

Health Equity In A Highland Rural Philippine Community: Multidimensional Determinants And Community-Engaged Transformative Interventions

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ABSTRACT

Health equity is influenced by socio-demographic, socio-economic, cultural, environmental, and health system determinants. These multidimensional factors are essential for designing contextually responsive interventions in rural communities. This study contributes to public health education through a community-based interdisciplinary framework that supports curriculum innovation, experiential learning, and academic-community partnerships.

A cross-sectional community study involved 915 residents. Multidimensional data were collected through structured surveys and local health records. Descriptive statistics were used to characterize population profiles, morbidity patterns, and priority health concerns. Participatory Action Research (PAR) was implemented to address identified issues through health education and community-based wellness initiatives.

Most participants were adults aged 20–59 years with diverse educational attainments; 65.7% reported monthly incomes below ₱10,000. Upper respiratory tract infections (URTIs), hypertension, and diabetes were the most prevalent conditions. Community-prioritized concerns emphasize environmental and behavioral risks. Interventions through PAR had outcomes on knowledge, practical skills, psychosocial support, and community empowerment. However, innovative, community-driven, and collaborative approaches to promoting sustainable health equity and resilient societies through participatory action and shared responsibility must be strengthened.

Health equity in the rural community of Bun-ayan, Sabangan, Mountain Province, Philippines, was influenced by interacting multidimensional factors, with persistent burdens of URTIs, hypertension, and diabetes linked to poverty and environmental risks. PAR activities highlighted how community participation and culturally responsive approaches increased health knowledge and skills, promoting empowerment and inclusive, equity-focused strategies that promote collective action to sustainable and resilient health systems in the community.

Keywords: health equity, socio-economic determinants, community health, participatory action research, rural Philippines.

Introduction

Health equity continues to be a major global issue, underscoring enduring differences in access to health care, social protection, and enabling settings across communities. International organizations, including the World Health Organization and the United Nations, underscore the need to tackle socio-economic, cultural, and environmental determinants of health system responsiveness (Lakioti et al., 2025). These concerns have increasingly positioned health equity as a global development and public health priority requiring multisectoral and community-responsive interventions.

These related determinants influence the dynamics of the disease process and individuals' capacity to access and utilize health services effectively (Chen et al., 2022). In many low- and middle-income settings, including the Philippines, health inequities are acutely felt in rural and indigenous communities. Structural disadvantages, such as poverty, limited education, geographic isolation, and culturally embedded practices, greatly impact health outcomes (Mamun & Alam, 2025). As already highlighted, in communities such as Barangay Bun-ayan, problems with language and culture, where traditional beliefs are predominant, and access to basic health services compound the strain. These variables are constantly intertwined and influence both vulnerability to illness and health-seeking behaviors (Atibila et al., 2026). Despite increasing recognition of these inequities, the interconnected nature of these determinants remains insufficiently explored in many marginalized and indigenous community settings.

The literature on individual determinants of health is not comprehensive. Existing studies remain fragmented, with limited literature examining how multiple dimensions collectively interact within communities to influence health equity. Moreover, few efforts aim to translate these insights into scalable interventions and transformative initiatives, especially in resource-limited and indigenous settings (Sidamo et al., 2026). The current study seeks to redress this gap through a multidimensional framework that examines the collective impact on health equity, including socio-demographic, socio-economic, socio-cultural, and community health indices. Despite being situated in a local context, the study aims to derive global-level insights and contribute to context-specific but scalable strategies for addressing health disparities. Thus, this research aims to guide transformative, participatory interventions that will enhance communities' capacity to address community health needs and provide evidence-based policy and program design to support equitable health outcomes. The study further emphasizes the importance of community empowerment, participatory governance, and sustainability-driven approaches in developing transformative health interventions. The study also contributes to interdisciplinary learning and graduate education by providing evidence-based insights for developing innovative, community-responsive, and sustainability-oriented health frameworks.

