

Health Impacts of Water Scarcity on Women in Baringo South Constituency, Baringo County, Kenya

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Abstract

Water scarcity remains a persistent challenge in Baringo South Constituency, where inadequate and unreliable water supplies place a disproportionate burden on women responsible for household water collection and use. Despite the potential health consequences of prolonged water shortages, evidence on the specific health burden among women in the area remains limited. The study examined the health impacts of water scarcity on women in Baringo South Constituency, Baringo County, Kenya, focusing on Marigat and Mochongoi wards. It was anchored on Feminist Political Ecology of Health perspective. A convergent parallel mixed-methods design combined quantitative household surveys with qualitative data from focus group discussions and key informant interviews. The target population comprised 22,623 women aged 18 years and above who were responsible for household water collection in the two wards. Using Yamane's formula at a 5% margin of error and 95% confidence level, a sample size of 393 women was determined for the quantitative survey. Quantitative data were analyzed using SPSS version 27 through descriptive statistics and chi-square tests, while qualitative data were transcribed, translated, and analyzed thematically. Women constituted the primary water collectors in 69.4% of households, with 62.5% traveling beyond 500 meters and 71.9% spending over one hour per trip. Musculoskeletal discomfort was reported by 75.0%, while psychological stress was high, with physical stress recording the highest mean score ($M = 4.80$, $SD = 0.41$). Diarrhoea was the most frequently reported health condition ($M = 2.44$, $SD = 0.88$). Water scarcity was significantly associated with diarrhoea ($\chi^2 = 16.42$, $p < 0.001$), skin infections ($\chi^2 = 12.58$, $p < 0.001$), eye infections ($\chi^2 = 9.87$, $p = 0.002$), genitourinary infections ($\chi^2 = 11.31$, $p = 0.001$), musculoskeletal pain ($\chi^2 = 25.64$, $p < 0.001$), and mental health stress/anxiety ($\chi^2 = 32.10$, $p < 0.001$). Qualitative findings further documented headaches, shoulder pain, fatigue, injuries, psychological strain, and reported reproductive-health challenges associated with water collection. The

study concludes that water scarcity in Baringo South imposes a triple burden of physical injury, psychological morbidity and infectious disease risk on women. Findings underscore the urgency of gender-responsive water interventions aligned with Sustainable Development Goals 3, 5, and 6.

Keywords: water scarcity, women's health, musculoskeletal disorders, psychological stress, waterborne diseases, Baringo South, Kenya

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Introduction

Water is fundamental to human health, dignity, and socio-economic development, yet global water security is deteriorating rapidly. The United Nations (2023) estimates that 3.6 billion people face water shortages, a figure projected to exceed 5 billion by 2050, while the United Nations Environment Programme (UNEP, 2024) reports that approximately half the world's population experiences water scarcity for at least one month annually.

In Africa, the situation is particularly severe, with more than 400 million people lacking access to basic drinking water, including 281 million people in Eastern and Southern Africa who remain without such access (World Bank, 2026). The World Meteorological Organization (2022) further warns that four out of five African countries are unlikely to achieve sustainably managed water resources by 2030.

Kenya is classified as a water-scarce country, with renewable freshwater availability below 1,000 m³ per capita annually, far beneath the global threshold of 1,700 m³ per capita (Mulwa et al., 2021). Approximately 32% of the Kenyan population struggles to access dependable safe drinking water, and the situation is exacerbated in arid and semi-arid lands (ASALs), which cover 80% of the national territory and host 36% of the population (Ministry of Water, Sanitation and Irrigation, 2020). Baringo County, a semi-arid region in Kenya's Rift Valley, exemplifies this crisis, with only 39% of its population having access to safe drinking water while 76.5% depend on unimproved sources, including water pans, seasonal rivers, and shallow wells that remain highly vulnerable to climatic shocks and contamination (County Government of Baringo, 2024).

The burden of water scarcity is strongly gendered across sub-Saharan Africa, where women and girls bear primary responsibility for collecting water in rural households, while improved access to basic water services could save women an estimated 77 million working days each year (UNESCO, 2024; WHO & UNICEF, 2025). In Baringo County, 95% of women in pastoral communities manage household water, while men retain authority over long-range herd movement and financial decisions (Liru, 2026). This division of labor positions women as the frontline actors navigating water insecurity, exposing them to distinct health risks that operate across physical, psychological, and infectious disease domains.

Physical health impacts are well documented. Geere et al. (2018) conducted a multi-country analysis across 24 low- and middle-income countries, finding that carrying heavy water containers was significantly associated with musculoskeletal pain, fatigue, and injuries affecting the head, neck, back, and lower limbs. In Nigeria, Otufale and Coster (2012) reported significant correlations between daily water trips, trekking duration, and adverse health outcomes among women. Khatun and Aktar (2026) similarly documented back pain, bone deformities, and pregnancy complications linked to water carrying in India. Despite this evidence, few studies have quantified the anatomical distribution and frequency of musculoskeletal strain in pastoral Kenyan contexts.

