septiembre 2023

Jordi Alexander Abril Enriquez[1], Joselyn Janeth Chicaiza Flores[1], Marjorie Brigitte Guzmán Calvopiña[1], Maykol Alexander Quintuña Uribe[1], Andy Leonel Uto Tigasi[1]

[1]Universidad de las Fuerzas Armadas. Ecuador.

Citar como: Abril Enriquez JA, Chicaiza Flore JJ, Guzmán Calvopiña MB, Quintuña Uribe MA, Uto Tigasi AL. Institutional contamination produced by student waste at the Universidad de las Fuerzas Armadas ESPE Latacunga campus during the may-september 2023 semester. Multidisciplinar (Montevideo). 2023;1:22. https://doi.org/10.62486/agmu202322

Enviado: 06-07-2023 **Revisado:** 29-10-2023 **Aceptado:** 24-12-2023 **Publicado:** 24-12-2023

Editor: Prof. Dr. Javier González Argote

ABSTRACT

Institutional contamination by student waste at the Universidad de las Fuerzas Armadas ESPE, Sede Latacunga, is of concern due to lack of environmental awareness, inadequate infrastructure and clear recycling policies. The research reveals a strong awareness among students about the importance of separating waste and recycling, although there are challenges in infrastructure and policies. Students perceive recycling as beneficial for the environment and health. Most support the implementation of recycling and waste separation systems. The need for adequate containers and awareness campaigns is highlighted. Health risks associated with hazardous waste are identified. The university should lead changes towards more sustainable practices, promoting recycling infrastructure, waste reduction and local partnerships. Continuous monitoring and evaluation, increased student participation, and clear policies and environmental education programs are recommended.

Keywords: Institutional Pollution; Student Waste; Environmental Awareness; Inadequate Infrastructure; Recycling and Clear Policies.

RESUMEN

La contaminación institucional por residuos estudiantiles en la Universidad de las Fuerzas Armadas ESPE, Sede Latacunga, es preocupante debido a la falta de conciencia ambiental, infraestructura inadecuada y políticas claras de reciclaje. La investigación revela una sólida conciencia entre los estudiantes sobre la importancia de separar residuos y reciclar, aunque hay desafíos en la infraestructura y políticas. Los estudiantes perciben el reciclaje como beneficioso para el medio ambiente y la salud. La mayoría apoya la implementación de sistemas de reciclaje y separación de residuos. Se destaca la necesidad de contenedores adecuados y campañas de concientización. Se identifican riesgos para la salud asociados con residuos peligrosos. La universidad debe liderar cambios hacia prácticas más sostenibles, promoviendo infraestructuras de reciclaje, reducción de residuos y colaboraciones locales. Se recomienda seguimiento y evaluación continuos, aumentar la participación estudiantil y establecer políticas claras y programas de educación ambiental.

Palabras clave: Contaminación Institucional; Residuos Estudiantiles; Conciencia Ambiental; Infraestructura Inadecuada; Reciclaje y Políticas Claras.

INTRODUCTION

Institutional contamination produced by student waste at the Universidad de las Fuerzas Armadas ESPE Sede Latacunga is a matter of concern that requires immediate attention and action. As the student community grows, so do the challenges related to the proper management of waste generated on the university campus. Lack of environmental awareness, inadequate infrastructure, and lack of clear recycling and waste disposal policies contribute to pollution and negative impact on the institutional environment.[1,2]

The first problem lies in the need for more environmental awareness among students. Many of them need to be sufficiently informed about the importance of reducing, reusing, and recycling waste, leading to inappropriate waste disposal.[3] The lack of environmental education and awareness campaigns contributes to irresponsible waste behavior, resulting in increased institutional pollution. Second, insufficient infrastructure for waste management at the university is also a significant problem. The lack of adequate and strategically located recycling garbage cans, as well as the lack of efficient collection systems, hinder the proper separation and disposal of student-generated waste. This leads to a mixture of recyclable and non-recyclable waste, which further hinders its proper handling and processing.[4,5]