The study's approach is grounded in a multidimensional health equity framework, which explains that community health outcomes are inspired by the combined influence of socio-demographic, socio-economic, socio-cultural, and environmental determinants (Amar et al., 2026). Age, sex, and education, as sociodemographic factors, play a part in vulnerability and health behaviors (Alberio et al., 2023); income and access to resources determine the capacity to obtain essential care (Tseng & Wu, 2021). Other socio-cultural components, such as ethnicity, language, and traditional practices, also influence health beliefs and utilization patterns (Chan et al., 2025). Moreover, a transformational form of Participatory Action Research (PAR) supports community members in recognizing problems and proposing solutions for sustainability once finalized (Eelderink et al., 2025). This participatory orientation strengthens the potential for locally grounded yet scalable interventions that promote long-term community resilience and inclusive health development. Across the integration of determinants, behaviors, and participatory interventions, the framework supports context-sensitive, scalable, and transformative approaches to improving health equity and addressing disparities both locally and in comparable global settings.

Methods

This cross-sectional descriptive design study assessed the multidimensional determinants of health equity in the community setting as a baseline for subsequent PAR investigation (Passi et al., 2025). It enabled the systematic analysis of socio-demographic, socio-economic, cultural, and health-related attributes that are important for identifying health priorities and guiding interventions (Chapirah et al., 2026).

This study included 915 community members in Barangay Bun-ayan, Sabangan, Mountain Province, in the northern highlands of the Philippines. The collected data were on age, sex, level of education, household income, patterns of morbidity, and level of community involvement. Community health indicators encompassed the incidence of common diseases, risk factors, and vulnerabilities. Socio-cultural factors were ethnicity, language, housing, and social participation.

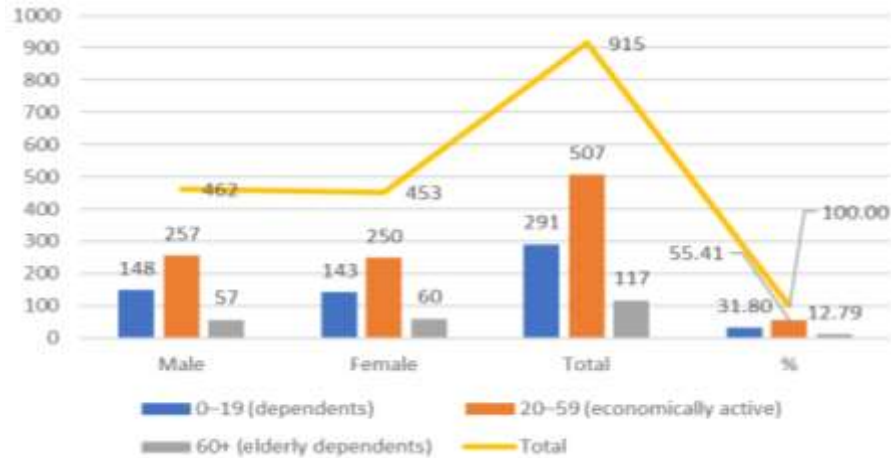
Descriptive statistics, including frequencies, percentages, and composite scores, were used to examine data, and the analysis was done in tables and graphical representations to display trends and disparities (Kopechek et al., 2025). The baseline assessment was interpreted and then integrated into a multidimensional analytic framework that informed the transition to PAR. Community stakeholders engaged as partners in identifying key concerns, co-designing interventions, and engaging in iterative cycles of action and reflection, thereby facilitating a collaborative and locally anchored process that fosters community ownership and sustainable health equity interventions (Chadd et al., 2025).

Connecting the localized evidence to systematic programs and participatory processes, the research input to inform effective intervention models that can be scaled or replicated across a range of global communities. The participatory framework fostered collective action, shared decision-making, and community empowerment toward sustainable and resilient health systems.

Results

Multidimensional determinants of health equity in community contexts were derived from the results of this study in Barangay Bun-ayan, Sabangan, Mountain Province, Philippines, and are influenced by interacting socio-demographic, socio-economic, socio-cultural, and health indices in a manner that is in keeping with global health equity models that the World Health Organization promotes. The age and sex distribution of the community population (N = 915) is shown in Figure 1.1. Most (55.4%) members of the residential community fall within the 20–59 age range.