Psychological dimensions of water insecurity have received increasing scholarly attention, with evidence synthesized by Bisung and Elliott (2016) showing that inadequate and unreliable access to water can generate anxiety, shame, social exclusion, and diminished quality of life, with these effects

potentially persisting even after households meet their immediate physical water needs. Tsai et al. (2016) established that household water insecurity was significantly associated with probable depression among women in Uganda, while Kimutai et al. (2025) documented persistent psychological distress characterized by anxiety, hopelessness, and emotional exhaustion among women in Nakuru County, Kenya. In Baringo South, the seasonal intensification of scarcity, combined with unsafe collection environments, creates a chronic stressor that remains poorly characterized.

Water scarcity also elevates infectious disease risk through compromised hygiene and consumption of contaminated water. In Kenya, diarrhoeal disease contributes to roughly 100 child deaths per day, with *Escherichia coli* and other pathogens frequently detected in surface and shallow groundwater sources (Mbae et al., 2024; Neyole, 2020; Kurui et al., 2017). Women, as primary water managers, face disproportionate exposure to microbial and chemical contaminants during collection, storage, and use, yet constituency-level data linking seasonal quality degradation to women's morbidity are fragmented.

Existing research in Baringo County has examined specific aspects of domestic water challenges, including microbial contamination of water pans (Kurui et al., 2017), seasonal water quality in Marigat town (Osiemo et al., 2019), and women's climate adaptation practices (Liru, 2026). Despite these contributions, the evidence remains fragmented, with limited attention to the combined relationship between water scarcity and the multidimensional health effects experienced by women in Baringo South Constituency. This study addresses the gap by evaluating the health impacts of

water scarcity on women in Baringo South Constituency.

Theoretical Framework

The study was anchored in the Feminist Political Ecology of Health (FPEH) perspective, which developed from Feminist Political Ecology (FPE) scholarship during the 1980s and 1990s. FPE has no single founder, but Dianne Rocheleau, Barbara Thomas-Slayter, and Esther Wangari were among the scholars who shaped its early development, particularly through *Feminist Political Ecology: Global Issues and Local Experiences* (Rocheleau et al., 1996). The perspective examines how gender, power relations, environmental resources, and socioeconomic conditions shape people's unequal exposure to environmental risks. FPEH extended these ideas into health research, with Nunbogu and Elliott (2021) integrating feminist political ecology with political ecology of health to explain how environmental and structural inequalities can translate into health inequalities.

FPEH therefore provides a framework for examining how gendered responsibilities, environmental conditions, socioeconomic circumstances, and unequal access to water resources shape women's exposure to water scarcity and its associated health impacts (Nunbogu & Elliott, 2021; WHO & UNICEF, 2023).

Methodology

Study Area

The study was conducted in Baringo South Constituency, Baringo County, Kenya (Figure 1). The county lies between longitudes 35°30' and 36°30' East and latitudes 0°10' South and 1°40' North, covering 11,015.3 km² (County

Government of Baringo, 2023). Baringo South falls within low-rainfall zones receiving approximately 600 mm annually, with temperatures ranging between 10°C and 35°C. The region is characterized by acacia shrubland, volcanic geology, and a pastoralist economy where livestock rearing dominates.

Research Design

A convergent parallel mixed-methods design was adopted, integrating quantitative household surveys with qualitative Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) (Creswell & Plano Clark, 2011).

Sampling and Data Collection

The target population comprised approximately 22,623 women aged 18 and above responsible for water collection in Marigat and Mochongoi wards. Using Yamane's (1967) formula with a 95% confidence level and 5% margin of error, a sample size of 393 was determined. Marigat and Mochongoi wards were purposively selected, followed by purposive selection of locations and sub-locations based on documented drought vulnerability. Villages and households were randomly selected using lottery methods and simple random sampling, respectively.

Quantitative data were collected using a structured questionnaire incorporating the Standardized Nordic Musculoskeletal Questionnaire and standardized psychological stress scales. Three trained research assistants administered the questionnaire through face-to-face interviews. Qualitative data were collected through FGDs involving 6–10 women per group and key informant interviews with healthcare professionals.

