

EXPLORING THE ASSOCIATION BETWEEN PERCEIVED WATER QUALITY AND SKIN HEALTH: A CROSS-SECTIONAL STUDY OF OTO/IJANIKIN RESIDENTS, LAGOS, NIGERIA

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Abstract

Concerns about water quality and its impact on health have risen globally, particularly in densely populated areas like Ojo Local Government Area. Despite efforts by the Lagos State Water Corporation, challenges persist in ensuring access to portable water access. This cross-sectional study investigated the association between perceived water quality and skin health among residents of Oto/Ijanikin, Nigeria. The study employed a structured questionnaire to collect data from 845 participants using convenience and stratified random sampling. Reliability analysis of the instrument yielded a Cronbach's alpha coefficient of 0.70, indicating the consistency of the questionnaire used. The analysis of the study included descriptive statistics of frequency counts and percentages; and inferential statistics of Pearson's Product Moment Correlation coefficient and Analysis of Variance (ANOVA) at 0.05 level of significance. The findings revealed that the two (2) null hypotheses were rejected indicating a significant association between perceived water quality and skin health, as well as a correlation between perceived water quality and severity/types of skin health conditions. The results emphasized the importance of addressing water quality concerns to improve public health outcomes. Findings suggest a need for policy interventions and community health initiatives to address water quality concerns and mitigate skin health burdens. This research contributes to understanding health challenges in underserved communities and informs strategies for improving public health outcomes.

Keywords: Association, Cross-sectional study, Oto/Ijanikin, Skin health, Water quality perception

Introduction

In recent years, concerns regarding water quality and its potential impact on human health have become increasingly prevalent worldwide (Adeloju et al., 2021). Access to clean and safe water is fundamental to public health, yet many communities continue to face challenges related to water contamination and its associated health risks (Longe & Yaya, 2015). Ojo Local Government Area where Oto/Ijanikin is situated is a densely populated area in Nigeria, residents have voiced concerns about the quality of their water supply and its potential implications for their well-being (Daramola, 2021; Edition, 2011).

In the past two decades, there has been a notable rise in the incidence of waterborne diseases, as widely documented in both print and electronic media. However, the specific contributing factors to this surge in Lagos, Nigeria, remain inadequately understood. Access to safe potable water remains a significant challenge for over 80% of the population, predominantly those belonging to the low socio-economic class, who often rely on untreated water sources for their daily needs. Responsible for public water supply to approximately 15 million Lagos State residents, the Lagos State Water Corporation (LSWC) operates multiple water treatment facilities across the state (Salami, 2025; Akinyemi et al., 2006). These treatment plants utilise

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both surface and underground water sources. Notably, the Adiyari, Iju, and Ishasi plants primarily rely on surface water and collectively account for around 95% of the total daily water production. The remaining 5% is supplied by mini-water works using underground borehole sources. While Adiyari and Iju treatment plants share similar treatment processes, such as screening, coagulation, and flocculation, with variations in sedimentation methods, Ishasi and mini-water works employ distinct treatment principles, including coagulation, flocculation, and vertical sedimentation (Ministry of Environment, 2025; Lagos State Water Corporation, 2002).

Despite the operational efforts of these treatment facilities, their average plant abstraction and production capacities have failed to meet the surging demand for piped water supply in Lagos. Consequently, there has been a widespread reliance on well water usage throughout the city (Akinyemi et al., 2006). Water quality perception, defined as individuals' subjective assessment of the cleanliness and safety of their water, plays a crucial role in shaping behaviours and attitudes towards water usage (Anthonj et al., 2022). Perception of water quality can be influenced by various factors, including visual cues, odor, taste, and community-level information (Flotemersch & Aho, 2021; Senanayake, 2020). Skin health conditions represent a significant burden on public health, affecting individuals' quality of life and posing economic challenges due to healthcare costs and productivity losses (Edition, 2011). Skin disorders can range from mild irritations to severe infections, with potential long-term consequences if left untreated. Skin disorders encompass a spectrum of health conditions, both acute and chronic, which can profoundly impact the quality of life for affected individuals, resulting in physical, social, emotional, and financial burdens for patients and their families (Abasiubong et al., 2011; Hong et al., 2008). Despite the chronic and non-life-threatening nature of many skin ailments, the associated morbidity and discomfort frequently drive individuals to seek medical attention, constituting a significant portion, approximately 24%, of medical consultations (Hu, 2011). The prevalence and pattern of skin disorders within communities vary across different countries and regions due to a myriad of factors including education levels, healthcare system development, infrastructure, sanitation practices, nutritional status, as well as cultural and religious customs (Hay et al., 2014).

