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Original Research Article

AVAILABILITY AND UTILIZATION OF PUBLIC HEALTH FACILITIES BY RURAL POPULATION IN BAREILLY DISTRICT: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Public health facilities form the backbone of healthcare delivery in rural India. Despite expansion of the public health infrastructure under national programs, disparities continue to exist between availability of services and their actual utilization by rural populations. Understanding patterns of availability, utilization, and satisfaction with public health facilities is essential for strengthening primary healthcare delivery and achieving universal health coverage. This study aimed to assess the availability and utilization of public health facilities among the rural population of Bareilly district, Uttar Pradesh, to analyze the influence of socio-demographic factors on utilization, to assess the level of satisfaction with public health services, and to suggest measures for improvement of rural public health facilities. **Materials and Methods:** A community-based cross-sectional study was conducted over one year among 407 participants residing in rural areas of Bareilly district. A multistage random sampling technique was used to select blocks, villages, and health facilities. Data were collected using a pre-tested structured questionnaire covering socio-demographic details, awareness, utilization patterns, perceived barriers, and satisfaction with public health services. Data were analyzed using SPSS version 21.0 and MS Excel 2021. Descriptive statistics, Chi-square test, t-test, ANOVA, and binary logistic regression were applied, with a p-value <0.05 considered statistically significant. **Result:** Awareness of Primary Health Centres was reported by 78.6% of participants, while awareness of Sub-centres and Community Health Centres was 71.3% and 66.3%, respectively. Overall, 89.7% of respondents reported regular or occasional utilization of public health facilities, primarily for illness treatment and maternal–child health services. Utilization was significantly associated with age, education, occupation, distance to facilities, and awareness of services. Satisfaction levels were moderate, with 43.0% of respondents reporting satisfaction or high satisfaction. Higher education, better awareness, proximity to facilities, and good perceived availability were significant predictors of utilization and satisfaction. **Conclusion:** The study highlights high dependence on public health facilities among the rural population of Bareilly district but reveals moderate satisfaction and persistent access barriers. Strengthening awareness, accessibility, and quality of services—particularly for vulnerable and low-literacy groups—is essential to improve effective utilization and patient satisfaction in rural public health settings.

INTRODUCTION

Access to affordable, acceptable, and quality healthcare is a fundamental component of public health and a key determinant of population well-being. In India, the public health system is designed as a three-tier structure comprising Sub-centres, Primary Health Centres (PHCs), and Community Health Centres (CHCs), intended to deliver comprehensive primary and secondary care services to rural populations. Despite substantial investments under the National Health Mission (NHM), disparities persist between availability of services

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and their actual utilization, particularly in rural and socio-economically disadvantaged settings.[1]

Globally, rural populations face disproportionate barriers to healthcare access due to geographic isolation, inadequate infrastructure, workforce shortages, and socio-economic constraints. The World Health Organization has emphasized that effective utilization of primary healthcare facilities is essential for achieving Universal Health Coverage (UHC), especially in low- and middle-income countries where public health systems serve as the primary source of care for rural communities.[2] However, mere physical availability of health facilities does not guarantee utilization; awareness, accessibility, perceived quality of care, and patient satisfaction play critical roles in healthcare-seeking behavior.[3]

India continues to have a predominantly rural population, with nearly 65% of its population residing in rural areas as per Census 2011.[4] Although rural health infrastructure has expanded considerably over the last two decades, utilization of public health facilities remains inconsistent across states and districts. Evidence from the National Family Health Survey-5 (NFHS-5, 2019–21) indicates that while institutional deliveries and maternal health service utilization have improved, outpatient service utilization at PHCs and CHCs remains suboptimal in several northern Indian states.[5] Studies have highlighted that rural populations often bypass nearby public facilities due to factors such as perceived poor quality, lack of medicines, long waiting times, and inadequate provider availability.[6]

Uttar Pradesh, the most populous state in India, presents unique public health challenges owing to its large rural population, socio-economic inequalities, and variable health system performance. According to NFHS-5, Uttar Pradesh has shown improvement in maternal and child health indicators; however, rural-urban and inter-district disparities in healthcare access and utilization persist.[5] The Rural Health Statistics (2022–23) report indicates shortfalls in specialist availability at CHCs and uneven distribution of PHCs and Sub-centres across districts, affecting both service availability and community confidence in public healthcare delivery.[7]

Bareilly district, located in western Uttar Pradesh, has a mixed rural-urban demographic profile with a substantial proportion of the population residing in villages and dependent on government health facilities for routine and emergency care. While the district has an established network of Sub-centres, PHCs, and CHCs, local evidence suggests that utilization patterns are influenced by socio-demographic factors such as education, occupation, distance to facilities, and awareness of services.[8] Patient satisfaction, which reflects both structural and process-related aspects of care, has increasingly been recognized as a critical indicator of health system performance and future utilization.[9]

Several Indian studies have demonstrated that higher education levels, better awareness of available services, and proximity to health facilities are associated with increased utilization of public health services, whereas distance, perceived barriers, and dissatisfaction reduce service uptake.[10–12] However, district-level evidence integrating availability, utilization, satisfaction, and socio-demographic determinants remains limited, particularly in rural Uttar Pradesh.