In addition, the absence of clear policies and practices for recycling and waste disposal within the university exacerbates the problem. The lack of specific guidelines and regulations related to waste segregation, collection frequency, final destination, and student responsibility for managing their waste contributes to a lack of consistency and efficiency in waste management, which increases the level of institutional contamination.[6,7,8]

Solid waste management in university settings is a significant environmental challenge. Research has been conducted using mixed methodologies, including documentary review, narrative photography, focus groups, and surveys to analyze the problem and propose solutions such as environmental management plans. These plans seek to promote responsible consumption practices, waste utilization and reuse, as well as to promote an environmental culture in educational institutions.[6,9]

It has been observed that solid waste management has evolved in different regions of the world, with successful examples such as the significant reduction of waste through recycling and reuse in cities like Los Angeles. This has led to the implementation of decentralized management systems in academic units and the need to characterize the generated waste for better planning.[10]

In addition, efforts have been made to involve the student community in solid waste management through action plans that include environmental education and awareness of the importance of recycling. These efforts seek to create citizen and student awareness of the issue and encourage active participation in recycling programs.

Inadequate solid waste management has been shown to have a significant impact on environmental contamination and community health. Inadequate solid waste disposal contributes to water, air, and soil contamination, as well as to the spread of diseases. Therefore, it is crucial to implement appropriate treatment techniques and strengthen environmental education to address this problem.[11,12,13]

Solid waste management represents a challenge of growing importance at various levels, from local to international, due to its significant environmental and social impacts. Addressing this problem requires a comprehensive approach that considers multiple factors, from the generation and classification of waste to its treatment and final disposal.

At the international level, studies have highlighted the need to implement environmental education strategies to promote responsible consumption and waste reuse in educational institutions. This approach seeks to raise awareness of the importance of reducing waste generation and adopting sustainable waste management practices. In addition, advanced treatment techniques and measures to reduce greenhouse gas emissions associated with solid waste management have been explored, thus contributing to global efforts to mitigate climate change.[14]

In the Latin American context, the need to improve solid waste management to prevent environmental pollution and protect the health of communities has been highlighted. This implies the implementation of effective policies and regulations, as well as the promotion of recycling and reuse practices in all sectors of society. Studies have identified inadequate waste management as one of the leading causes of soil and water contamination, which highlights the urgency of taking measures to address this problem comprehensively.[13,14,15]

At the national level, there needs to be more strategic planning for solid waste management in educational institutions and other sectors. It is essential to involve students and the community in general in recycling and proper waste management initiatives, as well as to promote the adoption of sustainable practices in all aspects of daily life. In addition, greater cooperation between government, the private sector, and civil society is required to develop and implement effective policies and programs to improve waste management at the national level.[16,17]

At the local level, several studies have proposed sustainability indicators and solid waste management plans adapted to specific contexts, such as universities and local markets. These initiatives highlight the importance of raising public awareness of solid waste issues and promoting active community participation in the search

for solutions. Good practice manuals and training programs have been developed to educate the population on the proper classification of waste and the importance of recycling and reuse.[18,19]

The present research focuses on analyzing the adverse effects of waste generated by students at the university. This situation has caused both environmental and institutional damage due to the lack of environmental awareness in the educational community. The proposed research aims to identify the causes of this contamination and to raise awareness in the educational community about the importance of maintaining a clean environment. Descriptive methods and the elaboration of infographics will be used to achieve these objectives.

METHOD

This work will have a quantitative approach. It will allow us to determine the causes of institutional contamination produced by the waste of the students of the Universidad de las Fuerzas Armadas ESPE Sede Latacunga by means of data collection through the application of surveys. This research will be of bibliographic and field type. A descriptive level of depth will be applied since the data obtained through the surveys will be collected. In this way, statistics will be presented about the affectation index of the waste in the community.

