

# Socioeconomic, Environmental, and Health-System Factors Associated with Healthcare-Seeking in Natitingou Municipality, Benin: A Cross-Sectional Study in 2025

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**How to cite this paper:** Yeni, M.F., Houeto, D., Tokpanoude, I.C.N., Lorens, Z.S., Djossou, S.E.E., Akpovi, H.E., Barikissou, G.D., Padonou, G. and Aguemon, B. (2026) Socioeconomic, Environmental, and Health-System Factors Associated with Healthcare-Seeking in Natitingou Municipality, Benin: A Cross-Sectional Study in 2025. *Health*, **18**, 902-918. <https://doi.org/10.4236/health.2026.1810057>

**Received:** August 13, 2026

**Accepted:** October 17, 2026

**Published:** October 20, 2026

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## Abstract

**Introduction:** Socioeconomic, environmental, and health-system inequalities can each shape health service utilization. In Benin, despite ongoing efforts to improve access to care, disparities persist, particularly in rural and peripheral areas. This study set out to identify the sociodemographic, socioeconomic, environmental, and health-system factors associated with healthcare-seeking in Natitingou municipality in 2025. **Methods:** We conducted a descriptive and analytical cross-sectional study from November 22 to December 23, 2025, among 510 households in Natitingou municipality, Benin. Sampling followed a two-stage cluster design: 30 clusters were selected through systematic probability-proportional-to-size sampling, after which 17 households were selected within each cluster using systematic, equal-probability sampling from updated householdlists. Analyses accounted for the cluster structure of the design. Bivariate associations were assessed using the Rao-Scott  $\chi^2$  test, followed by binary logistic regression and a Firth penalized-likelihood sensibility analysis. **Results:** Overall, 72.35% of households had used a health facility during their most recent illness episode. After adjustment for the cluster design, three factors remained significantly associated with healthcare-seeking. Households more than 60 minutes from a health facility had lower odds of seeking care

than those within 30 minutes (aOR = 0.31; 95% CI: 0.10 - 0.98;  $p = 0.046$ ). Households reporting distrust of health facilities had higher odds of seeking care (aOR = 9.13; 95% CI: 2.32 - 35.89;  $p = 0.003$ ). Households perceiving the distribution of health resources as inequitable had markedly lower odds of seeking care than those perceiving it as equitable (aOR = 0.02; 95% CI: 0.005 - 0.089;  $p < 0.001$ ). The Firth sensitivity analysis yielded a less extreme estimate for this last association (aOR  $\approx$  0.025; 95% CI: 0.009 - 0.065), while preserving the same direction of effect. **Conclusion:** In Natitingou, healthcare-seeking was associated with geographic accessibility, trust in health facilities, and perceived equity in the distribution of health resources. Only a travel time exceeding 60 minutes remained significantly associated with lower care-seeking after adjustment, whereas the 30 - 60-minute category was not statistically significant. The observed associations, particularly those involving trust and perceived equity, should be interpreted cautiously given the cross-sectional design and the sparseness of certain categories.

## Keywords

Healthcare-Seeking, Access to Care, Social Health Inequalities, Geographic Accessibility, Equity, Trust, Natitingou, Benin

## 1. Introduction

Social inequalities in healthcare-seeking are reflected in disparities in life expectancy and quality of care, shaped by income, education, gender, ethnicity, and housing. These inequalities follow a well-documented “social gradient”: the lower an individual’s social position, the poorer their health status tends to be, further compounding vulnerability [1] [2].

In sub-Saharan Africa, 75% of the population has no access to any form of social protection [3], and where such systems do exist, they are typically characterized by limited coverage, marked regional disparities, and considerable heterogeneity in the benefits provided [3]. Many developing countries have implemented measures that have had a positive impact on reducing these inequalities, without succeeding in eliminating them entirely. The literature suggests that narrowing inequalities in access to care in developing countries depends on a combination of interventions. Fee-exemption policies and health insurance schemes act mainly on financial barriers [4] [5], while strengthening primary care, community health workers, and outreach strategies help reduce geographic and organizational barriers [6]. Taken together, this body of evidence shows that improving average access to care does not necessarily translate into a reduction in social inequalities in access. Ethiopia’s experience illustrates this well: health insurance has been shown to increase service utilization, yet disparities persist by place of residence and educational level [7]. Reducing inequalities in access to care therefore appears to require combining financial interventions with measures that target the geographic, social,

and environmental determinants of access.

Since 2009, the Government of Benin has pursued a series of measures aimed at strengthening social protection, including free cesarean delivery in public hospitals (Decree No. 2009-96 of March 30, 2009) [8], enhanced maternal care services, a stated commitment to Universal Health Coverage (UHC) under the National Health Development Plan (PNDS) [9], expansion of the primary healthcare network, and targeted support for low-income populations through the Single Social Registry (RSU) [10]. While these measures have had a demonstrable positive effect on healthcare-seeking, disparities persist: wealthier households remain free to consult the facility of their choice, whereas lower-income households are largely confined to basic care at first-line centers and often delay seeking care because of socioeconomic constraints [11].

Natitingou, a municipality in the Atacora department of northern Benin, spans 3045 km<sup>2</sup> and comprises nine arrondissements, with an estimated population exceeding 129,844 in 2025 [12]. Across its 65 villages and city neighborhoods, distributed over its 9 arrondissements, the municipality counts 17,772 registered households [13]. The local economy is dominated by agriculture [13], supplemented by small-scale trade, craft production (blacksmithing, weaving, sculpture), and tourism centered on Pendjari National Park [13]. These activities generate modest household incomes, sustaining a degree of financial precarity that shapes how families navigate illness. Higher-income households tend to seek care as soon as symptoms appear, whereas lower-income households more often turn first to self-medication or traditional healers [11]. This study set out to identify the sociodemographic, socioeconomic, environmental, and health-system factors associated with the use of health facilities in Natitingou municipality in 2025.

## 2. Materials and Methods

### 2.1. Study Setting

The study was conducted in Natitingou municipality, in the Atacora department of northern Benin.

### 2.2. Study Design and Period

We conducted a descriptive and analytical cross-sectional study from November 22 to December 23, 2025.

