



## Original Article



## Socioeconomic Determinants of Access to Primary Healthcare in Rural Population of Sindh, Pakistan

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### ABSTRACT

Pakistan's rural population lacks access to primary healthcare facilities due to various socioeconomic factors. Investigating these factors is essential to improve healthcare delivery to these people. **Objective:** The Current study explores the socioeconomic determinants that influence the access to primary healthcare services in rural Sindh, Pakistan. **Methods:** This cross-sectional study was conducted in five districts of Sindh: Hyderabad, Thatta, Badin, Tharparkar, and Larkana. A total of 300 participants were surveyed using a structured questionnaire. Demographic data along with education, occupation, Monthly Income, Access to Utilities, Distance to medical facility, Medical services Costs, Waiting Times, Doctor, medicine, and diagnostic facilities. Descriptive statistics and logistic regression were used to analyze the data. **Results:** The study found that 46.8% of respondents had no formal education, and 54.5% reported a monthly household income of less than 20,000 PKR. Barriers to healthcare included long distances to healthcare facilities (72%), lack of transportation (60%), high treatment costs (55%), and long waiting times (50%). Logistic regression revealed that education level, income, and proximity to healthcare services were significant determinants of access to healthcare. **Conclusions:** Socioeconomic factors such as education, income, and geographical distance significantly affect access to primary healthcare in rural Sindh. Targeted interventions, including improving healthcare infrastructure and addressing transportation and affordability issues, are crucial to enhancing healthcare accessibility in these areas.

### INTRODUCTION

According to the user's perceived needs, accessibility is defined as "the possibility of the user to obtain the needed health care or the health service in the right place and the right time, and assumes the lack of geographical, economic, financial, social, cultural, organizational, or language obstacles" [1]. Ensuring access to healthcare is a fundamental right, as outlined in the EU Charter of Fundamental Rights, Article 33, which guarantees "the right of access to preventive healthcare and the right to benefit from medical treatment." [2]. Equitable and

comprehensive access to a basic package of healthcare services is a necessary condition for a well-functioning and well-organized health system, alongside goals such as general coverage, continuity of care, patient choice, and reasonable medical costs [3]. Healthcare disparities—differences in health and medical care standards among demographic groups—pose a significant challenge in rural settings. [4]. Utilization of maternal healthcare services is a prominent public health issue, highlighting the importance of understanding factors



influencing health-seeking behaviour and service utilization at both individual and community levels. [5]. The World Health Organization (WHO) emphasizes that health services must be accessible, socially acceptable, and non-discriminatory, especially for disadvantaged populations. [6]. People in rural areas face difficulties accessing healthcare services due to limited transportation options and a shortage of healthcare providers [7]. Insufficient funding, irregular medication supplies, and a lack of equipment in rural areas of underdeveloped countries severely restrict primary healthcare services.[8]. The lack of universal health coverage in rural areas is a result of the imprecise use of "rural". Due to a lack of more precise methods for dealing with rural contexts, possibilities for action in these places are not well-defined and are only agrarian. The definition of rurality criteria that can differentiate between various realities is still unclear, even in the international debate, particularly when it comes to remote areas [9, 10]. In rural areas, limited education, cultural norms, and economic constraints contribute to the stigma surrounding help-seeking, while concerns about privacy in small communities further discourage individuals from accessing primary healthcare services [11]. Wealthy, continental nations like the US, Canada, and Australia have spearheaded rural health research and discussions [4, 12-14]. Australia, in particular, has become a major player in government programs about rural health [14]. Understanding the tactics outlined in the global discussion on rural health can aid in comprehending this issue, which has not yet gotten much attention. To guarantee adequate access to healthcare and to eradicate disparities, reasonable measures are desperately needed. This study is grounded in Penchansky and Thomas's Access Model, which conceptualizes healthcare access through five dimensions: availability, accessibility, accommodation, affordability, and acceptability. This framework provides a structured approach to analyzing barriers to primary healthcare in rural areas [15].

