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Physical Accessibility to Public Healthcare Facilities in Ekiti State, Nigeria: Case Study of Gbonyin Local Government, Area

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ABSTRACT

Unhindered access to healthcare facilities is an indispensable and cardinal stance in the Sustainable Development Goal (SDG) which represents an important aspect of attaining inclusive development for enhanced living. However, the condition of transportation system within a region serves vital roles in community interaction and connection of residents to contrasting land uses. In essence, this study examined how residents convey to public healthcare facilities in the study area. Notably, 240 households were sampled systematically using structured questionnaire. Descriptive and inferential statistics were employed for data analysis. Findings established that majority of the respondents (41.7%) accessed transport facilities with motorcycle, while 19.2% of the respondents indicated foot. In addition, majority of the respondents (42.9%) revealed that road condition was fair. Similarly, many (85.5%) of the respondents often spend less than 30 minutes to access public medical services. It was equally observed that majority (72.6%) of the sampled respondents travelled a distance below 5km, which is considered acceptable. Further statistical analysis through Pearson correlation indicates that cost of transportation is significantly related to distance travelled. The available facilities and mode of transportation to public healthcare facilities insignificantly related to the frequency of visit to the facilities**.** It was concluded that the study area lacks adequate mode of transportation to access public healthcare facilities for emergency cases as majority using motorcycle could have effect on the sick been transported. It is suggested that improvement of existing and provision of new transport infrastructure would ensure effective and qualitative public healthcare services accessible to the residents.

INTRODUCTION

The location of public healthcare facilities is expected to improve residents' accessibility to quality healthcare service within all localities. This prompted the World Health Organisation (WHO) to recommend a 5km radius for the location primary health centre to ensure ease of locating healthcare facilities within reasonable distance (Usman and Sulyman, 2015). The provision of public healthcare facilities are not longevity-centric, but improvement of physical and emotional wellbeing (Anita et al., 2014). The Nigerian government has committed significant resources to provide public healthcare facilities towards the actualisation of Third Sustainable Development Goal (SDG3) for promotion of healthy living of citizenry.

However, the major facilitator of this accessibility in any region is transportation infrastructure and service which serves as the medium of movement. According to Bart et al. (2011), there is a key link between potential accessibility and actual utilisation of healthcare services which is achievable by enabling timely transport of health workers, equipment, supplies and patients. Therefore, transportation plays a vital role in the movement of people to places of demand. It aids the patronage and utilisation of basic healthcare facilities, by effecting and bringing changes to use the facility (Usman and Sulyman, 2015).

In Nigeria, transportation remains grossly inadequate leading to immobility in some areas characterized by unreliable, expensive and labour-intensive means of transportation (Atubi, 2019). Transportation is ranked as

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the second most important factor after financial obligation to access and utilise healthcare facility. Adesiji et al. (2012) noted that inadequate transport in some Nigeria limits access to these facilities and reduces opportunities for quality healthcare. People miss or even chose not to seek medical help as a result of various dimensions of transportation problems they face thereby rendering provision of public healthcare facilities meaningless because of difficulties accessing before utilisation.

The study therefore, explores how residents accessibility (transport infrastructure and service) to public healthcare facilities impact the overall level of healthcare service been delivered in the study area. The paper further propose a framework that help decision makers and residents to access better quality of public healthcare service delivery in their locality.

Conceptual Framework and Literature Review

Concept of physical accessibility

Wojuade and Fadare (2014) cited Mabogunje (1974) who coined physical accessibility as ability to get to or be reached by the activities, services or facilities and also as an essential link between supply and demand of facilities and services. That is the ease with which a location can be reached based on elements of locations and the characteristics of transportation network.

Accessibility is generally described in terms of spatial and aspatial dimensions. Anita et al. (2014) established five barriers to accessibility: affordability, accommodation, acceptability and availability issues. The first three covers spatial dimension which are socio-economic and cultural barriers while the last two are physical in nature. They address means of transportation, road conditions, travel time, facility and household location, healthcare personnel, equipment and demand for services.