In this context, the present cross-sectional study was undertaken to assess the availability and utilization of public health facilities by the rural population of Bareilly district. The study also aimed to analyze the influence of socio-demographic factors on healthcare utilization, evaluate public satisfaction with existing services, and generate evidence-based recommendations to strengthen rural public health service delivery in the district. The present study aims to assess the availability and utilization of public health facilities among the rural population of Bareilly district. The objectives are to evaluate the availability of services provided at Sub-centres, Primary Health Centres, and Community Health Centres, to estimate the extent and pattern of utilization of these public health facilities by the rural population, to analyze the influence of socio-demographic factors on healthcare utilization, and to assess the level of satisfaction of the general public regarding the availability and utilization of rural health services. The outcomes of this study are expected to generate district-level evidence on gaps between availability and utilization of public health facilities, identify key determinants affecting service uptake and satisfaction, and provide actionable recommendations for strengthening accessibility, quality, and community engagement, thereby supporting evidence-based planning and improvement of rural public health services in Bareilly district.

MATERIALS AND METHODS

The present study was a community-based cross-sectional study conducted in rural areas of Bareilly district, Uttar Pradesh, over a period of one year after obtaining approval from the Institutional Ethics Committee. The study area included selected blocks of Bareilly district, and the study population comprised individuals residing in villages as well as beneficiaries visiting Sub-centres, Primary Health Centres (PHCs), and Community Health Centres (CHCs) in the selected blocks. A quantitative approach was adopted to assess availability, utilization, and satisfaction related to public health facilities.

The sample size was calculated using the formula $n = Z^2P(1-P)/L^2$, assuming an estimated utilization proportion of public health facilities of 60%, a 95% confidence level, and a 5% allowable error. The calculated sample size was 370, which was further

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increased to 407 after adjusting for a 10% non-response rate. A multistage random sampling technique was employed. In the first stage, seven blocks were selected from the total fifteen blocks of Bareilly district using the lottery method. In the second stage, villages, PHCs, CHCs, and Sub-centres within the selected blocks were chosen by lottery method. In the third stage, study participants were selected using Probability Proportion to Size (PPS) sampling, with 50% of participants selected from villages and 50% from health facilities. Systematic random sampling was used for selection from villages, while simple random sampling was applied to select patients visiting healthcare facilities on the day of the survey.

Both indoor and outdoor patients who had been residing in the study area for more than six months and who provided informed consent were included in the study. Pediatric patients, physically disabled individuals with hearing, vision, or mobility impairments, and indoor patients unable to respond adequately were excluded. Data were collected using a pre-tested and pre-validated structured questionnaire through face-to-face interviews, covering socio-demographic details, awareness of health facilities, utilization patterns, perceived barriers, and satisfaction with public health services.

Data were entered into Microsoft Excel and analyzed using SPSS software version 21.0. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize the data. Inferential statistical analysis included Chi-square test, t-test, and ANOVA to assess associations between variables. Binary logistic regression analysis was performed to identify predictors of utilization and satisfaction with public health facilities. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 407 participants from rural areas of Bareilly district were included in the study. The largest proportion of participants belonged to the 30–39 years age group (27.5%), followed by 40–49 years (24.8%), ≥50 years (24.1%), and 18–29 years (23.6%). Males constituted 52.1% of the study population, while females accounted for 47.9%. Regarding educational status, 23.6% of participants were illiterate, 29.7% had primary education, 27.8% had secondary education, and 18.9% were graduates or above. Farmers formed the largest occupational group (30.5%), followed by laborers (24.1%), service or business workers (21.4%), students (15.0%), and homemakers (9.1%). Nearly half of the participants (44.2%) resided within 1–5 km of the nearest Primary Health Centre, while 36.6% lived at a distance of ≥5 km.

