

## Original Article



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# Facilitating factors and barriers to the implementation of hypertension prevention programs in Vietnam: lessons learned from the Communities for Healthy Hearts program

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## ABSTRACT

**Background:** Non-communicable disease (NCD) is the greatest contributor to premature deaths worldwide, with hypertension at the forefront. There was a need for a new model to help battle the burden of hypertension. In 2016, an innovative service delivery community-based model was launched in Ho Chi Minh City, Vietnam: “Communities for Healthy Hearts (CH2) program.” This qualitative study's focus is on the facilitators and barriers of the 5 aims of the Program.

**Methods:** We purposively selected 39 key participants, 20 for focus group discussions, and 19 for semi-structured interviews. We employed thematic content analysis and used NVIVO12 for data analysis.

**Results:** Overall, the diverse communication activities, training courses, and general support by key stakeholders were highlighted as the facilitators of the CH2 program. Barriers reported by interviewees were heavy workloads and the lack of financial incentives among the network, poor and inadequate referral services for patients, and the pending application of the digital registry for patient management. Overall, many informants were satisfied with the communication strategies, the increased accessibility of the hard-to-reach groups, the increased knowledge of residents, and early detection of hypertension; however, they expressed their concern about the long-term sustainability of this innovative model and the potential for scale-up.


**Conclusion:** The CH2 program enhanced knowledge about hypertension and its early detection, but challenges remain, such as sustaining the collaborator network of volunteers in the community, and the need for further capacity building in order for it to be integrated and scaled nationally. More attention should be focus on the recruitment process, development of the fully-functional eHypertension.Tracker software to support the referral process prior to scaling-up to ensure the program sustainability. We therefore suggested that the CH2 program should continuously engage stakeholders at all levels to scale-up this model in other provinces in Vietnam.

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### Conflict of Interest

The authors declare that they have no competing interests. This paper is one of the 4 study series under the evaluation of Communities for Healthy Hearts program in Ho Chi Minh City, Viet Nam.

### Author Contributions

Conceptualization: Hoang HH, Do VV, Bui PL, Adler AJ; Data curation: Hoang HH, Tran TA; Formal analysis: Hoang HH, Hoang VM; Funding acquisition: Hoang VM; Investigation: Hoang HH, Tran TA; Methodology: Hoang HH, Do VV, Bui PL, Adler AJ, Hoang VM; Project administration: Hoang HH, Do VV, Nguyen TV, Nguyen TNP; Resources: Hoang HH; Supervision: Hoang HH, Hoang VM; Writing - original draft: Hoang HH; Writing - review & editing: Hoang HH, Do VV, Bui PL, Tran TN, Khuong QL, Nguyen TNP, Nguyen BN, Hoang TA, Bui VT, McGuire H, Shellaby JT, Adler AJ, Hoang VM.

**Keywords:** Hypertension; Community-based; Barriers and Facilitator; Vietnam; Qualitative research

## INTRODUCTION

Non-communicable diseases (NCDs) contribute to 71% of premature deaths worldwide,<sup>1</sup> and cardiovascular diseases (CVD) account for most of NCD deaths. Hypertension is the leading cause for CVD<sup>2</sup> and is defined as having a systolic blood pressure (BP) reading of  $\geq 140$  mmHg and/or diastolic BP of  $\geq 90$  mmHg—both on 2 different days.<sup>3</sup> As one of the leading causes of death and morbidity in hospitals, this medical condition has become a major public health challenge.<sup>4,5</sup> Despite the global burden of hypertension, hypertension awareness, treatment and management worldwide is comparatively low.<sup>6,7</sup>

Vietnam, like many other low and middle-income countries (LMICs), has been facing an increasing burden of NCDs, with hypertension at the forefront. From 1960 to 1991, the number of individuals with hypertension increased from 1% to 11.2% of the population.<sup>8</sup> A recent systematic review in 2018 on hypertension in Vietnam indicated that the pooled prevalence of hypertension based on 3 national surveys was 21.1%.<sup>9</sup> However, levels of awareness and efforts to tackle this problem remain relatively low.<sup>10</sup> Of those who had been diagnosed with hypertension, only 11% had it under control,<sup>11</sup> or 4.7% were under treatment.<sup>9</sup>

