

Impact of Health Education and Awareness on Access to Drinking Water in the Urpaypampa Community, Ayacucho

Impacto de la educación sanitaria y la concientización en el acceso al agua potable en la comunidad de Urpaypampa, Ayacucho

 Juan Ramos López^{1,*},  Freddy Mamerto León Nina¹,  Katherin Leonor Gavilan Bellido¹ &  Juan Teófilo Cáceres Curo¹

Abstract

The study examines the relationship between health education and access to drinking water in Urpaypampa, Ayacucho, considering economic, educational, social, and cultural factors that influence its availability and quality. Furthermore, it analyses the role of social work in raising awareness and managing water resources, recognising water as a fundamental human right and assessing its impact on public health. The hypothesis suggests that health education improves the quality of drinking water and community hygiene practices, although sociocultural and economic barriers may limit its effectiveness. The research adopts a mixed-methods approach and a descriptive-explanatory design, employing surveys with 25 household heads, semi-structured interviews, and participant observation, complemented by statistical analysis. The findings indicate that health education contributes to improving water quality and promoting hygiene practices, although resistance to chlorination and low participation in educational campaigns persist. The study concludes that it is necessary to strengthen awareness-raising strategies, improve water infrastructure, and adopt an intercultural approach to ensure the sustainable management of drinking water in the community.

Keywords: health education, public health, drinking water, rural community.

Resumen

El estudio examina la relación entre la educación sanitaria y el acceso al agua potable en Urpaypampa, Ayacucho, considerando factores económicos, educativos, sociales y culturales que influyen en su disponibilidad y calidad. Asimismo, se analiza el papel del trabajo social en la sensibilización y gestión de los recursos hídricos, bajo el reconocimiento del agua como un derecho humano esencial y su impacto en la salud pública. Se plantea como hipótesis que la educación sanitaria mejora la calidad del agua potable y las prácticas de higiene comunitaria, aunque barreras socioculturales y económicas pueden limitar su efectividad. La investigación adopta un enfoque mixto y un diseño descriptivo-explicativo, aplicando encuestas a 25 jefes de hogar, entrevistas semiestructuradas y observación participante, complementadas con análisis estadísticos. Los hallazgos indican que la educación sanitaria favorece la mejora de la calidad del agua y promueve hábitos de higiene, aunque persisten resistencias a la cloración y baja participación en campañas educativas. Se concluye que es necesario fortalecer las estrategias de sensibilización, mejorar la infraestructura hídrica y adoptar un enfoque intercultural para garantizar una gestión sostenible del agua potable en la comunidad.

Palabras clave: educación sanitaria, salud pública, agua potable, comunidad rural.

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***Corresponding author:** juan.ramos.10@unsch.edu.pe

Introduction

Access to drinking water and its quality is a critical public health issue, particularly in rural areas, where deficiencies are linked to diseases such as acute diarrhoeal diseases (ADD). In Latin America, approximately 7,600 children under the age of five die annually from these illnesses, often associated with malnutrition and inadequate sanitation. According to the WHO, ensuring access to safe drinking water and sanitation services is essential for human development, as it positively impacts education, nutrition, and health (Rosas, 2011). Therefore, each country must establish clear strategies and policies to improve the quality of these services.

In this context, the Ministry of Housing, Construction and Sanitation (MVCS) has developed a Training and Environmental Health Education Plan for rural communities, aiming to reduce child

mortality caused by diarrhoeal diseases. However, in the community of Urpaypampa, in the district of Vinchos, access to drinking water remains inadequate, as residents consume water from natural sources without proper treatment. This situation reflects a structural problem in water and sanitation infrastructure, limiting access to safe and high-quality water.

¹Universidad Nacional San Cristóbal de Huamanga, Ayacucho, Perú

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The chosen population was 150 inhabitants with 32 homes in the Town Center. The type of sampling was census type and for convenience, precisely all homes and the population. 25 homes with 25 heads of family have been taken to apply the survey and interview instruments in each home of the drinking water service in the Populated Center of Urpaypampa de Vinchos.