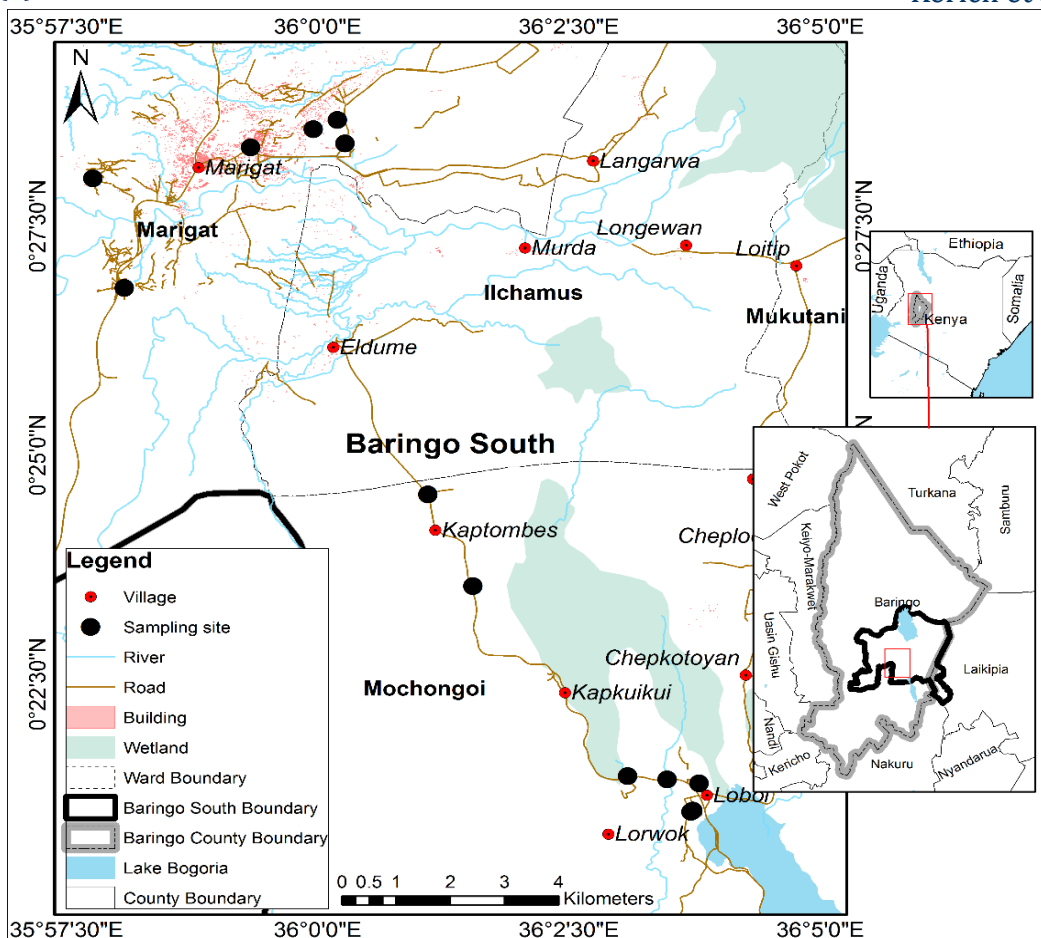


Figure 1: Map of the location of study area

Data Analysis

Quantitative data were analyzed using SPSS version 27 while qualitative data were transcribed, translated, and analyzed thematically. Descriptive statistics (frequencies, percentages, means, standard deviations) summarized socio-demographic and health variables. Chi-square tests assessed associations between water scarcity indicators and health outcomes.

Results

Socio-Demographic Characteristics

The socio-demographic characteristics of the 320 women who participated in the study are presented in Table 1. The distribution indicates that the respondents were predominantly

within the economically active age range. Women aged 26–35 years constituted 34.4% of the sample, while those aged 36–45 years accounted for 36.3%, giving a combined proportion of 70.7%. Respondents aged 18–25 years represented 20.0%, whereas those aged 46–55 years and above 55 years accounted for 5.9% and 3.4%, respectively.

Marital status findings show that married women formed the largest group at 61.6%, followed by single women at 29.7% and widowed women at 8.8%. In terms of education, 45.9% had primary-level education, while 8.8% had no formal education. A further 30.9% had attained secondary education and 14.4% had college or university education. Thus, more than half of the respondents

(54.7%) had primary education or less. Occupational characteristics further indicate limited formal economic engagement, with 67.2% reporting that they were unemployed. Self-employed women accounted for 20.9%, while 7.8% were engaged in farming and 4.1% had

salaried employment. Household size was predominantly 4–6 members, reported by 48.4% of respondents. Households with 7–9 members accounted for 20.0%, those with 1–3 members represented 19.7%, and 11.9% had more than nine members.

Table 1: Socio-Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Percent (%)
Age (years)	18–25	64	20.0
	26–35	110	34.4
	36–45	116	36.3
	46–55	19	5.9
	> 55	11	3.4
Marital status	Single	95	29.7
	Married	197	61.6
	Widowed	28	8.8
Education	No formal education	28	8.8
	Primary	147	45.9
	Secondary	99	30.9
	College/University	46	14.4
Occupation	Unemployed	215	67.2
	Self-employed	67	20.9
	Farming	25	7.8
	Salaried employment	13	4.1
Household size	1–3 members	63	19.7
	4–6 members	155	48.4
	7–9 members	64	20.0
	> 9 members	38	11.9

Source: Research Data (2026)

Water Scarcity, Accessibility and Collection Burden

The findings on water scarcity, accessibility, and collection burden are presented in Table 2. The results show that adult women were the primary water collectors in 69.4% of households, followed by households where men and women shared the responsibility (20.0%), while 10.6% reported that all household members participated in water collection. Regarding distance to water sources, 8.1% of respondents reported accessing water within 100 m, 29.4% within 101–500 m, 31.6% from 501 m–1 km, 29.7% from 1–3 km, and 1.3% from more than 3

km. Overall, 62.6% obtained water from sources located more than 500 m from their homes.

For time spent collecting water, 5.6% of respondents required less than 30 minutes per trip, 22.5% required 30 minutes–1 hour, 46.6% required 1–2 hours, and 25.3% required 2–4 hours. During the dry season, 89.7% reported a significant increase in the time and effort required to collect water, while 10.3% reported a moderate increase. Regarding water sufficiency, 6.6% indicated that water was always sufficient, 2.2% reported sufficiency most of the time, 20.9% reported sufficiency sometimes,

35.0% reported that water was rarely sufficient, and 35.3% reported that it was never sufficient. Water rationing was reported as a daily practice by 48.4% of

respondents, while 19.1% rationed water often on a weekly basis, 30.0% sometimes, and 2.5% rarely.