The Three-Delay Model

This was developed by the WHO to reduce mortality rate by evaluating the role of transportation in accessing emergency healthcare service**.** It identifies the factors contributing to mortality and focuses on the three main factors that affect outcome of emergencies. These factors are defined chronologically as; i. the lengths of the delays in decision to access care, ii. the identification of and transport to a medical facility and iii. the receipt of adequate and appropriate treatment. It showed that physical accessibility to healthcare services is not solely based on human or economic resources but a product of numerous interwoven factors.

LITERATURE REVIEW

Accessibility to appropriate transport services and infrastructure is a major issue for both urban and rural areas while people who do not have their own means of transport suffer considerable disadvantage, particularly in low density areas. As stated by Anita et al. (2014), the lack of proper consideration for physical accessibility during location of public healthcare facilities undermines the SDG goal 3 which is meant to ensure healthy lives and promote wellbeing for people so as to achieve universal healthcare coverage. Atobatele et al. (2022) argued that the best location for public healthcare facilities must have a combination of convenient proximity, roadway access, transit service and walking distance to settlements to be serviced. These statements emphasise the importance of transportation as a key to achieving the SDG goal. However, distance, inadequate and unaffordable transport systems are great hindrance to this achievement. Adesiji et al. (2012) further states that every public healthcare facility should be easily accessible by a tarred road with minimum width of 7.5m in carriageway.

Atubi (2019) noted that poor transport infrastructure and service, long distance and cost of transport are important reasons why people do not utilize public healthcare facilities. Hence, public healthcare facilities must be located in a manner that residents can access them with minimum stress. This helps with timely emergency services and allows improved distribution of services to health outposts. Further study by Atubi (2021) concluded that transport is meant to even the ratio of health facilities to population. However it has

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always been recognized that transport infrastructure and services indeed have an important supporting role to play in service distribution in any location.

Studies by Dalhatu and Ango (2021) and Atubi (2021) revealed that residents who travel more than 10 km to their physician visit them less frequently where the factor of distance is considered. Also, Scheffler et al. (2015) assessed the impacts of transport on healthcare service delivery in Eastern Cape Province of South Africa and concluded that delivery of adequate healthcare service needs improved transport infrastructure and services and also use of right type of vehicles. But the understanding of the terrains determines the best form of transport to be used in each area.

Wojuade and Fadare (2014), study on accessibility of health facilities to residents in Ibadan revealed the need for adequate urban planning in terms of location of health facilities so that residents can access within a minimum distance. This planning must cover travel time, bus stop location and walking distance to the bus stops. Also time schedule must be involved while emergency system must be introduced to aid transportation of the sick.

RESEARCH METHODOLOGY

Gbonyin Local Government Area comprises 31 settlements divided into 8 major and 23 minor settlements (Gbonyin LG, 2020). The study area had a population of 67,978 and 147,999 people by 1991 and 2006 Census, respectively (NPC, 2023), which is projected to 219,705 people for 2023 using 2.5% growth rate. The 31 settlements were divided into major and minor and also urban and rural based on their population after projection. A total of 10 settlements (5 major and 5 minor) were sampled at random for this study which included both urban and rural settlements. A quota of 0.2% and 0.5% of population were sampled respectively from urban and rural settlements resulting in a total of 240 questionnaires which were administered using systematic random sampling technique. The hypothesis to be tested with Pearson Correlation is that cost of transportation has no significant relationship to physical accessibility to public healthcare facilities in the study area**.**

Study Area

Gbonyin Local Government is situated in the North Eastern part of Ekiti State, Nigeria located between Latitude 7^0 15' and $8^0$5' N and from Longitude 4^0 5' and 5^0 45' E and shares boundaries with 5 LGAs in Ekiti State and Ondo State with a total land coverage of about 391 km^2. The area has a relative flat relief except in Iro-Ekiti and lowland at Egbe-Ekiti used as dam serving the study area and beyond. The study area is underlain by soil rich in fertility which aids the resident's pre-dominant agricultural activity. The economic activities of the study area include agriculture, commerce, handicrafts, manufacturing and service industries such as timber/saw mills, rice processing, garri processing, palm oil, kernel processing, block making, bakeries, furniture, etc (Gbonyin LG, 2020).