The community of Urpaypampa consumes poor quality drinking water without chlorine, this is due to the problems of drinking water networks with obsolete infrastructure. Communities consume raw water collected from all water sources, consuming water without chlorination that affects health through a traditional use system; This problem has been detected in the resistance to change from traditional consumption to modern consumption in the management system with the components of quality drinking water for use, with the respective chlorination of the water.

Social work plays a key role in raising awareness and providing health education, promoting changes in water consumption and usage habits, as well as in implementing strategies to improve service provision. This study aims to analyse the issue of access to drinking water in Urpaypampa, identifying existing inequalities and the factors influencing service quality. Additionally, it will examine the role of social workers as mediators between the MVCS, local government, and the community to establish an efficient water supply system. The ultimate goal is to improve the quality of life of rural families by reducing waterborne diseases and fostering appropriate hygiene and sanitation conditions.

Rural communities face a crisis in access to drinking water due to a lack of investment in infrastructure and inadequate state and municipal management, increasing the risk of diseases such as diarrhoea, cholera, and typhoid fever (Guzmán et al., 2016). Globally, one-third of the population lacks safe drinking water access, and by 2030, a 40% deficit is projected (Villareal et al., 2021). In Peru, 23.7% of the rural population does not have access to a public water network, while 30.1% consumes untreated water without chlorination (Instituto Nacional de Estadística e Informática, 2020), exacerbating the incidence of acute diarrhoeal diseases (ADD), which are primarily transmitted through the faecal-oral route (Goyes et al., 2022). The WHO highlights that access to drinking water is essential for human development, as it impacts education, nutrition, and health (Rosas, 2011). Despite being recognised as a fundamental human right in the Sustainable Development Goals (Cruz & Centeno, 2020), monetary poverty in Ayacucho reaches 39.4%, further limiting access to basic services (ComexPerú, 2024). This situation demands efficient public policies to ensure drinking water supply and proper sanitation in the most vulnerable rural areas.

In the district of Vinchos, only 45.5% of households have access to drinking water, while 37% lack access to

treated water, affecting child health through diseases such as ADD and acute respiratory infections (MVCS, 2022). In Urpaypampa, outdated infrastructure and resistance to consuming chlorinated water worsen the issue, necessitating health education and awareness strategies. This mixed-methods research employs household visits to assess water service quality and its impact. Social work plays a crucial role in reducing disparities, optimising water management, and improving the quality of life for vulnerable populations.

The reviewed studies concurred that access to and quality of drinking water services are influenced by various economic, social, cultural, technical, and management factors. García (2022) highlighted the positive impact of these factors on service effectiveness, while Jara (2019) identified sustainability risks due to structural and administrative issues. De la Rosa (2023) and Sanginéz (2017) emphasised the role of cultural habits and health education in the proper use of water, noting that a lack of knowledge contributed to diarrhoeal diseases. Gaspar & Martínez (2022) analysed the impact of poor public management and social conflicts on water supply, demonstrating that inadequate planning and implementation affected the fundamental right to water.

Meanwhile, Vargas & Isuiza (2021) and Chalco (2020) explored technical solutions and the need to improve infrastructure to ensure adequate supply. Collectively, these studies reflected that access to drinking water is not merely a technical issue but also a social, economic, and governance challenge requiring a comprehensive approach. Health and environmental education are crucial for the responsible use of drinking water and the prevention of diseases in vulnerable communities (Pachana & Sánchez, 2024). Despite being a human right, equitable access remains a challenge in Latin America, primarily affecting rural and Indigenous populations (Lema et al., 2023). Poor water management, insufficient infrastructure, and climate change exacerbate the problem (Moreno, 2022). Diarrhoeal diseases and respiratory infections linked to contaminated water consumption continue to be leading causes of child mortality (Madero et al., 2023).