Table 2: Water Accessibility and Scarcity Indicators (n = 320)

Indicator	Category	Frequency (n)	Percent (%)
Primary collector	Adult women	222	69.4
	Men and women	64	20.0
	All members	34	10.6
Distance to source	Within 100 m	26	8.1
	101–500 m	94	29.4
	501 m–1 km	101	31.6
	1–3 km	95	29.7
	> 3 km	4	1.3
Time per trip	< 30 min	18	5.6
	30 min–1 hr	72	22.5
	1–2 hr	149	46.6
	2–4 hr	81	25.3
Dry season burden	Significant increase	287	89.7
	Moderate increase	33	10.3
Water sufficiency	Always sufficient	21	6.6
	Most of the time	7	2.2
	Sometimes	67	20.9
	Rarely sufficient	112	35.0
	Never sufficient	113	35.3
Rationing frequency	Rarely	8	2.5
	Sometimes	96	30.0
	Often (weekly)	61	19.1
	Always (daily)	155	48.4

Source: Research Data (2026)

Qualitative findings supported the quantitative evidence, showing that water access became more difficult during dry seasons as women travelled longer distances to obtain water from marginal sources. One participant narrated, *“In dry seasons, accessibility of water is limited, while in rainy seasons, water is readily available.”* Participants also described risks encountered during water collection, including snake encounters, injuries from thorns of the invasive *Prosopis juliflora* (Mathenge), and physical assault.

Reported Health Conditions Linked to Water Scarcity

The study assessed the self-reported frequency of specific health conditions attributed to water scarcity among respondents, utilizing a 4-point Likert scale where 1 = Rarely, 2 = Sometimes, 3 = Often, and 4 = Very Often.

The findings in Table 3 reveals that diarrhoea represents the most frequently reported health impact, with a mean score of 2.44 (SD = 0.88), indicating that households experience diarrhoeal episodes between sometimes and often. Genitourinary infections, including urinary tract and vaginal infections,

constituted the second most prevalent condition with a mean of 2.10 (SD = 0.82), suggesting these occur slightly above the sometimes threshold. Skin infections such as rashes, sores, and itching were reported less frequently, yielding a mean of 1.73 (SD = 0.99), falling between rarely

and sometimes but indicating regular occurrence among affected households. Eye infections demonstrated the lowest frequency with a mean of 1.61 (SD = 0.88), though still registering above the baseline rarely category

Table 3: Frequency and Percentage of Perceived Health Impacts of Water Scarcity

Health Impact	Rarely (n)	Sometimes (n)	Often (n)	Very Often (n)	Mean	SD
Diarrhoea (self or household member)	66	153	66	34	2.44	0.88
Skin infections (rashes, sores, itching)	113	54	33	20	1.73	0.99
Eye infections (redness, irritation, conjunctivitis)	167	107	20	27	1.61	0.88
Genitourinary infections (UTIs, vaginal infections)	97	180	17	26	2.10	0.82

Source: Research Data (2026)

Musculoskeletal Burden

The study assessed the musculoskeletal impacts of water collection using the Standardized Nordic Musculoskeletal Questionnaire to quantify the physical toll of carrying heavy water containers across challenging terrain. This validated instrument enabled systematic documentation of discomfort across nine anatomical regions, allowing

respondents to indicate multiple affected areas to capture the comprehensive physical strain associated with repetitive water carrying activities. The findings presented in Table 4. reveal the distribution of musculoskeletal complaints among women engaged in domestic water collection in Baringo South Constituency.

Table 4: Musculoskeletal Discomfort Associated with Water Carrying

Body Region	Frequency (n)	Percent (%)
Neck	267	83.44
Shoulders	213	66.56
Upper back	243	75.94
Lower back	243	75.94
Elbows	213	66.56
Wrists/hands	213	66.56
Hips/thighs	187	58.44
Knees	267	83.44
Ankles/feet	183	57.19
No discomfort experienced	80	25.00

Source: Research Data (2026)

The findings indicate that water carrying imposes substantial musculoskeletal

burden, with 75% (n = 240) of respondents reporting discomfort in at

least one body region, while 25% (n = 80) reported experiencing no musculoskeletal discomfort. The neck and knees emerged as the most commonly affected sites, each reported by 83.44% (n = 267) of respondents. The upper and lower back were equally affected, with 75.94% (n = 243) experiencing discomfort in each region. The shoulders, elbows, and wrists/hands each affected 66.56% (n = 213) of respondents, indicating widespread upper extremity strain. The hips and thighs were affected by 58.44% (n = 187), while the ankles and feet were reported as problematic by 57.19% (n = 183) of respondents. The high prevalence of symptoms across multiple anatomical regions, particularly the axial skeleton (neck and back) and weight-bearing joints (knees, hips, ankles), reflects the biomechanical stress of transporting heavy water loads over long distances and uneven terrain.