Despite growing global evidence on rural healthcare disparities, there remains limited empirical data specifically from rural Sindh, Pakistan, that quantitatively examines how multiple socioeconomic determinants collectively influence access to primary healthcare. Existing studies often focus on isolated barriers (e.g., income or distance) without integrating them within a structured framework such as Penchansky and Thomas's Access Model, and few have applied multivariable logistic regression to identify the most significant predictors in this context. Furthermore, there is insufficient local evidence on how combined factors such as education, income, transportation, and infrastructure jointly shape healthcare utilization patterns in underserved rural populations. The present study therefore aimed to assess

the socioeconomic determinants influencing access to primary healthcare services in rural Sindh, Pakistan, and to quantify their relationship using a structured analytical approach. The study also sought to identify key barriers across accessibility, affordability, and availability dimensions to inform targeted health system improvements in these regions.

## METHODS

This cross-sectional study was conducted over three months, starting from September, to December, 2024, following ethical approval from the Ethical Review Committee of Gambat Medical College, Pir Abdul Qadir Shad Jeelani Institute of Medical Sciences, Gambat (Ref No: PAQSJIMS/ORIC/ERC/:35). The study was conducted in the Basic Health Units (BHUs) and Rural Health Centers (RHCs) of five districts of Sindh, Pakistan, including, Hyderabad, Thatta, Badin, Tharparkar, and Larkana. These districts were selected to represent the rural areas of Sindh, considering the healthcare issues in these areas. The adult people aged 18 years and older residing in the selected districts were taken for the study. Individuals with severe mental or physical disabilities that impaired their ability to provide consent or respond to the questionnaire were excluded. 300 participants were selected using a 95% confidence level, a 5% margin of error, and an assumed prevalence of healthcare access issues in rural areas using OpenEpi (Online Calculator). The sample was stratified based on district and socioeconomic status (low-, middle- and high-income groups) to ensure equitable representation. Data were collected using a structured questionnaire designed in English and translated into Sindhi and Urdu for better comprehension. The questionnaire covered demographics (age, gender, marital status), socioeconomic indicators (education level, monthly household income, occupation, and household size), and healthcare access parameters (distance to the nearest facility, transportation availability, service costs, and waiting times). Additional variables included perceived quality of care, encompassing the availability of doctors, medicines, and diagnostic facilities. The questionnaire underwent pilot testing with 30 individuals from a similar demographic to ensure clarity and reliability before being administered in the field. Trained researchers conducted face-to-face interviews, ensuring ethical compliance and obtaining informed consent from participants. The collected data were anonymized and securely stored. Statistical analysis was performed using SPSS version 26.0. Descriptive statistics summarized the demographic and socioeconomic characteristics of the participants. Chi-square tests were used to identify associations between categorical variables, and logistic regression analysis was applied to examine the relationship between

socioeconomic determinants and access to healthcare. A p-value of less than 0.05 was considered statistically significant.

## RESULTS

The study population consisted of 300 participants with a mean age of 38.5 years ( $\pm 12.7$ ). Males constituted the majority (62.3%), and most participants were married (74.1%). Nearly half (46.8%) of the respondents had no formal education, while only 22.0% had completed secondary or higher education. The majority (54.5%) reported a monthly household income below 20,000 PKR, indicating a predominantly low-income population (Table 1). Agriculture was the most common occupation (42.1%), followed by daily wage labor (28.9%). The majority of participants lived in their own houses (70.3%), and a significant proportion (56.3%) reported owning land. However, access to utilities varied, with electricity being available to 89.0% of households, but only 64.3% had access to clean drinking water, and 59.3% had proper sanitation. The average dependency ratio was 1.5, reflecting a high burden of dependents on working individuals. These socioeconomic characteristics highlight significant vulnerabilities that may impact healthcare access in this population (Table 1).

**Table 1:** Demographic and Socioeconomic Characteristics of Participants

Variable	n (%)
Age (mean $\pm$ SD)	38.5 $\pm$ 12.7
<b>Gender</b>	
Male	187 (62.3)
Female	113 (37.7)
<b>Marital Status</b>	
Married	222 (74.1)
Single/Widowed/Divorced	78 (25.9)
<b>Education Level</b>	
No formal education	140 (46.8)
Primary education	94 (31.2)
Secondary or higher education	66 (22.0)
<b>Monthly Household Income (PKR)</b>	
<20,000	164 (54.5)
20,000–40,000	98 (32.7)
>40,000	38 (12.8)
<b>Occupation</b>	
Agriculture	126 (42.1)
Daily wage labor	87 (28.9)
Small business	52 (17.3)
<b>Housing Type</b>	
Owned	211 (70.3)
Rented	67 (22.3)
Temporary	22 (7.4)
<b>Source of Income</b>	
Farming	129 (43.0)