In the community of Urpaypampa, irregular chlorination and a lack of sanitation have increased cases of diarrhoeal diseases (Ministerio de Salud, 2023). Incorporating intercultural approaches and strengthening community water management are essential strategies for ensuring water security and justice (Escate, 2022; Aldama et al., 2023). Continuous improvement and effective public policies are indispensable to guaranteeing the universal right to drinking water. Mora-Alvarado et al. (2022) provide evidence of how health education reduces disease incidence, while Páramo-Aguilera & Rivas-Pérez (2019) and Albarrán & Molina (2022) link water contamination to high morbidity rates. Reyes et al. (2022) and Cadme et al. (2021) warn about the presence of

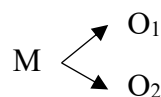
contaminants in water sources, affecting their potability. Moraga et al. (2022), García (2022), and Romero (2021) identify failures in water system management, compromising sustainability. Hoyos & Mejía (2021) question the commodification of water, while Concha (2022) underscores the role of the state in democratising health. Gutierrez-Moreno (2020) highlights how the pandemic exacerbated educational inequalities, which relate to a lack of access to basic services. Briceño-León (1996) stresses that health education should be participatory, a key factor in enhancing community resilience and ensuring the right to water.

The central objective is to examine how health education influences drinking water services, considering three fundamental factors: the economic aspect's effect on water access, the connection between educational level and service quality, and the influence of social and cultural factors on its availability and use.

Methodology

This research adopts a mixed-methods approach, combining quantitative and qualitative methods to analyse the relationship between health education and access to drinking water in the rural settlement of Urpaypampa, Vinchos district. Following Ruiz et al. (2013), the quantitative method aims for precision in measuring social indicators, while the qualitative method interprets social reality and the phenomena that occur. According to Hernández et al. (2014), this study is descriptive in nature, as it allows for the specification of population characteristics and profiles to measure, analyse, and interpret data within its context. Additionally, the descriptive-explanatory design seeks not only to characterise socio-environmental phenomena but also to establish cause-and-effect relationships (Hernández et al., 2014).

In this regard, the research employs both census-based and convenience sampling, considering 25 households and their respective heads of family for data collection through surveys and interviews. Moreover, a correlational approach is applied to assess the relationship between health education and access to drinking water (Hernández et al., 2014). Consequently, this study not only describes the conditions of the drinking water service in Urpaypampa but also analyses its impact on the community and its relationship with the level of health education, providing a comprehensive understanding of the phenomenon (Sánchez, 2019, p. 109).



The research, adopting a mixed-methods approach with a descriptive-explanatory design, analyses the relationship between health education (O1) and access to drinking water (O2) in Urpaypampa. A census-based and convenience sampling method (M) was applied to 25 household heads (Hernández, 2014). Arias (2020) highlights that surveys allow for the collection of information on perceptions and behaviours through pre-established questions, while Martín (2004) notes that questionnaires standardise data collection for quantification.

For validation, techniques such as literature review, interviews, and observation were employed, along with instruments including tracking sheets and sampling kits. According to Solorzano (2022), methodological triangulation is essential for cross-checking results and strengthening the reliability of findings. This approach enabled an assessment of the dimensions of contamination, economy, society, and health in relation to access to and quality of drinking water. Data were processed using SPSS and Excel, applying descriptive and inferential statistics, including normality and correlation tests to determine associations between variables (Hernández, 2014). Thus, the study provides a comprehensive analysis of the factors influencing access to drinking water in the community.

The estimators of health education and access to the drinking water service provided in the Urpaypampa Population Center, through the data obtained in 2023 through a survey guide that contains 19 questions with a quantitative perspective and an interview guide with 14 questions with a qualitative perspective, which collect information on health education with its dimensions: pollution, economy, social aspect and health, as well as access and quality of drinking water with its dimensions: quality and physical, chemical and standard. water microbiology, access to water for human consumption, clean, safe and healthy water to close gaps in the provision and quality of service. The coded data from the two sources were processed by combining SPSS and Excel software to take advantage of the benefits of each program.