Transportation infrastructure connecting the study area is shown in Figure 1. Plate 1 and 2 shows an example of tarred while Plate 3 shows that of an untarred road and earth roads. Inter and intra community footpaths connect farms, communities and other functions. There are also earth roads ranging from 3 to 6 meters in width that are maintained by the communities using them with natural drainage. Untarred roads in the study area range between 5 to 7 meters in width been constructed and maintained by the Local Government and communities. These roads lack constructed drainage system to transfer rain runoffs and waste water while some have hand dug drainage by users. Bituminous roads in the study area ranges from 5 to 7 meters in width used for Inter- and Intra-settlement movement and are constructed and maintained by Local, State or Federal Government. Some have constructed drainage with concrete or stone works while some are hand dug by the users. The drainage is only available within the settlements. Some of these roads have street light within the settlements.

Distribution of public healthcare facilities in the study area has shown in Figure 1 and Table 1 are 2 general hospitals and 19 primary health centres which provide 24 hours service with majority of the facilities in good

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condition. There are 4 ambulances available within the study area to transport patients. Table 1 shows a summary of public healthcare facilities in the study area and the condition of their immediate access road.

Table 1: Inventory of Public Healthcare Facilities in Gbonyin Local Government Area with condition of their accessing roads

Public Healthcare Facility	Condition of Accessing Road	Co- Ordinates (E,N)
General Hospital, Ode-Ekiti	Tarred Road (good condition)	7.647746,5.561157
General Hospital, Ijan-Ekiti	Tarred Road (good condition)	7.629702,5.400254
Comprehensive Health Centre, Ode-Ekiti	Tarred Road (good condition)	7.653219,5.546881
Comprehensive Health Centre, Agbado-Ekiti	Tarred Road (with potholes)	7.591285,5.522937
Comprehensive Health Centre, Aisegba-Ekiti	Tarred Road (good condition)	7.598821,5.478444
Comprehensive Health Centre, Imesi Ekiti	Tarred Road (good condition)	7.561159,5.573221
Basic Health Centre, Ode-Ekiti	Earth Road (unmotorable during rainy season)	7.651775,5.552942
Basic Health Centre, Agbado-Ekiti	Untarred Road (not motorable during rainy season)	7.580972,5.523953
Basic Health Centre, Ipole	Earth Road (not motorable during rainy season)	7.521942,5.526598
Basic Health Centre, Aisegba-Ekiti	Untarred Road	7.603888,5.480139
Basic Health Centre, Bolorunduro	Untarred Road (not motorable during rainy season)	7.526873,5.456699
Basic Health Centre, Ilumoba-Ekiti	Tarred Road (good condition)	7.634756,5.419308
Basic Health Centre, Ajebamidele	Untarred Road (not motorable during rainy season)	7.594500,5.435693
Basic Health Centre, Ijan-Ekiti	Tarred Road (good condition)	7.623006,5.390351
Basic Health Centre II, Ijan-Ekiti	Earth Road (not motorable during rainy season)	7.622725,5.379025
Basic Health Centre, Ilupeju-Ijan	Earth Road (motorable during rainy season)	7.571399,5.404473
Basic Health Centre, Egbe-Ekiti	Tarred Road (good condition)	7.601003,5.607795
Basic Health Centre, Iro-Ekiti	Tarred Road (good condition)	7.635298,5.699475
Basic Health Centre, Iro-Ayeteju	Earth Road (not motorable during rainy season)	7.635267,5.661946
Model Health Centre, Ode-Ekiti	Earth Road (not motorable during rainy season)	7.643524,5.554214
Staff Clinic, Ode-Ekiti	Tarred Road (with potholes)	7.646750,5.562605

