

Original Article

Assess the Effectiveness, Quality, Affordability, and Accessibility of Pakistan's Public Healthcare System (PHS)

Farah Ashfaq Bandukda¹, Naseem Fareed², Sana Shah³, Mahira Palwasha⁴, Islam Uddin⁵

¹ Instructor Sonologist, MBBS, RMP, MHCM, JPMC, Karachi, Pakistan

² Coordinator and Primary Health Care Provider, MHCM, LHV, Private Hospital and Sindh Govt 50-Bedded Hospital, Pakistan

³ Dental Surgeon (BPS-17), BDS, RDS, MHCM, Government of Sindh, Pakistan

⁴ General Dentist, Private Clinic, Karachi, Pakistan

⁵ General Manager, Emergency Services, Dr. Ziauddin Hospital Head Office, Pakistan.

✉ Correspondence: Farah Ashfaq Bandukda, farahfarooq911@gmail.com

Received: 19 January 2026

Revised: 03 February 2026

Accepted: 10 February 2026

Published: 15 February 2026

HOW TO CITE

Farah Ashfaq Bandukda et al. 2026. Assess the Effectiveness, Quality, Affordability, and Accessibility of Pakistan's Public Healthcare System (PHS). Journal of Health, Wellness and Community Research. 4, 3 (Feb. 2026), 1–8. DOI: <https://doi.org/10.61919/8vf77f74>

ARTICLE INFORMATION

Author Contributions	Concept: FAB; Design: FAB, NF; Data Collection: NF, SS, MP, IU; Analysis: FAB, SS; Drafting: FAB, NF, SS, MP, IU.
Ethical Approval	The study was approved by research ethical board of JPMC, Karachi, Pakistan
Informed Consent	Written informed consent was obtained from all participants
Conflict of Interest	The authors declare no conflict of interest.
Funding	No external funding.
Data Availability	Available from the corresponding author on reasonable request.
AI Declaration	No generative AI was used for conceptualization, analysis, or content generation. AI use was limited to language refinement, and the authors remain fully responsible for the accuracy, originality, validity, and integrity of the manuscript's content.

ABSTRACT

Background: Healthcare access depends on geographic availability, affordability, service readiness, workforce capacity, and equity. Financial and operational barriers may limit effective healthcare utilization despite physical proximity to services. **Objective:** To describe patient-reported healthcare accessibility, utilization, service quality, staffing adequacy, affordability, information sources, perceived disparities, and government healthcare initiatives among healthcare users in Pakistan. **Methods:** This cross-sectional observational survey included 379 patients recruited by convenience sampling from Basic Health Units, dispensaries, district hospitals, and private clinics. A 21-item English- and Urdu-language questionnaire assessed nine healthcare-related domains. Categorical responses were summarized using frequencies and percentages. **Results:** Of 379 participants, 311 (82.1%) were female and 288 (76.0%) were aged 20–40 years. Overall, 315 (83.1%) lived within 10 km of a healthcare facility. Private clinics were the most frequently reported primary facility (174, 45.9%), while 232 (61.2%) perceived facility staffing as inadequate. Fair or poor service quality was reported by 205 (54.1%), and 205 (54.1%) had delayed or avoided healthcare because of cost. Perceived unequal healthcare quality compared with wealthier areas was reported by 269 (71.0%), while 259 (68.3%) rated government initiatives as somewhat effective or ineffective. **Conclusion:** Geographic proximity coexisted with substantial patient-reported financial, staffing, quality, and equity concerns. These descriptive findings identify multidimensional barriers to healthcare access but do not establish causal relationships between public-sector limitations, private-sector utilization, and financial hardship. **Keywords:** Cross-Sectional Studies; Delivery of Health Care; Health Equity; Healthcare Disparities; Health Services Accessibility; Out-of-Pocket Payments; Quality of Health Care.