The health worker confirmed receiving cases of musculoskeletal disorders related to water collection, with back pain being the most common complaint: *"Most women carrying water in their backs leads them to back pain."* Shoulder pain was also prevalent among women carrying water with their hands and shoulders using jerrycans. These clinical observations align with the survey finding that 83.8% of women face long distances to water sources and 71.9%

spend more than one hour per collection trip.

The focused group discussion participants provided vivid accounts of the physical toll: *"effects of carrying water include headache, shoulder pain, fatigue, dislocation due to injuries during accidents. Elderly women are more affected."* The health worker confirmed serious reproductive health consequences, noting *"cases of miscarriage"* resulting from the burden of carrying heavy water loads. Most tragically, the FGD revealed *"some reported cases of death when pregnant woman fainted and died during water collection or other cases postpartum."*

The health worker's medical advice for women experiencing physical strain focused on safe water handling rather than reducing the burden itself: *"to practice the use of containers that can be closed for safety of water."* The focused group discussion participants offered their own practical recommendation: *"they should carry water in their carts instead of their backs."*

Frequency of Musculoskeletal Pain or Discomfort by Body Region

The study further examined the frequency of musculoskeletal pain across specific body regions using a 4-point scale ranging from Rarely to Daily, with results presented in Table 5.

Table 5: Frequency of musculoskeletal pain or discomfort by body region

Body Region	Rarely n	Sometimes n	Often n	Daily n	Mean	SD
Shoulders	19	71	102	128	3.27	0.78
Upper back	17	63	138	102	3.19	0.71
Lower back	12	51	88	169	3.54	0.66
Arms/elbows	11	41	119	149	3.52	0.51
Wrists/hands	23	61	93	143	3.11	0.95
Hips/thighs	31	49	118	122	3.15	1.01
Knees	14	52	96	158	3.59	0.51
Ankles/feet	21	49	91	159	3.60	0.51

Source: Research Data (2026)

The findings reveal that pain occurs with high regularity across all anatomical regions, with mean scores ranging from 3.11 to 3.60, indicating that discomfort is experienced between often and daily by the majority of respondents. The ankles and feet demonstrated the highest frequency of pain (M = 3.60, SD = 0.51), followed closely by the knees (M = 3.59, SD = 0.51), suggesting that weight-bearing joints bear the greatest burden from water carrying activities. The lower back also showed elevated pain frequency (M = 3.54, SD = 0.66), as did the arms and elbows (M = 3.52, SD = 0.51), reflecting the combined stress of load bearing and lifting motions. The shoulders (M = 3.27, SD = 0.78) and upper back (M = 3.19, SD = 0.71) exhibited moderate-high frequencies, while the hips and thighs (M = 3.15, SD = 1.01) and wrists and hands (M = 3.11, SD = 0.95) showed comparatively lower but still substantial pain frequencies. Notably, the lower standard deviations observed in the knees, ankles,

feet, and arms indicate consistent daily discomfort among affected individuals, whereas the higher variability in hips, thighs, wrists, and hands.

Effects of Pain or Discomfort from Water Collection on Activities and Strain

The study examined the functional consequences of musculoskeletal pain and discomfort resulting from water collection activities, assessing how physical strain interferes with daily responsibilities and livelihoods with findings presented in Table 6.

Household chores were most commonly affected, reported by 74.38% (n = 238) of respondents, followed by work or farm tasks at 62.81% (n = 201). Childcare responsibilities were impacted for 53.75% (n = 172) of respondents, while sleeping or rest was affected for 35.94% (n = 115). Social participation was disrupted for 26.88% (n = 86), and only 10.94% (n = 35) reported that their activities were unaffected by pain.

Table 6: Effects of pain or discomfort from water collection on activities and strain

Indicator	Frequency (n)	Percentage (%)
Activities affected		
Household chores	238	74.38
Childcare responsibilities	172	53.75
Sleeping/rest	115	35.94
Work/farm tasks	201	62.81
Social participation	86	26.88
None of the above	35	10.94
Treatment or remedy sought		
Yes	142	44.38
No	178	55.63
Perceived physical strain of fetching water		
No strain	8	2.50
Mild strain	32	10.00
Moderate strain	67	20.94
Severe strain	145	45.31
Extreme strain	68	21.25

Source: Research Data (2026)

Regarding healthcare utilization, 44.38% (n = 142) sought treatment or remedies

for their discomfort, while the majority (55.63%, n = 178) did not seek medical

intervention. Perceived physical strain from fetching water was predominantly severe or extreme, with 45.31% (n = 145) rating their strain as severe and 21.25% (n = 68) as extreme. Moderate strain was reported by 20.94% (n = 67), mild strain by 10.00% (n = 32), and only 2.50% (n = 8) reported experiencing no physical strain.

Psychological Health Impacts

Water scarcity generated profound psychological morbidity. All

eight measured stress indicators yielded mean scores above 4.0 on a 5-point scale. Physical signs of stress (headache, tiredness) were most frequently reported ($M = 4.80$, $SD = 0.41$), followed by anger and frustration when water was insufficient ($M = 4.72$, $SD = 0.45$). Sleep disturbances ($M = 4.46$, $SD = 0.79$), concentration difficulties ($M = 4.44$, $SD = 0.78$), and social withdrawal ($M = 4.42$, $SD = 1.18$) were also highly prevalent (Table 4).