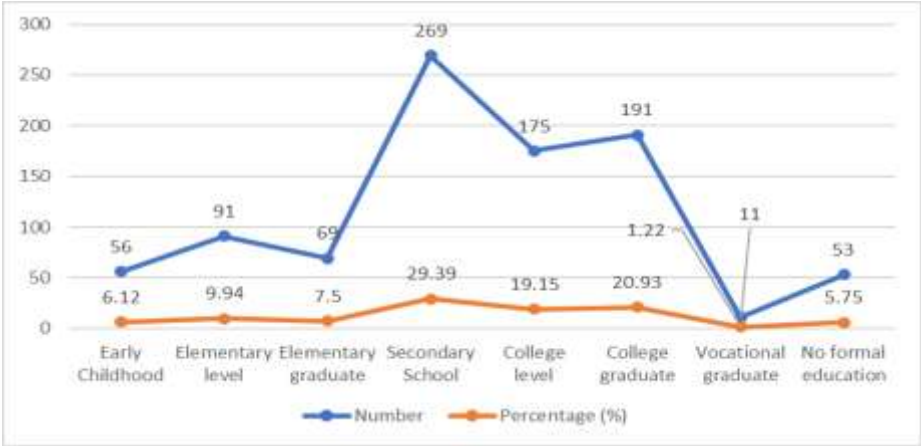
Figure 1.1 Demographic Characteristics According to Age and Sex



Working age is an essential contributing factor to household productivity and relative economic stability. The population of children and adolescents (0–19 years) dominated the determinants at 31.8%, followed by older adults (60+ years) at 12.8%, underscoring the need for age-appropriate health strategies such as preventive care for young people and geriatric services for older individuals. This highlights potential limitations in health literacy and access to health information (Aidoo, 2023). Meanwhile, the male–female ratio is nearly balanced; 50.6 percent (n = 462) are

males and 49.4 percent (n = 453) are females. At this point, these demographic patterns reveal opportunities and vulnerabilities within the community. Globally, these trends in low-resource settings have been associated with dependency ratios and inequitable access to care, emphasizing the need for health strategies relevant to equity and the community to address age and gender disparities. Furthermore, eight categories for educational attainment are shown in Figure 1.2.

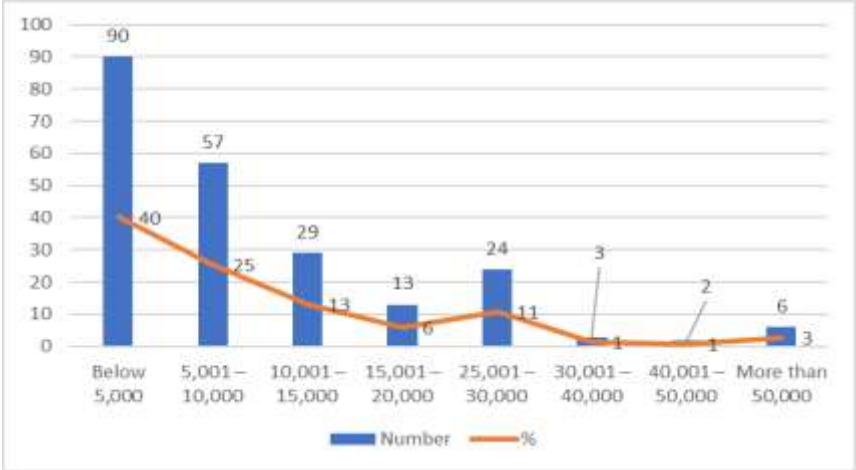
Figure 1.2 Demographic Characteristics According to Educational Attainment



The population's educational attainments vary widely. 29.4 percent of the population completed secondary education, 20.9% were college graduates, and 9.9 percent were at the elementary level. Smaller segments of the population have early childhood education (6.1%), elementary graduates (7.5%), vocational training (1.2%), or no formal education (5.8%). The distribution illustrates a dual-vulnerability pattern because most of the population has attended high school and gone on to college. In addition, a significant proportion of the population has little or no formal education, which could limit health literacy and public health information. Educational attainment is a relevant social determinant with implications on health behaviors, use of health services, and effective navigation of health systems (Aidoo, 2023).

On the other hand, Household Income was revealed in Figure 2. Household monthly income, as it relates to health equity, the primary socio-economic determinant, reflects a large disparity between upper- and lower-income groups in the community.

