


Community-Based Health Intervention Model for the Prevention of Non-Communicable Diseases in Coastal Areas

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ARTICLE INFO	ABSTRACT
<p>Article history:</p> <p>Received: 10 April, 2025 Revised: 21 April, 2025 Accepted: 15 Mei, 2025</p> <p>Keywords:</p> <p>Capacity Building; Coastal Communities; Community Empowerment; Early Screening; Health Education.</p>	<p>The increasing prevalence of non-communicable diseases (NCDs) such as cardiovascular diseases, diabetes, respiratory illnesses, and cancers poses significant public health challenges, particularly in coastal areas where socioeconomic disparities, limited healthcare access, and environmental factors intersect. This study explores community-based health intervention models as a strategic approach for preventing NCDs in coastal communities. Utilizing a qualitative descriptive method, the research analyzes various community health programs, involving local stakeholders, healthcare providers, and policymakers, to assess their effectiveness in mitigating NCD risks. The findings indicate that community engagement, culturally tailored health education, local capacity building, and multi-sectoral collaboration are critical components in reducing the burden of NCDs. Moreover, interventions emphasizing lifestyle modifications such as healthy diet, regular physical activity, smoking cessation, and early screening demonstrate positive outcomes in promoting preventive behaviors. The study concludes that adaptive, community-centered health models offer sustainable solutions for NCD prevention in coastal regions, provided that they are supported by continuous monitoring, adequate resources, and policy integration. These models not only address the medical aspects of NCDs but also empower communities to take active roles in safeguarding their health amidst unique coastal challenges.</p> <p><i>This is an open access article under the CC BY-NC license.</i></p> 

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1. INTRODUCTION

Non-communicable diseases (NCDs), including cardiovascular diseases, diabetes mellitus, chronic respiratory diseases, and cancer, represent a significant global health burden. According to the World Health Organization (WHO), NCDs account for approximately 74% of all global deaths annually. These diseases are primarily driven by behavioral risk factors such as tobacco use, physical inactivity, unhealthy diets, and harmful use of alcohol. In recent years, attention has shifted towards the prevention of NCDs through integrated, community-based strategies that address the social determinants of health and empower individuals to adopt healthy behaviors.

In Indonesia, the rise of NCDs is becoming an increasingly urgent concern, particularly in coastal areas. Coastal communities often characterized by a combination of low socioeconomic status, limited access to healthcare, environmental vulnerabilities, and traditional lifestyles face unique challenges in managing and preventing NCDs. Their dependence on marine-based livelihoods, exposure to environmental hazards, and geographic isolation contribute to health disparities that may exacerbate the prevalence of NCDs. Furthermore, limited awareness, weak healthcare infrastructure, and cultural perceptions toward disease and health-seeking behavior further hinder early detection and management of chronic illnesses.

The shift from a curative to a preventive healthcare paradigm underscores the necessity for health interventions that are not only evidence-based but also community-centered. A community-based approach acknowledges that health is shaped by the conditions in which people are born, grow, live, work, and age. It seeks to build capacity within communities, promote health education, and foster local leadership to implement sustainable and culturally appropriate health practices. Despite national health programs aimed at reducing NCD prevalence, the penetration and effectiveness of such programs in coastal regions remain limited. Many top-down interventions fail to account for local context, traditions, and resource constraints, resulting in low community engagement and poor long-term outcomes. For instance, while urban populations may benefit from frequent screenings and education campaigns, coastal villages may lack access to medical facilities, trained personnel, or even reliable transportation.

Additionally, the burden of NCDs in these communities often remains underreported due to weak health surveillance systems and the stigma associated with chronic diseases. Without timely diagnosis or intervention, individuals may only seek care at advanced stages of illness, leading to higher treatment costs and reduced quality of life. Thus, there is an urgent need to explore and implement community-based health intervention models that are tailored to the unique realities of coastal populations. These models must be participatory, inclusive, and responsive built upon local knowledge and strengthened through partnerships with governmental and non-governmental entities. The development and implementation of community-based health interventions are underpinned by several theoretical models. The Social Ecological Model (SEM), for instance, emphasizes the interaction between individual, interpersonal, community, organizational, and policy-level factors in shaping health behavior. Within coastal settings, this framework allows researchers and practitioners to identify points of intervention that span beyond individual choices, incorporating community norms, environmental factors, and institutional policies.

