

Overcoming Barriers to Healthcare Accessibility and Utilization: A Study on Resource Management and Sustainable Development in Rural Areas of Greater Noida

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Abstract

The study focuses on the main obstacles to accessibility and utilization of healthcare services in the rural areas of Greater Noida, such as finance, transport/communication, and healthcare services. A descriptive research design was followed whereby quantitative and qualitative information was gathered through a structured survey and interview. Among these, the main perceived barriers to the survey involving 150 respondents representing diverse demographic backgrounds are the following: transportation difficulties with a mean of 3.45, financial difficulties with a mean of 3.20, and distance to health facilities with a mean of 3.37. From the ANOVA result, significant effects of mentioned factors were recorded on health care accessibility with $F = 12.859$, $p < 0.001$ and use with $F = 16.351$, $p < 0.001$. Regression analysis indicated that these factors explained 51.8% of the variation in accessibility, given that $R^2 = 0.518$, and 42.3% in utilization, as $R^2 = 0.423$. Reliability analysis of the survey instrument established its reliability, with Cronbach's Alpha at 0.770 for the barriers to accessibility and 0.767 for barriers to utilization. These results show that efforts toward sustainable health development within rural settings need to be targeted at financial, infrastructural, and service-related barriers. These findings can enlighten policymakers and health professionals on how best to construct useful interventions aimed at ensuring better healthcare delivery.

Keywords: Healthcare Services, Rural Areas, Finance, Health Facilities, Sustainable Health Development and Infrastructural

1. Introduction

Equitable access to health services is an important condition for the sustainable development of people in areas like rural Greater Noida, where access to health services is often constrained by obstacles at socio-economic and infrastructural levels. In rural communities, there are remarkably higher disadvantages with regard to transportation networks, time-consuming travel, and availability of health facilities. A study conducted in rural Zimbabwe found that the most common reasons cited by healthcare users for not utilizing services included unaffordable transportation costs and shortages of essential medical supplies [1]. The same challenges have been documented in Kenya, where rural populations must travel more than six kilometers on average to access basic healthcare services [2]. Overcoming these barriers requires the development of policies that focus on strategic improvement in rural health infrastructures, reducing physical distances to health services.

Resource management is a core factor in combating healthcare challenges, with specific focus on rural areas. Some of the common challenges affecting rural areas include

understaffing, a scarcity of medical resources, and a general shortage in funds allocated to healthcare. Evidence within sub-Saharan Africa has also documented resource management innovations through new models that have demonstrated, improved access, including community-based health and mobile clinics [3]. Improvement in the “accessibility of health services in Malawi” has been done by increasing clinics and training more health professionals [4]. Integration of traditional healthcare with modern medical care would build trust within the community for better health outcomes [5].

Healthcare interventions will be truly sustainable if the holistic approach encompasses policy reforms, infrastructure development, and technological innovations. Geographic information systems have been in place in India to map out the accessibility of health care to help the authorities to identify areas of shortages and further optimize healthcare delivery [6]. In addition, the use of telemedicine and other e-health solutions has been recommended as viable approaches to overcome the physical barriers towards reaching quality healthcare to far-flung areas [7]. These, of course, would be successful, which has been very well demonstrated through the rural health initiatives taken up in Brazil: a healthcare strategy should be carefully designed to match the local socio-economic and geographical contexts [8].

1.1. Background of Rural Healthcare in Greater Noida

The rural health infrastructure in Greater Noida identifies with broader disparities in the country's rural health infrastructure. Besides, despite a number of strides that have been made under national initiatives like NRHM to address the challenge in health, there is still a gap as far as access and quality are concerned. “Almost 70% of India's population lives in rural areas”; however, due to inadequacies in infrastructure, lack of staffing, and socioeconomic barriers, most of this population has no access even to the minimal healthcare services [9]. Further, various studies conducted in North-East India also record the same scenario in terms of health care unequal dissemination: according to the latest records, an enormously vast deficiency in the number of “PHCs and sub-centres” were noted than the country's average [10]. Financial reasons remain one of the most crucial barriers to which, according to the cited sources, rural families very often seek services of private healthcare because of poor public services quality [11]. Ensuring sustainable health in rural Greater Noida highly depends on policy implementation and enhancement of infrastructure continuously [12].

1.1.1. Evolution of Healthcare Services in Rural Areas

The growth of health services in rural Greater Noida followed the national trends of transition from informal traditional care to government-supported formal systems. Most early healthcare efforts were informal, provided by the community and traditional healers. Established in 2005, the “National Rural Health Mission” was designed to improve the infrastructure of “rural health” care and the delivery of services to rural residents [13]. Yet, resource distribution continues to be uneven, and inequalities in health outcomes persist [14].