INTRODUCTION

Healthcare accessibility, quality, affordability, and equity are interdependent dimensions of health-system performance. Inadequate financing and reliance on out-of-pocket expenditure can restrict timely access to healthcare, disproportionately affecting socioeconomically disadvantaged populations and contributing to avoidable inequities in service utilization (1). Evidence from health systems in Malaysia and Mexico similarly demonstrates that the distribution of out-of-pocket healthcare payments and the design of financial-protection mechanisms can substantially influence equity in access to essential services (2,3). Financial Incidence of

financing-incidence studies has further shown that unequal out-of-pocket health expenditure remains an important contributor to financial vulnerability across different health systems (4).

Health-system inequities, however, are not determined by financing alone. Differences in geographic access, workforce availability, service readiness, patient-provider interactions, and the organization of care may also influence whether individuals can obtain appropriate healthcare when needed. International evidence has emphasized that health equity requires attention to structural determinants of care as well as improvements in practical access to healthcare services (5,6). These challenges are particularly relevant in resource-constrained settings, where direct household expenditure may coexist with shortages of healthcare personnel and uneven availability of public services. Evidence from developing-country contexts has demonstrated that out-of-pocket payments can impede access to necessary treatment, while broader equity frameworks emphasize the importance of strengthening community-level services and reducing structural barriers to care (7,8).

Pakistan operates a mixed healthcare system in which public-sector facilities coexist with private and other healthcare providers. Within such a system, patients may make healthcare choices according to availability, perceived quality, distance, cost, and confidence in the services offered. Evidence from other middle-income settings indicates that socioeconomic position can influence the burden of healthcare expenditure, while research from African health systems has highlighted the continuing importance of improving access, information, and service delivery for underserved populations (9,10). Consequently, geographic proximity to a healthcare facility alone does not necessarily indicate effective access if services are perceived as inadequately staffed, unaffordable, unavailable, or of insufficient quality.

Health policy has an important role in reducing disparities by improving financial protection, service availability, and equitable access to healthcare (11). Nevertheless, disparities may persist even where healthcare infrastructure is physically available, because socioeconomic and system-level barriers can influence patterns of utilization and patient experience (12). In Pakistan, there remains a need for patient-level evidence describing how healthcare users perceive accessibility, affordability, staffing, service quality, information availability, government initiatives, and disparities within the healthcare system. In particular, examining these dimensions together may help identify whether physical access to services is accompanied by acceptable affordability and perceived service readiness.

Therefore, this cross-sectional study aimed to describe patient-reported healthcare accessibility, utilization, service quality, staffing adequacy, affordability, information sources, perceived disparities, and perceptions of government healthcare initiatives among healthcare users in Pakistan. It also sought to characterize the major barriers reported by participants when seeking healthcare and the extent to which financial constraints were associated with self-reported delays or avoidance of care at the descriptive level.

MATERIALS AND METHODS

A cross-sectional observational survey was conducted among patients utilizing healthcare services in Pakistan. Participants were recruited from healthcare settings that included Basic Health Units, dispensaries, district hospitals, and private clinics. The study was designed to describe patient-reported experiences and perceptions relating to healthcare accessibility, utilization, service quality, staffing, affordability, information availability, perceived disparities, and government healthcare initiatives.

The target population comprised patients using healthcare services at the participating facilities. Healthcare facility staff and faculty members were excluded to reduce the likelihood that professional involvement in healthcare delivery would influence responses concerning service performance. Participants were selected using convenience sampling, and the final analytic sample consisted of 379 respondents.

Data were collected using a structured 21-item questionnaire administered in English and Urdu. The questionnaire covered nine domains: demographic characteristics; healthcare access and geographic proximity; service quality and staffing; affordability and financial barriers; awareness of available healthcare services; gender- and culture-related barriers; perceptions of government and policy initiatives; personal and community healthcare challenges; and perceived healthcare disparities. Participant characteristics included gender, age category, monthly household income, and educational level. Healthcare-access measures included distance to the nearest healthcare facility, the type of facility primarily utilized, and frequency of healthcare utilization. Service-related measures

included perceived quality of healthcare, perceived adequacy of facility staffing, and staff attitude. Financial measures included perceived affordability of healthcare and whether participants had delayed or avoided seeking care because of financial constraints.