Similarly, Health Belief Model (HBM) and Community Organization Theory offer insights into how perceptions of risk, benefits, and self-efficacy influence preventive behaviors, and how community mobilization can foster health promotion. These theoretical approaches suggest that sustainable health interventions require both behavioral change and structural transformation. In the context of NCD prevention, these models support strategies that include community health education, peer-led initiatives, health volunteer training, routine screening campaigns, and partnerships with local governments to create enabling environments. Coastal areas are not monolithic; they vary greatly in terms of ecology, culture, economic activities, and health profiles. However, common characteristics include a reliance on fishing and tourism, vulnerability to climate change and natural disasters, and relative remoteness from urban centers. These factors have profound implications for health and wellness.

Malnutrition, occupational hazards, water and sanitation issues, and mental health problems are often intertwined with the NCD landscape in coastal settings. For example, fishermen may have irregular eating patterns, limited access to fresh vegetables, and high rates of smoking all of which increase NCD risk. Women in these communities may face additional barriers related to gender norms and caregiving responsibilities, limiting their access to health services and information. Moreover, environmental degradation due to overfishing, pollution, and rising sea levels may indirectly impact community health by disrupting food security and increasing economic strain, both of which contribute to the stress-related onset of NCDs. Therefore, community-based intervention models must be designed with an acute awareness of the socio-ecological dynamics that shape coastal livelihoods and health outcomes.

Community participation is a cornerstone of effective health intervention. Empowering local populations to become active participants in their own health not only ensures the relevance of interventions but also enhances sustainability and ownership. Involving community members in health assessments, program design, implementation, and evaluation leads to interventions that are more acceptable, accessible, and effective. In coastal areas, local leaders, traditional healers, religious figures, youth groups, and women's associations can serve as key change agents in promoting health literacy and fostering behavior change. Additionally, community health workers (CHWs) or kader kesehatan can bridge the gap between formal health systems and remote communities by providing basic care, education, and referrals. The principles of participatory action research (PAR) further emphasize co-learning and mutual respect between researchers and community members. Through continuous

dialogue, feedback, and adaptation, intervention models can evolve in response to emerging needs and challenges.

Health Education and Promotion: Delivering information through culturally appropriate methods (e.g., community theater, storytelling, or local radio) to improve awareness of risk factors, healthy lifestyles, and early warning signs. **Capacity Building:** Training local volunteers, health workers, and peer educators to deliver interventions and sustain activities beyond the project period. **Health Screening and Monitoring:** Organizing regular check-ups, mobile clinics, or home visits to detect and monitor blood pressure, glucose levels, and body mass index (BMI). **Behavioral Change Campaigns:** Encouraging smoking cessation, reduced alcohol consumption, balanced diets, and physical activity through tailored programs. **Environmental Health Improvement:** Addressing factors such as clean water, sanitation, and food safety to support a holistic approach to wellness. **Referral and Follow-Up Systems:** Establishing clear pathways for individuals who need more specialized care, and ensuring continuity of services. **Policy Advocacy:** Engaging with local authorities to support supportive environments and policies that facilitate healthy behaviors (e.g., smoke-free zones, public exercise facilities). These components must be integrated and coordinated to create a coherent and adaptive intervention model.

Resource Limitations: Many coastal villages operate with minimal financial and human resources, making it difficult to sustain activities without external support. **Cultural Beliefs:** Traditional beliefs may conflict with modern health messages, requiring sensitive and respectful engagement to build trust and understanding. **Geographical Isolation:** Transportation difficulties may hinder access to training, supplies, or emergency care, particularly during adverse weather conditions. **Data Gaps:** Lack of reliable health data at the local level complicates needs assessment, monitoring, and impact evaluation. **Policy Incoherence:** Fragmented policies and weak coordination among agencies may lead to overlapping or contradictory initiatives. Overcoming these challenges requires innovation, persistence, and a commitment to community empowerment. Partnerships with academic institutions, NGOs, and private sectors can provide technical assistance, funding, and capacity development.

While community-based approaches have been increasingly studied in the context of maternal health or infectious disease control, there remains a relative paucity of research focusing specifically on NCD prevention in coastal communities. Most studies on NCDs are urban-centered or hospital-based, neglecting the specific socio-cultural and environmental conditions of marginalized rural and coastal populations. To identify the key components and strategies employed in community-based health interventions targeting NCDs in coastal areas; To analyze the effectiveness and sustainability of these models based on community outcomes, engagement, and behavior change; To explore the role of local culture, leadership, and social capital in facilitating or hindering intervention success; To propose a conceptual framework for scalable and replicable community-based NCD prevention in coastal regions.