### 2.3. Study Population and Sampling

The statistical unit was the household, and the respondent was the head of household or, in his or her absence, an adult representative. Individuals unable to respond because of a serious health condition were excluded. The minimum sample size was calculated using Schwartz's formula, based on a healthcare-utilization prevalence of 33% reported in a Cameroonian study by Commeyras *et al.* [14], a type I error ( $\alpha$ ) of 5%, and a precision of 5%:

$$n = Z^2 \cdot p \cdot q / d^2 = (1.96)^2 \times 0.33 \times 0.67 / (0.05)^2 \approx 340 \text{ households}$$

Applying a design effect of 1.5 increased this figure to  $340 \times 1.5 \approx 510$  households.

Sampling followed a two-stage cluster design. At the first stage, the sampling frame comprised the 65 villages and city neighborhoods of Natitingou municipality. Thirty clusters were selected through systematic probability-proportional-to-size sampling; a village whose number of households was markedly larger than that of other villages could accordingly be represented by two clusters. With a total of 17,772 households in the municipality (INSAE, 2016), the sampling interval ( $k$ ) was obtained by dividing this figure by the 30 target clusters, yielding  $k = 592$ . A random number between 1 and 592 identified the first cluster, and subsequent clusters were selected by successively adding the sampling interval to the previous number until all 30 clusters had been chosen.

At the second stage, households were selected using a systematic, equal-probability sampling procedure. Before data collection began in each cluster, an updated household list was obtained from municipal authorities. This list was then verified through prior field reconnaissance to delineate the cluster, confirm the existence of the recorded households, and limit omissions or double counting. All households enumerated within each cluster were numbered sequentially, from 1 to the total number of households recorded in the cluster ( $N_g$ ). With the target number of households per cluster set at 17, the sampling interval was determined for each cluster using the formula:

$$P = N_g / 17$$

where  $P$  represents the sampling interval and  $N_g$  the total number of households enumerated in the cluster. A random starting point was then determined within the first sampling interval by lottery draw, and households were selected at regular intervals corresponding to the sampling interval until the required 17 households had been obtained.

Because second-stage selection relied on an updated household list within each cluster, the conditional probability of household selection within a cluster could be calculated. Updated household counts by village or neighborhood were not available in the municipal-level sampling frame prior to cluster selection, however, so the overall individual selection probabilities (and, in turn, final sampling weights) could not be precisely calculated. No sampling weighting was therefore applied in the analysis. To account for intra-cluster correlation, the cluster was instead treated as the primary sampling unit, and standard errors were corrected accordingly in the statistical analyses.

### 3. Variables

The dependent variable was healthcare-seeking, a dichotomous variable (yes/no) defined as consultation of a formal health facility (a health center, referral or departmental hospital, or private clinic) by at least one household member who had experienced an illness episode in the two weeks preceding the survey. The inde-

pendent variables spanned four domains: i) sociodemographic characteristics (age, sex, ethnicity, religion, educational level, occupation); ii) socioeconomic characteristics (household type and size, monthly income, and composite socioeconomic status as measured by the EMICOV score); iii) physical environment and behaviors (household cleanliness, housing type, presence of latrines, access to safe drinking water, paved roads, recreational facilities, trust in the health system, forgone care, alcohol and tobacco use, and physical activity); and iv) factors related to the health system and the illness episode (travel time between the household and the nearest health facility, transportation cost, type of condition, perceived severity, cost of care, perceived quality of care, and perceived equity of resource distribution). During data collection, healthcare-seeking in the two weeks preceding the survey was assessed before respondents were asked about their trust in health facilities, perceived quality of care, and views on the equity of health-resource distribution.

Socioeconomic status was measured using the EMICOV score (Integrated Modular Survey on Household Living Conditions), a composite index built from 12 components: the primary construction material of the dwelling's exterior walls, household size, the main source of lighting, the number of rooms used for sleeping, the primary cooking fuel, ownership of a motorcycle, moped, or car, the number of mobile phones owned, tenure status of a subdivided, built, or irrigated plot of land, ownership of a television or VCD/DVD player, radio ownership, educational level, and occupation. Each response category was assigned a point value between 0 and 50, and the sum across all 12 components yielded a total score with a theoretical maximum of 115 points. This score was then expressed as a percentage of the maximum: EMICOV score (%) = (score obtained/115) × 100. Based on the thresholds defined by the instrument, socioeconomic status was classified as high (≥85%), medium (50% - 85%), or low (≤50%).

#### 4. Data Collection and Analysis

Data were collected through face-to-face interviews using a structured questionnaire, administered by five interviewers who had received prior training on the study's objectives, interview techniques, and questionnaire content. Analyses were performed in RStudio, version 4.6.1. The distribution of age was examined using descriptive statistics and graphical inspection; given its skewness, age is reported as a median with interquartile range (IQR), but was entered as a categorical variable in the association analyses. Qualitative variables are reported as frequencies and proportions. Associations between healthcare-seeking and categorical explanatory variables were assessed using the Rao-Scott  $\chi^2$  test, which accounts for the cluster sampling design. Binary logistic regression was then used to identify factors associated with healthcare-seeking. The adjustment set was defined a priori on conceptual grounds and comprised sociodemographic characteristics (age and sex), socioeconomic status, household size, geographic accessibility to care (road conditions and travel time), and select health-system-related perceptions, trust in health facilities and perceived equity in the distribution of health re-

sources; no backward elimination procedure was applied. Associations are expressed as odds ratios (OR) with 95% confidence intervals (95% CI). Two multi-variable models were fitted: a conventional model based on a simple analytic design, and a model accounting for the cluster structure of the sample, the latter serving as the primary model. In this model, the cluster was treated as the primary sampling unit, and standard errors were corrected to account for intra-cluster correlation. No missing data were observed among the variables included in the model, and no imputation was therefore necessary. Categories with sparse cell counts were reviewed prior to the multivariable analysis. Perceived quality of care was excluded from the main model because of a poorly represented category and a null cell for non-utilization. Given the small number of households that had not sought care within the “equitable” category of perceived equity in the distribution of health resources ( $n = 5$ ), a sensitivity analysis was conducted to assess the robustness of the observed association. A Firth penalized-likelihood logistic regression was applied to limit the bias in estimates arising from small cell counts and rare events; this sensitivity model included the same adjustment variables as the main model, with results expressed as adjusted odds ratios (aOR) and 95% confidence intervals. Statistical significance was set at  $p < 0.05$ .