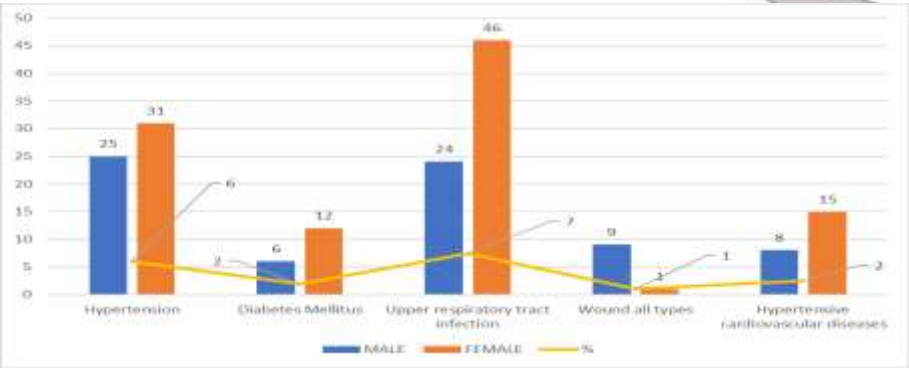
Figure 2. Distribution of Household Monthly Income



The largest share (40%) of households reported less than ₱5,000 per month, while 25.7% had incomes between ₱5,001 and ₱10,000. A narrower proportion is in the middle-income brackets, with 13% earning ₱10,001–₱15,000 and 6% earning ₱15,001–₱20,000. An increase occurs for the ₱25,001–₱30,000 segment (11%), while the share decreases to 1% in the ₱30,001–₱40,000 and ₱40,001–₱50,000 brackets, and 2.85% earns more than ₱50,000. In general, as one dimension of determinants of health equity in the community, this distribution reflects the economic pattern of households, with a decreasing frequency as income levels increase.

Meanwhile, Morbidity Patterns are shown in Figure 3. The most common health problems recorded between January and August 2024 included upper respiratory tract infections (URTI) (70 cases), hypertension (56), hypertensive cardiovascular disease (23), diabetes mellitus (18), and wounds (10). URTIs were more prevalent among females, while hypertension affected both sexes almost equally.

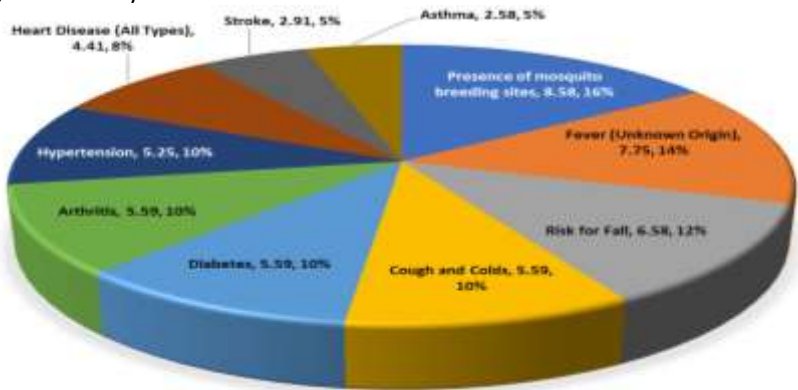
Figure 3 Top Morbidity Cases



It's a dual burden of disease within the community, as shown in the figure, the most common are upper respiratory tract infections (URTI), along with hypertension and other chronic diseases. More females suffer from URTI, possibly due to gender differences in environmental exposure, as well as differences in health-seeking behavior. Similarly, the near-identical prevalence of hypertension across genders points to broad chronic disease risk influenced by common structural determinants such as lifestyle transitions, dietary patterns, and limited preventive care. Hypertensive cardiovascular disease and diabetes also suggest a rising burden of non-communicable diseases (NCDs), indicating a continuing epidemiological shift. All these patterns represent environmental, behavioral, and systemic determinants that emerge at the community level, implicating a wider multidimensional health equity framework. Reducing this compounding burden would thus demand an integrated, equity-oriented approach to interventions for infectious and chronic disease drivers.

Moreover, Priority Health Problems are depicted in Figure 4. Community scoring is based on Alberti (2014) on the typology of nursing problems in family nursing practice.

Figure 4 Priority Health Problems



Health issues are classified as health threats, health deficits, and foreseeable crises. Mosquito breeding sites received the highest score (5.7), owing to recognition of environmental sanitation as a major health threat, while risk for falls (4.4) revealed safety concerns among vulnerable groups. Chronic illnesses such as diabetes, arthritis, coughs and colds (3.7), and hypertension (3.5) were rated marginally lower but still significant health deficits. In the context of global health equity, these priorities underscore how structural and environmental factors can shape communities' determination and the critical need for integrated interventions to address environmental risk factors and care for chronic disease.