The results present two parts, the first part presents aspects of the descriptive statistics of the two data collection instruments and the second part exposes the estimates of the inferential statistics in what corresponds to the hypothesis contrast.

The design of the survey guide due to its structure requires determining its reliability, while the interview guide due to its nature of containing open response questions requires an analysis of the responses to group them into categories or modalities that describe characteristics of the study variables, the details are set out below.

Tabla 1

Confiabilidad Alfa de Cronbach y Omega de McDonald de la guía de encuesta denominada “Educación sanitaria y acceso al agua potable en el centro poblado de Urpaypampa, Vinchos, Ayacucho, 2023”

	Media	DE	α de Cronbach	ω de McDonald
Escala	2.26	0.427	0.751	0.769

Nota. Datos de la guía de encuesta procesados en Jamovi

Table presents Cronbach's Alpha of 0.751 and McDonald's Omega of 0.769. Both statistics present the reliability of the survey guide that assesses the responses of the interviewees using a Likert scale. Due to the magnitude of the coefficients, it is determined that the survey guide is reliable, that it has internal consistency through the scores of each question with respect to the total score obtained by the interviewee in the survey guide and collects reliable information on the study variables.

The table shows that the average score of the dimensions of the same study variables, which vary by the number of questions they group, also provides an idea of their dispersion, for example, the economic factor groups 4 questions from the survey guide rated on a Likert scale from 1 to 5, whose score in the worst and best cases ranges from a minimum score of 4 points to the maximum score of 20 points, but according to the sample

data the scores range from 7 to 14 points, whose average score is 8.8 points with a positive asymmetry of 1.335, which indicates that the majority of the interviewees' scores are concentrated for small values of the Likert scale, that is, if we place the Likert scale on the number line, the largest number of scores of the economic factor are to the left of 3, because 4 questions times 3 points of the scale, is equal to 12 points that covers most of the range of said dimension. The other variables in the table have positive asymmetry, which indicates that the scores of these dimensions are concentrated at small values on the Likert scale, except for Drinking water service and Access and quality of drinking water, which have negative asymmetry, which indicates that the scores are slightly concentrated to the right of 3 on the Likert scale.

Sample Randomity Test

Formulation of hypotheses

H0: The sample of health education scores is random.

H1: The sample of health education scores is not random.

Significance level

The probability of rejecting the null hypothesis being true is assumed to be $\alpha = 0.05$.

Contrast statistic

Table 2

Runs test contrast statistics for the dimensions of health education and access to and quality of drinking water in the Urpaypampa community

Variables	Test value	Cases < test value	Cases $\geq$ test value	Total cases	Number of runs	Z	p-value (two-tailed)
Health education	26	11	14	25	17	1,319	,187
Access to and quality of drinking water	17	11	14	25	16	,904	,366
Economic factor	8	6	19	25	11	,216	,829
Social factor	6	11	14	25	15	,490	,624
Educational factor	12	12	13	25	16	,827	,408
Cultural factor	20	11	14	25	17	1,319	,187
Pollution	7	9	16	25	12	-,009	,993
Health	5	11	14	25	17	1,319	,187

Note: Survey guide tabulated in SPSS.

Decision

The decision rules

If the $p\text{-value} < \alpha = 0.05$, the null hypothesis H0 is rejected.

If the $p\text{-value} > \alpha = 0.05$, the null hypothesis H0 is accepted.

The Streak test $Z = 1.319$ has a value $p = 0.187 > \alpha = 0.05$, therefore, the sample provides sufficient information not to reject the null hypothesis, therefore, we can infer with 95% confidence that the health education scores correspond to a random sample.

Applying the randomness test to the other variables: Access and quality of drinking water, economic factor, social factor, educational factor, cultural factor, pollution and health, it is enough to apply the decision rule to the last column of table 37 which allows us to identify that for all the variables mentioned the Value $p > \alpha = 0.05$, therefore, it is inferred that the sample provides sufficient information with 95% confidence not to reject the null hypothesis that postulates in each case that the access and quality scores of drinking water, economic factor, social factor, educational factor and pollution, correspond to a random sample.