Awareness of public health facilities was generally high for Primary Health Centres, with 78.6% of respondents being aware of PHCs, followed by Sub-centres (71.3%) and Community Health Centres (66.3%). In contrast, awareness regarding mobile health clinics was relatively low (44.2%). Utilization of public health facilities was substantial, with 48.4% reporting regular use and 41.3% reporting occasional use, while 10.3% of participants had never utilized public health services. The most common reason for visiting public health facilities was treatment of illness (68.8%), followed by maternal and child health services (36.9%) and immunization services (30.5%). The mean utilization score was 1.9 ± 0.8, indicating moderate-to-high service use.

Assessment of satisfaction levels revealed that 43.0% of respondents were satisfied or very satisfied with the public health facilities, 29.5% expressed neutral satisfaction, and 27.5% were dissatisfied. The mean satisfaction score was 3.1 ± 1.0, reflecting an overall moderate level of satisfaction among users.

Analysis of socio-demographic factors showed that utilization of public health facilities was significantly associated with age, education, and occupation. Participants below 40 years of age demonstrated higher utilization (91.2%) compared to those aged 40 years and above (84.1%, $p = 0.033$). Utilization increased markedly with educational status, rising from 68.8% among illiterate participants to 93.5% among graduates ($p = 0.018$). Occupational differences were also significant, with students and service-class participants showing higher utilization (96.4%) compared to farmers (75.0%, $p = 0.034$). Gender did not show a statistically significant association with utilization.

Binary logistic regression analysis identified education, awareness of facilities, distance to health facilities, and perceived availability as significant predictors of utilization and satisfaction. Participants with secondary or higher education were 2.4 times more likely to utilize public health facilities, while those aware of available services had 2.45 times higher odds of utilization. Conversely, residing at a distance of ≥5 km from the nearest facility reduced the likelihood of utilization (AOR = 0.54). Perception of good facility availability significantly increased satisfaction and utilization (AOR = 2.35), whereas reported access barriers significantly reduced service use.

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Table 1: Socio-Demographic Profile of Study Participants (N = 407)

Variable	Category	Frequency (n)	Percentage (%)
Age group (years)	18–29	96	23.6
	30–39	112	27.5
	40–49	101	24.8
	≥50	98	24.1
Gender	Male	212	52.1
	Female	195	47.9
Education	Illiterate	96	23.6
	Primary	121	29.7
	Secondary	113	27.8
	Graduate & above	77	18.9
Occupation	Farmer	124	30.5
	Labourer	98	24.1
	Service/Business	87	21.4
	Student	61	15.0
	Homemaker	37	9.1
Distance to nearest PHC	< 1 km	78	19.2
	1–5 km	180	44.2
	≥5 km	149	36.6

Table 2: Availability, Utilization and Satisfaction with Public Health Facilities (Outcome Table)

Parameter	Category	Frequency (n)	Percentage (%)
Awareness of PHC	Yes	320	78.6
	No	87	21.4
Awareness of CHC	Yes	270	66.3
Awareness of Sub-centre	Yes	290	71.3
Awareness of Mobile Clinic	Yes	180	44.2
Utilization of public facilities	Regular	197	48.4
	Occasional	168	41.3
	Never	42	10.3
Purpose of visit*	Illness treatment	280	68.8
	Maternal & child health	150	36.9
	Immunization	124	30.5
Satisfaction level	Satisfied / Very satisfied	175	43.0
	Neutral	120	29.5
	Dissatisfied	112	27.5
Mean utilization score	—	1.9 ± 0.8	—
Mean satisfaction score	—	3.1 ± 1.0	—

*Multiple responses allowed

Table 3: Association Between Socio-Demographic Factors and Utilization of Public Health Facilities (Test of Significance I)

Variable	Category	Utilized (%)	Not utilized (%)	p-value
Age group	<40 years	91.2	8.8	0.033*
	≥40 years	84.1	15.9	
Education	Illiterate	68.8	31.2	0.018*
	Graduate & above	93.5	6.5	
Occupation	Farmer	75.0	25.0	0.034*
	Service/Student	96.4	3.6	
Gender	Male	89.6	10.4	0.412
	Female	89.8	10.2	

*Statistically significant ($p < 0.05$)

Table 4: Binary Logistic Regression Analysis for Predictors of Utilization and Satisfaction (Test of Significance II)

Predictor Variable	Adjusted Odds Ratio (AOR)	95% CI	p-value
Education ≥ secondary	2.40	1.42–4.06	0.001*
Awareness of facilities	2.45	1.39–4.31	0.002*
Distance ≥ 5 km	0.54	0.34–0.86	0.007*
Good facility availability	2.35	1.40–3.94	0.001*
Presence of access barriers	0.48	0.29–0.78	0.004*

