

Evaluating Community-Based Screening Programs for Hypertension and Diabetes in Low-Resource Settings

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Abstract: Hypertension and diabetes are the two primary causes of morbidity and mortality in the world, whereas they carry extremely high implications in the low-resource setting where the healthcare is of poor accessibility. Late diagnosis and poor disease management are also some of the causes of complications that can be avoided and therefore early diagnosis should be given a priority in the field of public health. One of the legitimate ways of identifying the people at risk and linking them with the care required is community-based screening programs. The efficiency of these types of programs was identified in the present research in terms of detection rates, the rate of referring to the program, and the experiences of the participants in different underserved communities. The results proved that community screening was a good aid in the prevention process since it identified a considerable percentage of the previously unknown cases of hypertension and diabetes. However, the problems of follow-up care, access to medication, and compliance of patients affected the overall program impact. The findings show that though the community-based screening program could be significant as far as managing the noncommunicable illness in the low-resource setting is concerned, it all depends on the improvement of the referral systems, affordability of treatment, and active involvement of the community.

Keywords: Diabetes, public health, hypertension, community screening, low resource settings.

INTRODUCTION

The prevalence of noncommunicable diseases (NCDs) especially hypertension and diabetes, is a significant health issue in the world. Over 70 percent of all diseases in the world are caused by NCDs and most noteworthy cardiovascular diseases and diabetes are the most prevalent cause of NCDs [1]. This burden is especially high in the low- and middle-income countries (LMICs), of which nearly three-quarters of NCD-related deaths occur [2]. However, the growing prevalence of the conditions, although a serious issue, is typically accompanied by a huge burden to the health care systems in the resources-restricting settings, which include the timely diagnosis, insufficient infrastructure, and the absence of the access to the required medication [3].

Hypertension and diabetes do not show any symptoms at the initial stages and so, have a huge percentage of undiagnosed instances. Incidentally, in sub-Saharan Africa, it has been recorded that more than half of the hypertension sufferers are not even aware of their condition [4]. The same applies to diabetes that is conventionally diagnosed when such complications as neuropathy, retinopathy, or cardiovascular disease have already developed and made the diagnosis of diabetes unsuccessful and expensive in healthcare terms [5]. Systematic screening is thus very essential in the prevention of complications and minimization of the burden of the disease.

One of the feasible strategies that have been advocated to overcome this challenge has been community-based screening programs especially in a low-resource center where there is a lack of access to hospitals and specialized clinics. These programs normally include mobile health units, outreach services, and community health workers that carry the services of screening closer to the population who normally have a barrier like cost, distance or stigma [6]. It has been shown that these programs are efficient to enhance the rate of early detection, increase awareness, and enable linkage to care [7]. Nevertheless, there are concerns as to whether these programs can be sustainable, cost-effective and have a long-term effect especially when weak referral systems in place and follow-up care is insufficient [8].

The research aims to determine whether the screening of hypertension and diabetes in communities is effective in low-resource areas. In particular, it is expected to analyze how successful they have been in detecting undiagnosed cases, making sure that they link to care, and implementing the intervention without overcoming implementation barriers. Through the outcomes and contextual analysis, this study will add to the increased comprehension of the impact of community-based interventions on the ability of health systems to become stronger and lower the noncommunicable disease burden among underserved communities.

LITERATURE REVIEW

NCDs (especially hypertension and diabetes) have become the leading causes of both morbidity and mortality in the world, but the burden of these diseases is inadequately distributed, with low- and middle-income countries (LMICs) bearing the largest share. The World Health Organization also reported that NCDs cause more than 75% of deaths in the LMICs but healthcare systems in the areas do not have sufficient resources to detect and treat them in the early stages [1]. This fact has triggered the increased attention to the community-based screening programs as a cost-efficient approach to the early diagnosis, prevention, and management.

