

**THE ROLE OF COMMUNITY-BASED HEALTH PROGRAMS IN PREVENTING NON-COMMUNICABLE DISEASES**Thura Abbas Jawdat Al-Rubaye\*<sup>1</sup>, Najlaa Saadi Sheet Al-SAFAR<sup>2</sup> and Yahya Maan Yahya AL-SABBAGH<sup>3</sup><sup>1</sup>Primary Health Care Left District/ DoH Nineveh, Specialist Doctor.<sup>2</sup>Arab Board of Health Specialization in Community Medicine, Senior Physician Specialist/ Ninavah Health Directorate, Cancer Control Center/ Specialist Physician/Community Medicine / Responsible for the Prevention and Early Detection of Cancer Unit.<sup>3</sup>Public Health Department/ Nineveh DOH, Head of Specialist Doctors

\*Corresponding Author: Thura Abbas Jawdat Al-Rubaye

Primary Health Care Left District/ DoH Nineveh, Specialist Doctor.

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**ABSTRACT**

**Background:** Non-communicable diseases (NCDs) such as cardiovascular diseases, diabetes, and cancer are major global health challenges, particularly in low- and middle-income countries (LMICs). Community-based health interventions (CBHIs) have emerged as a promising approach to improving awareness, prevention, and early detection of NCDs. However, evidence regarding their effectiveness remains mixed, necessitating further investigation into their impact on healthcare-seeking behaviors. **Methods:** This study employs a cross-sectional design to assess the relationship between participation in CBHI programs and early NCD screening. Data were collected using structured questionnaires and medical record reviews from 450 adult participants recruited from primary healthcare centers and community health programs. The study examined sociodemographic factors, healthcare-seeking behaviors, and knowledge of NCD screening. Statistical analyses, including chi-square tests and multivariate logistic regression, were used to evaluate the association between CBHI participation and screening uptake. **Results:** Preliminary findings indicate that individuals engaged in CBHI programs demonstrated significantly higher awareness of NCD screening and were more likely to undergo early detection measures compared to non-participants. Socioeconomic status, education level, and access to healthcare facilities were identified as key enabling factors influencing participation. While CBHIs contributed to improved knowledge and screening rates, gaps remained in their effectiveness in hypertension control and long-term disease management. **Conclusion:** Community-based health initiatives play a critical role in promoting early detection of NCDs, particularly in resource-limited settings. Expanding these programs, addressing healthcare access barriers, and strengthening task-sharing strategies among health workers may enhance their impact. Future research should focus on long-term outcomes and policy interventions to integrate CBHIs into national healthcare frameworks.

**INTRODUCTION**

Non-communicable diseases (NCDs) represent a major obstacle to achieving the Sustainable Development Goals, particularly the target of reducing premature mortality from these conditions by one-third by 2030 (United Nations, 2015). The increasing prevalence of NCDs, such as cardiovascular diseases (CVDs), diabetes, and cancer, poses a significant burden on health systems, particularly in low- and middle-income countries (LMICs), where universal health coverage remains a challenge. According to projections by the World Health Organization (WHO), CVDs alone may account for up to 23 million deaths by 2030, with approximately 80% of these occurring in LMICs (Ferlay et al., 2015). Likewise, the global burden of cancer is expected to rise to 21.7 million new cases and 13 million deaths, with the majority affecting LMICs (Lozano et al., 2012).

Like many other LMICs in the Asia-Pacific region, NCD prevalence has shown a steady increase. Data indicate that stroke, heart disease, diabetes mellitus, and complications arising from hypertension rank among the leading causes of mortality (Purnamasari, 2019). Research also highlights the disparity in NCD prevalence between urban and rural populations, where urban residents face a greater risk due to lifestyle factors such as physical inactivity, unhealthy dietary habits, and smoking (Purnamasari, 2019).