## 5. Ethical Considerations

The study protocol was first submitted to the Biomedical Research Ethics Committee of the University of Abomey-Calavi and received approval (No. 223/2025/FSS/DSP/SCOM). This approval was then presented to the administrative authorities of Natitingou municipality and to the heads of local health facilities to secure their agreement. Participation was voluntary and anonymous, and data collection was conducted under strict confidentiality.

## 6. Results

### 6.1. Sociodemographic Characteristics of the Study Population

A total of 510 households across the nine arrondissements of Natitingou were surveyed, with the largest numbers drawn from Natitingou III and Perma (102 households each). Respondents had a median age of 33 years (IQR: 26 - 43; range: 18 - 85 years). For the descriptive analysis, participants were grouped into three age categories: under 35 years, 35 - 54 years, and 55 years or older. Educational level was significantly associated with healthcare-seeking ( $F = 5.656$ ;  $p = 0.004$ ): care-seeking was reported by 78.10% of respondents with no formal education, compared with 66.34% of those with a primary education, 65.75% of those with a secondary education, and only 38.10% of those with a higher education. A similar gradient emerged for occupation ( $F = 11.047$ ;  $p < 0.001$ ), with care-seeking highest among farmers/herders (87.35%) and homemakers (77.89%), and lowest among craftspeople/laborers (64.37%), traders (60.00%), civil servants (69.77%), pupils/students (48.28%), and the “other” category (40.00%) (**Table 1**).

**Table 1.** Association between sociodemographic factors and healthcare-seeking in the Natitingou population.

| Health service utilization |             |            |       | Rao-Scott     |                  |
|----------------------------|-------------|------------|-------|---------------|------------------|
|                            | Yes n (%)   | No n (%)   | Total | F             | p                |
| <b>Age</b>                 |             |            |       | <b>1.996</b>  | <b>0.154</b>     |
| <34                        | 117 (75.0)  | 39 (25.0)  | 156   |               |                  |
| 35 - 54                    | 209 (68.75) | 95 (31.25) | 304   |               |                  |
| ≥55                        | 43 (86.0)   | 7 (14.0)   | 50    |               |                  |
| <b>Sex</b>                 |             |            |       | <b>0.851</b>  | <b>0.364</b>     |
| Male                       | 197 (75.19) | 65 (24.81) | 262   |               |                  |
| Female                     | 172 (69.35) | 76 (30.65) | 248   |               |                  |
| <b>Religion</b>            |             |            |       | <b>0.800</b>  | <b>0.449</b>     |
| Christian                  | 234 (71.12) | 95 (28.88) | 329   |               |                  |
| Muslim                     | 47 (68.12)  | 22 (31.88) | 69    |               |                  |
| Traditional/indigenous     | 88 (78.57)  | 24 (21.43) | 112   |               |                  |
| <b>Educational level</b>   |             |            |       | <b>5.656</b>  | <b>0.004</b>     |
| No formal education        | 246 (78.10) | 69 (21.90) | 315   |               |                  |
| Primary                    | 67 (66.34)  | 34 (33.66) | 101   |               |                  |
| Secondary                  | 48 (65.75)  | 25 (34.25) | 73    |               |                  |
| Higher education           | 8 (38.10)   | 13 (61.90) | 21    |               |                  |
| <b>Occupation</b>          |             |            |       | <b>11.047</b> | <b>&lt;0.001</b> |
| Farmers/herders            | 145 (87.35) | 21 (12.65) | 166   |               |                  |
| Craftspeople/laborers      | 56 (64.37)  | 31 (35.63) | 87    |               |                  |
| Traders                    | 42 (60.00)  | 28 (40.00) | 70    |               |                  |
| Civil servants             | 30 (69.77)  | 13 (30.23) | 43    |               |                  |
| Homemakers                 | 74 (77.89)  | 21 (22.11) | 95    |               |                  |
| Pupils/students            | 14 (48.28)  | 15 (51.72) | 29    |               |                  |
| Other *                    | 8 (40.00)   | 12 (60.00) | 20    |               |                  |

\*Drivers (n = 4), self-employed professionals (n = 6), social media influencers (n = 4), and religious workers (n = 6); self-employed professionals comprise independent consultants and entrepreneurs.

## 6.2. Association between Socioeconomic Characteristics and Healthcare-Seeking

Household type was significantly associated with care-seeking ( $F = 11.345$ ;  $p = 0.002$ ): 89.0% of polygamous households sought care during the most recent illness episode, compared with 68.3% of monogamous households. Household size showed a similar pattern ( $F = 7.391$ ;  $p = 0.001$ ), with care-seeking rising steadily from 61.2% among households of fewer than 3 members to 60.9% among those with 3 - 4 members, 67.9% among those with 5 - 7 members, and 85.7% among those with 8 or more members. Socioeconomic status was also significantly associated with care-seeking ( $F = 6.302$ ;  $p = 0.018$ ): 76.6% of households of medium socioeconomic status sought care, compared with 58.7% of those of low status;

no household reached the threshold for high socioeconomic status under the EMICOV score's criteria (**Table 2**).

**Table 2.** Association between socioeconomic characteristics and healthcare-seeking.

| Health service utilization  |             |            |       | Rao-Scott |       |
|-----------------------------|-------------|------------|-------|-----------|-------|
|                             | Yes n (%)   | No n (%)   | Total | F         | p     |
| Household type              |             |            |       | 11.345    | 0.002 |
| Monogamous                  | 280 (68.3)  | 130 (31.7) | 410   |           |       |
| Polygamous                  | 89 (89.0)   | 11 (11.0)  | 100   |           |       |
| Household size              |             |            |       | 7.391     | 0.001 |
| <3                          | 30 (61.2)   | 19 (38.8)  | 49    |           |       |
| 3 - 4                       | 78 (60.9)   | 50 (39.1)  | 128   |           |       |
| 5 - 7                       | 93 (67.9)   | 44 (32.1)  | 137   |           |       |
| ≥8                          | 168 (85.7)  | 28 (14.3)  | 196   |           |       |
| Monthly income (CFA francs) |             |            |       | 1.597     | 0.217 |
| <100,000                    | 248 (77.02) | 74 (22.98) | 322   |           |       |
| 100,000 - 200,000           | 71 (66.36)  | 36 (33.64) | 107   |           |       |
| ≥200,000                    | 50 (61.73)  | 31 (38.27) | 81    |           |       |
| Socioeconomic status        |             |            |       | 6.302     | 0.018 |
| Low                         | 71 (58.7)   | 50 (41.3)  | 121   |           |       |
| Medium                      | 298 (76.6)  | 91 (23.4)  | 389   |           |       |
| High                        | 0 (0)       | 0 (0)      | 0     |           |       |