Furthermore, Figure 5 reflected socio-cultural characteristics. The community is entirely Kankana-ey (100%), and it is the primary language alongside Ilocano, Tagalog, and English. Housing materials were mixed with wood/cement (55%), concrete (30%), and wood (15%). Participation in community activities was largely mandatory (Galatis), with elders exempt.

Figure 5 Socio-Cultural Characteristics

Variable	Description / Prevalence
Ethnic Group	Kankana-ey (100%)
Language	Kankana-ey; other spoken: Ilocano, Tagalog, English
Housing Material	Mixed wood/cement: 55% Concrete: 30%, Wood: 15%
Participation in community activities	Galatis participation mandatory; elders exempt
Participation in community activities	Galatis participation mandatory; elders exempt

This data shows that, overall, the group is largely homogeneous, with a well-defined identity, shared customs, and strong cultural norms. A complete “Kankana-ey” culture implies cultural unity, which is significant to health behaviors and decision-making. Multilingualism with the dominant dialect implies some level of external interaction and adaptability. Housing materials are varied, with over half residing in mixed-wood and cement houses, indicating moderate housing stability, and some continue to live in more vulnerable wooden structures. The community's largely mandatory “Galatis” (except for the elderly) involvement shows strong social organization and collective responsibility.

Lastly, in response to priorities identified in the community of health concerns, two participatory action interventions were enacted among elderly residents. Table 1 revealed the activities conducted in response to the health needs of the vulnerable group on morbidity cases. The Aging Gracefully and Health for All are PAR activities aimed at health and wellness interventions targeting the elderly.

Table 1 Summary of Participatory Activities extended in the community

Activity	Date	Participants	Focus	Key Components	Collaborators
Aging Gracefully	Mar 16, 2025	40	Wellness & Chronic Disease	Physical activity, nutrition, mental health, and social engagement	Local LGU, facilitators
Health for All	Feb 7, 2025	46	Hypertension, CVD, Diabetes	Screening, health education, and backyard gardening	BHWs, BLGU, facilitators

The Aging Gracefully program emphasized holistic well-being through physical activity, nutrition, mental health, and social engagement, while Health for All targeted hypertension, cardiovascular disease, and diabetes by screening, education, and backyard gardening. Both were conducted with the participation of local stakeholders, including barangay health workers and local government units, and drew 40–46 participants, which shows productive community participation. Such activities are emblematic of a holistic model of elderly health, which combines physical, mental, nutritional, and social aspects for well-being and resilience.

Discussion

This study provides insights into the multiple risk factors of health equity in a rural Filipino community. Collectively, the socio-demographic profile, socio-economic conditions, health outcomes, priority health concerns, and participatory interventions highlight the multi-dimensional contribution of health disparities in Barangay Bun-ayan. The results are conclusive, with evidence that health inequities do not stem from a discrete construct but rather from the interaction of structural, cultural, environmental, and individual factors (Mercado et al., 2024).

Socio-Demographic and Socio-Economic Drivers

Most people are of working age, but inequities in education and income indicate deeper vulnerabilities. The majority have completed high school, while those without higher education tend to have low health literacy, a risk factor for poorer health and delayed treatment-seeking (Mode et al., 2025). Educational status is closely linked to knowledge of disease prevention and adherence to health service recommendations (Kukulska & Garwacka-Czachor, 2024). About two-thirds of households earn less than ₱10,000 per month, limiting access to nutrition, transportation, and health services. Financial struggle is a key factor in ill-health in low-income countries (Dobarrio-Sanz et al., 2023). Limited income is consistently associated with reduced quality and weakened access to nonpharmacological care (Shin et al., 2025). In rural settings, basic medical care can contribute to well-being when resource inadequacy is offset by strong social safety (Mujawar et al., 2026). Financial deprivation in Bun-ayan exacerbates reduced access to health facilities and geographical isolation.

