

# Health system factors associated with access to oral healthcare among adults in Asamankese, Eastern Region, Ghana

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## Research Article

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# Abstract

## Introduction

: The aim of this study was to assess factors associated with access to oral healthcare among adults in Asamankese, Eastern Region, Ghana.

## Materials and Methods

A cross-sectional design was used in this study involving 310 adults. Descriptive statistics were used to describe demographic characteristics of the study population. Access to oral healthcare was described using the five dimensions of access on a five-point Likert scale: affordability, availability, accessibility, accommodation and acceptability. The chi square test was used to determine association between the independent variable; health system factors and the dependent variable (access to oral healthcare). Multiple logistic regression was used to determine the strength of association between the dependent variable and independent variables. The level of statistical significance was accepted at  $p < 0.05$  at 95% confidence interval.

## Results

The results showed that access to quality oral healthcare was moderate (69%). Distance to oral health was a factor that influenced access ( $p < 0.05$ ). Affordability was the major health system factor that significantly associated with access to quality oral healthcare ( $p < 0.05$ ).

## Conclusion

The study concludes and recommends that there will be the need to setup a dental facility closer to the community, make the National Health Insurance Scheme effective to fully cover dental procedures to improve affordability. The study suggests that policy makers should consider these factors to improve access to quality oral healthcare.

## Introduction

Oral health diseases are on the increase in developing countries due to limited access to care<sup>1</sup>. The impact of poor oral health can severely impede nutrition and growth which in turn can impede quality of life in a physical, psychological and social manner<sup>2</sup>. In Ghana, the Korle-Bu Teaching Hospital recorded an increase of 75% in dental infections from 2010 to 2011.<sup>3</sup> Additionally, a study revealed that the incidence of odontogenic infection was 40.3% among patients attending the outpatient dental clinic of Korle-Bu Teaching hospital<sup>4</sup>. These studies highlight the need for improved access to oral healthcare.

While there is no data on access to oral health care in Ghana, in most African countries, the proportion of people who have access to proper oral healthcare was 28%<sup>5</sup>. Studies in Nigeria, South Africa, India, and China, found that access to dental care was low<sup>6-9</sup>.

Insufficient delivery system and service providers factors have been identified to affect access to oral<sup>10</sup>. Lee<sup>11</sup> indicated that an individual's eventual choice of oral healthcare, whether of a conventional service, traditional or self-medication was dependent on the financial resources available to them. However, these factors have not been examined in any study in the Asamankese township. Despite the widespread nature of oral diseases, reliable, standardised global data are limited, largely because oral health data are often not integrated into national disease surveillance, particularly in low-and middle-income countries and separate national oral health surveys are complex and costly to conduct, and hence, not prioritised<sup>12</sup>. The motivation for the conduct of this study stemmed from the professional background of the lead author. As the Dentist in the next major town from Asamankese (about 27km), it was realised that most of the patients came from Asamankese. This led to the question: why do patients travel all the way from a bigger town to access oral healthcare? The possible answers considered were to help address these questions: Was it related to lack of availability of dental facility, quality of service, operating hours, payment options, accommodating environment etc? These necessitated the need for the research since assumptions could not provide the needed empirical evidence. This study addressed this gap by analysing the issue at its roots and to find out each specific barrier confronting the adults in Asamankese. In the long run, this study would serve as an asset for policy makers as they will understand the challenges that the population encounter in accessing oral healthcare and thus, be able to formulate better policies and interventions.

## Methods

This was a cross-sectional study using quantitative methods to collect data on both males and females who were above 18 years, lived in Asamankese township and were willing to participate in the study. Data was collected by the authors and two research assistants using interviewer- administered strategy.

The study was conducted in Asamankese in the West Akyem Municipality in the Eastern Region of Ghana after approval by Ethical Review Committee of the Ghana Health(GHS/RDD/ERC/Admin/App/20/220). Permission to conduct the study was also sought from the Council of Elders of Asamankese township using the community gatekeeper strategy before commencement of the study.

