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POVERTY, POLICY AND PLAQUE: RETHINKING ORAL HEALTH IN A LOW-INCOME POPULATION

Ghufran Khan[1], Iqra Batool[2], Hafiza Tayaba Batool[3]

[1]Department of Rural Development, Amir Muhammad Khan Campus, Mardan, The University of Agriculture, Peshawar, Pakistan
[2]Bachelor of Commerce (B. Com), University of Sargodha, Sargodha, Pakistan
[3]MBBS, Jiangxi University of Traditional Chinese Medicine, Nanchang, China

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Corresponding Author:
Hafiza Tayaba Batool,
MBBS, Jiangxi University of Traditional Chinese Medicine, Nanchang, China
Email:
tayababatool002@gmail.com

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ABSTRACT

Background: Oral health remains a neglected component of public health in Pakistan, despite high prevalence of preventable oral diseases and their substantial impacts on daily functioning and quality of life. Evidence on how low-income communities experience, prioritize, and navigate oral health challenges particularly in marginalized regions such as Khyber Pakhtunkhwa is limited.

Objective: This study explored lived experiences of oral health, perceived barriers to dental care, and perceptions of public oral health services among low-income populations in Khyber Pakhtunkhwa, Pakistan.

Methods: A qualitative exploratory design was employed, including 4 focus group discussions and 20 in-depth interviews with purposively selected adults and key informants. Data were analyzed thematically using an inductive approach, guided by a social determinant of health framework.

Results: Oral health problems, including toothache, gum disease, and tooth loss were widely normalized and deprioritized due to poverty, competing survival needs, and limited awareness. Financial constraints, transportation costs, and reliance on private dental care resulted in delayed care-seeking and preference for tooth extraction over restorative treatment. Women faced compounded barriers due to restricted mobility, financial dependence, and caregiving responsibilities. Public oral health services were perceived as inaccessible, inadequately equipped, and extraction focused. These findings resonate with national epidemiological data indicating high prevalence of untreated dental caries and periodontal disease among socioeconomically disadvantaged groups.

Conclusion: Oral health inequities in low-income communities of Khyber Pakhtunkhwa are embedded in structural poverty, gender norms, and weak policy prioritization. Addressing these inequities requires integrating oral health into primary healthcare, social protection programs, and universal health coverage reforms, alongside strengthening public services and implementing equity-oriented, preventive strategies.

Introduction

Oral health is a fundamental component of general health and well-being, encompassing the functional, social, and psychological dimensions of the mouth, teeth, and related structures (World Health Organization [WHO], 2022). Poor oral health results in tooth decay, periodontal diseases, pain, infection, and functional impairment, and well-documented associations with systemic conditions including cardiovascular disease, diabetes, and adverse pregnancy outcomes (Peres et al., 2020; Watt & Sheiham, 2012). Globally, oral diseases affect an estimated 3.5 billion people, with untreated dental caries remaining among the most common non-communicable diseases across all age groups (GBD 2019 Oral Disorders Collaborators, 2020).

Despite global recognition of oral diseases as a public health priority, their burden remains disproportionately high in low- and middle-income countries (LMICs), where structural barriers compound access constraints (Watt et al., 2019). In Pakistan, oral disease prevalence is high: a national meta-analysis revealed that approximately 56.6 % of the population experience dental caries, with similar proportions reported across provinces including Sindh, Punjab, and Khyber Pakhtunkhwa (KPK) (Siddiqui et al., 2021). Periodontal disease also constitutes a significant burden, with systematic reviews indicating prevalence estimates of up to 37 % in Punjab, 40 % in Sindh, and 20 % in Khyber Pakhtunkhwa (Fahim et al., 2025). Among children, recent local studies report dental caries prevalence as high as 74 % in primary school populations of Quetta, underscoring pervasive early-onset disease (Khawaja et al., 2025). Collectively, these figures point to a substantial and under-addressed oral disease burden that extends across age cohorts and socioeconomic strata.

In Pakistan, oral health care infrastructure and service delivery remain underdeveloped. Although oral health is nominally part of the primary health care system, it is often absent in routine services at Basic Health Units (BHUs) and secondary-level facilities (WHO EMRO, 2016). This gap contributes to high levels of unmet need, particularly among low-income populations who face financial, geographic, and informational barriers to dental care (Siddiqui et al., 2021; WHO EMRO, 2016). Moreover, the absence of a recent national oral health survey and systematic inclusion of oral health indicators in national health data systems has hindered policy planning and resource allocation (Siddiqui et al., 2021).