2. RESEARCH METHOD

This study employed a qualitative descriptive research design to explore and analyze community-based health intervention models for the prevention of non-communicable diseases (NCDs) in coastal areas. Data were collected through a combination of in-depth interviews, focus group discussions (FGDs), field observations, and document analysis. Key informants included local health officials, community health workers, traditional leaders, non-governmental organization (NGO) representatives, and residents from selected coastal communities. Purposive sampling was used to select study sites and participants, ensuring representation of diverse demographic, cultural, and geographic characteristics. Data collection instruments were semi-structured interview guides and observation checklists, designed to capture detailed information on health practices, intervention components, community engagement, challenges, and outcomes. Thematic analysis was applied to analyze qualitative data, allowing for the identification of key themes, patterns, and relationships relevant to NCD prevention. Data triangulation ensured the credibility and validity of the findings by cross-verifying information from multiple sources. Ethical clearance was obtained prior to data collection, with informed consent secured from all participants. This methodological approach provided a comprehensive understanding of effective community-based intervention models that are culturally sensitive, sustainable, and adaptable to the unique contexts of coastal populations.

3. RESULTS AND DISCUSSIONS

High Prevalence of NCD Risk Factors

The study confirmed that coastal populations are highly vulnerable to multiple NCD risk factors, many of which are linked to their socioeconomic status, occupational patterns, and lifestyle behaviors. Poor dietary habits: Many coastal residents rely heavily on processed and salted seafood, with limited intake of fresh vegetables and fruits due to their cost and limited availability. High tobacco consumption: Smoking remains culturally accepted, especially among men, contributing significantly to cardiovascular and respiratory illnesses. Physical inactivity: Although fishing and related work involve physical effort, automation and lifestyle changes have reduced daily physical activity, particularly among younger generations. Limited awareness of NCDs: Many community members lack basic knowledge about NCDs, their risk factors, and the importance of preventive measures. These factors create a fertile ground for the increasing prevalence of hypertension, diabetes, heart disease, and chronic respiratory illnesses in coastal areas.

One of the most consistent findings across study sites was the vital role played by community health workers (*kader kesehatan*) in bridging the gap between formal health systems and the community. Conducting regular household visits to monitor blood pressure, glucose levels, and other health indicators. Providing health education tailored to the local language, culture, and traditions. Encouraging participation in health promotion activities such as exercise groups, cooking classes, and health fairs. Referring individuals with detected risk factors or symptoms to higher-level care. The trust and familiarity that CHWs enjoy in their communities made them highly effective messengers for preventive health messages. The research found that health education efforts were most successful when they were adapted to the local culture and delivered through familiar channels. Community gatherings and religious events were utilized as platforms for delivering health messages. Storytelling, songs, and drama were used to communicate information in a way that resonated with local traditions. Local leaders and religious figures were actively involved in endorsing and delivering health messages, enhancing community trust and participation. This cultural tailoring helped overcome initial resistance to lifestyle changes and increased the community's receptivity to prevention efforts.

Effective Use of Peer Support Groups

Several communities had successfully implemented peer support groups for individuals at risk of or already living with NCDs. Emotional support and encouragement to adopt healthier behaviors. Practical advice on managing diet, exercise, and medication adherence. A sense of shared responsibility and community solidarity in tackling NCDs. In some communities, these support groups were organized around specific demographic groups, such as women's groups, youth clubs, and fishermen's cooperatives, further strengthening peer influence. Coastal communities that depend on fishing often incorporated nutrition education during cooperative meetings. Women's groups producing dried fish and seafood products were trained to improve food safety and reduce salt content. Physical activity campaigns were tied to traditional dancing, group walks along the beach, or communal fishing trips, making them more appealing and culturally relevant. By embedding health interventions into daily life, the programs achieved higher participation rates and sustainability.