The sample size (n) of 310 was calculated using the Cochrane Formula<sup>13</sup>. A 10% contingency was calculated bringing the total to 341. Community based sampling method was used in sampling the research participants. A community in Asamankese was randomly selected and a location near the centre of the community was also randomly chosen, followed by a random direction defined in the field by spinning a pen. Finally, the households along the chosen direction pointing outwards from the centre of the community were determined by tossing a coin and the occupants of the house that met the inclusion criteria were selected. These steps were repeated in the community until the sample size was met. The

dependent variable was described as access to oral healthcare, which was measured using five main dimensions of access: acceptability, accessibility, availability, accommodation and affordability on a five-point Likert scale. The independent variables were: health provider factors; availability of health service resources; geographical access, waiting time, communication and attitude of oral health personnel.

Descriptive statistics were calculated for all the variables (means and frequencies) to depict the characteristics of the study sample. After that, some of the variables were re-categorized in order to facilitate additional bivariate and regression analyses based on literature in order to make the groups more even to achieve greater statistical power.

Accommodating and affordability dimensions of access were assessed using three questions each. Highest possible score was 15. Scores 9 and below were defined as poor access, scores between 9 and 12 defined as moderate and scores above 12 defined as high. Acceptability, accessibility and availability dimensions of access were measured using four questions. Highest possible score was 20; scores 12 and below were defined as poor access; scores between 12 and 16 defined as moderate and scores above 16 defined as high.

In terms of the individual questions on all five domains (acceptability, accessibility, accommodation, availability, and affordability), the mean score below 3 was poor, mean score of 3 to 4 was moderate, and mean score of above 4 was high. The overall access to oral healthcare was assessed by summing all the questions that assessed access to oral healthcare. The combined highest possible score for all the five domains of access to oral healthcare was 100. A score of 60 or less indicated poor access, a score of 61 to 80 was moderate access and a score higher than 80 was high access.

Bivariate analysis was conducted to determine factors associated with access to oral healthcare within each domain with statistical significance set at  $p < 0.05$ , at 95% confidence interval. The standard chi-square test was used for nominal categorical variables. Variables showing significant association with access to quality oral healthcare ( $p \leq 0.05$ ) in the bivariate analysis were considered as candidates for logistic regression models for each domain separately. Multiple logistic regression models were created to identify the variables related to access to oral healthcare.

## Results

### Socio-demographic characteristics of respondents

All 310 respondents returned completed questionnaires giving a 100% rate of response (310/310). The results showed that majority, 144 (46.5%) of the respondents were within the age category of 18 to 27 years. Females were 163 (52.6%) and males were 147 (47.4%). A total of 181 (58.4%) were single, 106 (34.2%) were married and 23 (7.4%) were divorced. Results of the level of education showed the lowest as primary school, 13 (4.2%), and highest as Senior Secondary School / Senior High School / vocational, 122 (39.4%). In terms of employment status, the highest 109 (35.2%) were self-employed (those who run their own enterprises/businesses), and the lowest 95 (30.6%) were employed (those that were employed

by government or others). For health insurance status, 275 (88.7%) were insured on the National Health Insurance Scheme (NHIS), 24 (7.7%) were not insured, and 11 (3.5%) were insured on private health insurance schemes.

#### Level of access to oral healthcare among adults in Asamankese

Majority of the respondents indicated that level of access in respect of acceptability of oral healthcare was moderate (Mean = 14.93, SD = 3.526). The overall accommodation of oral healthcare was moderate (Mean = 9.90, SD = 2.620). Level of access in respect of availability of oral healthcare was moderate as well (Mean = 14.56, SD = 3.033). However, level of access in the domain of accessibility indicated that, majority of the respondents had poor access to oral healthcare on two of the questions and moderate access to oral healthcare for the other two. This resulted in an overall level of poor accessibility of oral healthcare (Mean = 11.83, SD = 2.649). The the overall access to oral healthcare in terms of affordability was also poor (Mean = 8.26, SD = 3.256). The results are illustrated in Table 1.