1.1.2. Current Status of Healthcare Infrastructure

The general health infrastructure prevailing in rural Greater Noida consists of PHCs, sub-centres, and private clinics, most of which face operational issues of varying magnitudes. Infrastructure gaps include unreliable electricity, transport networks, and a lack of essential medical equipment. Reliable electricity is seen as one of the key enablers for healthcare improvement: studies in Gujarat demonstrated better service delivery at electrified health centers [15]. Besides, most of the facilities in rural areas face human resource shortages, hence relying much on unregulated private providers [16]. Targeted investment and public-private partnerships are needed henceforth to address issues of gaps in service delivery [17].

1.1.3. Healthcare Challenges in Rural Communities

- **Geographical Barriers:** Inaccessibility due to remote locations and poor road conditions impairs timely access to healthcare.
- **Economic Constraints:** High out-of-pocket healthcare expenses prevent low-income families from receiving timely care.
- **Infrastructure Deficiencies:** Most of the health centers lack essential equipment and basic utilities like reliable electricity.
- **Human Resource Shortages:** Rural areas face a severe shortage of medical professionals and trained staff [18].

1.2. Importance of Resource Management in Healthcare

This, therefore, means that resource management will guarantee equity and quality in health services, especially where the resources are at a minimal level. Shortcomings in the area of infrastructure, a shortage of skilled human resources in health, and a lack of medical consumables might slow down the process of healthcare delivery in an area such as rural Greater Noida. Management of available resources will bridge these gaps and improve access to essential services. According to various studies, maximum utilization of the available resources can be done by redistribution of the healthcare personnel and improvement in the infrastructure to yield better results in healthcare outcomes [9]. In addition, the health care provided in the rural areas can be planned and strategized accordingly by utilizing the minimum financial and human resources [10]. Introduction of innovative technologies such as telemedicine and mobile health applications can further enhance resource management by reducing operational costs and improving accessibility to healthcare [19]. Public-private partnership has also been considered important in overcoming resource constraints and ensuring sustainable healthcare delivery [13].

1.2.1. Optimizing Infrastructure and Human Resources

There is a need to ensure that healthcare infrastructure and human resources are better optimized to achieve improved service delivery in the underserved areas. The rural healthcare infrastructure in Greater Noida comprises PHCs, CHCs, and private clinics, most of which are not utilized due to a shortage of staff. Accurate assessment and strategic distribution of the health workforce, along with focused investments in infrastructure, would substantially improve the quality and access to healthcare services [18]. Through the assistance of

government efforts that are backed by the private sector, this will be balanced in the distribution of healthcare facilities and the staff in places that are geographically isolated. This has to do with the efficient use of medical supplies within resource-constrained healthcare settings.

1.2.2. Efficient Utilization of Medical Supplies

In the rural areas where the supply chain is mostly unreliable, managing a limited supply to meet patient demand has been a great challenge. Centralized inventory systems and real-time monitoring can help avoid shortages and wastage of essential medicines and equipment [20]. Resource management practices in the training of healthcare staff will result in better outcomes by ensuring efficient use of the available medical supplies.

1.2.3. Role of Technology in Resource Optimization

- **Telemedicine:** This reduces the number of physical visits, hence optimizing the availability of doctors.
- **EHR:** It helps improve data management that would lead to an enhancement in patient care and a reduction in redundancy.
- **Mobile Health Applications:** This allows for diagnosis and monitoring of patients in rural areas.
- **AI-Driven Solution:** Used for predictive health care, resource allocation, demand forecasting [15].
- **Inventory Management Systems:** Helps in improving tracking of medical supplies and reduction in wastage.

1.3. Sustainable Development in Rural Healthcare

The definition of sustainable development on the ground means the long-term access to quality medical services, with conserving the resources and environment of the locality. In rural areas, including Greater Noida, a healthcare system often faces some specific problems regarding limited infrastructure, financial constraints, and environmental concerns. These call for a more comprehensive approach that is concerned with social, economic, and environmental sustainability. Sustainable rural health initiatives should focus on increasing access to health care, improving infrastructure, and enabling the efficient use of resources with minimal ecological impacts. Introduction of renewable energy solutions in the form of solar-powered clinics may contribute significantly to the enhancement of health care delivery with minimal carbon footprint from health facilities [18]. Of equal importance are sustainable practices in biomedical waste management in order to avoid environmental degradation and health hazards in rural areas [15]. Besides, the development of local health systems by strategies related to community involvement and public-private partnership contributes to improving not only the quality of services but also the sustainability of health initiatives. PPPs fill resource gaps with government support and private sector efficiency [13]. Moreover, the adaptation of technology-based solutions in the fields of telemedicine and electronic health records will provide the pathway for easier access to health facilities and manage resources in a more environmentally friendly manner [20]. Further, sustainable rural healthcare means long-term investments in infrastructure and human resource development

with care for the environment in order to ensure equal health outcomes and regional development for sustainability.