To help battle the burden of hypertension, the innovative service delivery and community-based model Communities for Healthy Hearts (CH2) program was launched in 2016 in Ho Chi Minh City (HCMC), the largest urban setting in Vietnam. Funded by the Novartis Foundation, with the collaboration of Program for Appropriate Technology in Health (PATH), Inc and HCMC Department of Health and Preventive Medicine Center, the CH2 program was informed by results from the PATH's audience assessment prior to the intervention, World Health Organization (WHO) HEARTS package, the Expanded Chronic Care Model,<sup>12</sup> and extensive consultation conducted with key stakeholders and end-user beneficiaries as part of a baseline assessment and to accurately understand the gaps and needs of people living with hypertension. In PATH's audience assessment prior to the intervention, participants reported that they felt healthcare facilities with a large number of patients were not suitable for hypertension consultation. Rather than relying on the already overburdened health system to provide these services, CH2 recruited and trained people from the community, as well as strengthened staff capacity at commune health stations (CHS), to fill these needs. CH2 engaged non-health workers from the community, or CH2 'collaborators', to educate, screen, and refer people with high BP readings to continuum services for hypertension diagnosis and treatment and monitor the BP of those diagnosed (refer to Fig. 1 from e10 published on June issue 2020 of J Glob Health Sci, which is one of series papers of CH2 program).

The CH2 model involved the following network of service providers. Firstly, a network of community checkpoint<sup>13</sup> volunteers, including pharmacies, local people's houses, which are located in residential areas. Each sub-wards had 3 checkpoint volunteers that are responsible to offer free BP checks, provide general information about hypertension and prevention, and referred patients with high BP levels for confirmation and treatment. Secondly, a network of community collaborators (or collaborators), including existing health collaborators, members of local official organizations, or leaders of residential groups. They had the same function as checkpoints first, then as "case managers" by follow-up and providing continuum

of care services to referred cases. Each collaborator assisted 3 checkpoints in their quarter.<sup>14</sup> Third, a network of healthcare workers at CHS. They coordinated all project activities at ward/community level, including supervised collaborators and checkpoints. Finally, a network of public and private health facilities, which provided quality diagnosis and treatment services for patients who were referred from the CH2 community-based network.

The program took place over a period of 3 years in 4 districts and 16 wards in HCMC,<sup>15</sup> CH2 engaged partners across multiple sectors, and developed 558 hypertension community checkpoints, or volunteers that screened for hypertension, measured BP, and provided health education.<sup>11</sup>

To the best of our knowledge, there was a lack of evidence of NCDs' interventions, particularly those that tackled the hypertension burden in LMICs. In Vietnam, the government formulated the National Strategy for the prevention and control of NCD for 2015–2025<sup>16</sup> with the objectives to reduce the prevalence of hypertension under 30% and to increase the proportion of diagnosis for those with hypertension by 50%, but many challenges remain. Thus, the aim of this study is to list and describe the facilitating factors and barriers of implementing the CH2 program in HCMC, and also provide the lesson-learned as experience of respondents. This paper's assessment was conducted on the 5 main objectives of the program. These 5 objectives are:

- 1) Increase knowledge of hypertension and demand for BP screening and treatment among adults aged  $\geq 40$  through behavior change communication (BCC) campaigns, including multiple communication channels, health talks, and information communication education (ICE) material.
- 2) Increase availability of hypertension screening, early detection, and referral by the CH2 community network of collaborators/checkpoints.
- 3) Increase the availability of hypertension services, reflecting the full continuum of patient-centered care in public and private facilities. Under objective 3, the program strengthened the capacity of public and private hospitals, CHSs, and community networks.
- 4) Support the continuous care and empowerment of patients by strengthening health care–provider capacity in hypertension diagnosis, treatment, and management by digital health technology, and data quality assurance (DQA).
- 5) Sustain and scale hypertension services.

## METHODS

### Study site and participants

This study was conducted from May to August 2019 in HCMC. The selection criteria for the districts were as follows: low economic status of the population, the expressed commitment from district health leadership to address hypertension, and the presence of organized networks of community-based groups, volunteers, and workplace infrastructures.