Table 1  
Level of access to oral healthcare among adults in Asamankese

Domains of access to oral healthcare	Min.	Max.	Mean	Std. Deviation
Health Providers (HPs) show compassion and are supportive to patients	1	5	3.62	1.265
HPs are trust-worthy and honest	1	5	3.72	1.063
HPs receive patients well and listen to patients adequately	1	5	3.66	1.093
There is confidentiality and privacy	1	5	3.93	1.006
<b>Acceptability</b>	4	20	14.93	3.526
I visit the dentist at least twice a year	1	5	2.31	1.270
Consideration are made for disabled persons	1	5	3.34	1.153
oral healthcare is accessible anytime	1	5	3.75	1.078
oral health facility is within reach	1	5	2.44	1.272
<b>Accessibility</b>	5	19	11.83	2.649
Waiting time for consultation is not too long	1	5	3.17	1.155
Waiting time for referral to another facility is not too long	1	5	3.27	1.081
Clinicians allow sufficient time for patients	1	5	3.46	1.119
<b>Accommodation</b>	3	15	9.90	2.620
Dental facilities have the right personnel and resources for proper diagnosis	1	5	3.76	1.083
Dentist is always available to provide treatment when needed	1	5	3.78	1.111
Facility offer quality treatment Options	1	5	3.71	1.126
When needed, referral is readily Arranged	1	5	3.31	1.199
<b>Availability</b>	4	20	14.56	3.033
Health services are covered by NHIS	1	5	2.69	1.346

Domains of access to oral healthcare	Min.	Max.	Mean	Std. Deviation
Cost of services are affordable to me	1	5	2.69	1.351
Financial support is made available by family	1	5	2.88	1.408
<b>Affordability</b>	3	15	8.26	3.256

The results revealed that 214 (69.0%) of the respondents had moderate access to quality oral healthcare, 78 (25.2%) had poor access and 18 (5.8%) had high access. A total of 273 (88.1%) considered the nearest dental clinic from their place of residence to be very far (more than 5km), 180 (58.1%) answered positively to lifetime visit to an oral health facility whilst 130 (41.9%) answered negatively. Respondents who visited a dental clinic within the past months, 55 (41.7%) paid out of pocket because the procedure was not covered by insurance, 52 (39.4%) added cash to national insurance cover, 6 (12.1%) made out of pocket expenses because they did not have insurance, 3 (2.3%) used personal insurance cover and 6 (4.5%) had full national insurance coverage. Dental treatments provided were: extraction 59 (44%), medication only 58 (43.6%), dental cleaning 44 (33.1%), routine check-up 23 (17.3%), referral to another facility 10 (7.5%), and restoration 9 (6.8%). Out of a total of 135 respondents who visited a dental facility, 107 (78.3%) reported having a pleasant experience whilst 28 (20.7%) did not have pleasant experience. The results of the level of access to oral healthcare are shown in Table 2.

## Multinomial regression analysis: Association between health system/provider factors and access to oral healthcare

*Acceptability.* Most of the respondents who had a previous history of visit to oral health facility had high acceptability than those who had no history. These differences were statistically significant ( $\chi^2 = 45.756$ ,  $p < 0.05$ ). Respondents who did out of pocket expenses because they did not have health insurance (OR = 3.1E7, CI = 5.1E6-1.9E8,  $p < 0.05$ ) and those who did out of pocket expenses because the procedure was not covered by any health insurance were more likely to have poor acceptability (OR = 1.3E7, CI = 2.8E6-6.0E8,  $p < 0.05$ ).