From the estimated contrast statistics, it is determined that the evaluated study variables comply with the randomness assumption of parametric statistics.

Normality Test

Formulation of hypotheses

H0: Health education scores behave like a normal distribution.

H1: Health education scores behave like a normal distribution.

Significance level

The probability of rejecting the null hypothesis being true is assumed to be $\alpha = 0.05$.

Results

Influence of Health Education on Access to Drinking Water in Urpaypampa, Vinchos

This section of the study presents the estimators related to health education and access to drinking water services in the rural settlement of Urpaypampa, based on data collected during 2023. A quantitative survey comprising 19 questions and a qualitative interview with 14 questions were used for this purpose. The survey gathers information on health education, covering the dimensions of contamination, economy, social aspects, and health. Meanwhile, the interview focuses on access to and quality of drinking water, assessing the physical, chemical, and microbiological quality dimensions, as well as access to safe water for human consumption. The collected data were processed using SPSS and Excel to maximise analytical capabilities.

Table 3

Cronbach's Alpha and McDonald's Omega Reliability of the Survey Guide Titled "Health Education and Access to Drinking Water in the Rural Settlement of Urpaypampa, Vinchos, Ayacucho, 2023"

	Mean	SD	Cronbach's Alpha (α)	McDonald's Omega (ω)
Scale	2.26	0.427	0.751	0.769

Note: Data from the survey guide processed in Jamovi

In Table 3, Cronbach's Alpha reaches a value of 0.751, while McDonald's Omega is 0.769, indicating a high reliability of the survey guide used to measure respondents' answers through a Likert scale. These coefficients suggest that the guide possesses internal consistency, as the scores for each question correlate appropriately with the total score obtained, ensuring the reliability of the information collected concerning the study variables. Regarding the assessment of drinking water quality, 52% (13) of household heads consider water impurities to be moderate, while 48% (12) rate them as poor (36%) or very poor (12%). These results indicate

that, on certain days, the drinking water consumed in Urpaypampa contains impurities, justifying the evaluations of moderate, poor, or very poor.

Findings reveal that most respondents have limited knowledge about identifying impurities in drinking water, with 52% rating them as poor or very poor, while only 48% consider them moderate or good. Additionally, participation in awareness campaigns to improve drinking water quality is low, with 60% of respondents rating it as poor or very poor, and only 40% considering it moderate. Finally, 68% of interviewees negatively assess the situation of families in Urpaypampa without access to drinking water, highlighting the lack of adequate facilities in some households in the area.

The results show that 44% of respondents rate the coverage of water and sewage installations in Urpaypampa as moderate, while another 44% consider it poor or very poor. This perception contrasts with the 12% who evaluate it as good or excellent. Although some families have access to drinking water, the lack of a sewage system leads to the perception that the service is insufficient. Furthermore, 60% of respondents consider the exclusion of poor families from access to drinking water as poor or very poor, while 40% see it as a circumstantial issue. This reflects respondents' solidarity with families unable to afford service installation. Regarding water cost policies, 52% of interviewees rate them as very poor or poor, as they do not align with some families' financial capacity, while 48% consider them appropriate. Lastly, 56% of those surveyed support solidarity assistance for poor families to ensure their access to drinking water, although 40% view it as poor or very poor. This demonstrates strong support for solidarity with families in need.

68% of respondents rate the participation of public institutions in organising campaigns on good water consumption and sanitation practices as very poor or poor, while only 28% consider it moderate, and 4% rate it as good. This suggests that most people perceive institutional efforts negatively, possibly due to low attendance at campaigns or because the messages are not applied in practice. Regarding family involvement in obtaining water and sanitation services, 92% of respondents believe that their engagement is minimal, which could be due to a lack of knowledge or the perception that these services are beyond their reach.