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Source: Field Survey (2023)

Plate 1: A Tarred Road Connecting Agbado-Ekiti to Ode-Ekiti

Source: Field Survey, 2023

Plate 2: A Tarred Road with Potholes connecting Anifowose to Bolorunduro

Source: Field Survey, 2023

Plate 3: An Untarred Road from Abusoro to Imesi-Ekiti

Source: Field Survey, 2023

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RESULTS AND DISCUSSION

This section discusses the socio-economic characteristics of the respondents and elements of access.

Socio-economic Characteristics

The analysis of socio-economic characteristic of the respondents is presented in Table 2. 47.1% are male while are female 52.9%. Age distribution indicated that the age of 18-25 years were 17.1%, 26-35years were 33.3%, 36-45years were 29.2%, 46-65years were 15% and above 65years were 5.4%. Further analysis revealed that 29.2% of the respondents were single and 65.4% married, implying that majority of the respondents are experienced and responsible for other people's life. The level of education of the respondents indicated that 1.2% had no formal education, 15.0% had primary education, 22.1% had secondary education and 61.7% had tertiary education. Also, respondents' monthly income revealed that 13.3% earned below ₦10,000, 53.8% earned from₦11,000-₦30,000. 27.5% earned from₦31,000-₦100,000 and 5.4% earned above ₦100,000. This implied that majority of the respondents are low income earners below the World Bank poverty line of earning $1 per day.