Participants were purposively sampled. They included patients with hypertension and representatives from the HCMC Department of Health, HCMC Provincial Preventive Health Center, healthcare workers at CHSs and private clinics, community collaborators, and BP checkpoint volunteers in the program wards, Thu Duc, Go Vap and Ward 12 to ensure representativeness of service providers at all levels and target population. Recruitment of interview participants continued until after the HUPH research teams reported reaching data saturation for key questions.

### Informants and data collection

Five focus group discussions (FGDs) with 4 to 5 participants each and 19 semi-structured interviews (SSIs) were conducted. In total, 39 participants were purposively sampled, and 24 interviews were conducted. Gender, age, rural and urban district were considered to ensure they fairly presented the participants' categories (**Table 1**).

The 6 interviews with policy makers were tailored to their expertise and position, and their engagement in the CH2 program. They were one manager in the HCMC Provincial Health Department, one representative of HCMC Preventive Medicine Center, and 3 leaders and managers of District Health Centers. Interviews focused on 1) NCD programs, 2) the key factors and barriers addressed by the CH2 program, 3) their suggestions for the sustainability of the program.

We interviewed 9 healthcare workers and had one FGD with 4 informants. They are from district hospital and CHSs. The topics for healthcare worker included 1) their roles/tasks, 2) treatment and clinical guidelines, 3) relationships with patients, 4) the health system issues, and 5) their insight about the CH2 intervention.

We performed 3 FGDs with patients enrolled in the CH2 program (2 males and 2 females in each) for a total of twelve patients to explore their 1) experiences of prevention and treatment before the intervention and 2) their experiences since being involved in the CH2 program.

We interviewed 4 collaborators and checkpoint volunteers, and carried out one FGD on: 1) their task and experience, 2) hypertension guidelines, 3) relationship with patients, 4) their experience with the CH2 intervention.

### Study contents

In order to identify the experience of patients, collaborators, checkpoints volunteers, healthcare workers, and stakeholders relating to hypertension awareness, treatment and control, we sought to explore these facilitators, barriers, lesson-learned and potential sustainability of the CH2 program. We based the themes completely on the 5 main objectives of the program with related activities stated in the introduction above (**Table 2**).

Of note, this study was conducted in the end-phase. To minimize bias in recall memory, we designed the semi-structure questionnaire, which was based on main activities of CH2 and used to ask for period of 2016–2019.

### Study instruments

There were 2 modalities of qualitative data collection: SSIs and FGDs. The interview guides included questions about stakeholders' perspectives on the successes of the program, implementation facilitators and challenges, existing partnerships, evaluation processes, and

**Table 1.** Number of conducted interviews

Participants	Focus group discussion (interviewees)	Semi-structured interviews	Total interviews (interviewees)
Policy-makers	0	6	6 (6)
Healthcare professionals	1 (4)	9	10 (13)
Collaborators	1 (4)	4	5 (8)
Patients with hypertension under the CH2 program	3 (12)	0	3 (12)
Total	5 (20)	19	24 (39)

CH2 = Communities for Healthy Hearts.

**Table 2.** Themes and subthemes

Themes	Subthemes
Increase knowledge of hypertension and demand for BP screening and treatment	BCC campaigns, ICE material tools and its impact SBCC building capacity Hypertension-related health talks
Increase availability of hypertension screening, early detection, and referral	Screening skills, early detection, reach Collaborators, checkpoints Workload, financial incentives, less active checkpoints
Increase the availability of hypertension services, reflecting the full continuum of patient-centered care	Training courses Patient-collaborator relationship, continuum care, referral process, higher-level
Management hypertension patients and increasing follow-up and patient empowerment	eHypertension.Tracker for NCD management Data quality assurant mHealth component and BP diary to increase patient interaction, treatment adherence
Sustainability and scale-up	Overall experiences of CH2 sustainability Suggestions and supporting for effective scale-up

BP = blood pressure; BCC = behavior change communication; ICE = information communication education; SBCC = social and behavior change communication; NCD = non-communicable disease; CH2 = Communities for Healthy Hearts.

adoption of the program's activities in the post-implementation phase. The focus group's interview guide aimed to collect health worker management's views and patients' experience of the hypertension services. All instruments were developed first in English, and after an iterative revision process, translated into the local primary language of Vietnam (these were completed by the 2 researchers from the Hanoi University of Public Health).