1.3.1. Environmental Impact of Healthcare Systems

- **Energy Consumption:** High dependence on conventional energy sources increases carbon emissions. The use of renewable energy, like solar power, reduces environmental impact.
- **Waste Management:** Poor collection of biomedical wastes may be fraught with health and environmental problems. There will be growing a need for safe disposal systems applicable in rural facilities.
- **Water Usages:** Medical facilities are great consumers of water. The mismanagement of water resources can subsequently affect local supplies. Efficient water use and wastewater treatment systems should be implemented.
- **Pollution Control:** Emissions from healthcare processes, including incineration of waste, can add to air pollution. Eco-friendly alternatives to incineration, such as autoclaving, may help to mediate this issue.
- **Land use:** Healthcare facilities that are projected in expansion plans need to make provisions in design for minimizing forest reduction and overall land degradation.

1.4. Barriers to Accessibility and Utilization of Healthcare

The barriers to healthcare accessibility and utilization in rural areas are many and affect the delivery of equitable healthcare. Physical remoteness, economic hardships, and socio-cultural factors are the major challenges for rural Greater Noida. Poor infrastructure and a limited availability of healthcare facilities make people travel long distances, leading to delays in getting essential medical attention and unmet health needs [10]. Meanwhile, financial reasons play an equally outstanding role, as high costs of out-of-pocket spending significantly restrict timely care. Besides that, low health literacy and a reliance on traditional medicine mean that modern health services remain underutilized. A real and sustainable response will thus involve several methods, ranging from investing in infrastructure to investment in support for low-income households in accessing more care to developing the educational aspect that will help in raising health awareness in the country.

1.4.1. Physical and Geographical Barriers

Physical and geographical barriers are major challenges to healthcare access in rural areas. Poor road networks and unreliable transportation systems contribute to the inability to reach health facilities, with the result that treatments are often delayed or foregone. Many rural areas of Greater Noida lack even basic connectivity, which makes it difficult for emergency medical services to work effectively. Moreover, geographic isolation hinders access to both medical supplies and personnel, impacting the provision of routine and critical care levels. Sometimes, these kinds of barriers require innovative approaches in order for them to be surmounted; examples include mobile health units or telemedicine that could take healthcare right to the very doorstep of these isolated communities.

1.4.2. Economic and Financial Constraints

The main deterrents to the utilization of healthcare in rural Greater Noida are economic and financial. Many rural households have a below-poverty-line level of living, and health services become unaffordable even when facilities are available. The absence of comprehensive health insurance coverage adds to the problem, as most rural residents have to bear the costs of healthcare services out-of-pocket. Besides, indirect costs, like transportation and wages lost during treatment, further raise the financial burden, which is reflected in delayed or foregone care. Increased health insurance coverage and financial assistance programs can reduce these barriers and improve healthcare utilization.

1.4.3. Social and Cultural Factors

- **Stigma:** Diseases such as HIV/AIDS and psychiatric disorders are often associated with stigma, which can deter people from seeking medical treatment [14].
- **Low Levels of Awareness:** A shortage of health education about the availability of services and poor information are a few factors contributing to the underutilization of health facilities [20].
- **Traditional Beliefs:** Many rural communities rely on traditional healers, which may delay or replace modern medical treatment [21].
- **Gender Inequality:** It is always seen that women and children, in rural areas, face more health problems because of patriarchal norms and lack of decision-making powers on matters relating to health [22].

2. Literature Review

Gogoi et al. (2021) attributed this to poor infrastructure, long distances, and inappropriate transportation, which contribute to reduced accessibility to health care in rural areas of India. The study showed that most rural regions have poorly equipped health facilities; thus, residents seek health services in urban centers. The authors suggested the creation of mobile healthcare facilities and an improvement in the road infrastructure. Similarly, Verma & Dash, 2020, indicate that the GIS-based models will enable the planners to locate the areas of inadequacy and facilitate better accessibility by optimizing the location of facilities. “Chen et al. (2019)” also point out that infrastructural improvements related to the electrification of primary health centers are necessary to be undertaken for improving healthcare access in rural areas. These findings collectively underline the importance of overcoming physical barriers to improve healthcare utilization.

Chen et al. (2019) cite that financial constraints are one of the stiff “barriers to healthcare” in rural India, and poor households cannot even afford basic medical services. Thus, the study highlights that high out-of-pocket expenditures and lower insurance coverage widen inequalities in health. According to Dutta & Lahiri (2015), PPPs might help bridge the resource gap and alleviate financial pressures on rural populations. Moreover, the subsidized health care and insurance schemes provided by the government can increase access to and the affordability of medical services.