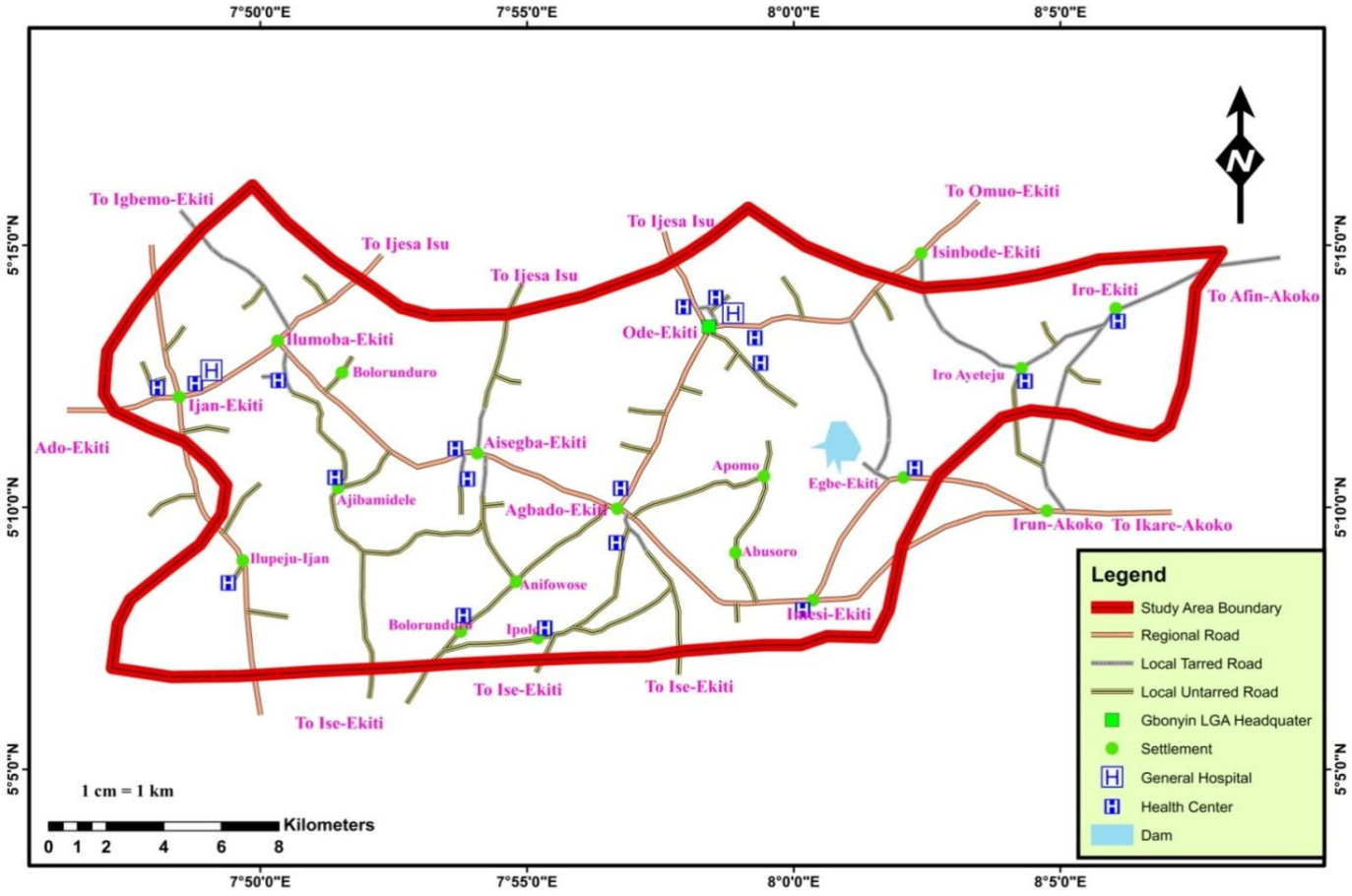

Figure 1: Map showing the Distribution of Public Healthcare Facilities and Road Network in the study area

Source: Field Survey, 2023

Table 2: Socio-Economic Characteristics of Respondents

Variables	Frequency	Percentage
Gender		
Male	113	47.1

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Female	127	52.9
Total	**240**	**100**
Age (years)		
18-25	41	17.1
26-35	80	33.3
36-45	70	29.2
46-65	36	15.0
Above 65	13	5.4
Total	**240**	**100.0**
Marital Status		
Single	70	29.2
Married	157	65.4
Divorced	1	.4
Widowed	12	5.0
Total	**240**	**100.0**
Level of Education		
No Formal Education	3	1.2
Primary Education	36	15.0
Secondary Education	53	22.1
Tertiary Education	148	61.7
Total	**240**	**100**
Income (₦)		
Less than 10,000	32	13.3
11,000-30,000	129	53.8
31,000-100,000	66	27.5
Above 100,000	13	5.4
Total	**240**	**100**

Source: Field Survey, 2023

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Transport Facilities and Services

The respondents give their opinion on the condition of roads linking the facilities as presented in Table 3. The result shows that 38.3% were of good condition, 42.9% argued for fair condition while 18.8% argued for bad condition. The result affirms the study by Christian (2023) where most road condition to medical facilities in Nigeria was reported to be fair thereby delaying swift access to these facilities. This could also be linked to the report in Table 1 were of the 21 public healthcare facilities in the study area, only 10 are accessible with tarred road in good condition.

Table 3: Road Condition

Road Condition	Frequency	Percentage
Good	92	38.3
Fair	103	42.9
Bad	45	18.8
Total	**240**	**100.0**

Source: Field Survey, 2023

Similarly, Table 4 presents the mode of transport residents' use to access the public healthcare facilities. Use of foot accounts for 19.2%, 2.9% of the respondents used bicycle, 41.7% used motorcycle, 34.2% use car and the remaining made use of other modes of transportation (mini bus, tricycle etc.). This corroborates the result by Hofman et al. (2008) that motorcycle is mostly used to access medical centres in Sub-Sahara Africa. Although motorcycle might not be the best mode to transport the sick but its adoptability to the terrine of the study area is rigid on the second point in the Three Delay Concept.