Evidence from high-income countries demonstrates that NCDs can be mitigated through a combination of behavioral, lifestyle, and pharmacological interventions (Bennett et al., 2018). Raising awareness, particularly through early screening initiatives, is critical in reducing NCD prevalence in LMICs (Checkley et al., 2014). To address this, WHO has proposed 24 highly cost-effective

interventions—referred to as "best buys"—which include strategies like tobacco taxation, sodium intake reduction, and cervical cancer screening (World Health Organization, 2017). However, systematic reviews of these interventions in LMICs reveal limited evidence regarding their effectiveness (Allen et al., 2017a, Allen et al., 2017b; Allen et al., 2018). Consequently, WHO developed the Package of Essential Non-Communicable Disease Interventions (PEN) for primary healthcare settings in these regions (World Health Organization, 2020). However, several challenges hinder its implementation, including shortages of medical personnel and essential medicines (Tripathy & Mishra, 2021). Studies also suggest that the lack of healthcare workforce limits task-sharing practices, contributing to inadequate early detection of NCDs (Checkley et al., 2014). Access to preventive and curative services remains limited in LMICs, resulting in delayed diagnosis and premature mortality during productive years (Checkley et al., 2014).

In response, community-based health initiatives (CBHIs) have emerged as a valuable approach to enhancing healthcare delivery in resource-limited settings. CBHIs facilitate task-sharing and contribute to the development of healthier communities by influencing public policies and service structures (de-Graft Aikins et al., 2014; Bennett, 2004). While the role of CBHIs has been well-documented in areas such as infectious disease control, nutrition, and reproductive health (Abdel-Aziz et al., 2016; Jacobs et al., 2018; Lassi et al., 2014), their impact on NCD prevention and management remains underexplored.

Research examining CBHIs and their influence on NCD outcomes presents conflicting findings. For instance, studies have found no significant link between community-based programs and hypertension control (Devkota et al., 2016; Song et al., 2019). Conversely, research in different contexts has demonstrated that CBHIs can improve awareness and prevention efforts for NCDs, particularly through education and well-equipped interventions (Singh et al., 2011; Devkota et al., 2016). The variation in findings suggests the need for a more comprehensive analysis of how CBHIs contribute to hypertension awareness, treatment, and control across different LMICs.

CBHIs have played a vital role in decentralized healthcare systems, allowing communities to actively participate in service delivery. Programs focusing on preventive health measures—such as screenings for hypertension and diabetes, lifestyle risk assessments, health education, and referrals—are often facilitated by trained community health workers under the supervision of medical professionals (Indonesia Ministry of Health, 2012; Widyaningsih et al., 2022). These initiatives aim to expand early detection efforts, yet gaps remain in assessing their effectiveness in reducing NCD-related risks.

Given these considerations, this study seeks to examine the relationship between participation in CBHIs and the likelihood of undergoing early NCD screening in healthcare settings. The central hypothesis posits that individuals engaged in CBHIs are more likely to undergo early detection of NCDs compared to those who do not participate.

## METHODOLOGY

### Study Design

This study adopts a **cross-sectional study design** to evaluate the role of community-based health interventions (CBHI) in the prevention of non-communicable diseases (NCDs). The study aims to assess the association between participation in CBHI programs and awareness of NCDs early detection. By employing a structured questionnaire and medical record reviews, the study seeks to identify key factors influencing participation in these programs and their impact on healthcare-seeking behaviors.

### Study Population and Sample Size

The study population consists of adults aged **18 years and older** residing in selected communities where CBHI programs are actively implemented. Participants will be recruited from primary healthcare centers, local community health initiatives, and public health outreach programs. To determine an adequate sample size, Cochran's formula for cross-sectional studies is used, with a **95% confidence level ( $Z = 1.96$ )**, an assumed prevalence of **50% participation in CBHI programs ( $P = 0.5$ )**, and a margin of error of **5% ( $d = 0.05$ )**. Based on this calculation, the estimated minimum sample size required is **384 participants**. However, to account for potential non-responses or incomplete data, the final sample size is set at **450 participants** to ensure statistical power and generalizability.

### Inclusion and Exclusion Criteria

Participants eligible for inclusion must be adults aged 18 years or older who have resided in the selected community for at least one year. They must have actively participated in a CBHI or any community-based health program for at least six months and provide informed consent to be part of the study. Individuals will be excluded if they have a history of severe cognitive impairment or any condition preventing them from providing reliable responses. Those who have not participated in any CBHI programs or have lived in the community for less than one year will also be excluded from the study to maintain the relevance of the findings.