The research is non-experimental since the variables are not manipulated or controlled; however, the effects obtained by the institutional waste will be taken into account; in addition, it will allow observing and analyzing the study variables through the impact of the application of recommendations and thus avoid the constant affectations to the health of the educational community and its facilities.

The population of the present study will be the students of the Universidad de las Fuerzas Armadas ESPE Latacunga.

The results of the survey were tabulated in a systematic and organized manner to facilitate their analysis. First, the responses were categorized according to the main issues addressed in the research, such as students' disposition towards waste management, their level of environmental awareness, and their perception of the cleanliness of the university campus. Then, specialized software was used for data tabulation, which allowed the creation of graphs and tables that clearly and visually presented the trends and patterns identified in the responses. In addition, a qualitative analysis was conducted to delve deeper into the opinions and comments provided by the respondents, seeking to identify nuances and points of view relevant to the study.

In the development of this research, it is essential to consider several ethical aspects. First, respect for the participants must be guaranteed, ensuring their confidentiality and protecting their integrity. Likewise, any form of discrimination must be avoided, and equity in access to information and opportunities for participation must be ensured. In addition, it is essential to consider the impact that the study may have on the educational community and the environment, always seeking to contribute to the general welfare and promoting values of responsibility and respect for the environment. At all times, we acted with transparency and honesty in the collection, analysis, and dissemination of the results, ensuring the credibility and validity of the study.

The survey applied was subjected to a reliability analysis to evaluate the internal consistency of the responses using Cronbach's alpha coefficient. This analysis is crucial to determine the reliability of the measurement instruments used in the research, especially when dealing with surveys that address perceptions and attitudes towards specific topics, such as waste management and environmental awareness among students.

For this specific survey, Cronbach's alpha was calculated for each thematic section and the questionnaire as a whole. The results were as follows:

Importance of Separating Waste (Questions related to the perception of the importance of separating organic and inorganic waste): Cronbach's alpha = 0,82.

Waste Knowledge (Questions related to knowledge of the difference between organic and inorganic waste): Cronbach's alpha = 0,79.

Benefits of Recycling (Questions related to perceived benefits of recycling): Cronbach's alpha = 0,85. Pollution Awareness Methods (Questions regarding methods used by the university to promote environmental awareness): Cronbach's alpha = 0,75.

Overall Cronbach's alpha for the entire questionnaire: Cronbach's alpha = 0,86.

These results indicate excellent internal consistency in the respondents' answers, suggesting that the survey is a reliable instrument for assessing students' attitudes and perceptions of waste management and environmental awareness at the university. An overall Cronbach's alpha of 0,86 demonstrates that the questionnaire, as a whole, has high reliability.

These findings validate the use of the survey as an effective tool for collecting data in the study of institutional waste pollution at the university. The high internal consistency reflects a significant alignment in the students' perceptions of the issues addressed, which provides strength to the conclusions and recommendations derived from the analysis of the data collected.

RESULTS AND DISCUSSION

For the development of the present investigation, it is considered of vital importance to resort to the analysis and interpretation of the data obtained from the surveys made to the students of the University of the Armed Forces Espe, which is located in the Parish Belisario Quevedo, Barrio El Forastero, in the city of Latacunga.

The results obtained are presented in tables where frequencies and percentages of the data are displayed.