Salaried job	88 (29.3)
Remittance	51 (17.0)
Other	32 (10.7)
<b>Land Ownership</b>	
Yes	169 (56.3)
No	131 (43.7)
<b>Access to Utilities</b>	
Electricity	267 (89.0)
Clean drinking water	193 (64.3)
Sanitation	178 (59.3)
Dependency Ratio (mean $\pm$ SD)	1.5 $\pm$ 0.7
Household Size (mean $\pm$ SD)	6.7 $\pm$ 2.5

Access to healthcare was significantly influenced by distance to facilities and transportation availability. A substantial proportion (42.7%) of participants lived more than 10 kilometers from the nearest health facility, and 38.4% reported difficulties in accessing transportation. Limited healthcare access due to distance and transportation issues may result in delays in seeking medical care, worsening health outcomes, and increasing the burden of preventable diseases. To mitigate these barriers, potential strategies include establishing mobile health clinics, improving road infrastructure, and implementing community-based transport services to facilitate easier access to healthcare. Service costs were another critical barrier, with 51.3% stating that out-of-pocket expenses deterred them from seeking timely care. Waiting times at healthcare facilities were reported as excessively long by 39.2% of participants (Table 2).

**Table 2:** Barriers to Healthcare Access

Barrier	n (%)
Distance to Facility (>10 km)	128 (42.7)
Transportation Difficulty	115 (38.4)
Service Costs	154 (51.3)
Long Waiting Times	118 (39.2)

Perceived quality of care also emerged as a significant determinant. Approximately 48.9% of participants reported frequent unavailability of doctors, while 57.1% stated that essential medicines were often out of stock. The unavailability of essential medicines significantly compromises the quality of care, leading to ineffective treatment and poor patient adherence to prescribed therapies. Addressing this issue requires strengthening the supply chain management, increasing government funding for essential medicines, and ensuring adequate stocking at healthcare facilities. Additionally, 45.3% noted a lack of diagnostic facilities at BHUs and RHCs (Table 3).

**Table 3:** Perceived Quality of Care

Aspect of Care	n (%)
<b>Doctor Availability</b>	
Frequent unavailability	147 (48.9)

Medicine Availability	
Frequent unavailability	171 (57.1)
Diagnostic Facilities	
Lack of facilities	136 (45.3)

The logistic regression analysis revealed several significant socioeconomic factors associated with limited access to healthcare. Participants with no formal education were significantly less likely to access healthcare compared to those with secondary or higher education (OR: 2.34,  $p < 0.01$ ). Similarly, individuals with monthly incomes above 20,000 PKR were significantly more likely to access healthcare than those earning less than 20,000 PKR (OR: 2.81,  $p < 0.01$ ). Geographical barriers also played a critical role, as participants residing more than 10 kilometers from the nearest healthcare facility were 2.67 times more likely to experience access difficulties ( $p < 0.01$ ). Housing type and land ownership also influenced healthcare access; those living in rented or temporary housing and those without land ownership were less likely to access healthcare services (OR: 1.85 and OR: 2.14, respectively; both  $p < 0.01$ ). Limited access to clean drinking water further exacerbated healthcare barriers, as those lacking this basic utility were three times more likely to face access issues (OR: 3.02,  $p < 0.01$ ). A high dependency ratio ( $>1.5$ ) was also associated with reduced healthcare access (OR: 2.25,  $p < 0.01$ ) (Table 4).

**Table 4:** Logistic Regression Analysis of Socioeconomic Determinants of Healthcare Access

Variable	Odds Ratio (OR)	95% CI	p-Value
Education Level (Secondary or Higher vs. No Formal Education)	2.34	1.52–3.59	<0.01
Monthly Income (>20,000 PKR vs. ≤20,000 PKR)	2.81	1.85–4.27	<0.01
Distance to Facility (>10 km vs. ≤10 km)	2.67	1.78–4.00	<0.01
Housing Type (Rented or Temporary vs. Owned)	1.85	1.19–2.87	0.01
Land Ownership (No vs. Yes)	2.14	1.38–3.33	<0.01
Access to Clean Drinking Water (No vs. Yes)	3.02	1.95–4.66	<0.01
Dependency Ratio (>1.5 vs. ≤1.5)	2.25	1.45–3.50	<0.01