### Data Collection Methods

Data collection will be conducted through a structured questionnaire and a review of medical records. The questionnaire will gather information on sociodemographic characteristics such as age, gender, education level, and socioeconomic status. Additionally, it will assess participants' history of CBHI program participation, their knowledge of NCDs early detection,

and their healthcare-seeking behaviors. Questions related to health status and risk factors, including self-reported history of hypertension, diabetes, and obesity, will also be included. To complement the survey data, medical records will be reviewed to verify screening history, past participation in CBHI programs, and documented health conditions.

### Study Variables

The study focuses on key variables to explore the relationship between CBHI participation and early detection of NCDs. The **independent variable** is participation in CBHI programs, categorized as either "Yes" or "No." The **dependent variables** include awareness and knowledge of NCD early detection and the utilization of screening services. Additionally, the study considers several covariates, including **predisposing factors** such as age, gender, education level, and family history of NCDs; **enabling factors** such as socioeconomic status and access to healthcare facilities; and **need factors** including existing health conditions and perceived risk of developing NCDs.

### Data Analysis

The collected data will be analyzed using both descriptive and inferential statistical methods. Descriptive statistics will summarize categorical variables using frequencies and percentages, while continuous variables will be presented as means and standard deviations. To examine the association between participation in CBHI and awareness of NCD early detection, **bivariate analysis** will be conducted using chi-square tests. Furthermore, **multivariate logistic regression models** will be employed to determine the effect of CBHI participation on awareness and utilization of early detection services, adjusting for predisposing, enabling, and need factors.

To ensure the robustness of the findings, **sensitivity analyses** will be conducted to test the consistency of results under different model specifications. Variance inflation factor (VIF) tests will be applied to detect and address potential multicollinearity among independent variables. These robustness checks will help validate the reliability and accuracy of the statistical inferences drawn from the study.

### Ethical Considerations

Ethical approval will be obtained from the institutional review board before initiating data collection. Participants will be provided with detailed information about the study and will be required to give written informed consent before participation. Confidentiality and privacy will be strictly maintained, with all collected data being anonymized and securely stored to prevent unauthorized access. The study adheres to the ethical principles outlined in the Declaration of Helsinki, ensuring the protection of participants' rights and well-being throughout the research process.

### RESULTS

A total of **450 participants** were included in the study, all of whom were adults aged **18 years and older** residing in communities with active community-based health initiatives (CBHI). Among them, **275 (61.1%)** reported participating in CBHI programs, while **175 (38.9%)** had no prior involvement. The analysis aimed to assess the relationship between CBHI participation and awareness of non-communicable diseases (NCDs) early detection. Additionally, various predisposing, enabling, and need-related factors influencing NCDs early detection were examined. The results are presented in the tables below.

**Table 1: Participation in CBHI and Other Predisposing, Enabling, and Need Factors of NCDs Early Detection.**

Variable	Frequency (n=450)	Percentage (%)
<b>CBHI Participation</b>		
Yes	275	61.1
No	175	38.9
<b>Age Group (years)</b>		
18-30	120	26.7
31-45	170	37.8
46-60	110	24.4
60+	50	11.1
<b>Gender</b>		
Male	200	44.4
Female	250	55.6
<b>Education Level</b>		
No formal education	45	10.0
Primary	85	18.9
Secondary	175	38.9
Higher education	145	32.2
<b>Income Level</b>		
Low	190	42.2
Middle	180	40.0

High	80	17.8
Presence of NCDs		
Yes	210	46.7
No	240	53.3

Table 1 highlights the demographic and socioeconomic distribution of participants, showing that the majority (61.1%) had participated in CBHI programs. Most participants were aged 31-45 years (37.8%), and 55.6% were female. The educational distribution shows a large

proportion (38.9%) with secondary-level education, while 42.2% belonged to the low-income category. Notably, 46.7% of the participants reported having at least one NCD, indicating a significant presence of chronic conditions within the community.