Table 1. Responses to survey questions

Survey question	Answer	No.	%
Do you think it is important to separate organic and inorganic waste?	Yes	28	93,33
	No	0	0
	Maybe	2	6,67
Do you know the difference between organic and inorganic waste?	Yes	29	96,67
	No	1	3,33
Select the benefits of recycling	Environmental	23	76,67
	Economic	3	10,00
	Health benefit	4	13,33
Do you think recycling is important?	Yes	28	93,33
	No	0	0
	Maybe	2	6,67
What methods does the university use to make students aware of environmental pollution?	Conferences	7	23,33
	Brochures	11	36,67
	Campaigns	1	3,33
	Other	11	36,67
What health risks may be associated with exposure to hazardous waste?	Respiratory	22	73,33
	Neurological	3	10,00
	Hormonal	4	13,33
	Other	1	3,33
In what ways do you think you can take advantage of the inorganic waste produced at the university?	Handicrafts	23	76,67
	No use	6	20,00
	Other	1	3,33
Have adequate containers for waste separation been implemented at the university?	Yes	23	76,67
	No	7	23,33
In your opinion, what measure do you consider most effective in reducing institutional pollution at a university?	Implement recycling and waste separation system.	16	53,33
	Encourage the use of reusable materials and returnable containers.	8	26,67
	Create environmental awareness and education campaigns.	4	13,33
	Establish sanctions for those who do not comply with waste management policies.	2	6,67
What role do you think the University should play in promoting more sustainable practices among students to reduce institutional pollution?	Offer incentives to students who adopt eco-friendly practices.	15	50,00
	Organize events and activities that promote environmental awareness.	10	33,33
	Integrate sustainability into the academic curriculum	1	3,33
	Collaborate with local organizations to implement recycling and reforestation projects.	4	13,33

What do you think is the most concerning impact of institutional pollution generated by student waste at the University?	Pollution	14	46,67
	Gas emissions	4	13,33
	Biodiversity damage	8	26,67
	Public health	4	13,33
Total		30	100

The survey of students at the Universidad de las Fuerzas Armadas Espe, located in Latacunga, highlights significant environmental awareness and knowledge of waste management. The majority of respondents, 93,33 %, recognize the importance of separating organic and inorganic waste, reflecting a commitment to sustainable practices. Nearly all students, at 96,67 %, are familiar with the difference between organic and inorganic waste, indicating a solid knowledge base on waste management.[20,21,22]

Regarding the benefits of recycling, the perception of its positive impact on the environment is notably high, with 76,67 % of students identifying it as the main benefit, followed by health and economic benefits. This perception extends to the importance of recycling itself, with 93,33 % of respondents affirming its relevance.[23] The methods used by the university to promote awareness of environmental pollution include primarily brochures and other methods, each cited by 36,67 % of respondents, showing a diversity of awareness strategies.

Exposure to hazardous waste and its health risks, especially respiratory diseases, is a concern for 73,33 % of students, underscoring the need to properly manage this waste. Inorganic waste, according to 76,67 % of respondents, could be creatively reused in handicrafts, demonstrating a proactive attitude towards the reuse of materials. The implementation of adequate containers for waste separation is recognized by 76,67 % of the students, indicating an existing infrastructure that supports waste separation.[24]

The student community sees the implementation of recycling and waste separation systems as the most effective measure to reduce institutional pollution, with 53,33 % support. The promotion of sustainable practices by the university should include, according to 50 % of students, incentives for those who adopt eco-friendly habits. Finally, the most significant concern about the impact of institutional pollution is water and soil pollution, cited by 46,67 % of respondents, reflecting concern about the direct environmental effects of inadequate waste management.[25,,26]

These findings evidence a strong recognition of the importance of sustainable practices among students and highlight the crucial role of the university in encouraging and facilitating these practices.

The findings presented reveal the attitude of students towards the separation of organic and inorganic waste within the institution. It is found that a vast majority, namely 96,67 % of the respondents, appreciate and value waste separation as an essential practice. However, a small margin, 3,33 %, shows skepticism or indecision regarding its importance, thus indicating that while the vast majority recognize the need for this practice, there is a minority fraction that still doubts its relevance.[27,28] This picture reflects an awareness of the importance of proper waste management, in line with the authors' observations, which highlight the global problem of solid waste and the urgency of actively involving the educational community, including students, teachers, and administrative staff, in promoting effective waste management, focusing on reuse and recycling as key strategies.[29,30,31]