Additional survey measures assessed participants' level of awareness regarding available healthcare services and their principal sources of healthcare information, including healthcare professionals, community leaders or Lady Health Workers, media sources, and other channels. Participants were also asked to identify major barriers to obtaining healthcare, including cost, lack of healthcare professionals, and distance to healthcare facilities. Perceptions of disparities in healthcare quality between their communities and wealthier areas, experiences of bias or discrimination during healthcare encounters, and perceived effectiveness of government healthcare initiatives were also assessed.

Questionnaire responses were summarized using descriptive statistics. Categorical variables were reported as frequencies and percentages using the total analytic sample of 379 respondents as the denominator where applicable. Analyses were organized according to the nine survey domains to describe the distribution of participant characteristics, healthcare utilization, perceived service quality, staffing adequacy, affordability, information sources, barriers to care, perceived disparities, and perceptions of government healthcare initiatives. No inferential, multivariable, subgroup, or adjusted statistical analyses were reported; consequently, the study findings were interpreted descriptively and were not used to establish causal relationships between socioeconomic characteristics, healthcare-sector utilization, staffing, affordability, or other survey variables.

RESULTS

A total of 379 participants were included in the analysis. Most respondents were female ($n=311$, 82.1%), and 288 (76.0%) were aged 20–40 years. The largest monthly household income category was PKR 10,000–30,000, comprising 243 participants (64.1%). Primary and secondary education were reported by 144 (38.0%) and 137 (36.1%) respondents, respectively, whereas 80 (21.1%) had attained higher education (Table 1). Healthcare facilities were located within 10 km for 315 participants (83.1%; 95% CI 79.0–86.5), including 133 (35.1%) who reported a distance of <5 km and 182 (48.0%) who reported a distance of 5–10 km. Private clinics were the most frequently reported primary facility type ($n=174$, 45.9%; 95% CI 41.0–50.9), followed by government hospitals ($n=155$, 40.9%). Community health centers and traditional healers accounted for 42 (11.1%) and 8 (2.1%) respondents, respectively (Table 2).

Perceived service quality was most commonly rated as fair ($n=171$, 45.1%), followed by good ($n=143$, 37.7%). Overall, 205 participants (54.1%; 95% CI 49.1–59.0) rated service quality as either fair or poor. Inadequate staffing was reported by 232 respondents (61.2%; 95% CI 56.2–66.0), compared with 102 (26.9%) who considered their healthcare facility adequately staffed. Staff attitudes were most frequently characterized as neutral ($n=197$, 52.0%), while 137 respondents (36.1%) reported respectful interactions (Table 2).

Regarding affordability, 220 participants (58.0%) considered healthcare somewhat affordable and 106 (28.0%) considered it unaffordable, whereas only 53 (14.0%) described healthcare as easily affordable. More than half of respondents reported delaying or avoiding healthcare because of financial constraints ($n=205$, 54.1%; 95% CI 49.1–59.0). Healthcare professionals were the most frequently reported source of healthcare information ($n=159$, 42.0%), followed by community leaders or Lady Health Workers ($n=117$, 30.9%) and media sources ($n=88$, 23.2%) (Table 3).

Table 1. Participant Demographic Characteristics (N=379)

Variable	Category	n (%)
Gender	Female	311 (82.1)
	Male	68 (17.9)
Age group, years	20–40	288 (76.0)
	Other age categories	91 (24.0)
Monthly household income, PKR	10,000–30,000	243 (64.1)
	30,000–50,000	76 (20.1)
	Other income categories	60 (15.8)
Education level	No formal education	18 (4.8)
	Primary	144 (38.0)
	Secondary	137 (36.1)
	Higher education	80 (21.1)

Table 2. Healthcare Access, Facility Utilization, Service Quality, and Staffing (N=379)

Variable	Category	n (%)
Distance to nearest healthcare facility	<5 km	133 (35.1)
	5–10 km	182 (48.0)
	Other distance category	64 (16.9)
Primary facility utilized	Private clinic	174 (45.9)
	Government hospital	155 (40.9)
	Community health center	42 (11.1)
	Traditional healer	8 (2.1)
Perceived service quality	Excellent	31 (8.2)
	Good	143 (37.7)
	Fair	171 (45.1)
	Poor	34 (9.0)
Perceived staffing adequacy	Adequately staffed	102 (26.9)
	Inadequately staffed	232 (61.2)
	Not sure	45 (11.9)
Staff attitude	Neutral	197 (52.0)
	Respectful	137 (36.1)
	Other reported responses	45 (11.9)