For instance, a comparison between skin disease patterns in Ghana and the UK revealed differing trends, with Ghana experiencing a higher prevalence of infections while malignant and premalignant health conditions were more common in the UK (Banner et al., 2017). Understanding the local pattern of skin diseases within communities is instrumental in determining the requisite infrastructure and expertise needed for healthcare planning, thereby facilitating improved access to dermatological care (Hay et al., 2014). Moreover, enhancing the capacity and training of community healthcare workers can lead to earlier detection of skin diseases and facilitate timely referrals where necessary. In Nigeria, studies on the pattern of skin diseases predominantly rely on hospital-based data, with limited information available from rural communities (Ewurum et al., 2025; Henshaw et al., 2018; Akinkugbe, 2016). Moreover, research conducted in rural Nigerian communities primarily focuses on school children (Kalu, 2015; Benjamin, 2009).

Addressing this gap by conducting community-based studies can provide valuable insights into the prevalence and characteristics of skin disorders in rural populations, informing targeted healthcare interventions and resource allocation. The extent to which water quality perception in Oto/Ijanikin is associated with the prevalence and severity of skin health conditions among its residents remains underexplored. Understanding the relationship between water quality perception and skin health conditions was therefore crucial for implementing targeted interventions to improve public health outcomes in Oto/Ijanikin. This study aims to fill this gap in knowledge by conducting a survey among residents of

Oto/Ijanikin to explore the association between water quality perception and skin health conditions. By elucidating the factors influencing residents' perceptions of water quality and assessing the prevalence and severity of skin health conditions within the community, this research seeks to provide valuable insights for policymakers, public health practitioners, and community stakeholders.

Statement of the Problem

Access to clean and safe water remains a major public health challenge in Nigeria, particularly in rapidly growing urban areas like Lagos. Despite the Lagos State Water Corporation's efforts, the supply of potable water has consistently fallen short of demand, forcing residents to rely on untreated sources such as wells and boreholes (Akinyemi et al., 2006; Longe & Yaya, 2015). This raises significant concerns about water quality and its potential health consequences, especially in peri-urban communities like Oto/Ijanikin.

While research on water-related health issues in Nigeria has largely focused on gastrointestinal and waterborne diseases, the relationship between water quality and skin health remains underexplored. Skin disorders are among the most common health problems worldwide, contributing to reduced quality of life, high treatment costs, and significant healthcare burdens (Hay et al., 2014; Hu, 2011). Perceptions of water quality – shaped by taste, odor, color, and community narratives – play an important role in shaping household water use practices (Anthonj et al., 2022; Senanayake, 2020), yet their potential link to dermatological conditions has received little empirical attention.

Existing studies on skin health in Nigeria are largely hospital-based, with limited data from community settings (Kuwande et al., 2024; Onwordi et al., 2022; Akinboro et al., 2015; Yahya, 2007). This gap hinders effective public health planning, particularly in underserved areas where reliance on non-piped water is common. Exploring the association between water quality perception and skin health among residents of Oto/Ijanikin is therefore critical to understanding local health risks and informing targeted interventions to improve community well-being.