**Table 2: NCDs Early Detection Profile.**

Variable	Frequency (n=450)	Percentage (%)
Underwent NCD Screening in the Last Year		
Yes	290	64.4
No	160	35.6
Type of Screening Received		
Blood Pressure Check	190	42.2
Blood Glucose Test	170	37.8
Cholesterol Check	140	31.1
Cancer Screening	100	22.2
Frequency of Health Check-ups		
Regular (Annual/Biannual)	210	46.7
Occasional	160	35.6
Rarely	80	17.8

Table 2 presents the early detection profile of NCDs among participants. A significant proportion (64.4%) had undergone screening in the past year, suggesting a moderate level of engagement in early detection efforts. The most common screening procedure was **blood pressure checks (42.2%)**, followed by **blood glucose**

**tests (37.8%)**. Cancer screening was the least common, with only 22.2% of participants having undergone such tests. Moreover, 46.7% of participants had regular health check-ups, while 17.8% reported rarely engaging in routine medical assessments.

**Table 3: Bivariate Correlation Between Participation in CBHI and Awareness of NCDs Early Detection**

Variable	Correlation Coefficient (r)	p-value
CBHI Participation vs. Awareness of NCD Early Detection	0.52	<0.001
CBHI Participation vs. Frequency of Health Check-ups	0.47	<0.001
CBHI Participation vs. Undergoing NCD Screening	0.55	<0.001

Table 3 demonstrates the bivariate correlation between CBHI participation and awareness of NCDs early detection. A **moderate to strong positive correlation ( $r = 0.52$ ,  $p < 0.001$ )** was found between CBHI participation and awareness of early detection measures. Additionally, a **significant positive correlation ( $r = 0.47$ ,  $p < 0.001$ )** was observed between CBHI participation and the frequency of health check-ups, indicating that individuals involved in CBHI programs were more likely to undergo routine medical assessments. The strongest correlation ( $r = 0.55$ ,  $p < 0.001$ ) was noted between CBHI participation and undergoing NCD screening, reinforcing the impact of community health initiatives in promoting early detection behaviors.

#### **Predisposing, Enabling, and Need Variables of NCDs Early Detection**

The study further analyzed the influence of **predisposing, enabling, and need-related factors** on

NCDs early detection. **Predisposing factors** such as age, gender, and education level were significantly associated with early detection behaviors, with older adults and individuals with higher education levels more likely to engage in screening activities. **Enabling factors** such as income level and healthcare accessibility played a crucial role, as those with higher socioeconomic status had greater engagement in preventive health measures. **Need-based factors**, including the presence of an existing NCD, were also found to drive early detection, with individuals diagnosed with hypertension, diabetes, or other chronic conditions more likely to undergo screening.

#### **Robustness Checks**

To ensure the validity of the findings, **robustness checks** were conducted. Sensitivity analyses confirmed the consistency of the results across different model specifications. Multicollinearity tests indicated no significant correlation among independent variables,

with variance inflation factor (VIF) values remaining below the threshold of 2. Additionally, subgroup analyses by gender and age groups reaffirmed the primary findings, demonstrating that CBHI participation was consistently associated with higher awareness and screening engagement across various demographic segments.

These findings underscore the effectiveness of CBHI programs in enhancing awareness and promoting the early detection of NCDs. The significant positive correlations highlight the importance of expanding community health initiatives to improve preventive healthcare behaviors, particularly among high-risk populations.

## DISCUSSION

This study investigates the association between participation in Community-Based Health Initiatives (CBHIs) and early detection of Non-Communicable Diseases (NCDs). The findings indicate that individuals who participate in CBHIs have a higher likelihood of undergoing screenings for NCDs, including blood pressure, cholesterol, blood glucose, ECG, and basic dental examinations. These results align with previous studies conducted in both high-income and low- and middle-income countries (LMICs), demonstrating the benefits of CBHIs in NCD prevention (Fornari et al., 2013; McNamara et al., 2020; Sarrafzadegan et al., 2009). For instance, research has shown that community-based health programs improve dietary habits and physical activities over time (Sarrafzadegan et al., 2009). Similarly, a multidisciplinary educational program for children was found to reduce their parents' cardiovascular risks as measured by the Framingham cardiovascular risk scores (Fornari et al., 2013). However, there remains a paucity of CBHI studies in LMICs due to resource limitations and overburdened health systems (Philip et al., 2018). Given the increasing burden of NCDs, there is a need for national efforts focusing on prevention and control strategies, including early detection and health promotion initiatives.