### 6.3. Association between Environmental Characteristics and Healthcare-Seeking

Household cleanliness was significantly associated with care-seeking ( $F = 5.017$ ;  $p = 0.033$ ), with utilization higher among households reporting an unclean environment (83.33%) than among those reporting a clean one (68.28%). The presence of latrines was likewise significantly associated with utilization ( $F = 15.063$ ;  $p < 0.001$ ): 85.46% of households without latrines sought care, compared with 56.14% of those with latrines. Housing type showed a strong association ( $F = 18.261$ ;  $p < 0.001$ ), with care-seeking markedly higher among households living in mud or earthen dwellings (88.70%) than among those in brick housing (56.90%). Physical activity was also strongly and significantly associated with utilization ( $F = 19.272$ ;  $p < 0.001$ ): 79.05% of physically active individuals sought care, compared with only 41.11% of those who were not physically active (**Table 3**).

**Table 3.** Association between environmental factors, behaviors, and lifestyle habits and healthcare-seeking.

| Health service utilization |             |             |       | Rao-Scott |       |
|----------------------------|-------------|-------------|-------|-----------|-------|
|                            | Yes n (%)   | No n (%)    | Total | F         | p     |
| Household cleanliness      |             |             |       | 5.017     | 0.033 |
| Yes                        | 254 (68.28) | 118 (31.72) | 372   |           |       |
| No                         | 115 (83.33) | 23 (16.67)  | 138   |           |       |

## Continued

|                                          |             |             |     |               |                  |
|------------------------------------------|-------------|-------------|-----|---------------|------------------|
| <b>Presence of latrines</b>              |             |             |     | <b>15.063</b> | <b>&lt;0.001</b> |
| Yes                                      | 128 (56.14) | 100 (43.86) | 228 |               |                  |
| No                                       | 241 (85.46) | 41 (14.54)  | 282 |               |                  |
| <b>Access to safe water *</b>            |             |             |     | <b>0.052</b>  | <b>0.820</b>     |
| Yes                                      | 295 (72.00) | 115 (28.00) | 410 |               |                  |
| No                                       | 74 (74.00)  | 26 (26.00)  | 100 |               |                  |
| <b>Passable roads</b>                    |             |             |     | <b>1.476</b>  | <b>0.234</b>     |
| Yes                                      | 76 (62.30)  | 46 (37.70)  | 122 |               |                  |
| No                                       | 293 (75.51) | 95 (24.49)  | 388 |               |                  |
| <b>Recreational facilities</b>           |             |             |     | <b>0.867</b>  | <b>0.359</b>     |
| Yes                                      | 181 (77.35) | 53 (22.65)  | 234 |               |                  |
| No                                       | 188 (68.12) | 88 (31.88)  | 276 |               |                  |
| <b>Orderly house alignment</b>           |             |             |     | <b>1.558</b>  | <b>0.222</b>     |
| Yes                                      | 15 (60.00)  | 10 (40.00)  | 25  |               |                  |
| No                                       | 354 (72.98) | 131 (27.02) | 485 |               |                  |
| <b>Housing type</b>                      |             |             |     | <b>18.261</b> | <b>&lt;0.001</b> |
| Brick                                    | 149 (56.90) | 113 (43.10) | 262 |               |                  |
| Mud/earth                                | 220 (88.70) | 28 (11.30)  | 248 |               |                  |
| <b>Forgone care due to lack of money</b> |             |             |     | <b>0.103</b>  | <b>0.750</b>     |
| Yes                                      | 201 (71.53) | 80 (28.47)  | 281 |               |                  |
| No                                       | 168 (73.36) | 61 (26.64)  | 229 |               |                  |
| <b>Alcohol/tobacco use</b>               |             |             |     | <b>1.628</b>  | <b>0.212</b>     |
| Yes                                      | 154 (77.78) | 44 (22.22)  | 198 |               |                  |
| No                                       | 215 (68.91) | 97 (31.09)  | 312 |               |                  |
| <b>Physical activity</b>                 |             |             |     | <b>19.272</b> | <b>&lt;0.001</b> |
| Yes                                      | 332 (79.05) | 88 (20.95)  | 420 |               |                  |
| No                                       | 37 (41.11)  | 53 (58.89)  | 90  |               |                  |

\*Represents access to water supplied by the National Water Company of Benin (Société Nationale des Eaux du Bénin, SONEB) or to borehole water.

#### 6.4. Association between Health-System-Related Factors and Healthcare-Seeking

Travel time between the household and the nearest health facility was significantly associated with care-seeking ( $F = 5.131$ ;  $p = 0.009$ ), as were the type of first-line facility consulted ( $F = 17.665$ ;  $p < 0.001$ ), the cadre of the health professional providing first contact ( $F = 5.776$ ;  $p = 0.002$ ), and perceived equity in the distribution of health resources ( $F = 55.888$ ;  $p < 0.001$ ). Care-seeking was most frequent among households living less than 30 minutes from a facility (87.43%), compared with those 30 - 60 minutes away (62.04%) or more than 60 minutes away (65.15%). Utilization was also markedly higher among households who perceived health-resource distribution as equitable (97.36%) than among those who perceived it as inequitable (57.50%) (**Table 4**).