Table 3. Healthcare Affordability, Information Sources, Perceived Disparities, and Government Initiatives (N=379)

Variable	Category	n (%)
Perceived healthcare affordability	Easily affordable	53 (14.0)
	Somewhat affordable	220 (58.0)
	Not affordable	106 (28.0)
Delayed or avoided healthcare because of cost	Yes	205 (54.1)
	No	174 (45.9)
Primary healthcare information source	Healthcare professionals	159 (42.0)
	Community leaders/LHWs	117 (30.9)
	Media (TV, radio, internet)	88 (23.2)
	Other	15 (3.9)
Perceived healthcare quality compared with wealthier areas	Equal quality	61 (16.1)
	Unequal/disparate quality	269 (71.0)
	Not sure	49 (12.9)
Perceived effectiveness of government healthcare initiatives	Effective	120 (31.7)
	Somewhat effective	162 (42.7)
	Ineffective	97 (25.6)

LHW, Lady Health Worker; PKR, Pakistani rupee.

Table 4. Key Patient-Reported Healthcare Indicators with 95% Confidence Intervals (N=379)

Indicator	n (%)	95% CI (%)
Residence within 10 km of a healthcare facility	315 (83.1)	79.0–86.5
Primary utilization of a private clinic	174 (45.9)	41.0–50.9
Fair or poor perceived service quality	205 (54.1)	49.1–59.0
Perceived inadequate facility staffing	232 (61.2)	56.2–66.0
Delayed or avoided healthcare because of cost	205 (54.1)	49.1–59.0
Perceived unequal/disparate quality compared with wealthier areas	269 (71.0)	66.2–75.3
Government healthcare initiatives rated somewhat effective or ineffective	259 (68.3)	63.5–72.8

CI, confidence interval. Confidence intervals for proportions were calculated using the Wilson method.

Perceived inequalities in healthcare delivery were common. A total of 269 participants (71.0%; 95% CI 66.2–75.3) considered healthcare quality in their communities unequal to that available in wealthier areas, whereas 61 (16.1%) perceived the quality as equal. Government healthcare initiatives were rated as effective by 120 respondents (31.7%), somewhat effective by 162 (42.7%), and ineffective by 97 (25.6%). Accordingly, 259 participants (68.3%; 95% CI 63.5–72.8) rated current government initiatives as either somewhat effective or ineffective (Tables 3 and 4).