With respect to diarrhoeal diseases in children and the elderly caused by consuming contaminated water, 68% of interviewees rate the situation as very poor or poor, while 32% consider it moderate, possibly due to a lack of awareness about water contamination or how to treat it. Finally, regarding knowledge of hygiene in food preparation, 40% of respondents consider it moderate, 36% rate it as poor or very poor, and 24% see it as good, indicating that most have limited knowledge, although some apply good hygiene practices in food preparation.

A total of 68% of respondents rate the consumption of non-chlorinated or contaminated water negatively, considering it harmful due to inadequate treatment and a lack of awareness of the need for chlorination. Additionally, 64% believe that the chlorination process is harmful to health, while 20% see it as moderate and 16% as adequate, recognising chlorine as a disinfectant. Regarding household water supply, 72% rate it as poor or very poor, as it does not ensure good quality, potentially causing health issues for consumers. Similarly, 56% of participants state that they are unfamiliar with the potable water installation system or do not recognise access to water as a human right. On the other hand, 40% consider the safety and potability of water acceptable, while 32% evaluate it negatively.

Regarding service quality, 52% rate it unfavourably, indicating that it does not meet established standards. Finally, concerning the relationship between access to drinking water and extreme poverty, 48% classify the situation as very poor or poor, while 36% consider it moderate. This suggests that, although access to drinking water has improved, it has not fully resolved poverty within the community.

52% of respondents express concern about water quality in Urpaypampa, as many cannot identify impurities visually but are aware that the water is contaminated or contains bacteria. Meanwhile, 48% report that the water sometimes contains visible residues such as grass, parasites, and animal remains, suggesting that the reservoir is not well protected. Regarding access to drinking water, 44% mention that, although most have household connections, some families cannot afford them, while others rely on irrigation canal water.

Concerning chlorination, 44% of respondents state that it is not carried out properly due to a lack of resources, and others indicate that local authorities discourage the use of chlorine or do not apply it consistently, reflecting poor water service management. 40% of respondents maintain that access to drinking water has not resolved extreme poverty in the community, as the lack of sewage and other basic services continues to keep families in poverty. A further 28% agree that, although there has been improvement, fundamental needs such as sanitation, toilets, electricity, and other essential services remain unmet. 24% believe that having drinking water at home does not solve extreme poverty, as the community remains impoverished and needs support in sectors such as agriculture and livestock farming. Finally, 8% state that, although having drinking water is an improvement, it is not enough, as there are other contributing factors to poverty that remain unaddressed. Overall, the responses indicate a consensus that access to water, while beneficial, is not sufficient to overcome extreme poverty, as families continue to face various shortages that affect their well-being.

Discussions

Impact of Economic, Educational, Social, and Cultural Factors on the Drinking Water Service

The analysis of the data obtained from surveys and interviews reveals a predominantly negative view of access to drinking water and health education in Urpaypampa. A group of residents, labelled “Pessimists”, unfavourably rate the water conditions, citing contamination and the lack of adequate infrastructure, such as proper drainage. Furthermore, community participation in educational campaigns and service management is minimal, which exacerbates health problems—particularly among children and the elderly affected by diarrhoeal diseases. Limited health education contributes to poor hygiene practices, thereby worsening poverty and the overall health situation in the community.

In Urpaypampa, 57.1% of respondents rate both the access to and quality of drinking water negatively, attributing this to insufficient chlorination and the presence of bacteria and heavy metals. These issues are consistent with the findings of Páramo-Aguilera & Rivas-Pérez (2019), who noted that contamination and a lack of health education undermine water quality and adversely affect community health. Although 76% of residents express some degree of optimism, problems related to contamination and the absence of essential infrastructure, such as drainage, persist. Albarrán & Molina (2022) warn that consuming untreated water is linked to an increased incidence of gastrointestinal and dermatological diseases, underscoring the need for better resource management. Moreover, the general lack of awareness regarding the right to drinking water and the importance of hygiene continues to affect quality of life, as Briceño-León (1996) emphasises the need for participatory health education tailored to the realities of each community to promote proper water use and reduce health risks.