**Table 4.** Association between health-system-related factors and healthcare-seeking.

| Health service utilization                                   |             |             |       | Rao-Scott     |                  |
|--------------------------------------------------------------|-------------|-------------|-------|---------------|------------------|
|                                                              | Yes n (%)   | No n (%)    | Total | F             | p                |
| <b>Trust in health facilities attended</b>                   |             |             |       | <b>4.073</b>  | <b>0.053</b>     |
| No                                                           | 82 (84.54)  | 15 (15.46)  | 97    |               |                  |
| Yes                                                          | 287 (69.49) | 126 (30.51) | 413   |               |                  |
| <b>Travel time, home to health facility</b>                  |             |             |       | <b>5.131</b>  | <b>0.009</b>     |
| Short (<30 min)                                              | 174 (87.43) | 25 (12.57)  | 199   |               |                  |
| Medium (30 - 60 min)                                         | 152 (62.04) | 93 (37.96)  | 245   |               |                  |
| Long (>60 min)                                               | 43 (65.15)  | 23 (34.85)  | 66    |               |                  |
| <b>Method of payment for care</b>                            |             |             |       | <b>0.203</b>  | <b>0.656</b>     |
| Third-party payment                                          | 4 (80.00)   | 1 (20.00)   | 5     |               |                  |
| Out-of-pocket payment                                        | 365 (72.28) | 140 (27.72) | 505   |               |                  |
| <b>First-line health facility</b>                            |             |             |       | <b>17.665</b> | <b>&lt;0.001</b> |
| None (self-medication)                                       | 35 (33.02)  | 71 (66.98)  | 106   |               |                  |
| Health center                                                | 241 (100)   | 0 (0)       | 241   |               |                  |
| Referral/departmental hospital                               | 4 (100)     | 0 (0)       | 4     |               |                  |
| Private clinic                                               | 82 (100)    | 0 (0)       | 82    |               |                  |
| Traditional healer                                           | 7 (9.09)    | 70 (90.91)  | 77    |               |                  |
| <b>Health professional providing first contact</b>           |             |             |       | <b>5.776</b>  | <b>0.002</b>     |
| Nursing assistant                                            | 5 (50.00)   | 5 (50.00)   | 10    |               |                  |
| Nurse                                                        | 262 (81.11) | 61 (18.89)  | 323   |               |                  |
| Physician                                                    | 89 (58.94)  | 62 (41.06)  | 151   |               |                  |
| Midwife                                                      | 13 (50.00)  | 13 (50.00)  | 26    |               |                  |
| <b>Perception of the technical platform</b>                  |             |             |       | <b>1.081</b>  | <b>0.307</b>     |
| Good                                                         | 40 (64.52)  | 22 (35.48)  | 62    |               |                  |
| Average                                                      | 329 (73.44) | 119 (26.56) | 448   |               |                  |
| <b>Opinion on the equity of health resource distribution</b> |             |             |       | <b>55.888</b> | <b>&lt;0.001</b> |
| Inequitable                                                  | 184 (57.50) | 136 (42.50) | 320   |               |                  |
| Equitable                                                    | 185 (97.36) | 5 (2.63)    | 190   |               |                  |
| <b>Perceived quality of care</b>                             |             |             |       | <b>1.114</b>  | <b>0.332</b>     |
| Poor                                                         | 11 (100)    | 0 (0)       | 11    |               |                  |
| Satisfactory                                                 | 315 (72.58) | 119 (27.42) | 434   |               |                  |
| Very satisfactory                                            | 43 (66.15)  | 22 (33.85)  | 65    |               |                  |

### 6.5. Multivariable Analysis: Binary Logistic Regression

After adjustment for the selected covariates and accounting for the clustered sampling design, travel time to the nearest health facility, trust in health facilities, and perceived equity in the distribution of health resources remained significantly associated with healthcare-seeking. Relative to households located less than 30 minutes from a facility, those with a travel time exceeding 60 minutes had 69%

lower odds of seeking care (aOR = 0.31; 95% CI: 0.10 - 0.98;  $p = 0.046$ ). Households 30 - 60 minutes away also showed lower odds of care-seeking (aOR = 0.57; 95% CI: 0.25 - 1.31), though this association did not reach statistical significance ( $p = 0.176$ ).

Trust in health facilities was independently associated with care-seeking: households that did not trust local health facilities had 9.13-fold higher odds of seeking care than those that did (aOR = 9.13; 95% CI: 2.32 - 35.89;  $p = 0.003$ ) (**Table 5**).

Perceived equity in the distribution of health resources showed the strongest association with utilization in the model. Households who viewed this distribution as inequitable had lower odds of seeking care than those who viewed it as equitable (aOR = 0.02; 95% CI: 0.005 - 0.089;  $p < 0.001$ ). This estimate warrants cautious interpretation, however, given the sparseness of certain cells: among the 190 households who perceived resource distribution as equitable, only five did not seek care, a sparse reference-category cell that likely contributed to the instability and imprecision of the multivariable estimate. Given this sparse cell, a Firth penalized-likelihood sensitivity analysis was conducted. In the main model, households perceiving the distribution of resources as inequitable had an adjusted OR of 0.02 (95% CI: 0.005 - 0.089;  $p < 0.001$ ) relative to those perceiving it as equitable; after Firth penalization, the estimate was 0.025 (95% CI: 0.009 - 0.065). The association thus retained the same direction and remained strongly associated with care-seeking, though the penalized estimate was less extreme than that obtained through conventional logistic regression. These findings suggest that the observed association is robust to the choice of estimation method, while its magnitude should be interpreted cautiously given the limited number of events in the reference category.

**Table 5.** Multivariable logistic regression model of the determinants of healthcare-seeking (dependent variable: healthcare-seeking, yes/no) (Natitingou, 2025).