*Statistically significant ($p < 0.05$)

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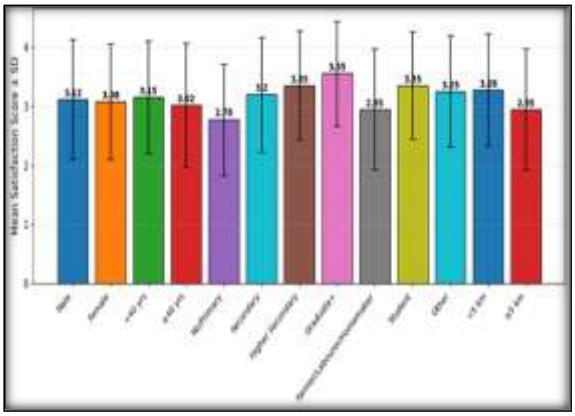

Figure 1: Mean Satisfaction Scores by Socio-Demographic Factors.

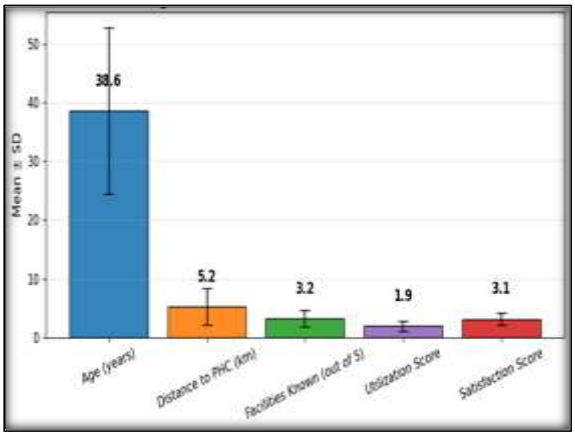

Figure 2: Mean Values of Selected Variables

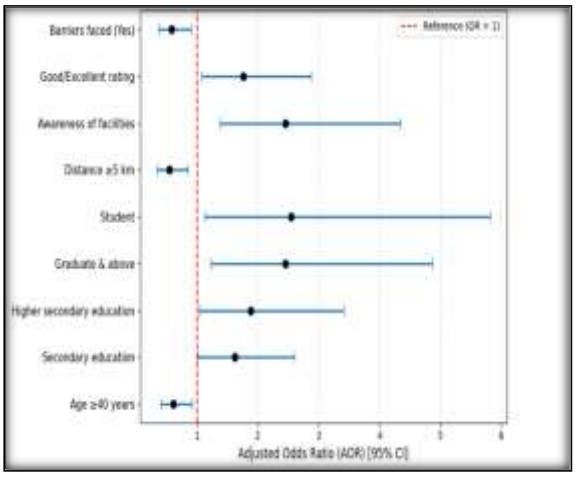

Figure 3: Forest Plot- Determinants of Utilization of Public Health Facilities

DISCUSSION

The present cross-sectional study evaluated the availability, utilization, and satisfaction related to public health facilities among the rural population of Bareilly district and analyzed the influence of socio-demographic factors on healthcare utilization. The findings indicate that while awareness and utilization of public health facilities were relatively high, gaps persist in accessibility, satisfaction, and equitable use, particularly among older adults, individuals with lower educational status, and those residing farther from health facilities.

In the present study, awareness of the three-tier public health system was satisfactory, with 78.6% of respondents aware of PHCs, 71.3% aware of Sub-centres, and 66.3% aware of CHCs. However, awareness regarding mobile health clinics was relatively low (44.2%). Similar findings were reported by Sharma JK et al. (2011), who observed that although rural residents were generally aware of fixed health facilities, outreach and mobile services remained under-recognized and underutilized in North India.[13] Early evidence by Das and Hammer (2014) further highlighted that mere physical presence of health infrastructure does not ensure effective availability if services are irregular or poorly communicated.[14]

Utilization of public health facilities in this study was high, with 89.7% of respondents reporting regular or occasional use. This utilization rate exceeds that reported in earlier Indian studies. Ganguly et al. (2014) documented lower utilization levels in rural West Bengal and attributed this to occupational constraints and perceived poor quality of care.[15] The relatively higher utilization in Bareilly district may be due to improved road connectivity, strengthened primary healthcare under the National Health Mission, and active involvement of frontline health workers such as ASHAs.