Table 4: Mode of Transportation

Mode of Transportation	Frequency	Percentage
Foot	46	19.2
Bicycle	7	2.9
Motorcycle	100	41.7
Car	82	34.2
Ambulance	1	0.4
Bus	3	1.6
Others	1	0.4
Total	**240**	**100.0**

Source: Field Survey, 2023

Table 5 presents analysis of respondents' travel time to access these facilities. 1.7% of the respondents spent less than 5 minutes travelling to public healthcare facilities, 8.8% spent between 6-10 minutes, 12.9% had to travel 11-15 minutes. Also, 17.5% spend 16-20 minutes, 20.0% spent 21-25 minutes, 24.6% spent 26 to 30 minutes, 10.8% spent 31 and 45 minutes, 2.9% used 46 to 60 minutes while 0.8% spent between 1 to 2 hours.

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This is a positive result as the timeframe aim for response and transport time of less than 60 minutes is a general guideline (Valentin *et al*., 2024).

Table 5: Travel Time

Travel Time to Facility	Frequency	Percentage
0-5 mins	4	1.7
6-10 mins	21	8.8
11-15 mins	31	12.9
16-20 mins	42	17.5
21-25 mins	48	20.0
26-30 mins	59	24.6
31-45 mins	26	10.8
46-60 mins	7	2.9
1-2 hrs	2	0.8
Total	**240**	**100.0**

Source: Field Survey, 2023

The distance covered to reach public health facility indicated that 3.8% of the respondents travelled less than 500 meters, 31.7% travelled between 500 meters and 1 kilometre, 37.1% travelled between 1 to 5 kilometres while 27.5% travelled above 5 kilometres. The WHO adopted a 5km radius as the target maximum distance to access primary public healthcare facility (Usman and Sulyman, 2015, Dalhatu et al, 2021). The study area is able to overcome issue of distance earning the first point in the Three Delay Model.

Table 6: Distance to Nearest Public Healthcare Facility

Distance	Frequency	Percentage
<500m	9	3.8
500m-1km	76	31.7
1-5km	89	37.1
Above 5km	66	27.5
Total	**240**	**100.0**

Source: Field Survey, 2023

The cost per trip shown in Table 7 indicates that none of the respondents spent below ₦100, 20.4% spent between ₦100 and ₦300, 33.8% spent between ₦300 and ₦500, 17.0% spent between ₦500 and₦1,000 while 9.2% spent above ₦1,000 to access public healthcare facilities. The missing 19.2% are those that access the public healthcare facilities by foot. The fare paid justifies the relative short distance travelled by majority of

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residents to health facilities, although if compared with their income in Table 2, it is likely to be high especially for low income earners.

Table 7: Cost per Trip

Cost of Transportation	Frequency	Percentage
Below ₦100	0	0
₦100-₦300	49	20.4
₦300-₦500	81	33.8
₦500–₦1,000	41	17.0
Above ₦1,000	23	9.6
Missing	46	19.2
Total	**240**	**100.0**

Source: Field Survey, 2023

However, 25% of the respondents perceived the cost as cheap, 44.2% as moderate and 11.7% as expensive. The missing 19.2% access the public healthcare facilities by foot as shown on Table 8. The respondents using private cars made their assumption based on fuel used to access the facilities. This result justifies the low income level of majority of the respondents in the study area.

Table 8: Perception on Cost of Transportation

Perception on Cost	Frequency	Percentage
Cheap	60	25.0
Moderate	106	44.2
Expensive	28	11.7
Missing	46	19.2
Total	**240**	**100.0**

Source: Field Survey, 2023

Testing of Hypothesis

The hypothesis stated that "cost of transportation has no significant relationship to physical accessibility to public healthcare facilities in Gbonyin LGA". This was tested with Pearson Correlation Technique and the variables for physical accessibility include; frequency of visit, distance to facility, availability of facility and mode of transportation.