Socioeconomic determinants exacerbate these challenges. Studies combining dental epidemiology with socioeconomic data demonstrate strong associations between low income, high consumption of cariogenic diets, poor oral hygiene practices, and elevated caries prevalence in Pakistani communities (Anonymous, 2024). Traditional dietary patterns characterized by high sugar and carbohydrate intake have been linked to increased oral disease severity, while protective behaviours remain limited by

awareness gaps and resource constraints (Anonymous, 2024).

Despite this epidemiological burden, oral health remains marginalized within Pakistan's broader health agenda. The limited availability of preventive programs, school-based screenings, and community oral health promotion contributes to the perception that oral health is a personal responsibility rather than a public health concern (Watt et al., 2019; WHO EMRO, 2016). Furthermore, disparities in access are compounded by gendered social norms, with women experiencing disproportionately greater barriers to dental care due to mobility restrictions, household financial dependence, and caregiving roles.

Given this context, there is a critical need to understand how oral health is experienced, prioritized, and navigated among low-income populations in Khyber Pakhtunkhwa Pakistan. A richer understanding of lived oral health experiences and access constraints can inform policy responses that integrate oral health into primary health care, social protection frameworks, and universal health coverage strategies.

Methodology

This study adopted a qualitative exploratory research design to investigate oral health experiences, barriers to care, and policy-level challenges among low-income populations in Khyber Pakhtunkhwa (KP), Pakistan. Qualitative approaches are particularly suited for examining lived experiences and socio-contextual determinants of health, especially in marginalized communities where quantitative data alone cannot capture the nuances of behavior, perceptions, and structural constraints (Creswell & Poth, 2018; Naz et al., 2024a, Naz et al., 2024b). The study was framed using the social determinants of health framework, which emphasizes the influence of socioeconomic status, gender norms, and institutional factors on health outcomes (Marmot et al., 2020; Watt & Sheiham, 2012). This framework guided the development of research questions, data collection instruments, and analytical strategies.

The research was conducted in the districts of Mardan and Nowshera, selected purposively due to their high poverty levels, dense populations, and reliance on public-sector healthcare facilities, including Basic Health Units (BHUs) and Tehsil Headquarters (THQs), where dental services are limited or inconsistently available. Within these districts, low-income communities were identified using poverty and deprivation indicators from the Pakistan Bureau of Statistics (PBS) and the Multidimensional Poverty Index (MPI) developed by the Planning Commission of Pakistan (Planning Commission of Pakistan, 2021). Communities exhibiting high deprivation in education, health, housing conditions, and asset ownership were prioritized, ensuring that participants represented the most socioeconomically vulnerable populations.

The study population comprised adult men and women aged 18 years and above, residing in the selected communities for a minimum of one year to ensure sustained exposure to local living conditions and healthcare systems. Participants were required to have experienced oral health problems and to have used, or not used, public dental services. This criterion ensured that participants could provide meaningful insights into care-seeking behavior, perceived barriers, and community perceptions of public oral health services.

A purposive sampling strategy was employed to capture diversity across gender, age, socioeconomic status, and oral health experiences (Palinkas et al., 2015; Riaz et al., 2024a; Riaz et al., 2024b). Data collection included four focus group discussions (FGDs) with six to eight participants each, allowing exploration of shared perceptions and collective experiences, and 20 in-depth interviews (IDIs) with community members and key informants, including public-sector

dental practitioners and primary healthcare providers. Sampling continued until thematic saturation was achieved, ensuring that no new themes emerged from additional data collection (Guest, Bunce, & Johnson, 2006; Naz et al., 2025).

Data were collected using indepth-interview and FGD guides, developed based on the study objectives and a review of relevant literature on oral health in low-income settings (Peres et al., 2020; Ahmed et al., 2022). The guides explored participants' perceptions of oral health, oral hygiene practices, affordability of care, care-seeking behaviors, and experiences with public oral health services and policies. Interviews and FGDs were conducted in Pashto or Urdu, according to participant preference, by trained qualitative researchers. All sessions were audio-recorded with informed consent, and field notes were maintained to capture contextual observations. The instruments were pilot tested in a non-study community to ensure cultural appropriateness, clarity, and relevance.