According to Srinivasa et al. (2018), proper management of resources holds the key to bringing an improvement in health care delivery at rural settings. Inequable resourcing has become characteristic of the commonly cited deficiencies found in the various systems under analysis and this will necessarily have its ripple effect in several aspects such as a chronic shortage of qualified personnel, highly erratic drug and medicinal supply, and incomplete and ill-maintained infrastructure. Arguably, for instance, Devarakonda calls for a hub-and-spoke model, with centralization of specialized care coupled with decentralization in the delivery of primary care from its constituent satellite units in promoting prudent use of resources. Also, Kumar et al. highlight integrating technology such as telemedicine and electronic health records in managing healthcare resources in remote areas. This has been further reiterated by Shastry & Rai in 2021 that renewable energy might be utilized in reducing the issue of erratic power supply at the rural health centres, further augmenting the provision of service.

Smith et al. (2009) claim that the sustainable development of rural health is possible by involving both top-level policies and grassroots mechanisms. This study identifies community participation as an essential element in sustaining health programs in rural areas for a longer period. According to Shastry & Rai (2021), rural health systems should introduce renewable energy sources and environmental-friendly infrastructure instead of. Lastly, Verma & Dash (2020) underline the need for policy reforms and investments in infrastructure to achieve sustainable rural healthcare development.

3. METHODOLOGY

3.1. Research Design

“The present study has adopted a descriptive research design” to examine the issues in accessing health care and utilization in rural areas of Greater Noida. A descriptive approach was found suitable as it allows the identification of prevailing challenges, analysis of resource management practices, and the evaluation of sustainable development initiatives within the healthcare system. Quantitative and qualitative data collection methods will be employed to ensure that factors causing roadblocks in healthcare accessibility and non-utilization of services are comprehensively gauged.

3.2. Data Collection

A structured Google survey is proposed to measure the responses on the barriers to accessibility and utilization of healthcare services. A 5-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree), will be used to forward closed-ended items in the survey. This questionnaire will comprise two major sections based on the above-mentioned purposes: section one on accessibility barriers of healthcare and section two on the utilization barriers. Additionally, it would explore barriers through semi-structured interviews among local health providers and community leaders representing rural residents.

3.3. Objective

1. Exploring the factors that cause roadblocks in accessibility of healthcare services.
2. Exploring the roadblocks that cause non-utilization of available healthcare services.

3.4. Sampling Strategy and Sample Size

“This study will use a non-probability convenience sampling method” for its sampling technique. Citizens of Greater Noida who dwell in rural regions and fall between the age bracket of 18 to 60 make up the target demographic. We selected a total of 150 individuals to guarantee that our sample is diverse and adequately represents the population. This sample size is deemed enough for conducting significant statistical analysis within the time and resource restrictions of the study.

3.5. Data Analysis Techniques

In this study, SPSS will be used to evaluate the quantitative data. The reliability of the survey instrument will be evaluated by computing Cronbach's Alpha, also known as internal consistency. Standard deviation and mean values are summarized in descriptive statistics. Methods of inferential statistics include ANOVA and Chi-square tests on testing significant differences in responses due to demographic variables. Qualitative interviews will be analyzed thematically to add value to the quantitative findings on the overall understanding of barriers to health care accessibility and utilization.

4. Results

Table 1: Demography

Category	parameter	Frequency	Percent
Gender	Male	83	55.3
	Female	67	44.7
	Total	150	100.0
Family status	Joint family	72	48.0
	Nuclear family	78	52.0
	Total	150	100.0
Marital Status	Married	116	77.3
	Unmarried	34	22.7
	Total	150	100.0
Qualification	High School	30	20.0
	Diploma	36	24.0
	Graduation	35	23.3
	Master	30	20.0
	PhD	19	12.7
	Total	150	100.0

The demographic profile of the respondents shows a balanced gender distribution, with 55.3% male and 44.7% female participants, ensuring representation from both genders. Regarding family status, respondents are almost evenly split, with 48.0% living in joint families and 52.0% in nuclear families, reflecting a diversity in living arrangements. Marital status data reveals that 77.3% of the respondents are married, while 22.7% are unmarried, indicating that a significant portion of the sample has family responsibilities, which may influence their healthcare needs and utilization. Educational qualification varies widely, with

20.0% having completed high school, 24.0% holding a diploma, 23.3% having a graduation degree, 20.0% possessing a master's degree, and 12.7% earning a PhD. This range of educational levels highlights a well-informed population, potentially affecting their healthcare awareness and accessibility. Demographic diversity in terms of gender, family structure, marital status, and educational background ensures a comprehensive analysis of healthcare accessibility and utilization barriers in rural areas of Greater Noida.