Research Questions

The following research questions were formulated:

1. What is the perception of water quality among residents of Oto/Ijanikin, Lagos State?
2. What is the perception of skin health among residents of Oto/Ijanikin, Lagos State?
3. What is the **relationship between perceived water quality and skin health among** Oto/Ijanikin residents, Lagos State?
4. What is the correlation between perceived water quality and the severity/types of skin health conditions among Oto/Ijanikin residents

Hypotheses

The following hypotheses were tested:

1. There is no significant relationship between perceived water quality and skin health among Oto/Ijanikin residents.
2. There is no correlation between perceived water quality and the severity/types of skin health conditions among Oto/Ijanikin residents.

Methodology

This study employed a cross-sectional research design to investigate the association between water quality perception and skin health conditions among residents of Oto/Ijanikin. A cross-sectional design allows for the collection of data at a single point in time, providing a snapshot of the relationship between variables of interest within the population.

The population of Oto/Ijanikin consists of approximately 32,106 registered residents, as documented in the polling records (Akinyetun et al., 2021). Although the area is predominantly inhabited by students of Lagos State University of Education (LASUED), whose residency may not be permanent, the polling records serve as a proxy for the population under study.

To determine the sample size, the Cochran formula for sample size calculation for categorical data was employed:

$$n = \frac{Z^2 * p * (1-p)}{d^2}$$

Where:

- n = sample size
- Z = Z-score corresponding to the desired confidence level (e.g., 95% confidence level, $Z=1.96$)
- p = estimated proportion of population affected by skin health conditions
- d = margin of error (set at 5%)

Given the lack of specific data on the proportion of the population affected by skin health conditions in Oto/Ijanikin, a conservative estimate of $p=0.50$ was used to yield the maximum sample size. Thus:

$$n = \frac{1.96^2 * 0.50 * (1-0.50)}{0.05^2}$$

$$n = \frac{3.8416 * 0.50 * 0.50}{0.0025}$$

$$N \approx 768$$

Considering potential non-response and incomplete surveys, the sample size was increased by 10%, resulting in a final sample size of approximately 845 participants.

The sampling technique was a combination of convenience sampling and stratified random sampling. First, Oto/Ijanikin was stratified into various zones based on residential areas and proximity to water sources. Then, participants were conveniently selected from each stratum to ensure representation across different zones.

A structured questionnaire was utilised for data collection, incorporating items derived from the previously developed questionnaire based on the research questions and hypotheses outlined earlier. The questionnaire included sections on demographic information, perception of water quality, experience with skin health conditions, and factors influencing water quality perception. The questionnaire underwent content validity assessment by experts in public health and dermatology to ensure relevance and comprehensiveness. Reliability analysis was conducted using Cronbach's alpha coefficient for internal consistency with the reliability of $r = 0.70$. A coefficient of 0.70 or higher is considered acceptable.

Prior to data collection, approval was obtained. Informed consent was obtained from all participants, emphasizing voluntary participation and confidentiality of responses. The researchers in addition to three (3) trained research assistants administered the questionnaire through face-to-face interviews with participants in selected households and through the use of Google Forms. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize demographic characteristics, water quality perception, and skin health condition variables. Inferential statistical analyses of Pearson Product Moment Correlation (PPMC) and Analysis of Variance (ANOVA) were used to explore the association between water quality perception and skin health conditions at a significance level of $\alpha=0.05$. Additionally, data was analyzed using statistical software such as SPSS (Statistical Package for the Social Sciences).

Results

This section presents the analysis of data to explore the association between water quality perception and skin health conditions using a cross-sectional study of Oto/Ijanikin residents. Three hypotheses were generated and tested for this study using Pearson's Product Moment Correlation coefficient (PPMC) for hypotheses one and two, while hypothesis three was analysed using ANOVA, all at 0.05 level of significance.

Responses to Questions

Research Question 1: What is the perception of water quality among residents of Oto/Ijanikin, Lagos State?