| Variable                                    | Yes n (%)  | No n (%)  | Crude OR [95% CI]  | aOR [95% CI]<br>simple design | aOR [95% CI]<br>cluster design | P            |
|---------------------------------------------|------------|-----------|--------------------|-------------------------------|--------------------------------|--------------|
| <b>Socioeconomic status</b>                 |            |           |                    |                               |                                |              |
| Medium (ref.)                               | 298 (76.6) | 91 (23.4) | 1.00               | 1.00                          | 1.00                           | –            |
| Low                                         | 71 (58.7)  | 50 (41.3) | 0.43 [0.28 - 0.67] | 1.78 [0.95 - 3.34]            | 1.78 [0.89 - 3.60]             | 0.102        |
| <b>Household size</b>                       |            |           |                    |                               |                                |              |
| <3 (ref.)                                   | 30 (61.2)  | 19 (38.8) | 1.00               | 1.00                          | 1.00                           | –            |
| 3 - 4                                       | 78 (60.9)  | 50 (39.1) | 0.99 [0.50 - 1.94] | 1.57 [0.67 - 3.70]            | 1.57 [0.66 - 3.77]             | 0.298        |
| 5 - 7                                       | 93 (67.9)  | 44 (32.1) | 1.34 [0.68 - 2.64] | 2.23 [0.94 - 5.30]            | 2.23 [0.86 - 5.80]             | 0.096        |
| ≥8                                          | 168 (85.7) | 28 (14.3) | 3.80 [1.89 - 7.65] | 3.11 [1.11 - 8.67]            | 3.11 [0.94 - 10.28]            | 0.063        |
| <b>Travel time, home to health facility</b> |            |           |                    |                               |                                |              |
| <30 min (ref.)                              | 174 (87.4) | 25 (12.6) | 1.00               | 1.00                          | 1.00                           | –            |
| 30 - 60 min                                 | 152 (62.0) | 93 (38.0) | 0.23 [0.14 - 0.38] | 0.57 [0.32 - 1.02]            | 0.57 [0.25 - 1.31]             | 0.176        |
| >60 min                                     | 43 (65.2)  | 23 (34.8) | 0.27 [0.14 - 0.52] | 0.31 [0.13 - 0.74]            | 0.31 [0.10 - 0.98]             | <b>0.046</b> |

## Continued

|                                                                 |            |            |                    |                     |                      |                  |
|-----------------------------------------------------------------|------------|------------|--------------------|---------------------|----------------------|------------------|
| <b>Passable roads</b>                                           |            |            |                    |                     |                      |                  |
| Yes (ref.)                                                      | 76 (62.3)  | 46 (37.7)  | 1.00               | 1.00                | 1.00                 | –                |
| No                                                              | 293 (75.5) | 95 (24.5)  | 1.87 [1.21 - 2.88] | 0.53 [0.30 - 0.94]  | 0.53 [0.16 - 1.75]   | 0.286            |
| <b>Trust in health facilities</b>                               |            |            |                    |                     |                      |                  |
| Yes (ref.)                                                      | 287 (69.5) | 126 (30.5) | 1.00               | 1.00                | 1.00                 | –                |
| No                                                              | 82 (84.5)  | 15 (15.5)  | 2.40 [1.33 - 4.32] | 9.13 [4.34 - 19.20] | 9.13 [2.32 - 35.89]  | <b>0.003</b>     |
| <b>Perceived equity in the distribution of health resources</b> |            |            |                    |                     |                      |                  |
| Equitable (ref.)                                                | 185 (97.4) | 5 (2.6)    | 1.00               | 1.00                | 1.00                 | –                |
| Inequitable                                                     | 184 (57.5) | 136 (42.5) | 0.04 [0.01 - 0.09] | 0.02 [0.01 - 0.06]  | 0.02 [0.005 - 0.089] | <b>&lt;0.001</b> |
| <b>Sex</b>                                                      |            |            |                    |                     |                      |                  |
| Female (ref.)                                                   | 172 (69.4) | 76 (30.6)  | 1.00               | 1.00                | 1.00                 | –                |
| Male                                                            | 197 (75.2) | 65 (24.8)  | 1.34 [0.91 - 1.98] | 1.13 [0.69 - 1.86]  | 1.13 [0.62 - 2.07]   | 0.684            |

## 7. Discussion

In our study, 72.35% of households had consulted a health facility during the most recent illness episode. This figure is close to the 70.4% care-seeking rate reported among children under five with diarrhea in Niger by Page *et al.* [15], though somewhat lower than the 79.5% reported by Bapolisi *et al.* among a rural population in the Democratic Republic of the Congo [16]. That roughly seven in ten households sought care points to substantial reliance on health services in this rural setting (a pattern that may reflect limited access to preventive resources, insufficient health information regarding disease prevention, and a degree of precarity that leaves rural populations more exposed to disease vectors. It is worth noting that the survey was conducted in a locality where no household reached the threshold for high socioeconomic status and where the local economy rests largely on agriculture [12], small-scale trade, craft production (blacksmithing, weaving, sculpture), and tourism centered on Pendjari National Park [12]) activities that generate modest incomes and sustain a financial precarity that shapes how households seek care.

Equity in the distribution of health resources emerged as an important determinant of care-seeking in our study (aOR = 0.02; 95% CI: 0.005 - 0.089;  $p < 0.001$ ). This finding is consistent with evidence from across Africa showing that regions where health resources are unevenly distributed tend to exhibit lower utilization of health services, particularly in rural areas [17]. Strengthening equity of access (through universal health coverage, financial-protection mechanisms, and a more balanced distribution of infrastructure) has been shown to help narrow such disparities in utilization [17].

The association between perceived equity in the distribution of health resources and care-seeking nonetheless warrants cautious interpretation. Among the households who perceived this distribution as equitable, five had not sought care, a sparse reference-category cell that can destabilize estimates from conventional logistic regression. The Firth penalized-likelihood sensitivity analysis produced a

less extreme estimate (aOR = 0.025; 95% CI: 0.009 - 0.065), while preserving the same direction of association. This concordance indicates that the association is not driven solely by small-sample bias, although its precise magnitude remains uncertain.

Prior research has generally found that geographic accessibility (particularly the distance between the household and the nearest health facility) constitutes a major barrier to care-seeking [18]-[20]. Our findings, however, do not fully bear this out: the association between a short travel time and care-seeking was not significant at the 5% threshold, whereas a medium-to-long travel time was significantly associated with utilization ( $p = 0.003$ ). This apparent paradox should be interpreted with caution given the cross-sectional design, which does not allow us to establish a causal mechanism. Rather than reflecting a straightforward distance effect, this pattern may capture unmeasured differences between households at different distances from care (for instance, in perceived illness severity, prior experience with local providers, or reliance on informal arrangements with health workers) that were not fully captured by the variables included in the model.