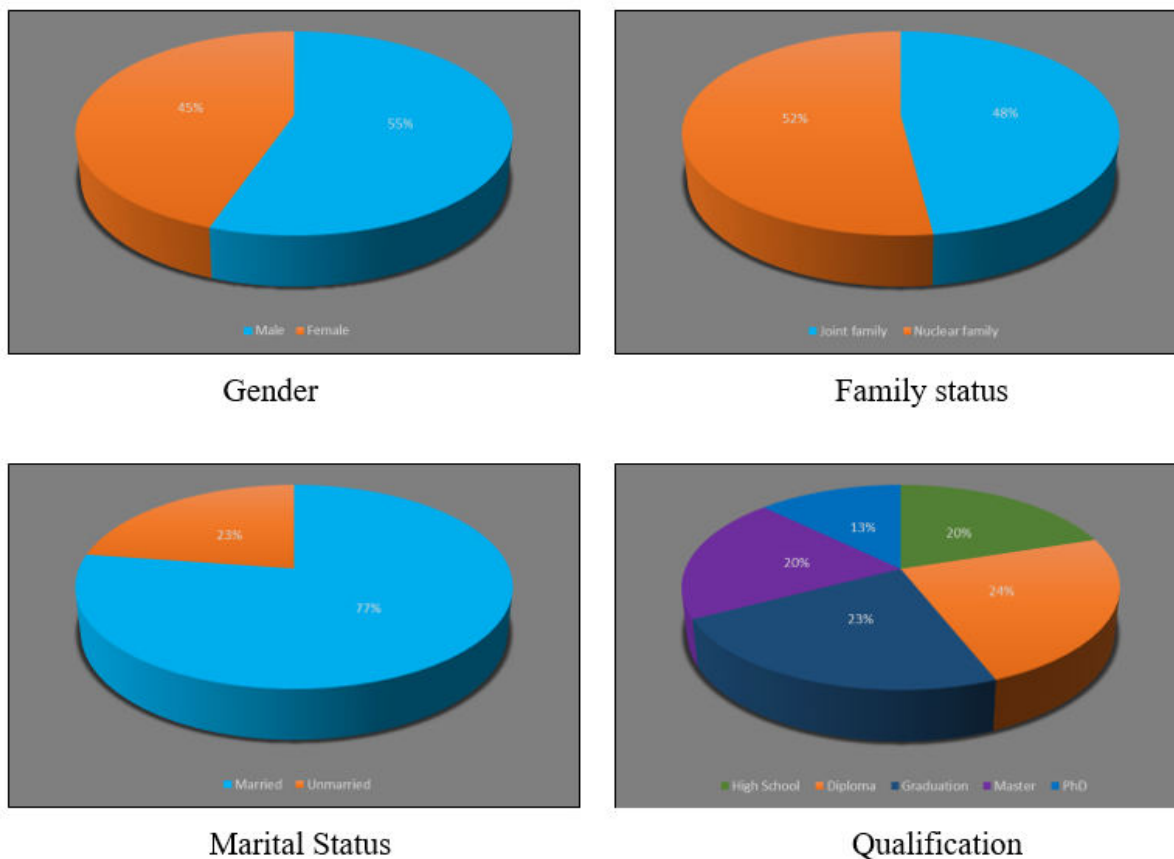


Figure 1: Demography

Objective: Exploring the factors that cause roadblocks in accessibility of healthcare services.

Sample T-Test

Table 2: Objective 1-One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Financial Constraints.	150	3.20	1.290	.105
Lack of Transportation Facilities	150	3.45	1.383	.113
Awareness	150	3.46	1.344	.110
Healthcare Services	150	3.29	1.374	.112
distance of Healthcare Facilities	150	3.37	1.358	.111

In this respect, the financial constraints show the mean score at 3.20, having a standard deviation of 1.290 and standard error mean at 0.105. On the other side, the lack of

transportation facilities show a mean score at 3.45 having a standard deviation of 1.383 and standard error mean at 0.113. “Awareness shows the mean score of 3.46 having a standard deviation of 1.344 and standard error mean of 0.110. On one hand, health care services has a mean of 3.29 with a standard deviation of 1.374 and a standard error mean of 0.112 while the distance to health care facilities had a mean score of 3.37 with a standard deviation of 1.358 and standard error mean of 0.111”.