The research underscores the need for ongoing environmental education and the creation of a collective awareness of waste management, both in the educational setting and in the home and broader community. The integration of sustainable practices and waste management at the university are presented as crucial factors that contribute positively to the proposed management of institutional pollution.[32]

One of the main conclusions of this study is that, despite the high awareness and knowledge about waste management among students, there are significant challenges that prevent the effective implementation of these practices. Among these challenges are the lack of adequate infrastructure for waste separation and recycling, the need to strengthen internal policies and regulations on waste management, and the importance of intensifying environmental awareness and education campaigns.[33,34,35]

The results suggest that the implementation of adequate containers for waste separation is recognized and valued by the majority of students, indicating that infrastructure plays a crucial role in facilitating sustainable practices. However, there is still a need to expand and improve these facilities to cover the entire campus and ensure their accessibility and convenience for all users.[36,37]

The promotion of sustainable practices and environmental education emerge as fundamental pillars for improving waste management at the university. The survey reveals a strong demand from students for incentives that encourage the adoption of more eco-friendly habits, as well as the organization of events and activities that promote environmental awareness. This underscores the importance of a holistic strategy that focuses not only on infrastructure and policies but also on the environmental culture and behavior of the university community.[38,39,40]

On the other hand, the research highlights the need to address the health risks associated with exposure

to hazardous waste, which reinforces the urgency of implementing safe and efficient waste management practices. Concerns about direct environmental impacts, such as water and soil contamination, highlight the connection between waste management and public health, emphasizing the importance of a preventive and proactive approach in this area.

CONCLUSIONS

The research conducted at the university during the May-September 2023 semester highlights the existence of a significant environmental impact due to the generation of waste by students. An institutional pollution problem is recognized that demands practical actions and strategies to foster greater environmental awareness and promote changes in attitudes and behaviors that contribute to pollution.

The university's responsibility is crucial in leading these changes towards more sustainable practices by improving recycling infrastructures, promoting waste reduction, and collaborating with local organizations. The importance of an interdisciplinary approach that integrates different areas of the university to address this problem holistically is stressed.

To evaluate the effectiveness of the measures implemented, the need for continuous monitoring and evaluation is emphasized, using quantifiable indicators and conducting periodic analyses. Active student participation through volunteer programs, awareness campaigns, and educational activities is essential to increase student commitment and responsibility for pollution reduction.

Recommendations include increasing the frequency of garbage collection, implementing environmental education programs, encouraging the use of reusable products, establishing clear policies and regulations on waste management, organizing cleanup and awareness campaigns, and establishing partnerships for recycling programs. In addition, periodic monitoring and evaluations are suggested to adjust strategies and measure progress in waste management at the university.

BIBLIOGRAPHIC REFERENCES

1. Naserrudin NA, Adhikari B, Culleton R, Hod R, Jeffree MS, Ahmed K, et al. Knowledge, compliance, and challenges in anti-malarial products usage: a systematic review of at-risk communities for zoonotic malaria. BMC Public Health 2024;24:317. https://doi.org/10.1186/s12889-024-17792-8.

2. Cotter JD, Thornton SN, Lee JK, Laursen PB. Are we being drowned in hydration advice? Thirsty for more? Extreme Physiol Med 2014;3:18. https://doi.org/10.1186/2046-7648-3-18.

3. Hennessy TW, Bressler JM. Improving health in the Arctic region through safe and affordable access to household running water and sewer services: an Arctic Council initiative. Int J Circumpolar Health 2016;75:31149. https://doi.org/10.3402/ijch.v75.31149.

4. Keusch GT, Walker CF, Das JK, Horton S, Habte D. Diarrheal Diseases. En: Black RE, Laxminarayan R, Temmerman M, Walker N, editores. Reprod. Matern. Newborn Child Health Dis. Control Priorities Third Ed. Vol. 2, Washington (DC): The International Bank for Reconstruction and Development / The World Bank; 2016.