### Data collection procedures

SSIs and FGDs were audio-recorded with permission from the participants. All participants were given a brief explanation and verbal consent form before participating. Those who refused or discontinued interviews were able to continue their work as usual without any penalty. The interviewees' personal identities were coded and quoted anonymously. If a participant did not agree to an audio recording, the researchers took detailed notes and captured illustrative quotes. During the survey, interview recordings, field notes, visual materials, and program documents were collected.

### Data analysis

All audio recording files were transcribed verbatim, and the data analysis was conducted using NVIVO12 (QSR International). Two trained public health researchers employed thematic content analysis. Firstly, after reviewing all the transcripts and records, we coded based on a priori themes and subthemes created from the questions. Based on this coding, the 2 researchers and project coordinators reviewed the content and identified the major themes.

Many steps were taken to enhance the validity of a cross-English qualitative study, including all quotations that were proofread by a professional translator, and metaphors were thoroughly considered during the translation process.<sup>17</sup>

### Ethics statement

The protocol for monitoring and evaluating the CH2 program was approved by the Institutional Review Boards (No. 359/2017/YTCC-HD3) of the Hanoi University of Public Health. All participants provided verbal informed consent.

## RESULTS

We presented the results of this end-line phase assessment along with the 5 main objectives of CH2 program. The key barriers, facilitators and operational recommendations were summarized in **Table 3**.

### Increase accessibility, knowledge of hypertension and demand for screening

Population knowledge about hypertension risk factors and prevention are limited in Vietnam. By utilizing various communication channels and events, the targeted groups (who are older than 40 years old) were reach out to and invited to enroll in the CH2 program. They were engaged in multiple communication channels and the program leveraged several platforms: face-to-face communication at commune events, hypertension-related health talks, television spots, and social media campaigns to improve the patient knowledge of hypertension. The

**Table 3.** Summary of key barriers, facilitators and operational recommendations

Objectives	Key facilitating factors	Key barriers	Operational recommendations
Objective 1: increase knowledge of hypertension and demand for BP screening and treatment	<ul style="list-style-type: none"> <li>-Multiple communication channels and the program leveraged several platforms</li> <li>-SBCC skills for health workers to deliver health talks and consult people having high BP</li> </ul>	<ul style="list-style-type: none"> <li>-Limited health talks</li> <li>-Difficulties in reaching the target population, such as schedules of working individuals</li> </ul>	<ul style="list-style-type: none"> <li>-Continuing support health facilities for the hypertension activities, including ICE materials</li> <li>-Increasing local access: more health talks should be held to increase local access and sustain multiple communication channels of the program</li> </ul>
Objective 2: increase the availability of hypertension screening, early detection, and referral	<ul style="list-style-type: none"> <li>-The brand identity of CH2 program including banners, the logo</li> <li>-Sufficient equipment and prompt support from CH2 program</li> <li>-Hypertension counseling</li> <li>-Supports from local volunteers</li> </ul>	<ul style="list-style-type: none"> <li>-Heavy workload among collaborator/ checkpoints</li> <li>-Added quota of delivering BP screening</li> <li>-Lack of financial incentive for CH2 network</li> <li>-Services (BP screening) unmet local needs</li> <li>-Reduced interactions between collaborator-patients in the end-line phase</li> </ul>	<ul style="list-style-type: none"> <li>-Identifying the inactive checkpoints/ collaborators</li> <li>-Providing clear viewpoints to the network</li> <li>-Providing financial incentives for collaborators/checkpoint volunteers network</li> </ul>
Objective 3: increase the availability of hypertension services, reflecting the full continuum of patient-centered care	<ul style="list-style-type: none"> <li>-Several training courses that tailored for multi-levels of health facilities and CH2 network</li> </ul>	<ul style="list-style-type: none"> <li>-Patients' unmet information needs on hypertensive medication and side effects from collaborators/ checkpoints</li> <li>-Lack of support from clinical and treatment units, including poor services for referred patients at CHSs, no referral reports/feedback from the upper-level</li> </ul>	<ul style="list-style-type: none"> <li>-Integrating useful training courses to the health system to strengthen the network of service providers</li> </ul>
Objective 4: management hypertension patients and increasing follow-up and patient empowerment	<ul style="list-style-type: none"> <li>-Digital tool for NCD management (multi-function of eHypertension.Tracker)</li> <li>-Collaborator's consultations, mHealth messages, and the BP diary to patients to build healthier habits</li> </ul>	<ul style="list-style-type: none"> <li>-The pending implementation of the eHypertension.Tracker software across facilities</li> <li>-Heavy workload among collaborator/ checkpoints in the verification process in data quality assurance</li> <li>-Technology gap among older people</li> </ul>	<ul style="list-style-type: none"> <li>-Continuing to develop and integrate E.Htn.tracker software to reduce the workload among collaborator/ checkpoint</li> </ul>
Objective 5: sustainability and scale-up	<ul style="list-style-type: none"> <li>-Supports and positive views from stakeholders at all levels</li> <li>-Initial impacts on increasing hypertension knowledge to residents</li> </ul>	<ul style="list-style-type: none"> <li>-Less active among the CH2 network in the end-phase</li> <li>-Inaccuracy and insufficiency of the management data</li> </ul>	<ul style="list-style-type: none"> <li>-Implementing scale-up program at a smaller-scale with a higher quality of selected checkpoints</li> <li>-Focusing on the recruitment process and capacity of the non-healthcare workers in the initial phase</li> </ul>