Table 3: Objective 1-One-Sample Test

	t	df	Test Value = 0		95% Confidence Interval of the Difference	
			Sig.	Mean Difference	Lower	Upper
Financial Constraints.	30.378	149	.000	3.200	2.99	3.41
Lack of Transportation Facilities	30.518	149	.000	3.447	3.22	3.67
Awareness	31.523	149	.000	3.460	3.24	3.68
Healthcare Services	29.366	149	.000	3.293	3.07	3.51
distance of Healthcare Facilities	30.360	149	.000	3.367	3.15	3.59

The t-test result for financial constraints is 3.200, having a t-value of 30.378 and a confidence interval of the difference at 95% level, ranging from 2.99 to 3.41. Lack of transportation facilities 3.447, having a t-value of 30.518 and confidence interval of the difference at 95% level of the estimate ranges from 3.22 to 3.67. Awareness shows a mean difference of 3.460, with a t-value of 31.523 and a confidence interval from 3.24 to 3.68. Health care services have a mean difference of 3.293, the t-value of 29.366, and a confidence interval of 3.07 to 3.51. The distance to health facilities has a mean difference of 3.367, t-value of 30.360, and confidence interval of 3.15 to 3.59. All statistically significant, $p < .000$.

Table 4: Objective 1-Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.72	0.518	0.515	0.9

- a. Predictors: (Constant), distance of Healthcare Facilities, Healthcare Facilities, Financial Constraints., Awareness, Lack of Transportation Facilities

Regression analysis run to explore causes of road blocks in the access of health service delivery at $RS = 0.720$ signifies that a good deal of co-relations is at large between predictors- Distance of Health-care Facilities, Heath-care Facilities, Financial Constraints, Awareness and lack of Transportation facilities and barriers to accessibility in health care at $RS = 0.518$ -51.8% variance in health accessibility explained due to the roles of the specified predictors in particular. Its respective adjusted R-Square value for the model corresponds to 0.515. The standard error of the estimate is 0.900. This suggests that the model fits fairly well.

Table 5: Objective 1-ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	86.764	5	17.353	12.859	.000
Residual	194.330	144	1.350		
Total	281.093	149			

b. Dependent Variable: Healthcare Services

a. Predictors: (Constant), distance of Healthcare Facilities, Healthcare Facilities, Financial Constraints., Awareness, Lack of Transportation Facilities

The regression model is statistically significant ($F = 12.859$, $p < .001$) according to the ANOVA table, and the predictors have a substantial impact on the healthcare services dependent variable. The relative size of the sum of squares regression, 86.764, to that of the residual, 194.330, would suggest that this model accounts for quite a lot of the variation within the healthcare services.

Table 6: Objective 1-Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	.749	.381		1.964	.000
Healthcare Facilities	.076	.073	.074	1.033	.003
Financial Constraints.	-.033	.088	-.031	-.370	.001
Lack of Transportation Facilities	.364	.085	.366	4.300	.000
Awareness	.197	.083	.192	2.364	.019
distance of Healthcare Facilities	.136	.085	.134	1.595	.113

a. Dependent Variable: Healthcare Services

The coefficients table reveals the importance of individual predictors in the model. Lack of transportation facilities ($B = .364$, $p < .001$) is the most impactful factor, indicating that transportation is crucial for accessing healthcare services. Awareness ($B = .197$, $p = .019$) and healthcare facilities ($B = .076$, $p = .003$) also have significant positive impacts, emphasizing the role of both infrastructure and community awareness. Financial constraints ($B = -.033$, $p = .001$) negatively affect healthcare services, highlighting economic barriers. While the distance of healthcare facilities ($B = .136$, $p = .113$) was not statistically significant, it still plays a role in the overall model. These insights suggest that addressing transportation and financial barriers, along with enhancing awareness and infrastructure, is essential for improving healthcare services in rural areas.

Objective: Exploring the roadblocks that cause non utilisation of available healthcare services.

Sample T-Test

Table 7: Objective 2-One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Low Quality of Care.	150	3.30	1.379	.113
Healthcare Services	150	3.24	1.422	.116
High Medical Costs	150	3.36	1.353	.110
Long Waiting Times	150	3.24	1.345	.110

The mean for low quality of care is 3.30 with a standard deviation of 1.379 and a standard error mean of 0.113. Healthcare services mean score is 3.24 with a standard deviation of 1.422 and a standard error mean of 0.116. High medical costs have a mean score of 3.36 with a standard deviation of 1.353 and a standard error mean of 0.110. Long waiting times show an average score of 3.24 with a standard deviation of 1.345 and a standard error mean of 0.110.