For data analysis, audio recordings were transcribed verbatim and translated into English where necessary. Thematic analysis was employed (Afridi et al., 2025; Amin et al., 2025) following an inductive approach, involving repeated reading of transcripts, open coding, categorization of codes, and identification of overarching themes (Braun & Clarke, 2006). Coding and theme development were independently reviewed by multiple researchers to enhance credibility and analytical rigor. An audit trail was maintained throughout the analytical process to ensure transparency and reproducibility.

Informed consent, written or verbal, was obtained from all participants (Ishtiaq et al., 2025; Riaz et al., 2025). Confidentiality and anonymity were ensured through the assignment of unique identifiers and secure storage of data (Naz et al., 2023). Participants reporting severe or untreated oral health problems were provided with referrals to nearby public dental or primary healthcare facilities to ensure ethical responsibility and participant safety.

Results

The analysis of focus group discussions and in-depth interviews yielded three overarching themes, each comprising multiple sub-themes that capture the lived experiences, barriers, and policy perceptions related to oral health among low-income populations in Khyber Pakhtunkhwa.

Theme 1: Oral Health as a Neglected but Persistent Burden

Within this theme, three sub-themes emerged: normalization of dental problems, limited oral hygiene practices, and impact on daily life. Participants frequently described oral health issues, such as tooth decay, gum bleeding, and tooth loss, as common and expected aspects of daily life. Many reported enduring pains until it became severe, reflecting the normalization of dental problems in resource-constrained households. As one participant noted:

"We all have toothaches at some point, but we just live with it. Only when the pain is unbearable do we see a doctor" (Female, 35, Mardan).

Limited oral hygiene practices were also reported, with brushing often irregular or performed without toothpaste. Traditional methods, such as miswak sticks, were commonly used but inconsistently applied. The impact of poor oral health extended into everyday life, affecting eating, sleep, productivity, and social interactions. Participants emphasized the subtle yet persistent burden:

"When my teeth hurt, I cannot eat properly or go to work. But we have no choice; life goes on" (Female, 29, urban Nowshera).

Theme 2: Poverty as a Structural Barrier to Oral Healthcare Access

The second theme reflects the influence of poverty as a central determinant of oral health behaviors and care-seeking. Three sub-themes emerged: financial constraints, transport and opportunity costs, and gendered access barriers. Financial hardship was the most frequently cited barrier, with participants reporting that private dental care was unaffordable beyond simple tooth extraction. One participant shared:

"Dentists charge so much. We cannot afford filling or root canal, so we wait until the tooth falls out" (Male, 38, Mardan).

Transportation costs and lost wages further discouraged visits to public or private facilities, with participants prioritizing immediate household needs over preventive care:

"Going to the city hospital means losing a day's wage and spending money we don't have. So, we endure the pain at home" (Female, 31, rural Mardan).

Women faced additional barriers due to mobility restrictions and dependence on male household members for permission and financial support:

"As a woman, I cannot go alone. My husband has to take me, and he may not have time or money" (Female, 26, Nowshera).

Together, these factors highlight poverty as a multidimensional structural barrier influencing both access and prioritization of oral health.

Theme 3: Limited Reach and Perceived Ineffectiveness of Oral Health Policies and Public Services

The third theme focused on community perceptions of public dental services and policies, with three sub-themes: low awareness of public services, inadequate service provision, and policy and institutional gaps. Awareness of government dental services was generally low, with most participants associating public facilities with general medical care rather than dental care. One participant stated:

"I didn't know government hospitals had dentists. We think they only treat general illness" (Male, 45, urban Mardan).

Even those who had accessed public services reported inconsistent availability of dental staff, limited treatment options, and lack of preventive care.

"When I went to the BHU, there was no dentist. They only do extractions, nothing else" (Female, 33, rural Nowshera).

Key informants corroborated these experiences, acknowledging insufficient funding, shortage of trained personnel, and low policy priority for oral health.

"Oral health is ignored at policy level. There are no program or regular checkups in our area" (Dental Officer, Nowshera).

These gaps contribute to mistrust and underutilization of public services and reinforce the perception of oral health as an individual responsibility rather than a public health concern.