BP = blood pressure; CH2 = Communities for Healthy Hearts; SBCC = social and behavior change communication; NCD = non-communicable disease; ICE = information communication education.



NCD program managers at the district level reported great satisfaction the support that they received from the program for the hypertension communication activities.

*“It was thanks to this program that (we) provided colorful leaflets and attractive ICE materials to attract local interest. Besides which, PATH provided us with financial support, which enables us to prepare the content and preparations for the Hypertension Prevention Day. For example, we used to take the hypertension content then sent it to the ward committee who turned it over to the loudspeaker system.” (Leader and program manager of District Health Centre)*

Health workers were trained in social and BCC skills and to hold specific health talks in the community. In these health talks, they were trained to counsel patients on the importance of BP management, provided orientation in the use of the CH2 program BP diary, and to answer participant's questions. They informed us that they believed hypertension-related health talks within community events had been successful in raising people's knowledge and hypertension control.

*“Thanks to the health talks, people in my ward now all understand the risk factors of hypertension and levels of BP indicating this condition. He used to say that he felt normal with his BP level, which was 160 to 170 mmHg, and did not need to go to the healthcare facility. However, he has now become aware of hypertension complications and consequently taken medicines regularly” (A healthcare worker of CHS).*

Patients in FGDs indicated they were satisfied with ICE materials, such as BP diaries, to manage their hypertension. Patients in FGDs emphasized how the CH2 program positively impacted their daily routine.

*“Collaborators often came to measure my BP, then they gave me the BP diary, which has the BP steps guide, range of pre- and hypertension, and how to record my BP in this diary.” (Focus group with patients)*

*“I'm a bit afraid to miss the pills, so I always have the alarm clock set at 4:30 to wake me up, wash my face, and do some exercises... it's just like that” (Focus group with patients)*

One health worker highlighted the difficulty of reaching the target population, including trying to fit into the schedules of working individuals but he emphasized the importance of health education and its impact on hypertension adherence. He suggested more health talks should be held to increase local access.

*“In this crowded ward, many people have not been approached by communication events yet. In the daytime, they (the employed) go to work. In the evening, they take care of their families. sometimes only one person in each family can participate in the health talks.” (A healthcare worker of CHS)*

### **Hypertension screening, early detection, and referral**

The CH2 network of collaborators and BP checkpoints were provided banners, logo and Omron BP monitors. They were also trained on the risk factors for hypertension and to offer (free) BP screening as well as health consultations to their neighbors. Their BP screening skills for identifying hypertension were given positive reviews by Head of CHSs, as illustrated by the following quote:

*“They do it (check BP) carefully. Even though I could not follow all of them, but their activities (to measure BP) followed the standard and were good” (A Head of CHS)*

Healthcare workers reported that there were positive outcomes for local people, especially the working-class, as they could easily access checkpoints to be screened and get an earlier diagnosis.