*Accessibility.* Most of the respondents who had high accessibility reported that the nearest dental clinic was near, most of those who had moderate accessibility reported that the nearest clinic was close to them, and most of those who had poor accessibility reported that the nearest dental clinic was far from them. These differences were statistically significant ( $\chi^2 = 22.482$ ,  $p < 0.05$ ). Respondents who had ever had any dental problem were more likely to report poor (OR = 13.3, CI = 2.9-61.4,  $p < 0.05$ ) and moderate (OR = 6.250, CI = 1.4-28.6,  $p < 0.05$ ) access than high access to oral healthcare.

*Accommodation:* Most of the respondents who had high accommodation reported that they had pleasant experience during their last visit to a dental clinic than those who reported that they did not have pleasant experiences at their last dental visit. These differences were statistically significant ( $\chi^2 = 8.116$ ,  $p < 0.05$ ). Respondents who had ever had any dental problem were more likely to have poor accommodation than high accommodation to oral healthcare (OR = 2.994, CI = 1.3–6.78,  $p < 0.05$ ).

*Availability:* Most of the respondents who reported that they had a history of visit to an oral health facility had high availability than those who reported that they had no history of a visit to an oral health facility, which was statistically significant ( $\chi^2 = 17.024$ ,  $p < 0.05$ ). Respondents who had ever had any dental problem were less likely to report poor (OR = 0.138, CI = 0.06–0.3,  $p < 0.05$ ) and moderate availability (OR = 0.484, CI = 0.3–0.9,  $p < 0.05$ ) than high availability of oral healthcare.

*Affordability:* Affordability was poor for the majority who were far from a dental facility. These differences were statistically significant ( $\chi^2 = 18.969$ ,  $p < 0.05$ ). Most of the respondents who had high affordability had full national health insurance cover, most of those who had moderate affordability paid via personal health insurance cover, and most of those who had poor affordability had national health insurance but had to do a top up. These differences were statistically significant ( $\chi^2 = 21.131$ ,  $p < 0.05$ ). Respondents who had ever had any oral health problem were more likely to report poor access than high access to oral healthcare (OR = 6.522, CI = 2.7–15.8,  $p < 0.05$ ). The results are displayed in table 3 below.

## Discussion

The study found that access to oral healthcare was moderate (69.0%). The acceptability (Mean = 14.93), availability (Mean = 12.93), and accommodation (Mean = 14.56) domains of access were moderate. This was contrary to studies in Nigeria, South Africa, China, India, and Saudi Arabia where access to oral healthcare was reported to be poor<sup>6–9</sup>. However, the findings that the accessibility (Mean = 9.90) and affordability (Mean = 8.26) domains were poor had a relationship with some studies<sup>6–9</sup>.

The socio-demographic / economic factors revealed that dental health services were reportedly far for 88.1%. Majority of the respondents who visited a dental clinic within the past months paid out of pocket (41.7%) and a very small percentage (4.5%) had full insurance coverage. The combination of these factors do not encourage high access. Therefore, such individuals were less likely to access dental services since it meant much time and more travel cost to the facilities. Moreover, the cost of dental treatment, coupled with a number of procedures not being fully covered by health insurance negatively influence access to dental care<sup>14</sup>. Northridge<sup>15</sup> noted that dental treatment obtained on pay for service basis was a barrier to accessing oral healthcare, compared to that offered under insurance and subsidy.

The most common treatment accessed by respondents was extraction (44%), followed by medication only (43.6%). This could be explained by a report which noted that the type of treatment was limited to the availability of resources, and where the facility was not adequately resourced, treatment options would be limited to simple ones like extraction and medications<sup>16</sup>. This in a way could suggest that

dental facilities at the district/municipal level were under resourced in terms of personnel or infrastructure or both. It could also imply clients reported late for oral healthcare, narrowing down treatment options to extraction or more expensive and time/resource demanding ones like root canal therapy. Oral health education, encouraging clients to report early for treatment can positively improve treatment options and oral health eventually.