Cross-Cutting Insight: Oral Health as a Socially Embedded Issue

Across all themes, oral health emerged as a socially and structurally embedded issue, influenced by poverty, institutional neglect, and low policy priority. Participants' narratives emphasized that oral health challenges cannot be separated from broader socioeconomic constraints:

"It is not just about brushing or cleaning; it is about money, time, and what the government provides or doesn't provide" (Male, 40, Mardan).

This perspective underscores the need to rethink oral health beyond a biomedical lens, integrating poverty alleviation, community education, and policy interventions into comprehensive strategies for improving oral health equity.

The findings indicate that oral health problems are widespread but normalized, poverty is the primary barrier to accessing care, and public dental services are underutilized due to low availability,

awareness, and trust. Collectively, these results demonstrate the interplay of poverty, policy, and plaque, supporting the study's aim to generate evidence for rethinking oral health in low-income populations.

Table 1. Themes, Sub-Themes, and Illustrative Quotes

Theme	Sub-Theme	Illustrative Quotes
1. Oral Health as a Neglected but Persistent Burden	Normalization of dental problems	"We all have toothaches at some point, but we just live with it. Only when the pain is unbearable do we see a doctor." (Female, 35, rural Mardan)
	Limited oral hygiene practices	"We brush teeth sometimes, mostly without toothpaste. Sometimes we use miswak sticks, but not regularly." (Male, 42, Nowshera)
	Impact on daily life	"When my teeth hurt, I cannot eat properly or go to work. But we have no choice; life goes on." (Female, 29, urban Nowshera)
2. Poverty as a Structural Barrier to Oral Healthcare Access	Financial constraints	"Dentists charge so much. We cannot afford filling or root canal, so we wait until the tooth falls out." (Male, 38, Mardan)
	Transport and opportunity costs	"Going to the city hospital means losing a day's wage and spending money we don't have. So we endure the pain at home." (Female, 31, rural Mardan)
	Gendered access barriers	"As a woman, I cannot go alone. My husband has to take me, and he may not have time or money." (Female, 26, Nowshera)
3. Limited Reach and Perceived Ineffectiveness of Oral Health Policies and Public Services	Low awareness of public services	"I didn't know government hospitals had dentists. We think they only treat general illness." (Male, 45, urban Mardan)
	Inadequate service provision	"When I went to the BHU, there was no dentist. They only do extractions, nothing else." (Female, 33, rural Nowshera)
	Policy and institutional gaps	"Oral health is ignored at policy level. There is no program or regular checkups in our area." (Dental Officer, Nowshera)
Cross-Cutting Insight	Oral health as socially embedded	"It is not just about brushing or cleaning; it is about money, time, and what the government provides—or doesn't provide." (Male, 40, Mardan)

Discussion

This study provides in-depth qualitative evidence on how oral health is perceived, experienced, and managed among low-income communities in Khyber Pakhtunkhwa, Pakistan. The findings reveal that oral health is simultaneously normalized, structurally constrained, and institutionally neglected, reflecting the interplay of poverty, gendered social relations, and weak health system prioritization. These results reinforce a growing body of global and regional scholarship arguing that oral health inequalities are socially produced and cannot be effectively addressed through individual-level behavioral interventions alone (Peres et al., 2020; Watt et al., 2019).

Quantitative evidence from Pakistan underscores the high national burden of dental disease, which contextualizes participants' perceptions in this study. A recent systematic review and meta-analysis estimated that nearly 60% of the Pakistani population has dental caries, with similar prevalence across provinces including Punjab, Sindh, and Khyber Pakhtunkhwa (51.2% when combined with Baluchistan) (Anwar et al., 2021). This high prevalence reflects poor oral health promotion, limited preventive services, and entrenched social norms that accept tooth decay and pain as everyday experiences, a pattern mirrored in participants' narratives in this study.

Secondary data also indicate high levels of oral disease severity among children, with school-based surveys showing dental caries prevalence as high as 74% among primary schoolchildren in Quetta (suggesting widespread disease even at early ages) and poor oral hygiene indices requiring treatment in over 90% of cases (Saeed et al., 2025). Such epidemiological patterns indicate that the normalization of pain and decay reported by adults in this study is grounded in a context where oral disease is pervasive across life stages. These prevalence estimates align with global patterns that demonstrate high untreated caries burden in LMICs but also point to the acute need for country-specific policy responses (GBD 2019 Oral Disorders Collaborators, 2020).