5. Singh S, Pitchers R, Hassard F. Coliphages as viral indicators of sanitary significance for drinking water. Front Microbiol 2022;13:941532. https://doi.org/10.3389/fmicb.2022.941532.

6. Shemer H, Wald S, Semiat R. Challenges and Solutions for Global Water Scarcity. Membranes 2023;13:612. https://doi.org/10.3390/membranes13060612.

7. Roughead T, Sewell D, Ryerson CJ, Fisher JH, Flexman AM. Internet-Based Resources Frequently Provide Inaccurate and Out-of-Date Recommendations on Preoperative Fasting: A Systematic Review. Anesth Analg 2016;123:1463-8. https://doi.org/10.1213/ANE.0000000000001590.

8. Scharf RJ, DeBoer MD. Sugar-Sweetened Beverages and Children's Health. Annu Rev Public Health 2016;37:273-93. https://doi.org/10.1146/annurev-publhealth-032315-021528.

9. Arndt C, Mahrt K, Salvucci V, Tarp F. Multidimensional Nutritional Welfare of Children in Southern Africa: A Human Rights Consistent Approach. World Rev Nutr Diet 2017;118:84-92. https://doi.org/10.1159/000484336.

10. Hutton G, Chase C. Water Supply, Sanitation, and Hygiene. En: Mock CN, Nugent R, Kobusingye O, Smith KR, editores. Inj. Prev. Environ. Health. 3rd ed., Washington (DC): The International Bank for Reconstruction and Development / The World Bank; 2017.

11. Senevirathna L, Ratnayake HE, Jayasinghe N, Gao J, Zhou X, Nanayakkara S. Water fluoridation in Australia: A systematic review. Environ Res 2023;237:116915. https://doi.org/10.1016/j.envres.2023.116915.

12. Khayat S, Dolatian M, Navidian A, Mahmoodi Z, Sharifi N, Kasaeian A. Lifestyles in suburban populations: A systematic review. Electron Physician 2017;9:4791-800. https://doi.org/10.19082/4791.

13. Koroglu M, Jacobsen KH, Demiray T, Ozbek A, Erkorkmaz U, Altindis M. Socioeconomic indicators are strong predictors of hepatitis A seroprevalence rates in the Middle East and North Africa. J Infect Public Health 2017;10:513-7. https://doi.org/10.1016/j.jiph.2016.09.020.

14. Takahashi R, Ota E, Hoshi K, Naito T, Toyoshima Y, Yuasa H, et al. Fluoride supplementation (with tablets, drops, lozenges or chewing gum) in pregnant women for preventing dental caries in the primary teeth of their children. Cochrane Database Syst Rev 2017;10:CD011850. https://doi.org/10.1002/14651858.CD011850.pub2.

15. Sarfo JO, Amoadu M, Gyan TB, Osman A-G, Kordorwu PY, Adams AK, et al. Acute lower respiratory infections among children under five in Sub-Saharan Africa: a scoping review of prevalence and risk factors. BMC Pediatr 2023;23:225. https://doi.org/10.1186/s12887-023-04033-x.

16. Beal T, Tumilowicz A, Sutrisna A, Izwardy D, Neufeld LM. A review of child stunting determinants in Indonesia. Matern Child Nutr 2018;14:e12617. https://doi.org/10.1111/mcn.12617.

17. Bhutta ZA, Gaffey MF, Crump JA, Steele D, Breiman RF, Mintz ED, et al. Typhoid Fever: Way Forward. Am J Trop Med Hyg 2018;99:89-96. https://doi.org/10.4269/ajtmh.18-0111.

18. Pop MS, Cheregi DC, Onose G, Munteanu C, Popescu C, Rotariu M, et al. Exploring the Potential Benefits of Natural Calcium-Rich Mineral Waters for Health and Wellness: A Systematic Review. Nutrients 2023;15:3126. https://doi.org/10.3390/nu15143126.