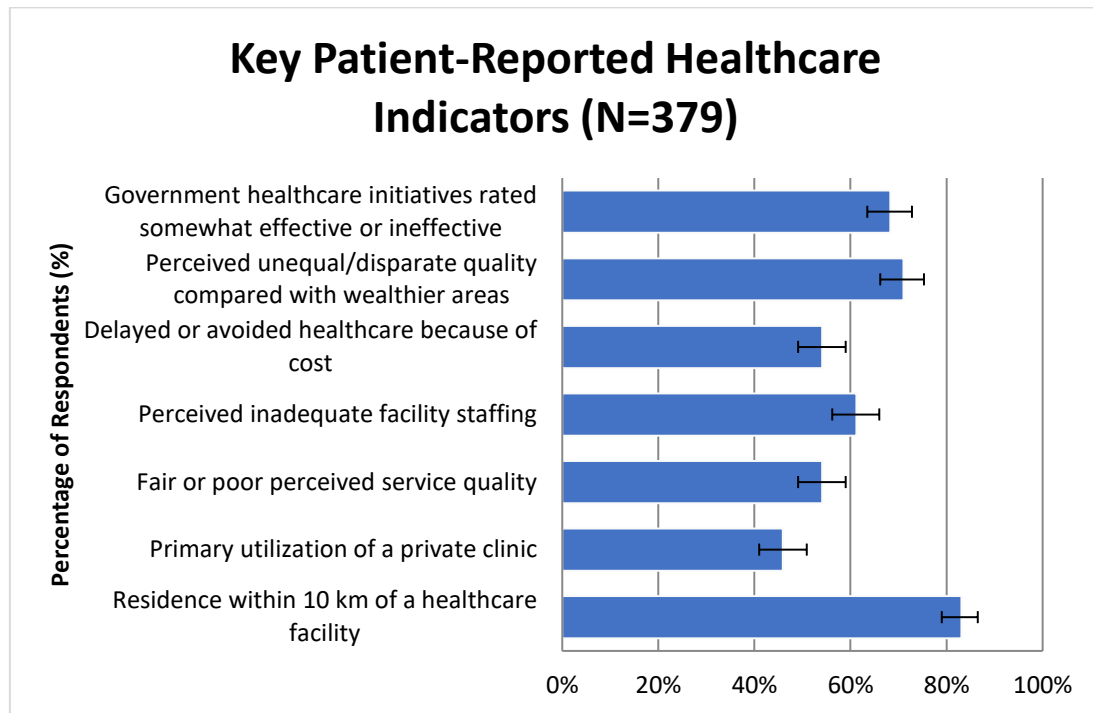


Figure 1 Key Patient-Reported Healthcare Indicators (N=379)

DISCUSSION

This cross-sectional survey identified a pattern in which relatively close geographic proximity to healthcare facilities coexisted with substantial patient-reported concerns regarding affordability, staffing adequacy, service quality, and equity. Although most respondents lived within 10 km of a healthcare facility, private clinics represented the most frequently reported primary source of care, and more than half of participants reported delaying or avoiding healthcare because of financial constraints. Perceived inadequate staffing and unequal healthcare quality compared with wealthier areas were also common. Collectively, these findings suggest that physical proximity alone may not adequately represent meaningful healthcare access because affordability, perceived service readiness, workforce availability, and confidence in healthcare services may also influence patients' experiences and utilization patterns.

The distinction between geographic availability and functional access is consistent with wider health-services literature. Strengthening access requires not only the physical presence of healthcare facilities but also sufficient workforce capacity, timely service availability, affordability, and an organizational environment capable of responding to population needs (6). Studies of marginalized communities have similarly identified socioeconomic disadvantage, geographic barriers, limited availability of providers, and other structural constraints as important components of healthcare access (13). Evidence examining urban-rural disparities also emphasizes that healthcare infrastructure and workforce distribution may influence whether geographically available services are practically usable by underserved populations (14). In the present study, 61.2% of respondents perceived healthcare facilities as inadequately staffed. This measure reflects patient perception rather than objectively measured staff-to-patient ratios; nevertheless, the finding indicates that workforce availability is an important component of the healthcare experience reported by this sample. Likewise, the substantial utilization of private clinics should not be interpreted as evidence that public-sector deficiencies caused patients to select private providers because reasons for provider choice were not analyzed at the individual level.

Financial barriers represented another prominent dimension of the findings. More than half of respondents reported delaying or avoiding healthcare because of cost, while only a minority considered healthcare easily affordable. This pattern is consistent with international evidence demonstrating that out-of-pocket expenditure can create unequal financial burdens and restrict access to necessary services, particularly among socioeconomically vulnerable households (1–4). Evidence from developing-country settings has also linked direct healthcare payments with delayed or reduced utilization of necessary care (7), while socioeconomic analyses from other settings show that healthcare expenditure varies substantially according to household circumstances and

financial protection arrangements (9). The present findings therefore reinforce the importance of distinguishing physical accessibility from financial accessibility. However, because the survey did not quantify actual household healthcare expenditure or compare cost-related delays according to facility type or income category, it cannot establish that private-sector utilization was responsible for the reported financial difficulties.