Table 4: Psychological stress and anxiety related to water scarcity

Statement	Mean	SD
I experienced physical signs of stress (headache, tiredness) due to water problems	4.80	0.41
I felt angry or frustrated when water was insufficient for household needs	4.72	0.45
I had trouble sleeping because of water-related worries	4.46	0.79
I was unable to concentrate on daily tasks due to worries about water	4.44	0.78
I avoided certain social or family activities because I needed to fetch water	4.42	1.18
I felt helpless or powerless about my water situation	4.31	1.16
I felt overwhelmed by the time and effort required to fetch water	4.14	1.38
I felt nervous or anxious because I didn't know if water would be available	4.04	0.97

Scale: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very Often.

Source: Research Data (2026)

Qualitative findings further demonstrated the emotional and psychological burden associated with water scarcity. Participants narrated that water shortages were “emotionally draining” and “so stressful and a waste of time.” They explained that anxiety became more pronounced during dry seasons, particularly when concerns about the safety of stored water disrupted sleep. One participant narrated, “when women leave water outside, the snake will come and drink the water, which affects sleep.” The health worker similarly reported that stress and depression were common among women, linking these experiences to household responsibilities and financial pressures. As the health worker explained, “Some women have roles in their family to play which makes

them stress themselves in terms of economic factor.”

Infectious Disease, Hygiene Compromise and Health-Seeking Behavior

Self-reported morbidity patterns reflected the public health consequences of inadequate and unsafe water. Diarrhoea was the most frequently reported condition ($M = 2.44$, $SD = 0.88$), occurring between “sometimes” and “often.” Genitourinary infections, including urinary tract and vaginal infections, were also prevalent ($M = 2.10$, $SD = 0.82$). Skin infections ($M = 1.73$, $SD = 0.99$) and eye infections ($M = 1.61$, $SD = 0.88$) were regularly reported (Table 5).

Despite the high burden of water-related illness, respondents expressed limited confidence in the safety of their

drinking water. Only 8.8% reported that their drinking water was always safe, whereas 14.4% considered it never safe. In addition, 77.5% had sought medical treatment for a water-related illness within the preceding year. Water scarcity also compromised hygiene practices, with 83.8% reporting reduced personal

hygiene during periods of shortage. FGD participants further narrated that inadequate water availability affected menstrual and postpartum hygiene, noting that *“menstrual hygiene is also a problem especially during postpartum care.”*

Table 5: Self-reported health conditions and health-seeking behavior

Indicator	Category	Frequency (n)	Percent (%)
Perceived water safety	Yes, always	28	8.8
	Most of the time	74	23.1
	Sometimes	102	31.9
	Rarely	70	21.9
	No, never	46	14.4
Sought treatment (past year)	Yes	248	77.5
	No	72	22.5
Physical strain from fetching water	No strain	8	2.5
	Mild	32	10.0
	Moderate	67	20.9
	Severe	145	45.3
	Extreme	68	21.3

Source: Research Data (2026)

The health worker reported that malaria, typhoid, and dysentery were among the common illnesses presented at the health facility. Skin infections were also associated with exposure to contaminated irrigation water. The health worker explained that *“Most cases of skin infection are caused by contaminated water... Many people also use*

contaminated water for cooking and drinking.”

Association Between Water Scarcity and Health Impacts

Chi-square tests were conducted to examine the association between water scarcity and the reported health outcomes. The findings are presented in Table 6.

Table 6: Chi-Square test results for association between water scarcity and reported health impacts

Health Impact	χ^2	df	p-value
Diarrhoea (self/household member)	16.42	1	< 0.001
Skin infections (rashes, sores, itching)	12.58	1	< 0.001
Eye infections (redness, irritation)	9.87	1	0.002
Genitourinary infections (UTIs, vaginal)	11.31	1	0.001
Musculoskeletal pain (from water collection)	25.64	1	< 0.001
Mental health stress/anxiety	32.10	1	< 0.001

The results show statistically significant associations across all measured health

outcomes. Water scarcity was significantly associated with diarrhoea (χ^2

= 16.42, $df = 1$, $p < 0.001$), skin infections ($\chi^2 = 12.58$, $df = 1$, $p < 0.001$), eye infections ($\chi^2 = 9.87$, $df = 1$, $p = 0.002$), genitourinary infections ($\chi^2 = 11.31$, $df = 1$, $p = 0.001$), musculoskeletal pain associated with water collection ($\chi^2 = 25.64$, $df = 1$, $p < 0.001$), and mental health stress/anxiety ($\chi^2 = 32.10$, $df = 1$, $p < 0.001$). The findings indicate that each of the examined health outcomes had a statistically significant relationship with water scarcity.

Discussion

Water scarcity as a multidimensional women's health problem

The findings demonstrate that water scarcity in Baringo South is not simply a problem of insufficient water volume. It produces a chain of physical, infectious, reproductive, nutritional and psychological consequences. The high scores recorded for hygiene, reproductive health, body pain and stress indicate that the burden reaches multiple dimensions of women's health simultaneously. This interpretation is consistent with the broader water-insecurity literature, which conceptualizes water access as an environmental determinant of physical health, psychosocial well-being, household functioning and social participation (Bisung & Elliott, 2017; Kimutai et al., 2023).