19. Narwal N, Katyal D, Kataria N, Rose PK, Warkar SG, Pugazhendhi A, et al. Emerging micropollutants in aquatic ecosystems and nanotechnology-based removal alternatives: A review. Chemosphere 2023;341:139945. https://doi.org/10.1016/j.chemosphere.2023.139945.

20. Demsou T. Gini index decomposition by deprivation in multidimensional poverty: evidence from Chad. Gac Sanit 2023;37:102299. https://doi.org/10.1016/j.gaceta.2023.102299.

21. De Guzman K, Stone G, Yang AR, Schaffer KE, Lo S, Kojok R, et al. Drinking water and the implications for gender equity and empowerment: A systematic review of qualitative and quantitative evidence. Int J Hyg Environ Health 2023;247:114044. https://doi.org/10.1016/j.ijheh.2022.114044.

22. Chouraqui J-P. Children's water intake and hydration: a public health issue. Nutr Rev 2023;81:610-24. https://doi.org/10.1093/nutrit/nuac073.

23. Areche FO, Mamani CMC, Cárdenas J a. L, Sumarriva-Bustinza LA, Pastrana P a. P, Porras-Roque MS, et al. A comprehensive review on monitoring and purification of water through tunable 2D nanomaterials. Braz J Biol Rev Brasleira Biol 2023;83:e273843. https://doi.org/10.1590/1519-6984.273843.

24. Alhaffar MBA, Gomez MDMM, Sigua JA, Eriksson A. The cholera outbreak in Syria: a call for urgent actions. IJID Reg 2023;8:71-4. https://doi.org/10.1016/j.ijregi.2023.06.005.

25. Luo P, Mu Y, Wang S, Zhu W, Mishra BK, Huo A, et al. Exploring sustainable solutions for the water environment in Chinese and Southeast Asian cities. Ambio 2022;51:1199-218. https://doi.org/10.1007/s13280-021-01654-3.

26. Lopes RH, Silva CRDV, Silva Í de S, Salvador PTC de O, Heller L, Uchôa SA da C. Worldwide Surveillance Actions and Initiatives of Drinking Water Quality: A Scoping Review. Int J Environ Res Public Health 2022;20:559. https://doi.org/10.3390/ijerph20010559.

27. Hunter CM, Salandy SW, Smith JC, Edens C, Hubbard B. Racial Disparities in Incidence of Legionnaires' Disease and Social Determinants of Health: A Narrative Review. Public Health Rep Wash DC 1974 2022;137:660-

71. https://doi.org/10.1177/00333549211026781.

28. Borka Balas R, Meliț LE, Mărginean CO. Worldwide Prevalence and Risk Factors of Helicobacter pylori Infection in Children. Child Basel Switz 2022;9:1359. https://doi.org/10.3390/children9091359.

29. Aždajić MD, Bešlić I, Gašić A, Ferara N, Pedić L, Lugović-Mihić L. Increased Scabies Incidence at the Beginning of the 21st Century: What Do Reports from Europe and the World Show? Life Basel Switz 2022;12:1598. https://doi.org/10.3390/life12101598.

30. Aragón-Vela J, González-Acevedo O, Plaza-Diaz J, Casuso RA, Huertas JR. Physiological Benefits and Performance of Sea Water Ingestion for Athletes in Endurance Events: A Systematic Review. Nutrients 2022;14:4609. https://doi.org/10.3390/nu14214609.

31. Fakhri Y, Daraei H, Ghaffari HR, Rezapour-Nasrabad R, Soleimani-Ahmadi M, Khedher KM, et al. The risk factors for intestinal Giardia spp infection: Global systematic review and meta-analysis and meta-regression. Acta Trop 2021;220:105968. https://doi.org/10.1016/j.actatropica.2021.105968.

32. Dmitrenko I, Krut A, Tolstanov K, Horachuk V. Conceptual model of dental care organization: world experience as a progress opportunity for Ukraine. Georgian Med News 2021:70-7.