## DISCUSSION

According to the findings of this study the 46.8% of participants had no formal education, which is a critical barrier that severely confines health literacy and awareness of available healthcare options. This aligns with the findings of Abbas et al. (2019) [16], who highlighted the role of education in improving access to healthcare services. Education not only raises awareness but also allows individuals to find healthcare systems effectively. The economic landscape also plays an important role in accessing healthcare services. In this study nearly half of the participants belong to the category who earn less than

20,000 PKR monthly. This is another determinant of poor accessibility of healthcare services in these rural areas. Financial constraints in rural areas limit the availability, recruitment, and education of healthcare professionals, making it difficult to develop a strong primary healthcare workforce. Resource shortages hinder proper recruitment and retention, prevent providers from fulfilling their roles, and contribute to burnout [17]. As reported by Khalid and Ali (2020) [18], the high dependency ratio increases poverty, ultimately limiting the utilization of primary healthcare facilities. Distance and poor transportation appeared as significant barriers in this study in utilizing the basic health facilities. A large proportion of participants were residing more than 10 kilometers from the nearest healthcare facility. Distance has long been recognized as a critical determinant of access, as reported by Abbas et al. (2019) [16] who reported that many of the remote areas often lack the necessary transportation to healthcare services. Perhaps one of the most serious findings was the unavailability of healthcare services or poor quality. Nearly half of the participants reported the unavailability of doctors, and a majority reported the unavailability of basic medicines and a lack of diagnostic facilities. Similar observations were also reported by Islam and Amin (2024) [19] in their study pointing out the resource constraints in rural healthcare settings. Basic utilities, such as clean drinking water and sanitation, were also found to be lacking in many households. This not only contributes to the prevalence of preventable diseases but also poses significant challenges for healthcare-seeking behavior. Amri and Sihotang (2023) [20] emphasized that the absence of fundamental utilities exacerbates health vulnerabilities, making access to even primary healthcare an arduous task for rural populations. The study findings resonate with global research on rural healthcare access. For instance, Yar & Yasouri, (2024) [21] noted that rural populations in developing countries face similar patterns of geographic isolation, financial insecurity, and inadequate healthcare infrastructure. The parallels reinforce the universal need for targeted rural health policies, such as the deployment of mobile healthcare units, improved transportation infrastructure, and incentivized rural postings for healthcare professionals. Study limitations include reliance on self-reported data, introducing recall bias, and limited generalizability due to the cross-sectional design. Strengthening PHC with adequate staffing and resources is essential for improving healthcare access in rural areas. To mitigate the impact of essential medicine unavailability (57.1%), future initiatives should focus on strengthening supply chain management, expanding government subsidies for essential drugs, and integrating community-based distribution models to ensure consistent availability. Establishing public-private

partnerships and utilizing digital inventory tracking systems can further reduce stockouts and improve medication access. To improve healthcare accessibility for individuals living more than 10 kilometers from facilities (42.7%), mobile health clinics, telemedicine services, and community-based healthcare worker programs should be expanded.

This study is limited by its cross-sectional design, which restricts causal inference between socioeconomic factors and healthcare access. The reliance on self-reported data may introduce recall and social desirability bias, while the sample from selected districts may limit generalizability to other rural regions of Pakistan. Future research should adopt longitudinal or mixed-method designs to better explore causal pathways and lived experiences of healthcare access. Larger, nationally representative studies are recommended to strengthen external validity, alongside policy-focused research evaluating the impact of infrastructure development, mobile health services, and financial protection schemes on improving equitable healthcare access in rural settings.

## CONCLUSIONS

According to the findings of our study, education, poverty, unavailability of basic medical facilities and transportation are the significant factors that contribute to the poor access to the basic healthcare services in rural areas of the five selected districts of Sindh, Pakistan.

## Authors' Contribution

Conceptualization: SH

Methodology: SH, MT, AN, HS

Formal analysis: MT, SS<sup>1</sup>

Writing and Drafting: AN, SS<sup>2</sup>

Review and Editing: AN, SS<sup>2</sup>, HS

All authors approved the final manuscript and take responsibility for the integrity of the work

## Conflicts of Interest

The authors declare no conflict of interest.

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