Perceived inequity was also prominent, with 71.0% of participants reporting that healthcare quality in their communities was unequal to that in wealthier areas. Broader public-health literature similarly describes healthcare inequity as a multidimensional phenomenon shaped by socioeconomic resources, geography, institutional capacity, and unequal distribution of healthcare opportunities (15). Research on underserved populations has further demonstrated how institutional and policy environments can contribute to differences in healthcare access and experiences, although the specific mechanisms and populations investigated outside Pakistan differ from those examined in the present study (16). Reviews from other low- and middle-income settings have likewise identified socioeconomic, geographic, governance, and resource-allocation factors as contributors to healthcare inequalities (17,20). These international comparisons provide contextual support for the importance of equity-focused health-system assessment but should not be interpreted as direct evidence of the magnitude or causes of disparities within Pakistan.

Participants' perceptions of government healthcare initiatives provide an additional perspective on health-system performance. More than two-thirds rated such initiatives as either somewhat effective or ineffective, indicating limited confidence in their perceived effectiveness among this sample. Health policy can influence healthcare access and equity through financing, insurance coverage, service organization, and resource allocation, although its effects may vary substantially across population groups and settings (11). Reviews of policy reforms have shown that gains in healthcare utilization may not be distributed equally among different socioeconomic or demographic groups (18), while evidence from vulnerable populations demonstrates that multiple social disadvantages can intersect in shaping healthcare utilization (19). Consequently, the present findings support the value of evaluating government health initiatives not only in terms of geographic coverage but also in relation to affordability, perceived quality, staffing, and equity. The finding that healthcare professionals and community leaders or Lady Health Workers were prominent sources of healthcare information also indicates that direct provider- and community-based communication remains an important channel through which respondents obtain information about available services.

This study has several strengths. It evaluated multiple dimensions of healthcare experience within the same sample, including geographic access, provider utilization, perceived service quality, staffing, affordability, information sources, disparities, and government initiatives. The inclusion of 379 respondents and administration of the questionnaire in English and Urdu also allowed the survey to capture experiences across participants with different educational backgrounds. Nevertheless, the findings must be interpreted in light of important limitations. Convenience sampling increases the possibility of selection bias, and the predominance of female participants may limit representativeness of the broader healthcare-using population. The available study description does not provide sufficient geographical detail to determine how well the sample represents different provinces, districts, or rural and urban populations; therefore, the results should not be generalized to the entire Pakistani population. The cross-sectional design establishes the distribution of patient-reported perceptions at one point in time but cannot determine temporal or causal relationships.

The reliance on self-reported responses introduces additional limitations, including recall error and subjective differences in how participants interpreted concepts such as service quality, affordability, staffing adequacy, and healthcare disparity. Objective indicators such as workforce density, waiting times, medicine availability, healthcare expenditure, clinical outcomes, or facility-level quality measures were not reported. Furthermore, the analysis was descriptive and did not examine associations between income, distance, facility type, perceived staffing, affordability, or delayed care. Consequently, it cannot determine whether low-income participants were more likely to utilize private clinics or whether perceived staffing inadequacy was associated with poorer quality ratings or delayed care. Questionnaire development and validation procedures were also insufficiently documented in the available manuscript, limiting assessment of measurement reliability and validity.

Within these limitations, the findings indicate that healthcare accessibility should be evaluated as a multidimensional construct rather than solely through geographic proximity. Financial protection, workforce

availability, perceived service quality, and equity warrant consideration alongside physical availability when evaluating healthcare services (6,11). Future research using geographically representative sampling, clearly documented and validated measurement tools, objective health-system indicators, and participant-level comparative analyses could clarify how socioeconomic characteristics, provider choice, geographic access, and financial constraints interact within Pakistan's healthcare system.

CONCLUSION

Among the 379 healthcare users surveyed, geographic proximity to healthcare facilities coexisted with frequent reports of inadequate staffing, cost-related delays or avoidance of care, substantial utilization of private clinics, and perceived disparities in healthcare quality. These findings indicate that healthcare access in this sample involved financial, service-readiness, and equity dimensions in addition to physical distance. Because the study was cross-sectional, convenience-sampled, and descriptive, the findings do not establish that public-sector limitations caused private-sector utilization or financial hardship; rather, they identify patient-reported areas that warrant consideration when evaluating the accessibility, affordability, quality, and equity of healthcare services in Pakistan.