Table 1: Residents' perception of water quality in Oto/Ijanikin

Perception Indicators	Frequency	Percentage (%)
Water quality rated as poor	601	58.7
Water quality rated as good	140	13.7
Households reporting problems	930	90.8
Odour as main problem	406	39.4
Taste as main problem	208	20.2
Particles as main problem	156	15.1
Not confident in water safety	789	77.0

The findings revealed widespread concern about water quality among residents. Over half of the respondents (58.7%) rated the water in their area as poor, while only 13.7% considered it good. A large majority (90.8%) reported experiencing water quality problems in their households, with odour (39.4%), taste (20.2%), and particles (15.1%) being the most common issues. Confidence in water safety was also low, as 77% of respondents stated they were "not very confident" in the safety of water used for drinking and bathing. Taste (58.8%) emerged as the most influential factor shaping perceptions. These results indicate a strong perception of poor water quality across the community.

Research Question 2: What is the perception of skin health among residents of Oto/Ijanikin, Lagos State?

Table 2: Perceived skin health conditions among residents

Skin Health Condition	Frequency	Percentage (%)
Any condition (past year)	834	81.5
Dermatitis	692	83.0
Bacterial infections	94	11.3
Fungal infections	48	5.7
Mild severity	489	58.6
Moderate severity	307	36.8
Severe symptoms	38	4.6
Sought medical treatment	604	72.4

In terms of health outcomes, 81.5% of residents reported experiencing skin health conditions in the past year. Dermatitis was the most common condition (83%), followed by bacterial infections (11.3%) and fungal infections (5.7%). Most cases were rated as mild (58.6%) or moderate (36.8%), with only 4.6% reporting severe symptoms. Notably, 72.4% of affected residents sought medical treatment, suggesting that skin health concerns are both prevalent and significant enough to prompt care-seeking behaviour.

Research Question 3: What is the relationship between perceived water quality and skin health among Oto/Ijanikin residents, Lagos State?

Table 3: Relationship between perceived water quality and skin health

Indicators	Frequency	Percentage (%)
Agree water quality affects skin health	1024	100.0
Reported changes in skin with water changes	930	90.8

When asked directly, all respondents (100%) agreed that there is a relationship between water quality and skin health. Moreover, 90.8% reported noticing changes in their skin condition coinciding with changes in water quality. These findings confirm that community members perceive a strong link between the quality of their water and the burden of skin health problems.

Collectively, the data demonstrate that poor water quality perception is associated with high prevalence and severity of skin conditions, aligning with the objectives of the study.

Testing of Hypotheses

Hypothesis One

There is no significant association between water quality perception and the prevalence of skin health conditions among Oto/Ijanikin residents. This hypothesis was tested with Pearson's product Moment Correlation coefficient (PPMC) and the result is presented in Table 4 below:

Table 4: Relationship between perceived water quality and skin health among Oto/Ijanikin residents

Variables	N	Mean	SD	r-calc.	Sig.
Perceived water quality	845	5.50	1.037	0.192	0.000
Skin health	845	3.00	0.678		

P < 0.05; df = 843

From Table 4, the association between water quality perception and skin health among Oto/Ijanikin residents is significant, because the calculated value of 0.192 at a significant P(0.000 < 0.05) given 843 degrees of freedom. Hence, the hypothesis is significant. Therefore, there is a significant association between perceived water quality and skin health among Oto/Ijanikin residents, because null hypothesis was rejected. Similarly, there is also a positive relationship between the two variables

Hypothesis Two

There is no correlation between perceived water quality and the severity/types of skin health conditions reported among Oto/Ijanikin residents. This hypothesis was tested with Pearson's product Moment Correlation coefficient (PPMC) and the result is presented in Table 5 below:

Table 5: Relationship between perceived water quality and the severity/types of skin health conditions reported among Oto/Ijanikin residents

Variables	N	Mean	SD	r-calc.	Sig.
Perceived water quality	845	5.50	1.037		

Severity/types of skin health conditions	845	1.46	0.584	0.298	0.000
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P < 0.05; df = 843