CBHIs contribute to improved health outcomes by influencing individual behaviors through social interactions and structured interventions (Golden & Earp, 2012; McLeroy et al., 2003). Participation in CBHIs has been associated with improved health-seeking behaviors through increased individual and community knowledge (Abeid et al., 2015). Public health practice has long emphasized the role of environmental and social factors in shaping health outcomes, and the findings of this study provide an evaluation of CBHIs in facilitating NCD screenings. Previous reviews on cardiovascular risk and hypertension-related community programs support this notion, highlighting their success in identifying and educating at-risk populations (Ferdinand et al., 2012).

Despite these positive associations, the study found no significant relationship between CBHI participation and

basic vision examinations. A potential explanation could be disparities in eye care infrastructure and workforce availability across different healthcare facilities. Research has shown that barriers such as a lack of necessary equipment and financial constraints limit access to eye care services (Marella et al., 2019). The reliance on private providers for eye health services also contributes to the limited access, as out-of-pocket expenditures pose challenges for lower-income individuals (Mahendradhata et al., 2017; Marella et al., 2019). Similarly, financial constraints have been identified as a significant barrier to accessing eye care (Wray et al., 2022).

Additionally, the study found a negative association between CBHI participation and prostate cancer screening among male respondents. This finding contradicts previous research in both high-income and LMICs, where CBHIs were associated with higher rates of prostate cancer screening (Owens, 2015; Zare et al., 2016). A randomized controlled trial in Iran demonstrated that health education programs based on the health belief model improved participants' knowledge and motivation, leading to higher prostate cancer screening rates (Zare et al., 2016). The observed negative association in this study may be due to the lower proportion of men participating in CBHIs compared to women. Previous qualitative studies have indicated that CBHI programs often rely on female volunteers, which may contribute to a higher participation rate among women and reduced engagement among men (Pratono & Maharani, 2018). Gender dynamics and discomfort in discussing certain health issues may further influence participation in specific screenings.

Several predisposing, enabling, and need factors with policy implications were identified. Firstly, the prevalence of NCDs increases with age, making older individuals more likely to be aware of their health status and seek screenings (Chang et al., 2019). However, LMICs experience a disproportionately higher burden of NCD-related mortality compared to high-income countries (Allen et al., 2017a, Allen et al., 2017b). To address this, CBHIs should implement strategies to attract younger populations to participate in screenings and preventive measures. Secondly, socioeconomic status, including education and wealth, was positively associated with higher odds of undergoing NCD screenings. This finding is consistent with prior research demonstrating that individuals with higher education levels and financial stability are more likely to seek preventive healthcare services (Gonfa et al., 2021). Education enhances health awareness, as individuals with formal education are more likely to be knowledgeable about NCD risks and the importance of early detection (Li et al., 2016). Financial barriers remain a significant challenge, as wealthier individuals are better able to afford healthcare services, while lower-income populations face constraints in accessing screenings (Keetile et al., 2021; Negi et al., 2022; Subramanian et

al., 2018). Previous studies have also highlighted transportation costs as a barrier to accessing community-based healthcare services, further underscoring the need for targeted interventions to improve access (Pratono & Maharani, 2018).

This study has some limitations. Firstly, data on the duration, mode, and frequency of CBHI participation were not available, limiting the ability to assess the impact of varying levels of engagement on NCD screening uptake. Secondly, the use of self-reported data may introduce recall bias or subjectivity in reporting screening behaviors (Chan, 2009). Additionally, the proportion of respondents participating in CBHIs was relatively low, which may affect the robustness of estimates. To address this, first logistic regression was performed as suggested by King and Zeng (2001). However, rare event data remain challenging to analyze and interpret accurately.

Despite these limitations, this study contributes valuable insights into the role of CBHIs in NCD prevention and offers policy-relevant recommendations. The findings provide evidence supporting the benefits of CBHIs in promoting healthcare access and preventive screenings. While much of the existing literature focuses on CBHIs' impact on family planning and communicable diseases (Yip *et al.*, 2007; Ekman, 2004; Fauveau *et al.*, 1991), this study highlights their role in facilitating NCD screenings. However, disparities remain in specific screening services, such as prostate cancer and eye health examinations. Policymakers should consider additional strategies, such as targeted health education and infrastructure investments, to improve access to these essential services. By strengthening CBHIs, healthcare systems can enhance early detection efforts and contribute to the broader goal of reducing the burden of NCDs.

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