Regarding the overall access to and quality of drinking water in Urpaypampa, the results indicate predominantly negative assessments: 57.1% of the indicators were rated as very poor or poor. The water is not being chlorinated, and residents report that this is due to a lack of resources to purchase chlorine, coupled with fears that chlorinated water might be more harmful to their health. Even though a drinking water system has been installed, the water quality remains deficient, with contamination levels that fail to meet safety standards. Most of the community is unaware that access to drinking water is a fundamental right, and many do not routinely practise proper hygiene due to either a lack of awareness or time, hindering improvements in their quality of life. Additionally, the issue is compounded by the absence of proper drainage and other basic services, which perpetuates extreme poverty.

The survey employs a Likert scale to assess the dimensions of health education and access to drinking water, taking into account economic, educational, and social factors. Gaspar & Martínez (2022) analyse how poor public management and social conflicts affect equitable access to water, thereby reinforcing the relevance of the economic factor in this study. De la Rosa (2023) and Sanginéz (2017) emphasise that cultural habits

and educational levels influence the proper use of water, highlighting the importance of the educational factor in disease prevention. Moreover, Reyes et al. (2022) warn that the presence of microbiological contaminants in the water compromises its quality, making it essential to evaluate the service according to physical, chemical, and microbiological standards within the framework of the human right to drinking water.

Table 4

Summarised statistics on the aspects of health education, as well as the access to and quality of drinking water in the community of Urpaypampa

	N	Minimum	Maximum	Mean	Standard Deviation	Skewness Statistic	Standard Error
Economic Factor	25	7	14	8,80	1,756	1,335	,464
Educational Factor	25	8	16	11,84	2,211	,270	,464
Social and Cultural Factor	25	18	39	26,40	4,537	,744	,464
Quality of Drinking Water Service	25	3	13	6,68	2,322	,987	,464
Drinking Water Service	25	4	15	9,92	3,239	-,106	,464
Health Education	25	18	39	26,40	4,537	,744	,464
Access and Quality of Drinking Water	25	9	25	16,60	4,610	-,120	,464

Note: Survey guide tabulated in SPSS.

Table 4 shows that the scores for the study dimensions predominantly exhibit positive skewness, except for Drinking Water Service and Access and Water Quality, where the skewness is negative. This reflects inequalities in access to drinking water, as noted by Lema et al. (2023), primarily affecting rural and Indigenous populations. Furthermore, water resource management prioritises profitability over social benefit

(Hoyos & Mejía, 2021) and is constrained by structural deficiencies (Moreno, 2022). Health education influences perceptions of the service (Pachana & Sánchez, 2024), while the consumption of contaminated water remains a significant cause of disease (Madero et al., 2023; Cadme et al., 2021), reinforcing the need for improved water management.

Table 5

Contrast statistics for the normality test of the dimensions of health education and the access to and quality of drinking water in the Urpaypampa community

Health Education		Health Education	Access and Water Quality	Economic Factor	Educational Factor	Social Factor	Cultural Factor	Pollution	Health
Kolmogórov-Smirnov	Statistic	,127	,179	,215	,152	,131	,176	,200	,147
	df	25	25	25	25	25	25	25	25
	p-value (Sig.)	,200*	,038	,004	,139	,200*	,043	,011	,174
Shapiro-Wilk	Statistic	,963	,954	,859	,937	,945	,932	,949	,960
	df	25	25	25	25	25	25	25	25
	p-value (Sig.)	,480	,301	,003	,127	,197	,096	,232	,420

Note: Survey guide tabulated in SPSS.

The decision rule establishes that if the p-value is less than $\alpha = 0.05$, the null hypothesis (H_0) is rejected, whereas if the p-value is greater than $\alpha = 0.05$, the null hypothesis (H_0) is accepted. Given that the sample size is $n = 25$, the Shapiro-Wilk normality test is applied for small samples. In Table 3, the S-W statistic = 0.963 with a p-value of $0.480 > \alpha = 0.05$ indicates that the health education scores follow a normal distribution with 95% confidence. The same decision rule was applied to the remaining variables (Access and Water Quality, Economic, Educational, Social, and Cultural Factors, Pollution, and Health). With 95% confidence, all variables were found to meet the normality assumption,

except for the Economic Factor, which has a p-value of $0.003 < \alpha = 0.05$, indicating that it does not follow a normal distribution.