Regarding the association between trust in health facilities and care-seeking: after adjustment, households that reported distrust had higher odds of seeking care than those that reported trust (aOR = 9.13; 95% CI: 2.32 - 35.89;  $p = 0.003$ ). Several mechanisms may underlie this association. First, the perceived severity or urgency of the illness episode, which was not fully captured in the final model, may act as a confounder: a household may seek care despite low trust when the health condition is perceived as serious. Second, a measurement or temporal bias is plausible: trust was assessed after care-seeking had already been evaluated, so a household's recent experience of care may have shaped its reported level of trust. Reverse causality cannot therefore be ruled out using health services may itself expose households to positive or negative experiences that alter their subsequent trust. Unmeasured or imperfectly measured characteristics of the household or the illness episode may also contribute to this association. In this context, the elevated OR should be read as a statistical association rather than evidence that distrust causally increases care-seeking. Perceived illness severity is indeed a well-established determinant of care-seeking behavior [21] [22]. In a cross-sectional study, reverse causality remains a plausible explanation: individuals who use health facilities more often are also more exposed to their shortcomings wait times, difficulties in obtaining care, or perceived staff attitudes and may consequently develop lower trust as a result [23] [24].

In the bivariate analysis, care-seeking was less frequent among households of low socioeconomic status than among those of medium status (58.7% versus 76.6%), but this association was no longer statistically significant after adjustment (aOR = 1.78; 95% CI: 0.89 - 3.60;  $p = 0.102$ ). The bivariate result therefore does not support an independent effect of socioeconomic status on care-seeking. The association observed may instead reflect the influence of factors correlated with both socioeconomic conditions and healthcare-seeking, such as household size,

geographic accessibility, or characteristics of the illness episode. The EMICOV score is itself a composite measure incorporating educational level, occupation, housing characteristics, and asset ownership, so associations involving these related variables should be interpreted with this conceptual overlap in mind. The severity or urgency of an illness episode may also shape care-seeking behavior independently of a household's available resources. The absence of a statistically significant association after adjustment therefore argues against interpreting socioeconomic status as an independent determinant of care-seeking in this study, a conclusion broadly consistent with the multicountry analysis by Bonfrer *et al.*, conducted across 18 sub-Saharan African countries, which found that healthcare utilization was consistently higher among wealthier individuals in nearly all countries studied [25].

Care-seeking was likewise more frequent among households lacking latrines and among those living in earthen dwellings. These variables may serve as indirect markers of broader social, economic, residential, or territorial characteristics not fully captured elsewhere in the model. They may also correlate with differences in disease exposure or in the frequency of illness episodes, which could in turn affect the likelihood of consultation. The severity and urgency of an illness episode, in particular, could simultaneously influence both the emergence of a care need and the decision to seek treatment. Certain environmental variables were also based on household self-report or observation, which may be subject to misclassification. These associations should accordingly be regarded as patterns observed within this population rather than as causal relationships.

## 8. Conclusion

This study identifies associations between certain socioeconomic characteristics, perceived equity in the distribution of health resources, and the use of health facilities in Natitingou municipality. The finding for geographic accessibility, however, appears somewhat counterintuitive: only a travel time between the household and the health facility exceeding 60 minutes showed a statistically significant association with care-seeking. Improving the utilization of health services in this setting will therefore require more than simply expanding the supply of care: it will also depend on reducing social and territorial inequalities. Strengthening households' financial protection, improving physical accessibility to services, ensuring a more equitable distribution of health resources, and investing in local infrastructure are essential levers for promoting more equitable healthcare-seeking.

## Author Contributions

Conceptualization, Yeni M'po Florent and Houeto David; methodology, Houeto David and Akpovi Enangnon Hilaire; software, Tokpanoude Coovi Nonwanou Ignace; validation, Badirou Aguemou, Géraud Padonou, and Georgia Damien Barikissou; formal analysis, Tokpanoude Coovi Nonwanou Ignace and Djossou

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- [1] Wagstaff, A. (2002) Poverty and Health Sector Inequalities. *Bulletin of the World Health Organization*, **80**, 97–105.
- [2] Lang, T., Leclerc, A. and Kaminski, M. (2008) Inégaux face à la santé. Du constat à l'action. La Découverte, 297 p.  
[https://www.editionsladecouverte.fr/inegaux\\_face\\_a\\_la\\_sante-9782707147226?utm](https://www.editionsladecouverte.fr/inegaux_face_a_la_sante-9782707147226?utm)
- [3] Devereux, S. and Macauslan, I. (2006) Review of Social Protection Instruments in Malawi. Desk study for DFID Malawi.  
<https://www.ids.ac.uk/files/MalawiSocialProtectionReview.pdf?utm>
- [4] Aye, T.T., Nguyen, H.T., Petitfour, L., Ridde, V., Amberg, F., Bonnet, E., *et al.* (2024) How Do Free Healthcare Policies Impact Utilization of Maternal and Child Health Services in Fragile Settings? Evidence from a Controlled Interrupted Time Series Analysis in Burkina Faso. *Health Policy and Planning*, **39**, 891–901.  
<https://doi.org/10.1093/heapol/czae077>
- [5] Ilboudo, P.G. and Siri, A. (2023) Effects of the Free Healthcare Policy on Maternal and Child Health in Burkina Faso: A Nationwide Evaluation Using Interrupted Time-Series Analysis. *Health Economics Review*, **13**, Article No. 27.  
<https://doi.org/10.1186/s13561-023-00443-w>
- [6] Kok, M.C., Dieleman, M., Taegtmeier, M., Broerse, J.E., Kane, S.S., Ormel, H., *et al.* (2014) Which Intervention Design Factors Influence Performance of Community Health Workers in Low- and Middle-Income Countries? A Systematic Review. *Health Policy and Planning*, **30**, 1207–1227. <https://doi.org/10.1093/heapol/czu126>
- [7] Geta, E.T., Wakjira Bidika, A. and Etana, B. (2023) Does Community-Based Health Insurance Reduce Disparities in Modern Health Service Utilization among Households in Ethiopia? A Community-Based Comparative Cross-Sectional Study. *Frontiers in Public Health*, **10**, Article ID: 1021660. <https://doi.org/10.3389/fpubh.2022.1021660>
- [8] République du Bénin (2009) Décret n°2009-96 du 30 mars 2009 portant gratuité de la césarienne dans les hôpitaux publics au Bénin.
- [9] Ministère de la Santé du Bénin (2009) Plan national de développement sanitaire (PNDS) 2009-2018. Ministère de la Santé (MS).  
<https://sante.gouv.bj/bibliotheque/4-documents-de-reference?page=2&utm>
- [10] Secrétariat Général du Gouvernement du Bénin (2023) Décret No. 2023-491 du 26 septembre 2023 portant création du Registre social unique. Gouvernement du Bénin, Cotonou. <https://sgg.gouv.bj/doc/decret-2023-491/>
- [11] Mulolo Tshilumba, R. (2016) Analyse des déterminants influençant l'offre et la demande