From Table 5, the association between water quality perception and the severity/types of skin health conditions reported among Oto/Ijanikin residents is significant, because the calculated value of 0.298 at a significant $P(0.000 < 0.05)$ given 843 degree of freedom. Hence, the hypothesis is significant. Therefore, there is a significant correlation between variations in water quality perception and the severity/types of skin health conditions reported among Oto/Ijanikin residents, because null hypothesis was rejected. Similarly, there is also a positive relationship between the two variables

Discussion of Findings

The research findings of hypothesis 1 indicate a significant association between water quality perception and the prevalence of skin health conditions among residents of Oto/Ijanikin. This finding underscores the importance of considering subjective perceptions of water quality in understanding its impact on dermatological health outcomes within the community. Previous studies have also highlighted the influence of water quality on skin health. For instance, Yau et al. (2009); and Ng and Chew (2020) conducted a meta-analysis revealing a consistent link between poor water quality and various skin disorders. Similarly, Lin (2022) conducted a systematic review emphasizing the impact of water quality perception on health outcomes, including dermatological health. These studies support the notion that individuals' perceptions of water quality can serve as important indicators of potential health risks, particularly regarding skin health conditions. Contrary to the findings of the current research, some studies have reported inconclusive or contrasting results regarding the association between water quality perception and skin health conditions. For instance, Ochoo et al. (2017) conducted a population-based study that found no significant relationship between water quality perception and skin health outcomes. Additionally, Ramya (2021) examined the relationship between water quality perception and skin health conditions from a rural perspective, yielding mixed findings. These discrepancies may arise from variations in study populations, methodologies, or environmental contexts, highlighting the complexity of the relationship between water quality perception and skin health.

The research findings of hypothesis 2 reported a significant correlation between variations in water quality perception and the severity or types of skin health conditions reported among residents of Oto/Ijanikin. This correlation implies that individuals' perceptions of water quality may influence the severity or types of skin health conditions they experience. While this finding aligns with the notion that environmental factors, such as water quality, can impact dermatological health outcomes, it is important to note that the relationship between water quality perception and skin health conditions is complex and multifaceted. Previous studies have explored the relationship between environmental factors and skin health outcomes, providing insights into the potential mechanisms underlying this correlation. Arif et al. (2020) conducted a review revealing a consistent link between poor water quality and various skin disorders. Similarly, Lin et al. (2022) conducted a systematic review emphasizing the impact of water quality perception on health outcomes, including dermatological health. Also, a study carried out by Nawaz et al. (2023) found out that the source of drinking water had a lifelong effect on the health of all age groups. These studies support the idea that individuals' perceptions of water quality can serve as important indicators of potential health risks, particularly regarding skin health conditions.

Conclusion

In conclusion, the research findings highlight the interconnectedness between water quality perception and skin health among residents of Oto/Ijanikin. The significant association between perceived water quality and the skin health emphasizes the importance of subjective perceptions in shaping health outcomes within the community. Furthermore, the observed correlation between perceived water quality and the severity or types of reported skin health conditions underscores the complex interplay between environmental factors and dermatological health. These findings suggest that individuals' perceptions of water quality may not only influence their likelihood of experiencing skin health conditions but also the severity or types of health conditions they may encounter. This underscores the need for comprehensive approaches to address water quality concerns and promote dermatological health in the community.

Recommendations

Based on the above conclusion, the followings are hereby recommended:

1. Conduct regular testing of water sources in Oto/Ijanikin to identify and address contamination issues promptly.
2. Provide targeted health education campaigns to raise awareness about the importance of clean water for skin health and hygiene practices.
3. Invest in the maintenance and improvement of water treatment facilities and distribution systems to ensure the delivery of safe drinking water.
4. Improve access to dermatological care and treatment services for residents affected by skin health conditions related to water quality.
5. Engage community members in decision-making processes and empower them to advocate for better water infrastructure and services.

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