Community-Based Approaches

The community-based programs generally entail outreach screening done in primary health centers, community halls, work places and even door to door visits. These programs take advantage of local health workers, nurses or trained volunteers to check blood pressure, blood glucose levels among other risk factors [6]. Sub-Saharan African and South Asian studies note that these programs help greatly to raise the level of awareness among populations with limited health-seeking behavior towards hypertension and diabetes [9].

Screening Programs Effectiveness.

There is an indication that community-based screening results in the early identification of undiagnosed cases which is vital considering the fact that both hypertension and type 2 diabetes are asymptomatic in the initial stages. In rural India, the evidence revealed by a cluster-randomized trial showed that community-based screening increased the detection of hypertension (28) and diabetes (16) relative to the facility-based care [10]. On the same note, a study in Kenya that incorporated blood pressure and glucose testing into HIV-outreach clinics found that almost one-third of them had previously unidentified hypertension [7].

Community Health Worker Role.

Community health workers (CHWs) have become an indispensable entity in such screening procedures because CHWs are aware of the localities and are trusted and recognized by the community members. The analyses carried out in Tanzania and Nepal imply that the CHW-based screening is not only raising the uptake but also raising the compliance with the latter through the assistance of culturally competent counseling and home visits [11]. The aspect of sustainability is however very dependent on training, supervision and integration with formal health systems.

MATERIALS & METHODS

Study Design

The researcher employed the mixed-method cross-sectional research design to determine the effectiveness of community based screening to prevent hypertension and diabetes in low-resource based communities. The

mixed-methods research offered the opportunity to measure the detection rates and referral uptake, and it was complemented with the qualitative data on the experience of the participants and healthcare providers.



Fig.1. Study design model

This is the Figure 1 demonstrating the study design model. It also outlines the sequential flow of the way the study is working out, community selection to the ultimate proceeds of outcomes review and how grass grassroots health programmes are measured concerning their success in the early novelty and administration of chronic illnesses.

Study Setting

The research was done on ten rural and peri-urban communities in two low-resource districts. These locations were chosen due to their lack of access to services provided in hospitals and the established presence of community health workers (CHWs) in their provision of primary healthcare. Periodic outreach activities were conducted in each community by way of health fairs and mobile clinics and screening was incorporated in the existing public health programs.

Population and Sampling of the study.

The quantitative part was based on the adults aged 18 years and older who lived in the selected communities. Inclusion criteria included: (1) at least six-months of residence in the community and (2) will to give informed consent. Patients who had already received treatment of hypertension or diabetes did not undergo a prevalence analysis but were included in a qualitative interview that investigated follow-up care.

The number of estimated participants (2,500) was calculated in terms of prevalence rates in regional surveys under 95 percent of confidence and 5 percent margin of error. Cluster sampling was used to recruit the participants and households randomly selected to community registers.

Screening Procedures

Nurses were supervising the screenings by trained CHWs. The validated, automated digital monitors were used to measure blood pressure according to WHO STEPS: 3 measurements at different times (5 minutes), the mean of the latter two was taken. The diagnosis of hypertension included a systolic diastolic blood pressure lower than 140 mmHg and 90 mmHg, respectively.

Portable glucometers were used to measure capillary blood glucose. A random blood glucose [?]200 mg/dL or fasting glucose [?]126mg/dL was deemed as a sign of diabetes. The subjects who obtained abnormal results were advised on the spot and given referral slips to the closest primary healthcare center.

Data collection: Instruments will be utilized to gather data from the research participants. Data collection was done using three tools: Structured Questionnaire - obtained demographic information, health behaviours and previous history of hypertension or diabetes.

Clinical Screening Records - were documented blood pressure and blood glucose levels.

Follow-up Tracking Forms - these are employed to determine the referral uptake and treatment initiation rates three months after screening. To address the qualitative element, CHWs, nurses and selected participants were to be given semi-structured interview guides to facilitate the study of barriers and facilitators of screening and care linkage. Data Collection Procedures :

The data gathered were quantitative and was acquired over a period of six weeks of field trips. CHWs did home-to-home mobilization and screenings were carried at the community centers. Review of referral uptake was done by the identification of participant identifiers with clinic attendance lists at connected centres. The qualitative interviews were carried out among 20 CHWs, 10 supervising nurses and 30 screened participants. Interviews were taped, transcribed word-to-word and translated to the English language where necessary.