Despite this, since most variables are normally distributed, non-parametric statistics will be used for the analysis. This suggests that the economic factor reflects the lack of resources to maintain the drinking water system. Jara (2019) states that service management depends on administrative sustainability, while Moreno (2022) highlights the limitations of municipal funding. Based on these assumptions, linear regression will be used to model the variables and determine how the independent variables affect the dependent one.

Table 6

Estimated statistical correlation between the education factor and the provision of drinking water services

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	,386 ^a	,149	,112	4,344

^aPredictors: (Constant), Educational Factor

Table 6 shows a Pearson correlation of 0.386, indicating a weak but direct relationship between educational level and access to drinking water. This suggests that the insufficient provision of health education

in Urpaypampa influences the negative perception of the service. This aligns with the findings of Pachana and Sánchez (2019), who highlight health education as a key factor in the responsible use of drinking water. Likewise, Moreno (2022) emphasises that poor management and lack of infrastructure affect service quality, potentially reinforcing negative evaluations. Finally, Madero et al. (2023) warn that the consumption of contaminated water remains a leading cause of disease, underscoring the need to strengthen both health education and water resource management.

Table 7

Estimated coefficients of the regression model for drinking water service as a function of health education

Model	Unstandardised Coefficients			Standardised Coefficients _t	Sig.
	B	Standard Error	Beta		
1 (Constant)	1,209	4,645		,260	,797
Health Education	,583	,174	,574	3,360	,003

a. Dependent variable: Drinking Water Service.

Table 7 presents the hypothesis test for the regression coefficients with a 95% confidence level. The coefficient $\beta_1 = 1.209$ has a p-value of 0.797, greater than $\alpha = 0.05$, indicating that the intercept is not significant and should be excluded from the model. In contrast, the coefficient $\beta_1 = 0.586$ has a p-value of 0.003, validating its inclusion in the regression model:

$$Y_{sap} = 0.583x_{ed}$$

These results align with the findings of Pachana and Sánchez (2024), who highlight the role of health education in shaping perceptions of drinking water services. Additionally, Moreno (2022) emphasises that inadequate infrastructure and resource management affect water quality, reinforcing the need to consider structural factors in the analysis of water access. Furthermore, Madero et al. (2023) warn that consuming contaminated water remains a significant cause of disease, underscoring the importance of improving both health education and resource management to ensure adequate service provision.

Conclusions

The study demonstrates that health education significantly influences access to and appropriate use of drinking water in the community of Urpaypampa. However, deficiencies persist in the understanding and application of basic hygiene practices, exacerbating health risks. Negative perceptions of chlorination and low participation in educational campaigns have limited the effectiveness of government interventions. This highlights the need for more effective awareness strategies, incorporating intercultural approaches to respect and adapt interventions to local conceptions of water and health.

Infrastructure deficiencies and poor management of drinking water have created precarious conditions that impact community health. The lack of investment in distribution and sanitation networks, along with the exclusion of families in extreme poverty, has perpetuated unequal access to safe water. The relationship between economic, educational, and social factors is key to understanding this issue, as poverty not only limits access to basic services but also restricts the population's ability to adopt better consumption and sanitation practices.

The study reaffirms that access to drinking water is a fundamental human right and a critical factor in achieving the Sustainable Development Goals (SDGs). Despite government efforts, progress remains insufficient due to the absence of sustainable public policies and inefficient water resource management. The role of social work is crucial in mediating between the community and institutions, fostering comprehensive solutions that integrate education, infrastructure, and community participation to ensure equitable and sustainable access to drinking water in Urpaypampa.

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