Acceptability was high among those with previous experience and those who did not make payment for procedure. This could be that those with no dental visit history had poor perception of oral healthcare. The solution to this will be proper education on oral healthcare with a lot of demonstration or practicality, to increase the comfort level <sup>12</sup>.

Those who had to travel a great distance reported poor accessibility. Cappelli<sup>17</sup> argue that transportation is an important factor in accessing health facilities, especially in rural areas where distances to health care facilities are far and facilities inaccessible. Respondents who had ever had any dental problem also had poor access to oral healthcare. This could be due to the long distance they traveled with the pain/discomfort to get relief. Thus, to improve the accessibility dimension of access, there will be the need to site a dental facility close to the populace.

Accommodation was high as majority of the respondents who visited a dental facility had a pleasant experience (78.3%) coupled with the observation that none of them felt that their oral health needs were not well understood <sup>18</sup>. A study in Kenya, found that high client satisfaction was associated with friendly and understanding service providers, which encouraged users to return, promoting access <sup>19</sup>.

Availability was high among those with previous visit. Those with previous visit are in the know of the type of services provided and may have been pleased with the service rendered. Where human and material resources are lacking, treatment options will obviously be limited, decreasing availability of service thereby limiting clients' interest in accessing a dental facility <sup>16</sup>.

Affordability was poor for the majority who were far from a dental facility. The results also revealed affordability showed a significant association with oral healthcare and it was more pronounced in the groups who had to make some payment ( $p < 0.05$ ). A study in India revealed that payment of dental service was the main barrier to accessing oral <sup>20</sup>. Thus, setting up a dental facility close to the populace and ensuring full insurance coverage would improve the affordability component of access.

## Conclusion

The study concludes that the overall level of access to quality oral healthcare was moderate. However, the accessibility and affordability mean score domains of access were poor. These were influenced by distance to oral health facility and payment for dental procedures due to partial coverage by insurance or the individual not registered for health insurance. Access to oral healthcare could be improved upon by setting up a dental facility in the municipality. To improve affordability, there would be the need to enact

policies, that will enable the NHIS to fully cover for dental procedures, pay adequately for them, and also promptly. This will ensure that health facilities do not resort to top ups (co-payment) to make up for the late and inadequate payment as any form of payment affects access to quality oral healthcare. There will also be the need to encourage the populace to enroll into the NHIS to improve affordability.

## **Limitations To The Study**

Primarily, the word “quality” employed in the research denotes professional care as the study was limited in accessing quality of oral healthcare. This was largely due to lack of oral health facilities in the municipality. Secondly, assessment of quality of oral healthcare was beyond the scope of the research as the focus was on assessing the factors, which were associated with access to professional dental care.

## **Declarations**

### **Ethics approval and consent to participate**

The study was conducted in Asamankese in the West Akyem Municipality in the Eastern Region of Ghana after approval by Ethical Review Committee of the Ghana Health(GHS/RDD/ERC/Admin/App/20/220) - Ghana Health Service Review Committee, Research and Development Division.

All methods were carried out in accordance with relevant guidelines and regulations

The consent of all participants in the study were sought prior to their inclusion in the study. Individuals who were eligible for inclusion were enrolled only after they had endorsed a written informed consent/assent form, either by signing or thumb-printing before they responded to the items on the questionnaire.

### **Consent for publication**

I consent to the publication of this manuscript to contribute to realising an improved access to quality oral healthcare.

### **Availability of data and materials**

All data generated or analysed during this study are included in this published article (and its supplementary information files).

### **Competing interests**

There is no competing interest

### **Funding**

There was no funding for this research

## Authors' contributions

Adu-Gyamfi J. wrote the main manuscript text and Aidam K. prepared the data. Adomah-Afari A. reviewed the manuscript.

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## Table 2

Table 2 is available in the Supplementary Files section.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Oralhealthdataset1.xlsx](#)
- [Questionnaire.docx](#)

- [Table2.docx](#)