Table 8: Objective 2-One-Sample Test

	t	df	Test Value = 0		95% Confidence Interval of the Difference	
			Sig.	Mean Difference	Lower	Upper
Low Quality of Care.	29.301	149	.000	3.300	3.08	3.52
Healthcare Services	27.902	149	.000	3.240	3.01	3.47
High Medical Costs	30.426	149	.000	3.360	3.14	3.58
Long Waiting Times	29.513	149	.000	3.240	3.02	3.46

The t-test results for low quality of care have an average of the difference as 3.300, with a t-value of 29.301 and a 95% confidence interval from 3.08 to 3.52. Healthcare services have an average difference of 3.240, with a t-value of 27.902 and a confidence interval from 3.01 to 3.47. The mean difference in said high medical costs is 3.360, the t-value is 30.426, while the confidence interval is between 3.14-3.58. The long waiting times had a mean difference of 3.240 with a t-value of 29.513 and the confidence interval was between 3.02-3.46. All statistically significant with $p < .000$.

Table 9: Objective 2-Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.65	0.423	0.42	1

- a. Predictors: (Constant), Long Waiting Times, High Medical Costs, Low Quality of Care.

There is a robust relationship ($R = 0.650^{**}$) between the variables and the non-utilization issues in the regression analysis that reveals the barriers driving non-utilization of accessible healthcare services. These variables account for 42.3% of the variation in non-utilization, according to the R Square value of 0.423; the corrected R Square value is 0.420. A decent model fit is shown by the standard error of the estimate, which is 1.000.

Table 10: Objective 2-ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	75.786	3	25.262	16.351	.000
Residual	225.574	146	1.545		
Total	301.360	149			

- a. Dependent Variable: Healthcare Services
- b. Predictors: (Constant), Long Waiting Times, High Medical Costs, Low Quality of Care

The regression model is extremely significant, as seen in the ANOVA table below: $F = 16.351$, $p < .001$. This provides more evidence that poor service quality, high costs, and lengthy wait times all have a major impact on healthcare. These variables account for a large portion of the variation in healthcare services, as shown by the high regression sum of squares value of 75.786 compared to the residual sum of squares value of 225.574.

Table 11: Objective 2-Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	1.011	.335		3.021	.003
Low Quality of Care.	.208	.085	.202	2.454	.015
High Medical Costs	.210	.086	.199	2.429	.006
Long Waiting Times	.258	.085	.244	3.022	.003

- a. Dependent Variable: Healthcare Services

The coefficients table, there is a fuller revelation on the extent to which the respective predictors act: Long waiting times have the greatest effect $B = .258$, $p = .003$; thus, definitely improving health service access will happen if the wait is shortened. The high cost of medicine similarly demonstrates an extremely substantial adverse effect- $B = .210$, $p = .006$ -cares in health shall thus be ensured, being reasonably and highly affordable to them. Poor quality of care is also a determinant of healthcare services, with $B = 0.208$ and $p = 0.015$, indicating that improvement in the standards of care is highly needed. These findings have brought into focus the need for the aforementioned two major issues to be addressed in order to improve both availability and quality of healthcare services in rural areas.

Table 12: Reliability

S. No	Parameters	No. of items	Cronbach's alpha
1	Factors causing accessibility roadblocks	5	.770
2	Roadblocks for non-utilisation	5	.767

Cronbach's Alpha was conducted to gauge the reliability of the survey instrument on two parameters, namely roadblocks caused by factors of accessibility and roadblocks of non-utilization. Both had 5 items each, and Cronbach's Alpha values were 0.770 and 0.767, respectively, indicating good internal consistency; hence, reliable data would be gathered to analyze healthcare accessibility and utilization barriers in rural Greater Noida.

5. Conclusion

The study was conducted to explore the barriers to healthcare accessibility and utilization in rural areas of Greater Noida, focusing on key factors such as financial constraints, transportation, and healthcare services. The key findings were derived through demographic analysis and statistical tests. The gender ratio of respondents was 55.3% male and 44.7% female, ensuring balanced representation. Family Structure: Nuclear-52.0%, joint families-48.0% ANOVA from Objective 1: $F = 12.859$, $p < 0.001$, which says financial constraints, lack of transportation, and distance to health facilities have already significantly affected the accessibility. This regression analysis showed that all these factors put together explained 51.8% of the variation in accessibility, with an R-square of 0.518. In addressing Objective 2, which sought to investigate the barriers to healthcare utilization, ANOVA yielded an F-value of 16.351 and a p-value of less than 0.001, meaning that long waiting time, high medical costs, and low quality of care were significant determinants of utilization. The factors that included the regression model explained 42.3% of variance in utilization, with an R-square value of 0.423. Thus, internal consistency regarding the reliability of the survey instrument is good; that is, the Cronbach's Alpha stood at 0.770 and 0.767 for accessibility and utilization barriers, respectively. These findings indicate urgent improvements in transport, cost of care, quality, and awareness for helping the rural parts of Greater Noida attain sustainable development in health.