Participants' normalization of toothache, gum disease, and tooth loss reflects a well-documented pattern in marginalized populations, where chronic conditions become embedded in everyday life and lose their status as treatable health conditions (Peres et al., 2020; Benzian et al., 2021). In such contexts, oral disease is often interpreted as inevitable rather than preventable, resulting in delayed care-seeking and reliance on self-management strategies until pain becomes unbearable.

The impact of untreated oral disease on daily functioning affecting eating, sleep, work productivity, and social participation emerged strongly in participants' narratives. This observation aligns with global epidemiological evidence indicating that oral disorders are among the most prevalent non-communicable conditions worldwide and are a leading cause of years lived with disability (GBD 2019 Oral Disorders Collaborators, 2020). Despite these substantial quality-of-life and economic consequences, oral health remains largely invisible within household health priorities in low-income settings, where immediate survival needs such as food, shelter, and income take precedence.

Poverty emerged as the most pervasive and cross-cutting determinant shaping oral health behaviors and access to care. Participants' accounts illustrate how financial constraints extend beyond the direct cost of dental treatment to include transportation expenses, lost wages, and informal payments, collectively rendering both public and private dental care inaccessible. These findings are consistent with the social determinants of health framework, which positions income insecurity, precarious employment, and material deprivation as fundamental drivers of

health inequities, including oral health outcomes (Marmot et al., 2020).

The preference for tooth extraction over restorative or preventive care reflects a broader structural pattern in resource-poor health systems, where cost considerations and limited-service availability push patients toward irreversible, crisis-oriented interventions (Petersen & Ogawa, 2018). This pattern has been widely observed in LMICs, where oral healthcare is predominantly curative and pain-focused rather than preventive, resulting in avoidable tooth loss and long-term functional impairment (Peres et al., 2020). The emphasis on lost wages further demonstrates how oral health is deeply intertwined with livelihood precarity; for daily wage earners, seeking care is perceived as economically risky, reinforcing delays and non-utilization.

Gendered access barriers further intensify oral health inequities. Women's restricted mobility (Naz et al., 2022a), financial dependence on male household members (Naz et al., 2022b), and disproportionate caregiving responsibilities significantly limited their ability to seek timely dental care. These findings align with extensive evidence from Pakistan and comparable sociocultural contexts, where patriarchal norms shape health-seeking behavior and systematically disadvantage women across multiple dimensions of healthcare access (Kabeer, 2016; Shaikh & Hatcher, 2021; Naz et al., 2022a; Naz et al., 2022b, Naz et al., 2023; Riaz et al., 2025).

The study highlights widespread mistrust, low awareness, and underutilization of public oral health services, pointing to systemic neglect within Pakistan's health system. Participants' experiences of inconsistent staffing, limited treatment options, and extraction-focused services mirror national assessments identifying oral health as one of the least prioritized components of public healthcare (Ahmed et al., 2022; Ministry of National Health Services, Regulations and Coordination, 2021). The absence of a dedicated national oral health policy and preventive frameworks further exacerbates these service gaps (WHO, 2022). Oral health is thereby relegated to episodic, curative treatment rather than integrated into comprehensive primary healthcare.

This neglect reflects a broader global pattern in which oral health has been largely excluded from universal health coverage (UHC) agendas, particularly in LMICs, despite its high disease burden and strong links to general health and well-being (Watt et al., 2019). In Pakistan, the absence of systematic community screening or school-based programs contributes to entrenched disparities.

A central contribution of this study is its framing of oral health as a socially embedded issue shaped by structural inequalities, governance failures, and gender relations. Participants' narratives challenge behaviorist explanations that attribute poor oral health primarily to inadequate brushing or individual negligence. Instead, they demonstrate how oral health behaviors are constrained by material deprivation, time poverty, and institutional absence.

This perspective aligns with contemporary public health scholarship advocating a shift from downstream, individual-level interventions toward upstream strategies that address the root social and economic causes of oral health inequities (Peres et al., 2020; Watt & Sheiham, 2012). Integrating oral health into poverty alleviation programs, social protection schemes, and primary healthcare reforms is therefore essential. Without such integration, oral health disparities are likely to persist, regardless of advances in clinical knowledge or technology.