The cumulative data revealed that 92.8% of respondents experienced water scarcity as frequent or persistently severe provides an important explanation for the intensity of the reported health burden. Chronic exposure differs from an isolated drought episode because women repeatedly encounter the same collection demands, source uncertainty and household trade-offs. The thesis shows that 67.2% of respondents reported increased time spent collecting water,

55.6% increased financial costs, 47.5% greater emotional or physical stress, 44.7% reduced time for childcare or rest, and 42.5% reduced engagement in income-generating activities. These effects are consistent with recent Kenyan evidence showing that water collection time imposes substantial opportunity costs on household welfare and well-being (Cook et al., 2024).

The findings also reveal a clear gender dimension to the burden of water scarcity. Women are not only affected by inadequate household water supplies; they often compensate for shortages through increased physical labour. Limited or unreliable water infrastructure therefore translates into additional unpaid work, particularly through water collection, household hygiene, food preparation, and caregiving. This gendered burden is consistent with WHO/UNICEF evidence showing that women and girls remain primarily responsible for water collection in two out of three households without water on the premises. The findings from Baringo South therefore demonstrate how inadequate water access can reinforce existing gender inequalities through the unequal distribution of household labour.

Reproductive health and menstrual hygiene

Difficulty maintaining personal hygiene during menstruation or childbirth recorded the highest perceived health-impact score ($M = 4.88$, $SD = 0.63$), followed by reproductive health problems associated with inadequate water access ($M = 4.69$, $SD = 0.64$). These findings are consistent with evidence from western Kenya, where pregnant and postpartum women reported that water insecurity created stress and constrained personal hygiene, food preparation, and maternal care (Collins et al., 2019).

The findings also correspond with global evidence linking menstrual health to adequate WASH conditions. WHO recognizes access to appropriate water, sanitation, hygiene facilities, and menstrual materials as important components of menstrual health and dignity. In Baringo South, limited water availability may therefore force women to prioritize drinking and cooking needs over bathing, washing reusable menstrual materials, and maintaining reproductive hygiene. This trade-off may increase the practical difficulties women face during menstruation and the postpartum period. The high score for reproductive health problems requires cautious interpretation. The study assessed women's self-reported experiences and perceptions rather than clinically confirmed diagnoses. The finding consequently indicates a substantial perceived and lived burden but does not establish the presence of specific reproductive infections or other clinically diagnosed conditions.

Musculoskeletal disorders and physical strain

The 75% prevalence of musculoskeletal discomfort in at least one body region demonstrates that water collection creates a substantial physical health burden. The high prevalence of neck and knee complaints and the widespread involvement of the back, shoulders and upper limbs suggest that water collection affects the whole musculoskeletal system rather than producing a single localized pain syndrome. The finding is remarkably similar to evidence from northeastern Ethiopia, where 72.5% of 618 water-carrying women reported musculoskeletal symptoms during the preceding year (Berihun et al., 2024).

The distribution of affected body regions is also biomechanically plausible.

Water containers create repetitive load-bearing and lifting demands, while long-distance walking introduces repeated stress on the knees, ankles, feet and lower back. Head, back, shoulder and hand carriage can further increase strain across the cervical and lumbar spine and upper limbs. Previous systematic evidence has linked water carrying to musculoskeletal disability affecting the neck, back, hips and lower limbs (Geere et al., 2018). The current study extends that evidence to Baringo South by demonstrating the extent to which discomfort interferes with daily activities.

The functional consequences were especially important. Almost three-quarters of respondents reported interference with household chores, 62.81% with work or farm tasks, and more than half with childcare. More than one-third reported effects on sleep or rest. This suggests that water-related musculoskeletal morbidity may create a feedback mechanism: women collect water to support household functioning, but the resulting pain reduces their ability to perform the same household and livelihood activities. The findings from rural Kenya reported in Cook et al. (2024) support the broader proposition that reducing water-collection time improves reported happiness and releases substantial time for household and social activities.

The treatment-seeking findings deserve attention. Although 44.38% of women with discomfort sought treatment or remedies, 55.63% did not. This may reflect normalization of pain, competing domestic demands, financial limitations, distance to health facilities or limited recognition of recurrent water-carrying pain as a condition requiring professional care. The result reinforces the value of incorporating screening and counselling for musculoskeletal problems

into primary healthcare services in water-stressed communities.

Infectious diseases and hygiene-related morbidity

Diarrhoea was the most frequently reported health condition ($M = 2.44$, $SD = 0.88$), with a statistically significant association between water scarcity and diarrhoeal illness ($\chi^2 = 16.42$, $p < .001$). This finding is consistent with the established relationship between inadequate water quantity, poor water quality, and enteric disease transmission. WHO identifies faecally contaminated drinking water as an important pathway for the transmission of diarrhoea, cholera, dysentery, and typhoid.

Evidence from Baringo provides further context for this association. Kurui et al. (2017) reported microbial contamination in water pans and temporal variation in microbial indicators, particularly during dry periods. Osiemo et al. (2019) also documented contamination at both water sources and household points of use in Marigat.