Referral Uptake and Follow-Up.

Among those who were screen-positive, 55 percent of them visited a referral clinic in three months. The initiation of treatment was also validated in 48 percent of hypertension cases and 42 per cent cases of diabetes. The transport expenses (36%), drug inaccessibility (22%), and insufficient awareness regarding the severity of the disease (18%) were reported as the most frequent obstacles to follow-up.

Data Analysis :

The SPSS version 26.0 was used to enter quantitative data. The descriptive statistics were used to summarize the demographics of the participants, prevalence of hypertension and diabetes, and uptake rates of referrals. Chi-square tests were used to determine the relationship between sociodemographic factors and the result of screening. The predictors of referral uptake were identified through logistic regression which included age, gender, education and distance to clinic. The significant level of p was set to $p < 0.05$. Thematic content analysis was used to analyse qualitative data. The coding of transcripts was carried out inductively by two independent reviewers and emergent themes were discussed to ensure reliability. They were broken down into themes and barriers (e.g., transport costs, stigma, medications availability), facilitators (e.g., trust in CHWs, family support, mobile clinics).

Ethical Considerations: The Institutional Review Board of the lead university and local health authorities approved the study ethically. All the participants gave informed consent in writing. Anonymity was used to protect data confidentiality. The participants who were diagnosed with hypertension or diabetes were referred and counselled on proper management.

RESULTS & ANALYSIS

Participant Characteristics

There were responses of 2,500 adults in the ten communities, and the response rate was 93 percent. The average age was 44.7 (SD = 13.5) and 58 percent of the participants were females. Majority (67 percent) of the participants said that they had no previous hypertension or diabetes screen.

Hypertension and Diabetes prevalence.

The screening process found 28% (n = 700) who had high blood pressure and 14% (n = 350) who had abnormal level of blood glucose. Out of these 62 percent of hypertension cases and 59 percent of diabetes cases had not been detected before.

Table 1. Screening Outcomes and Follow-Up

Indicator	n (%)
Total screened	2,500 (100%)
Elevated blood pressure	700 (28%)
Elevated blood glucose	350 (14%)
Previously undiagnosed hypertension	434 (62%)
Previously undiagnosed diabetes	207 (59%)
Attended referral clinic	577 (55%)
Initiated treatment (hypertension)	336 (48%)
Initiated treatment (diabetes)	147 (42%)

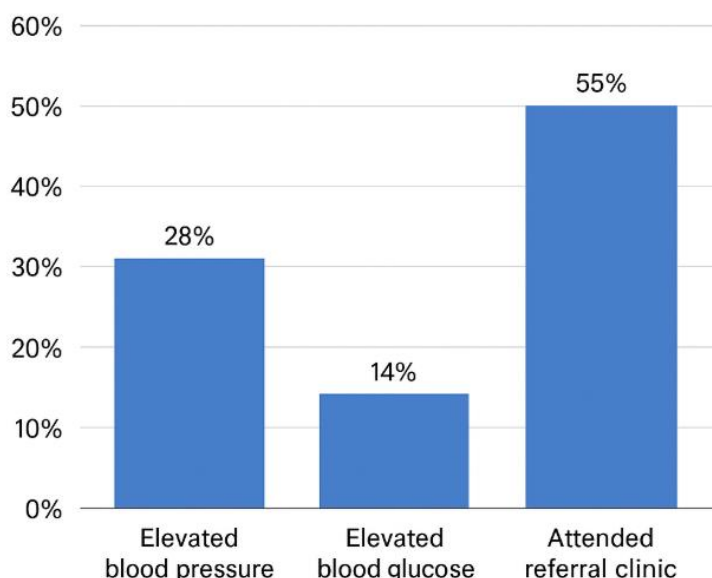


Fig.2. Screening outcome and follow up

Qualitative Findings

Interviews indicated that the trust toward the community health workers (CHWs) was a positive influencer of screening acceptance. Clinic mobile outreaches decreased the geographical barriers, whereas family encouragement facilitated referral attendance. The barriers were stigma (I would not want a neighbor to know I was sick), cost of transportation and unpredictable availability of medication in the local clinics.