Patterns of morbidity reveal a hybrid burden of communicable and non-communicable diseases (NCDs). Among women, upper respiratory tract infections (URTIs) were the most frequently diagnosed disease, possibly due to environmental exposures, occupational roles, and health-seeking behavior (Ginsburg et al., 2023). URTIs are also associated with poor ventilation, indoor air pollution, and seasonal weather uncertainties (Gunasekaran et al., 2025). Hypertension and diabetes were distributed equally between men and women, suggesting widespread lifestyle factors including diet, obesity, inactivity, and stress (Stefan & Schulze, 2023). Although some studies report gender differences in NCD prevalence, recent evidence suggests that increasingly homogeneous lifestyles are reducing inequalities in metabolic risk factors (Huang et al., 2025).

These findings indicate an epidemiologic transition in which communicable diseases coexist with increasing NCDs (Sinha, 2024). Similar patterns have been documented in low- and middle-income communities (Waage et al., 2023). Treating only one infectious disease may therefore be insufficient (Davis et al., 2022).

Variables in the Context and Environment

Community-identified priority problems, mosquito breeding sites, and fall risk highlight environmental and systemic factors associated with health disparities. Mosquito breeding sites reflect ongoing challenges in vector control and sanitation, where stagnant water and inadequate waste management increase the risk of vector-borne diseases. Identifying fall risk is critical for addressing physical infrastructure vulnerabilities among older individuals (Dudás, 2024).

Although these environmental factors provide a roadmap for community interventions, literature emphasizes that volunteer community activities require adequate government resources and systemic infrastructure support (Beigbeder, 2023). Nevertheless, residents' perceived environmental threats correspond with ecological predictions of health behavior. WHO (2024) postulated that health status depends on the physical and social environment.

Socio-Cultural Determinants and Active Engagement of the Community

Bun-ayan is ethnically and linguistically homogeneous. A communal Kankana-ey identity can promote collective action and mutual aid, strengthening community resilience (Sab-it Jr et al., 2024). However, norms may become barriers to health information if messaging is not culturally and linguistically appropriate (Sadia et al., 2024). Traditions such as “Galatis” and community obligations may compete with personal time for health. Several studies identify deep-rooted cultural practices as barriers to public health interventions (Shibli et al., 2025). Nevertheless, culturally congruent programs have proven more acceptable and sustainable in indigenous communities (Loucks et al., 2022). Culturally competent health promotion is therefore advantageous in Bun-ayan.

Health Equity and Participatory Action

The PAR “Aging Gracefully” and “Health for All” interventions addressed community needs through empowerment, knowledge, and practical approaches to chronic disease prevention and management. This supports evidence that participatory health programs improve health outcomes through empowerment, relevance, and sustainability (Dushkova & Ivlieva, 2024). Strategies promoting physical activity, health education, mental illness support, and backyard gardening address medical, social, and ecological determinants simultaneously (Magomedova & Fatima, 2025). However, PAR initiatives require rigorous evaluation because sustained behavioral change depends on strong structural support rather than temporary community participation (Ozer et al., 2010). Nevertheless, positive community involvement and appropriate outcome measurement strengthen conclusions.

Integrate Interventions Based on Multidimensional Determinants

These findings support holistic and context-sensitive health equity interventions. One-dimensional approaches focused solely on clinical care or health education overlook economic burden, environmental hazards, cultural practices, and community norms (Mamun & Alam, 2025). Integrated approaches combining preventive services, environmental improvements, sociocultural congruence, and economic support are more likely to produce equitable and sustainable health outcomes. Practical strategies include expanding community health worker training in culturally sensitive practices, strengthening collaboration with local government units for infrastructure development, and designing programs aligned with village rhythms, including integrating Galatis with sanitation and vector-control activities. These approaches address the determinants identified in this study while strengthening community capacity and resilience (Pooyan & Hokugo, 2023). These findings underscore the importance of collaborative governance, interdisciplinary innovation, and community-engaged learning in addressing health inequities and advancing resilient societies.

Conclusion

Highland rural places face a unique health equity challenge due to interconnected socio-demographic, socio-economic, socio-cultural, environmental, and health system determinants, causing a dual burden of communicable and non-communicable diseases. Multidimensional determinants can be effectively countered through integrated, culturally congruent, and community-engaged approaches, such as participatory interventions. This study points out that achieving sustainable health equity requires integrated, context-sensitive, and transformative interventions that simultaneously target structural, behavioral, and environmental factors. More importantly, the findings reinforce the role of collective action, participatory innovation, and community-engaged research in building sustainable and resilient societies in addressing multidimensional health inequities.

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