The analysis shown in Table 9 revealed that there is no significant relationship between cost of transportation and frequency of visit to the public healthcare facility in sampled settlements as p-value is greater than 0.05. This implies that the frequency at which the residents access the public healthcare facilities is not a function of cost of transportation to the facility. It also justifies the high level of educated individuals in the study area understanding the importance of using the public healthcare facilities.

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The analysis also revealed that cost of transportation has a significant relationship with distance to public healthcare facility, availability of public healthcare facility and mode of transportation to public healthcare facility in the study area. This shows that cost of transportation increases with distance travelled to access the public healthcare facility. Also, the availability of the facility in the settlements determines the amount spent on accessing public healthcare facility. The mode of transportation used to access the public healthcare facility also determines the cost of transportation to the facilities.

The cost of transporting to access this service cut across all income level and could easily undermine the SDG Third Goal. These results intensify that improvement of existing transportation infrastructures will reduce the time travel to access these facilities also reducing cost of accessing them. Where necessary, more facilities and infrastructures needs be provided has this variables affects upward cost of accessing the public healthcare facilities in the study area.

Table 9: Pearson Correlation Analysis

Variable	Value	Transportation Cost	Action
Frequency of visit	Pearson Correlation	.073	Accept H_0
	Sig. (2-tailed)	.313	
	N	194	
Distance to facility	Pearson Correlation	.577	Reject H_0
	Sig. (2-tailed)	.000	
	N	194	
Availability of facility	Pearson Correlation	.258	Reject H_0
	Sig. (2-tailed)	.000	
	N	194	
Mode of transportation	Pearson Correlation	.193	Reject H_0
	Sig. (2-tailed)	.007	
	N	194	

Source: Generated by Author using SPSS, 2023

Limitation

While this study brings several advantages to accessing public healthcare facilities in both urban and rural areas, it is essential to recognise potential challenges that may be encountered. A significant drawback is the lack of fixed bus stop or schedules time schedule. Upgrading existing and constructing new transport system and public healthcare facilities may necessitate additional resources and personnel, which could be difficult to obtain due to limitation on available resources. Cultural and economic factors can impact the adoption of the recommendation, as some communities may resist change due to cultural beliefs or economic concerns. Lastly, the smooth operation of the recommendations may be obstructed by bureaucratic and administrative hurdles.

To address these issues, it is important to have a comprehensive implementation strategy, adequate resources, active participation from the community and policymakers willing to be flexible. Continual evaluation and

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feedback mechanisms could help improve the framework with time, ensuring its long-term sustainability and adaptability to evolving healthcare needs and community dynamics.

RECOMMENDATIONS AND CONCLUSION

Quality transportation infrastructure and service breaks the barrier of distance, transportation cost, travel time, waiting time at bus stops and poor road condition. Settlements with long distance and bad road condition suffer more to use public healthcare facilities especially at night or emergencies. It emphasises the importance of good transportation for delivery of quality public healthcare service. This is to meet the 3th Sustainable Development Goal (SDG) of ensuring healthy lives and promote wellbeing for all to achieve universal health coverage regardless of location.

The study recommends quality study prior to the location of any public healthcare facilities so as to achieve maximum coverage of a region. This is to follow WHO recommendation of 5km and 30mins maximum to access public healthcare facilities. It also encourages judicious use of funds allocated to road construction or maintenance to improve transportation while government makes public transportation services not only available but affordable, accessible, reliable, safe and also gender friendly.

Emergency transport with associated communications system is mainly concerned with having transport available in cases of emergencies. There should be a provision of adequate integrated outreach service to tackle the issue of location of the facility and transport costs.

Participant consent for publication: The participants' were fully informed that their response will later be used for publications so it would reach different stakeholders in the nearest future.

Ethical approval: The confidentiality of the participants' responses and anonymity of their identities were fully guaranteed. Ethics approval to conduct the study was sought from The Office of the Local Government Chairman and State Ministry of Health, Ode-Ekiti before respondents were approached.

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