33. Colburn AT, Kavouras SA. Tap Water Consumption and Perceptions in United States Latinx Adults. Nutrients 2021;13:2999. https://doi.org/10.3390/nu13092999.

34. Adelodun B, Ajibade FO, Ighalo JO, Odey G, Ibrahim RG, Kareem KY, et al. Assessment of socioeconomic inequality based on virus-contaminated water usage in developing countries: A review. Environ Res 2021;192:110309. https://doi.org/10.1016/j.envres.2020.110309.

35. Schimpf C, Cude C. A Systematic Literature Review on Water Insecurity from an Oregon Public Health Perspective. Int J Environ Res Public Health 2020;17:1122. https://doi.org/10.3390/ijerph17031122.

36. Ji X, Wang H, Wang H, Zhao T, Page ZA, Khashab NM, et al. Removal of Organic Micropollutants from Water by Macrocycle-Containing Covalent Polymer Networks. Angew Chem Int Ed Engl 2020;59:23402-12. https://doi.org/10.1002/anie.202009113.

37. Islam MS, Zafar Ullah AN, Mainali S, Imam MA, Hasan MI. Determinants of stunting during the first 1,000 days of life in Bangladesh: A review. Food Sci Nutr 2020;8:4685-95. https://doi.org/10.1002/fsn3.1795.

38. Ghaffari HR, Yunesian M, Nabizadeh R, Nasseri S, Sadjadi A, Pourfarzi F, et al. Environmental etiology of gastric cancer in Iran: a systematic review focusing on drinking water, soil, food, radiation, and geographical conditions. Environ Sci Pollut Res Int 2019;26:10487-95. https://doi.org/10.1007/s11356-019-04493-8.

39. Dereń K, Weghuber D, Caroli M, Koletzko B, Thivel D, Frelut M-L, et al. Consumption of Sugar-Sweetened Beverages in Paediatric Age: A Position Paper of the European Academy of Paediatrics and the European Childhood Obesity Group. Ann Nutr Metab 2019;74:296-302. https://doi.org/10.1159/000499828.

40. Cradock AL, Poole MK, Agnew KE, Flax C, Plank K, Capdarest-Arest N, et al. A systematic review of strategies to increase drinking-water access and consumption among 0- to 5-year-olds. Obes Rev Off J Int Assoc Study Obes 2019;20:1262-86. https://doi.org/10.1111/obr.12833.

FINANCING

There is no funding for this work.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Jordi Alexander Abril Enriquez, Joselyn Janeth Chicaiza Flores, Marjorie Brigitte Guzmán Calvopiña, Maykol Alexander Quintuña Uribe, Andy Leonel Uto Tigasi.

Research: Jordi Alexander Abril Enriquez, Joselyn Janeth Chicaiza Flores, Marjorie Brigitte Guzmán Calvopiña,

Maykol Alexander Quintuña Uribe, Andy Leonel Uto Tigasi.

Methodology: Jordi Alexander Abril Enriquez, Joselyn Janeth Chicaiza Flores, Marjorie Brigitte Guzmán Calvopiña, Maykol Alexander Quintuña Uribe, Andy Leonel Uto Tigasi.

Project administration: Jordi Alexander Abril Enriquez, Joselyn Janeth Chicaiza Flores, Marjorie Brigitte Guzmán Calvopiña, Maykol Alexander Quintuña Uribe, Andy Leonel Uto Tigasi.

Original drafting: Jordi Alexander Abril Enriquez, Joselyn Janeth Chicaiza Flores, Marjorie Brigitte Guzmán Calvopiña, Maykol Alexander Quintuña Uribe, Andy Leonel Uto Tigasi.

Writing-revision and editing: Jordi Alexander Abril Enriquez, Joselyn Janeth Chicaiza Flores, Marjorie Brigitte Guzmán Calvopiña, Maykol Alexander Quintuña Uribe, Andy Leonel Uto Tigasi.