- des services de santé dans la ville de Lubumbashi. Mémoire de Master, Université de Lubumbashi.  
[https://ccsc-  
rdc.com/doc/M%C3%A9moire%20ESP%20UNILU%20analyse%20des%20d%C3%A9terminants%20influençant%20l'offre%20et%20la%20demande...Dr%20Ridier.pdf?utm](https://ccsc-<br/>rdc.com/doc/M%C3%A9moire%20ESP%20UNILU%20analyse%20des%20d%C3%A9terminants%20influençant%20l'offre%20et%20la%20demande...Dr%20Ridier.pdf?utm)
- [12] Institut National de la Statistique et de la Démographie (INStAD). Statistiques démographiques et projections de la population du Bénin. INStAD, Cotonou.  
<https://instad.bj/statistiques/statistiques-demographiques>
- [13] Institut National de la Statistique et de l'Analyse Économique (2016) Cahier des villages et quartiers de ville du département de l'Atacora (RGPH-4, 2013). INSAE.  
[https://www.instad.bj/images/docs/insae-statistiques/enquetes-recensements/RGPH/1.RGPH\\_4/resultats%20finaux/Cahiers%20villages/Cahier%20des%20villages%20et%20quartiers%20de%20ville%20de%20l'Atacora.pdf](https://www.instad.bj/images/docs/insae-statistiques/enquetes-recensements/RGPH/1.RGPH_4/resultats%20finaux/Cahiers%20villages/Cahier%20des%20villages%20et%20quartiers%20de%20ville%20de%20l'Atacora.pdf)
- [14] Commeyras, C., Ndo, J.R., Merabet, O., Koné, H. and Rakotondrabé, F.P. (2005) Étude de l'accessibilité et des déterminants de recours aux soins et aux médicaments au Cameroun. *Cah Études Rech Francoph Santé*, **15**, 161-166.  
<https://catalog.ihns.org/citations/76007?utm>
- [15] Page, A., Hustache, S., Luquero, F.J., Djibo, A., Manzo, M.L. and Grais, R.F. (2011) Health Care Seeking Behavior for Diarrhea in Children under 5 in Rural Niger: Results of a Cross-Sectional Survey. *BMC Public Health*, **11**, Article No. 389.  
<https://doi.org/10.1186/1471-2458-11-389>
- [16] Bapolisi, W.A., Karemere, H., Ndogozi, F., Cikomola, A., Kasongo, G., Ntambwe, A., *et al.* (2021) First Recourse for Care-Seeking and Associated Factors among Rural Populations in the Eastern Democratic Republic of the Congo. *BMC Public Health*, **21**, Article No. 1523. <https://doi.org/10.1186/s12889-021-11313-7>
- [17] Andersen, R.M. (1995) Revisiting the Behavioral Model and Access to Medical Care: Does It Matter? *Journal of Health and Social Behavior*, **36**, 1-10.  
<https://doi.org/10.2307/2137284>
- [18] Institut National de la Statistique et de l'Analyse Économique (INSAE), ICF (2019) Cinquième Enquête Démographique et de Santé au Bénin (EDSB-V) 2017-2018. [https://instad.bj/images/docs/insae-statistiques/enquetes-recensements/EDS/2017-2018/1.Benin\\_EDSBV\\_Rapport\\_final.pdf](https://instad.bj/images/docs/insae-statistiques/enquetes-recensements/EDS/2017-2018/1.Benin_EDSBV_Rapport_final.pdf)
- [19] INS and ICF (2020) Enquête démographique et de santé du cameroun 2018. INS and ICF. <https://dhsprogram.com/pubs/pdf/fr360/fr360.pdf?utm>
- [20] World Health Organization (2023) Social Determinants of Health: Progress of the World Report on Social Determinants of Health Equity. Report by the Director-General. World Health Organization.  
[https://apps.who.int/gb/ebwha/pdf\\_files/EB154/B154\\_21-en.pdf?utm](https://apps.who.int/gb/ebwha/pdf_files/EB154/B154_21-en.pdf?utm)
- [21] Ahorlu, C.K., Koram, K.A., Ahorlu, C., De Savigny, D. and Weiss, M.G. (2006) Socio-cultural Determinants of Treatment Delay for Childhood Malaria in Southern Ghana. *Tropical Medicine & International Health*, **11**, 1022-1031.  
<https://doi.org/10.1111/j.1365-3156.2006.01660.x>
- [22] Do, S., Lohmann, J., Brenner, S., Koulidiati, J., Souares, A., Kuunibe, N., *et al.* (2020) Patterns of Healthcare Seeking among People Reporting Chronic Conditions in Rural Sub-Saharan Africa: Findings from a Population-Based Study in Burkina Faso. *Tropical Medicine & International Health*, **25**, 1542-1552. <https://doi.org/10.1111/tmi.13500>
- [23] Akafu, W., Daba, T., Tesfaye, E., Teshome, F. and Akafu, T. (2023) Determinants of Trust in Healthcare Facilities among Community-Based Health Insurance Members in the Manna District of Ethiopia. *BMC Public Health*, **23**, Article No. 171.

<https://doi.org/10.1186/s12889-023-15124-w>

- [24] Tibbels, N., Hendrickson, Z., Mills, H., Sidibé, S., Vondrasek, C. and Gurman, T. (2022) The Saliency of Trust to the Client-Provider Relationship in Post-Ebola Guinea: Findings from a Qualitative Study. *Global Health: Science and Practice*, **10**, e2100429. <https://doi.org/10.9745/ghsp-d-21-00429>
- [25] Bonfrer, I., van de Poel, E., Grimm, M. and Van Doorslaer, E. (2014) Does the Distribution of Healthcare Utilization Match Needs in Africa? *Health Policy and Planning*, **29**, 921-937. <https://doi.org/10.1093/heapol/czt074>