References

- [1]. Roets, L., Mangundu, M., & Janse van Rensburg, E. (2020). Accessibility of healthcare in rural Zimbabwe: The perspective of nurses and healthcare users. *African Journal of Primary Health Care and Family Medicine*, 12(1), 1-7.
- [2]. Batti, R. C. (2014). Performance and Sustainability of Community Health centres in Kenya's Rural Areas: Case study of centres in Kathonzwani Division of Makueni District. *Tropical medicine and International health*, 5, 107-118.
- [3]. Seidu, A. A. (2020). Mixed effects analysis of factors associated with barriers to accessing healthcare among women in sub-Saharan Africa: Insights from demographic and health surveys. *PLoS One*, 15(11), e0241409.

- [4]. Jayaram, G., Goud, R., & Srinivasan, K. (2011). Overcoming cultural barriers to deliver comprehensive rural community mental health care in Southern India. *Asian journal of psychiatry*, 4(4), 261-265.
- [5]. Verma, V. R., & Dash, U. (2020). Geographical accessibility and spatial coverage modelling of public health care network in rural and remote India. *Plos one*, 15(10), e0239326.
- [6]. Kiberu, V. M., Mars, M., & Scott, R. E. (2017). Barriers and opportunities to implementation of sustainable e-Health programmes in Uganda: A literature review. *African Journal of Primary Health Care and Family Medicine*, 9(1), 1-10.
- [7]. Vieira-da-Silva, L. M., Chaves, S. C. L., Esperidião, M. A., & Lopes-Martinho, R. M. (2010). Accessibility to primary healthcare in the capital city of a northeastern state of Brazil: an evaluation of the results of a programme. *Journal of Epidemiology & Community Health*, 64(12), 1100-1105.
- [8]. Madhavi, N. (2020). Health Issues and Challenges in Rural India. *Global journal for research analysis*.
- [9]. Gogoi, M., Hazarika, S., Phukan, K. K., & Gogoi, P. (2021). Rural Healthcare Infrastructure of North-East India and its Challenges. *International Journal of Current Research and Review*, 13(13), 56-63.
- [10]. Srinivasa, D., & Siddegowda, Y. S. (2018). Rural health care towards a healthy rural India: A social work response.
- [11]. Sreenu, N. (2018). A Study on Management of Health Care Infrastructure Development in Rural India: Critical analysis of current status and future challenges. *Asia Pacific Journal of Health Management*, 13(3), 1-6.
- [12]. Dutta, S., & Lahiri, K. (2015). Is provision of healthcare sufficient to ensure better access? An exploration of the scope for public-private partnership in India. *International journal of health policy and management*, 4(7), 467.
- [13]. Younger, D. S. (2016). Health Care in India. *Neurologic clinics*, 34(4), 1103-1114.
- [14]. Chen, Y. J., Chindarkar, N., & Xiao, Y. (2019). Effect of reliable electricity on health facilities, health information, and child and maternal health services utilization: evidence from rural Gujarat, India. *Journal of Health, Population and Nutrition*, 38, 1-16.
- [15]. Devarakonda, S. (2016). Hub and spoke model: making rural healthcare in India affordable, available and accessible. *Rural and Remote Health*, 16(1), 1-8.
- [16]. Shastri, V., & Rai, V. (2021). Reduced health services at under-electrified primary healthcare facilities: Evidence from India. *PloS one*, 16(6), e0252705.
- [17]. Kumar, R. R. (2016). Rural e-health care model. In *Proceedings of International Conference on ICT for Sustainable Development: ICT4SD 2015 Volume 1* (pp. 467-474). Springer Singapore.
- [18]. Verma, V. R., & Dash, U. (2020). Geographical accessibility and spatial coverage modelling of public health care network in rural and remote India. *Plos one*, 15(10), e0239326.

- [19]. Dodd, W., King, N., Humphries, S., Little, M., & Dewey, C. (2016). Self-reported morbidity and health service utilization in rural Tamil Nadu, India. *Social Science & Medicine*, 161, 118-125.
- [20]. Taqi, M., Bidhuri, S., Sarkar, S., Ahmad, W. S., & Wangchok, P. (2017). Rural healthcare infrastructural disparities in India: a critical analysis of availability and accessibility.
- [21]. Kumar, S., Sharma, A., Sood, A., & Kumar, S. (2016). Urban health in India: Policies, practices and current challenges. *Journal of Health Management*, 18(3), 489-498.
- [22]. Smith, H. K., Harper, P. R., Potts, C. N., & Thyle, A. (2009). Planning sustainable community health schemes in rural areas of developing countries. *European Journal of Operational Research*, 193(3), 768-777.