Education emerged as a strong determinant of utilization in the present study, with utilization increasing from 68.8% among illiterate participants to 93.5% among graduates. This finding aligns with Sharma JK et al. (2011), who reported that education enhances health literacy and confidence in public health services, thereby improving utilization.[13] Similar conclusions were drawn by Kumar and Roy (2022), who demonstrated a strong positive association between educational attainment and primary healthcare utilization in rural India.[16]

Distance to health facilities was another critical factor influencing utilization. Participants residing ≥5 km from the nearest facility had significantly lower odds of utilization (AOR = 0.54). This observation is consistent with findings by Banerjee and Duflo (2021), who emphasized that geographic proximity plays a more decisive role than income in determining healthcare use in rural India.[17] Barve et al. (2023) also reported that transport difficulties and travel time significantly reduced outpatient attendance in rural health facilities.[18]

Sociodemographic analysis showed that utilization was significantly associated with age, education, and occupation, while gender was not a significant determinant. Older individuals (≥40 years) demonstrated lower utilization, a trend also reported by Bagchi (2022), who noted declining utilization with advancing age due to mobility limitations and preference for home-based remedies.[19] Occupational variation was evident, with students and service-class individuals showing higher utilization compared to farmers, corroborating

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findings by Ganguly et al. (2014) that agricultural workers often face time constraints and opportunity costs that discourage healthcare-seeking.[15]

Satisfaction with public health facilities in the present study was moderate, with 43.0% of respondents reporting satisfaction or high satisfaction. This level is lower than that reported by Barve et al. (2023) and Ganguly et al. (2014), who documented satisfaction levels of approximately 70–80% in other rural settings.[15,18] Logistic regression analysis in the present study showed that education, awareness of services, good perceived availability, and absence of access barriers significantly increased satisfaction. These findings are consistent with Banerjee and Duflo (2021) and Purohit and Siddiqui (2023), who highlighted that patient satisfaction is influenced by convenience, provider behavior, availability of medicines, and waiting time rather than infrastructure alone.[17,20]

Recent evidence by Mozumdar et al. (2024) among rural tribal populations in West Bengal similarly demonstrated that awareness, proximity, and perceived quality were key drivers of healthcare utilization, reinforcing the conclusions of the present study.[21] Furthermore, a national decomposition analysis by Sharma et al. (2025) showed that improvements in rural healthcare utilization were concentrated in regions with robust public health systems, better facility density, and strong outreach mechanisms.[22]

Overall, the findings of this study corroborate national and regional evidence that availability of infrastructure alone is insufficient to ensure optimal utilization and satisfaction. Education-based empowerment, improved awareness, geographic accessibility, and consistent service quality are essential for strengthening rural public health systems. The study underscores the need for targeted interventions focusing on older adults, low-literacy groups, and remote populations to achieve equitable and effective utilization of public health facilities in rural Bareilly district.

CONCLUSION

The present cross-sectional study demonstrates that public health facilities in rural areas of Bareilly district are widely available and form the primary source of healthcare for a large proportion of the rural population. Awareness and utilization of Sub-centres, Primary Health Centres, and Community Health Centres were found to be relatively high; however, utilization was influenced by socio-demographic factors such as age, education, occupation, distance to health facilities, and awareness of available services. Despite high dependence on public health facilities, the level of satisfaction among users was only moderate, indicating gaps in perceived service quality, accessibility, and convenience. Overall, the findings highlight that while infrastructural availability exists, strengthening functional aspects of service delivery and addressing barriers to access are essential for improving effective utilization and satisfaction with rural public health services in Bareilly district.

Limitations

The study has certain limitations that should be considered while interpreting the findings. Being cross-sectional in nature, causal relationships between availability, utilization, and satisfaction could not be established. Data were collected using self-reported responses, which may be subject to recall bias and social desirability bias. The study was confined to selected rural blocks of Bareilly district, thereby limiting the generalizability of results to other districts or states. Seasonal variations in healthcare utilization could not be assessed due to the one-time survey design. Additionally, qualitative aspects of patient experiences and provider perspectives were not explored in depth.

Recommendations

Based on the study findings, it is recommended that community-level awareness activities be strengthened to improve knowledge regarding the availability of public health services, particularly mobile health clinics and outreach programs. Efforts should be made to enhance accessibility by improving transport facilities, ensuring functional Sub-centres within a 5 km radius, and strengthening referral linkages. Improving service quality through regular availability of medicines, adequate staffing, courteous provider behavior, and reduced waiting time is essential to enhance patient satisfaction. Targeted interventions should focus on older adults, low-literacy groups, and agricultural workers who demonstrated lower utilization. Routine monitoring of patient satisfaction and community feedback mechanisms should be institutionalized to guide continuous quality improvement in rural public health facilities.

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