Water scarcity may also affect health through reduced hygiene practices rather than drinking-water exposure alone. Limited supplies can restrict handwashing, bathing, utensil cleaning, and laundering, increasing vulnerability to infections. This provides a plausible context for the significant associations between water scarcity and skin infections ($\chi^2 = 12.58$, $p < .001$) and eye infections ($\chi^2 = 9.87$, $p = .002$). These findings are consistent with WHO evidence linking adequate household water access with hygiene practices that reduce infection risks.

Genitourinary infections were also significantly associated with water scarcity ($\chi^2 = 11.31$, $p = .001$), with a mean frequency score of 2.10. This finding corresponds with the study's evidence on menstrual and reproductive hygiene

challenges. Limited water availability can constrain bathing, personal cleansing, and menstrual hygiene management, particularly when households prioritize scarce supplies for drinking and cooking. The findings therefore indicate that the health effects of water scarcity extend beyond enteric diseases to conditions associated with inadequate personal and reproductive hygiene.

Psychological stress, anxiety and emotional burden

Psychological outcomes constituted some of the most pronounced findings in the study. Physical stress symptoms recorded the highest mean score (4.80), followed by anger and frustration (4.72), sleep disturbance (4.46), and difficulty concentrating (4.44). Mental health stress and anxiety also demonstrated the strongest association with water scarcity ($\chi^2 = 32.10$, $p < .001$), indicating that persistent uncertainty about household water availability may contribute to sustained psychosocial distress.

These findings are consistent with evidence from other settings. Kimutai et al. (2023), in a synthesis of quantitative studies, reported a significant association between water insecurity and common mental-health symptoms, particularly depression and anxiety. Similarly, qualitative research from western Kenya found that uncertainty over water availability, repeated collection trips, and pressure to meet household needs contributed to psychological stress among women (Collins et al., 2019). More recent evidence from Kenya also links water insecurity and inadequate sanitation among women with emotional suffering, daily stress, and relational difficulties (Kimutai et al., 2025). The present findings extend this evidence by showing how psychological distress in Baringo

South is closely intertwined with recurrent physical labour and uncertainty over water supplies. Beyond anxiety, women experienced anger, helplessness, social withdrawal, difficulty concentrating, and sleep disturbance, indicating that water scarcity affects several dimensions of psychological well-being.

Social withdrawal can also be understood as a consequence of the time burden associated with water collection. Time spent travelling to distant water sources and queuing for water reduces the time available for family interaction, social participation, and rest. This interpretation is consistent with evidence from Kenya showing that improved access to water can free up time for leisure and social activities (Bisung & Elliott, 2018). Thus, water scarcity carries a psychosocial opportunity cost, as prolonged water collection can limit women's opportunities for social engagement and activities that support emotional well-being.

Conclusion

Water scarcity in Baringo South Constituency was associated with a substantial and multidimensional burden on women's health, including musculoskeletal discomfort, infectious and hygiene-related conditions, psychological distress, and self-reported reproductive-health and menstrual-hygiene challenges. Three-quarters of the women reported musculoskeletal discomfort, while diarrhoea was the most frequently reported health condition. Mental stress and anxiety showed the strongest statistical association with water scarcity. The reproductive-health findings represent self-reported experiences and should not be interpreted as clinically diagnosed conditions.

Overall, the findings demonstrate that water scarcity extends beyond inadequate water availability to affect multiple dimensions of women's health and daily well-being. The physical demands of water collection, reliance on potentially unsafe water sources, difficulties maintaining hygiene, and persistent psychological strain collectively characterize the health burden associated with water insecurity among women in Baringo South Constituency.

Recommendations

First, the County Government of Baringo and relevant national agencies should prioritize reliable domestic water infrastructure in communities experiencing recurrent scarcity, with particular attention to borehole rehabilitation, strategically located water points, piped distribution and climate-resilient rainwater harvesting.

Second, water interventions should explicitly reduce the physical burden on women. Water carts, roller drums, closer collection points and improved lifting and carrying practices can reduce load-related injury while longer-term infrastructure reduces the need for repeated manual transport.

Third, household water-safety programmes should strengthen treatment, safe storage and hygiene practices. This recommendation is supported by the finding that only 11.9% of households reported always treating drinking water and by the extensive microbial contamination identified in household supplies.

Fourth, reproductive and menstrual-health services should integrate WASH considerations, including access to sufficient water for bathing, cleaning menstrual materials and maintaining hygiene during pregnancy, childbirth and the postpartum period.

Fifth, county health services should incorporate routine screening for musculoskeletal pain and psychosocial distress in water-stressed communities. Community health workers can provide basic psychosocial support and referral, particularly for women reporting persistent anxiety, sleep disturbance, helplessness or depressive symptoms.

Sixth, women should have meaningful representation in community water-management committees and decisions concerning water-point location, service reliability, user fees and maintenance. Such participation can help align water governance with the daily realities documented in this study.

Finally, future research should use longitudinal designs and, where feasible, clinical outcome measures to distinguish short-term perceptions from diagnosed health conditions and to assess how sustained improvements in water access affect women's health over time.

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