Despite these successes, many challenges related to healthcare infrastructure were identified; Limited access to medical facilities: Many coastal communities are geographically isolated, making it difficult for residents to access screening, diagnosis, and treatment services for NCDs. Shortage of trained healthcare professionals: Many health centers are understaffed, and health workers are often overburdened. Inconsistent supply of medications and equipment: Essential supplies for screening and management, such as glucose test strips and blood pressure monitors, were often unavailable or unaffordable. Weak referral systems: When NCD cases require specialist care, transportation and financial barriers often prevent timely referrals to larger hospitals. These systemic issues limit the capacity of community-based interventions to fully address NCD prevention and management.

The study highlighted that environmental and socioeconomic conditions in coastal areas have a strong influence on NCD risks and intervention success: Food security and diet: Limited arable land and dependence on fishing constrain access to a balanced diet. Occupational hazards: Fishermen face exposure to harsh weather, long working hours, and physical stress, all of which may exacerbate health risks. Climate change impacts: Rising sea levels and extreme weather events threaten livelihoods, contributing to stress, poverty, and food insecurity all indirect contributors to NCD development. Economic instability: Many households prioritize daily survival over preventive health investments, making long-term behavior change more challenging.

Communities that implemented regular screening programs for blood pressure, blood glucose, cholesterol, and body weight demonstrated measurable improvements in early detection and management of NCD risk factors. Early identification allowed individuals to receive counseling, lifestyle guidance, and timely medical interventions, preventing disease progression. Screening programs were often organized during community events or through mobile health units, increasing accessibility for remote residents. The active involvement of CHWs in mobilizing residents for screening contributed to high participation rates. These findings demonstrate that community-based health intervention models offer a promising and culturally appropriate strategy for NCD prevention in coastal areas. However, long-term success requires addressing both individual behaviors and structural determinants, along with continued investment in capacity-building and health system strengthening.

Discussion

The findings of this research provide comprehensive insights into the design, implementation, and impact of community-based health intervention models for the prevention of non-communicable diseases (NCDs) in coastal areas. This discussion will integrate these findings with existing literature, analyze their broader implications, and highlight the strengths, limitations, and future directions for community-based interventions in similar settings. The high prevalence of NCD risk factors identified in coastal communities aligns with global evidence that marginalized and resource-limited populations often face a dual burden of communicable and non-communicable diseases. Coastal residents' dependence on fishing, low and irregular incomes, environmental challenges, and limited access to diverse food sources create conditions that foster unhealthy diets, sedentary lifestyles, high tobacco use, and chronic stress all major contributors to NCD development.

These findings highlight that addressing NCDs in coastal areas requires more than promoting individual behavior change; it necessitates comprehensive interventions that target structural and environmental determinants of health. As supported by the Social Ecological Model (SEM), effective NCD prevention demands interventions at multiple levels: individual, interpersonal, organizational, community, and policy. One of the most encouraging findings is the critical role played by community health workers (CHWs), or *kader kesehatan*, in driving prevention efforts. Consistent with studies by Lehmann and Sanders (2007), CHWs serve as trusted intermediaries who not only provide basic healthcare services but also serve as educators, advocates, and cultural navigators within their communities.

In coastal settings where formal healthcare access is limited, CHWs successfully compensated for resource gaps by conducting home visits, organizing community education, monitoring chronic conditions, and mobilizing residents for screening programs. Their familiarity with local languages, customs, and social dynamics allowed for better acceptance of health messages, increasing the relevance and cultural appropriateness of interventions. The success of CHWs in these interventions also underscores the need for continued investment in their training, support, and supervision to ensure quality service delivery and prevent burnout. The research further emphasizes that culturally adapted health education is essential for promoting NCD prevention. When messages are delivered through culturally familiar formats—such as storytelling, religious events, and traditional arts communities are more receptive and likely to adopt recommended behaviors.

This finding is supported by numerous studies, including Airhihenbuwa (1995), who argues that culturally insensitive interventions often fail because they do not resonate with the lived realities of target populations. In coastal communities where traditional norms remain strong, interventions must not challenge but rather align with cultural values to ensure sustainability and acceptance. Moreover, the involvement of local leaders, religious figures, and social groups in the delivery of health education significantly strengthened intervention outcomes by building trust and reinforcing shared responsibility for health improvements. The establishment of peer support groups emerged as a powerful tool for fostering lifestyle modifications and long-term behavior change. These groups provided a social platform for individuals to share experiences, overcome challenges, and maintain motivation in managing their health. Social support theory suggests that peer influence can significantly affect behavior change by normalizing healthy behaviors and providing emotional reinforcement (Dennis, 2003).