REFERENCES

1. Eschliman BH, Pham HH, Navathe AS, Dale KM, Harris JJ. The role of payment and financing in achieving health equity. *Health Serv Res.* 2023;58:311-7.
2. Baharin MFA, Juni MH, Abdul Manaf R. Equity in out-of-pocket payments for healthcare services: evidence from Malaysia. *Int J Environ Res Public Health.* 2022;19(8):4500.
3. Garcia-Diaz R, Sosa-Rubí SG, Lozano R, Serván-Mori E. Equity in out-of-pocket health expenditure: evidence from a health insurance program reform in Mexico. *J Glob Health.* 2023;13:04134.
4. Shaltynov A, Jamedinova U, Semenova Y, Abenova M, Myssayev A. Inequalities in out-of-pocket health expenditure measured using financing incidence analysis (FIA): a systematic review. *Healthcare.* 2024.
5. Arefin S. Health equity and solutions in the United States healthcare system. *Integrated Journal of Science and Technology.* 2024;1(2).
6. Jindal M, Chaiyachati KH, Fung V, Manson SM, Mortensen K. Eliminating health care inequities through strengthening access to care. *Health Serv Res.* 2023;58:300-10.
7. Obeagu EI, Obeagu GU. Implications of out-of-pocket payments for the control of malaria in developing countries: a narrative review. *Medicine.* 2026;105(6):e47639.
8. Offodile AC, Gibbons JB, Murrell S, Kinzer D, Sharfstein JM. A global equity model (GEM) for the advancement of community health and health equity. *NAM Perspect.* 2022;2022:10.31478/202211b.
9. Ali MA. Measuring socioeconomic disparities in out-of-pocket healthcare expenditure: evidence from Saudi Arabia. *Qubahan Academic Journal.* 2025;5(3):368-84.
10. Qoseem IO, Okesanya OJ, Olaleke NO, Ukoaka BM, Amisu BO, Ogaya JB, et al. Digital health and health equity: how digital health can address healthcare disparities and improve access to quality care in Africa. 2024;14(1):3.
11. Maddox KEJ. The role of health policy in improving health outcomes and health equity. 2024;134:200.
12. Faust AM, Dy CJ. Achieving health equity: combatting the disparities in American access to musculoskeletal care: disparities exist in every aspect of orthopaedic care in the United States—access to outpatient visits, discretionary and unplanned surgical care, and postoperative outcomes. What can we do? *Curr Rev Musculoskelet Med.* 2024;17(11):449-55.
13. Williamson G. Healthcare access disparities among marginalized communities. *Global Perspectives in Health, Medicine, and Nursing.* 2024;3(1):11-22.
14. Afni N. Disparities in healthcare access: addressing systemic barriers in urban and rural communities. *Journal of Health Literacy and Qualitative Research.* 2023;3(2):112-22.
15. Mamun AA, Alam M. Promoting equity in public health: addressing inequality and social disparities. *Health Sci Rep.* 2025;8(5):e70821.
16. Mbanugo OJ. Structural racism, healthcare policy, and their impact on health disparities among underserved populations in the United States. *International Journal of Research Publication and Reviews.* 2025;6(3):3199-212.
17. Oke GI, Sibomana O. Understanding health inequality, disparity and inequity in Africa: a rapid review of concepts, root causes, and strategic solutions. *Public Health Chall.* 2025;4(1):e70040.

18. Osmani AR. Unequal gains? A literature review on the Affordable Care Act's effects on healthcare utilization across racial and ethnic groups. *Int J Environ Res Public Health*. 2025;22(7):1059.
19. Ferezin LP, Rosa RJ, Moura HSD, de Campos MCT, Delpino FM, Nascimento MC, et al. Disparities in healthcare utilization among vulnerable populations during the COVID-19 pandemic in Brazil: an intersectional analysis. *Int J Environ Res Public Health*. 2025;22(6):831.
20. Abdi YH, Abdi MS, Bashir SG, Ahmed NI, Abdullahi YB. Understanding global health inequality and inequity: causes, consequences, and the path toward justice in healthcare. *Public Health Chall*. 2025;4(4):e70156.