Conclusion

This study examined oral health experiences, access barriers, and policy perceptions among low-income communities in Khyber Pakhtunkhwa, Pakistan, revealing oral health

as a deeply embedded social and structural issue rather than a matter of individual choice or hygiene alone. The findings demonstrate that oral health problems are widespread yet normalized, with pain, tooth decay, and tooth loss commonly accepted as unavoidable aspects of everyday life. This normalization reflects prolonged exposure to poverty, limited health literacy, and the absence of accessible and preventive dental services, leading to delayed care-seeking and reliance on crisis-driven solutions such as tooth extraction.

Poverty emerged as the most significant determinant shaping oral health outcomes and behaviors. Financial constraints, transport costs, and opportunity costs collectively restricted access to both public and private dental care, forcing households to prioritize immediate survival needs over preventive or restorative treatment. Gendered social norms further compounded these barriers, disproportionately limiting women's mobility, autonomy, and access to oral healthcare. These intersecting disadvantages underscore how oral health inequities are produced and sustained through broader socioeconomic and gender relations.

The study also highlights systemic weaknesses in public oral health provision, including low awareness of available services, inconsistent staffing, limited treatment options, and the absence of preventive care at primary healthcare facilities. Oral health remains marginal within public health policy, reinforcing perceptions of dental care as a private responsibility rather than a public good. Together, these findings illustrate the interconnectedness of poverty, policy neglect, and oral disease, supporting the central argument that meaningful improvements in oral health require structural, institutional, and policy-level interventions.

By foregrounding the voices and lived experiences of low-income communities, this study contributes context-specific evidence from Pakistan to global discussions on oral health equity. It emphasizes the need to reposition oral health within broader development, health systems strengthening, and social protection agendas, particularly in low-resource settings.

Recommendations

Based on the study findings, the following recommendations are proposed to improve oral health equity among low-income populations: Although policymakers were not interviewed, consistent community and provider accounts highlight systemic gaps warranting policy action.

1. Policy Integration and Prioritization of Oral Health

Oral health should be explicitly integrated into national and provincial health policies, primary healthcare strategies, and universal health coverage frameworks. Recognizing oral health as an essential component of public health would enable dedicated budgeting, workforce planning, and accountability mechanisms.

2. Strengthening Public Oral Health Services at the Primary Level

Basic Health Units (BHUs) and Tehsil Headquarters (THQ) hospitals should be equipped with functional dental units, essential supplies, and trained dental personnel. Expanding services beyond tooth extraction to include preventive care, basic restorations, and oral health counseling is critical for reducing unmet needs and improving trust in public facilities.

3. Community-Based Preventive and Awareness Programs

Culturally appropriate oral health education programs should be implemented at the community level, emphasizing the links between oral health, nutrition, productivity, and overall well-being. School-based and community outreach initiatives can play a key role in challenging the normalization of oral disease and promoting early care-seeking behaviors.

4. Financial Protection and Affordability Measures

Subsidized or free essential dental services for low-income households should be introduced through public financing mechanisms or social protection schemes. Reducing out-of-pocket expenditure is essential to shift oral healthcare from crisis-driven to preventive and timely utilization.

5. Gender-Responsive Oral Health Interventions

Oral health programs should explicitly address gender-based barriers by improving women's access to services through community outreach, female-friendly service delivery, and integration with maternal and reproductive health programs. Enhancing women's autonomy and mobility is critical for improving oral health outcomes.

6. Workforce Development and Institutional Capacity Building

Investments in training and retaining dental professionals within the public sector are necessary to ensure consistent service availability. Incentive structures for rural postings and integration of oral health training for primary healthcare providers can help address workforce shortages.

7. Future Research and Monitoring

Further mixed-methods and longitudinal research are needed to quantify the economic and social costs of untreated oral disease and to evaluate the effectiveness of community-based and policy interventions. Routine monitoring of oral health indicators should be incorporated into national health information systems.

Together, these recommendations emphasize that improving oral health among low-income populations requires a shift from fragmented, treatment-oriented approaches toward comprehensive, equity-focused strategies that address the social, economic, and policy determinants of health.

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