Involving existing groups such as fishermen's cooperatives and women's associations also enhanced intervention reach and legitimacy, as these structures are already integrated into the community's social fabric. This approach minimized costs and increased sustainability by leveraging existing community assets. Another critical aspect of successful interventions was the integration of health promotion activities into daily livelihood routines. For example, introducing nutrition education

during fishery meetings or promoting physical activity through community walks adapted health behaviors into existing cultural and occupational contexts. This finding echoes the importance of ecological validity, as proposed by Bronfenbrenner's ecological systems theory, suggesting that interventions grounded in the community's real-world experiences are more likely to succeed.

By aligning health interventions with the rhythms of community life, participants felt less burdened by change, increasing adherence and participation. This strategy also supports sustainability, as interventions feel less imposed and more naturally embedded within community practices. These findings are consistent with WHO reports (2010) that emphasize the importance of strong primary healthcare systems in achieving successful NCD prevention outcomes. Without addressing these structural deficiencies, community-based efforts may be insufficient to control the rising NCD burden. Furthermore, climate change and environmental degradation in coastal areas threaten livelihoods, increase food insecurity, and elevate chronic stress levels, indirectly increasing NCD vulnerability. Therefore, effective interventions must be multi-sectoral, linking health promotion with poverty alleviation, environmental protection, and economic development.

The research highlights that collaboration between multiple sectors including health, education, agriculture, environment, and local governance was crucial for intervention success. Multi-sectoral partnerships allowed for the pooling of resources, expertise, and authority to address the complex interplay of health and environmental factors in coastal areas. For example, collaboration with agricultural sectors supported the promotion of home gardens to increase fruit and vegetable consumption, while partnerships with religious organizations facilitated the delivery of culturally sensitive health education. Local governments provided regulatory support, and NGOs contributed technical expertise and financial assistance. Such partnerships align with the principles of Health in All Policies (HiAP), which advocate for integrating health considerations into policymaking across sectors to address the root causes of ill health.

Perhaps the most promising outcome of community-based interventions was the observed increase in health literacy and empowerment among community members. As residents became more aware of NCD risks and prevention strategies, they developed greater confidence in adopting healthy behaviors and participating in health decision-making processes. Empowered communities demonstrated higher levels of self-reliance, ownership, and sustainability of health programs, even when external funding decreased. This finding reflects Paulo Freire's (1973) theory of empowerment education, which stresses that individuals are more likely to change behaviors when they are actively involved in their learning and empowered to take control of their health. This research contributes to the growing body of literature that advocates for localized, participatory, and culturally sensitive health interventions to address NCDs in resource-constrained environments. It demonstrates that despite numerous challenges, coastal communities possess significant social capital and resilience that can be harnessed for effective disease prevention. By documenting specific strategies, such as the integration of health promotion into livelihoods, the role of CHWs, the importance of peer groups, and multi-sectoral partnerships, this study offers practical insights for policymakers, program designers, and researchers working in similar coastal or rural settings.

4. CONCLUSION

The study on Community-Based Health Intervention Models for the Prevention of Non-Communicable Diseases (NCDs) in Coastal Areas demonstrates that community-based approaches are highly effective, practical, and adaptable to the unique needs of coastal populations. The integration of health promotion into the cultural, economic, and social fabric of these communities enables greater participation, sustainability, and ownership of health programs. The research findings highlight several key elements that contribute to the success of these models. First, the central role of community health workers (CHWs) serves as a crucial link between formal health systems and the local population. Their cultural competence, trustworthiness, and accessibility allow for effective education, early screening, and consistent monitoring of NCD risk factors. Second, the cultural adaptation of health education, delivered through familiar and respected community structures such as religious leaders, local organizations, and peer support groups, fosters better understanding and acceptance of healthy behaviors. Integrating health interventions with livelihood activities further increases participation and minimizes disruptions to daily life. However, the study also reveals that structural challenges—including limited healthcare infrastructure, lack of specialist services, and insufficient medical supplies—remain significant obstacles. Addressing these systemic issues requires strong multi-sectoral collaboration involving health, education, agriculture, and local governance sectors. Ultimately, empowering communities

through education, capacity-building, and participatory program design strengthens health literacy and enables individuals to take active roles in managing their own health. Community-based intervention models, when properly supported and adapted, offer a promising pathway to reduce the burden of NCDs and improve health outcomes in vulnerable coastal populations.

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