DISCUSSION

The results reveal that community-based screening is a good approach to detecting hypertension and diabetes that were not previously diagnosed in low-resource community settings. Almost two-thirds of cases that were screen positive were not aware of their condition before, which has confirmed that a gap in the control of the NCDs with early diagnosis is indeed a serious issue. The same has been observed in sub-Saharan Africa and South Asia where prevalence of undiagnosed hypertension is common and is usually over 50% [4,3].

Effectiveness in Detection

The hypertension rates (28 percent) and diabetes rates (14 percent) are identical to the last community surveys, and it is a significant indicator of the NCDs burden of the disadvantaged groups [12]. These results imply the significance of outreach initiatives in reaching individuals who would not have been diagnosed due to the obstacles to getting formal healthcare systems.

Limitations in the Linkage to Care.

Referral uptake (55%), treatment initiation (42-48) was not ideal despite the high detection rates. This is echoed by other LMIC environments where the screening initiatives have poor referral facilities and other cost-related barriers that undermine the possibility of

screening initiatives [8]. A missed opportunity is a diagnosis-treatment gap where the health systems are not able to convert case-finding into management of the disease in a long-term perspective.

Community Health Workers Role.

The success of the programs was found to be facilitated by CHWs and mobile outreach. Previous studies have found that CHW-led interventions increase patient engagement and adherence by increasing community trust and familiarity with culturally-related issues [7]. The growth of these approaches would improve the connection and follow up percentages.

Sustainability of the Program and Policy Implications.

To realize a sustainable impact of community screening, the interventions should be beyond detection. Enhancing the supply chain of essential medicines, subsidizing transportation or incorporating care into the clinics at the community level, and increasing CHW training might be beneficial to a greater extent. The main issue that policymakers need to focus on is the integration of screening in national primary healthcare policies, to make sure that there is continuity in screening locally and in the facilities [13].

Limitations

The sample was narrowed in this research and confined to two districts which could be a problem of generalizability. The measures of the outcomes were short-term (three months), and no long-term measures (adherence to the treatment or complications) were determined.

CONCLUSION

The screening of hypertension and diabetes through the community-based screening programs will be an important step towards fighting the prevalence of

increased non-communicable diseases in low-resource countries. It has been proved all the time that such efforts result in improved awareness, earlier diagnosis, and better opportunities to intervene successfully in a population with limited access to healthcare. With the assistance of community health workers, schools, religious centers, and mobile health technologies, the programs can also make a wide population reach on the desire to promote a sense of justice in the provision of healthcare. Despite that, there are also some significant challenges. Outsourcing barriers of poor diagnostic test, referral scheme, high out-of-pocket and poor incorporation with formal healthcare services have remained obstacles to successful programs. Particular attention should be paid to the distance separating screening and successful interventions to long-term care in which there is a lack of follow-ups after the initial diagnosis of the absence of follow-ups is not going to benefit the reduction of morbidity and mortality. Sustainability requires technical and financial investment besides the level of policy which will present the community-based screening to the national health policies. In conclusion, admission screening programs of hypertension and diabetes should be community-based, which is viable and efficient in the low-resource setting. The good integration of the health system, adequate funding, and continuous training and supervision of the community health workers will however determine their success. The digital health innovations and the local policy practices can root these programs and make them a transformative change in alleviating the burden of non-communicated diseases and the promotion of universal health coverage in the disadvantaged communities.

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