*“Overall, many people have been unaware that they have hypertension since they never checked their BP. Hired workers, who hardly got their health checked in the hospital before, saw the checkpoints’ banners and came for screenings. Thereby, some of them found that they had hypertension, so they went to the hospital to get treatment.” (A healthcare worker of CHS)*

Patients who received hypertension services expressed their satisfaction with collaborators. They highlighted the counseling that they received, which is better than hospitals, where doctors often do not have enough time and just prescribe the medicines.

*“AI: in general, the information is very good, I have the time to understand that, but when I go to the hospital, care providers there do not have time to properly counsel patients. Ms. Hoa, after being detected with high BP, she then promoted the fact that people should eat less salt, as well as avoid stimulants, such as alcohol. She sat and talked for 5 to 10 minutes to counsel me. Also, she advised me to exercise gently on a daily basis, and to not think too much.” (Focus group with patient)*

However, an unintended consequence of the program was the heavy workload among network reported as a key barrier by many healthcare workers. They expressed frustration about instances when the program required them and the collaborators to meet the quota of delivering BP screenings, such as screening 50 percent of local residents in their ward. In the real situation, they indicated that a great deal of time and effort was needed to meet these quotas.

*“In this ward, each collaborator had to screen for a neighborhood of 2 to 3 hundred people. When I went on 10 household visits with them, I knew that they only could meet 4 to 5 people. Some people were not at home when she visited; some moved. So, collaborators came many times to meet them. And some people refused and did not welcome collaborators; they said: ‘I don’t need this service (BP check).’ When they (collaborators) do not reach the target, my ward did not work effectively.” (Focus group with heads of CHS)*

Dissatisfaction with a lack of financial incentives for checkpoint volunteers was reported by healthcare workers and collaborators. They reported that their checkpoint volunteers suffered from low motivation about their work, and some carried out CH2 activities with lower levels of commitment. Since they had other commitments such as other jobs and family, some BP checkpoints were no longer active or only remained active temporarily.

*“She is a pensioner, and she is a checkpoint volunteer. Her daughter has a drug store. People come to check their BP index without buying medicine, so they felt annoyed, they did not do (the) monthly report, they quitted. We suggested the financial support for checkpoints much time in many meetings, they (CH2 program managers) just noted and didn’t do anything.” (Head of CHS)*

The difficulty in maintaining patients-collaborator/checkpoint relationships was also reported. Collaborators and checkpoint volunteers were responsible for offering people BP screenings and providing general hypertension information. However, in the end-phase, many residents had BP monitors at home which reduced the need and interaction with collaborators. Consequently, a collaborator reported that many checkpoint volunteers in her ward had reported that they did not have any new clients for several months. She indicated her work was affected by these less active and unmotivated checkpoints.



*“At the beginning of the program, I did more BP checks. Now more and more people have BP machines at home. Now people find it (BP machine) affordable, so they get their BP checked at home. I just stop by sometimes to visit (follow-up).” (A checkpoint)*

*“Three checkpoints (in the interviewee’s ward) sometimes have no report because of an empty list. They say, “people don’t want to check their BP, they already had a BP monitor, there’s nothing I can do about it.” These BP checkpoint volunteers, they did not have financial support, anything... so they only half-hearted supported programs, like charity work, and no enthusiastic at work.” (Collaborator)*

### **Strengthening the capacity of health care workers in public and private facilities, reflecting full continuum care**

As per PATH’s annual report, the training courses aimed to strengthen the capacity of public and private hospitals, CHS providers, and community networks to offer high-quality diagnosis, treatment, referrals and management of hypertension. It contained modules on 1) Early hypertension detection; 2) Case management and follow-up for collaborators and checkpoints; 3) Diagnosis and treatment for health care workers at CHSs, outpatient clinics, and district hospitals; and 4) Referrals by primary health care workers and community collaborators. These training packages were based on the Ministry of Health and WHO guidelines.<sup>18</sup>

According to a manager of a public health station, several training courses, tailored for multi-levels, were useful to the collaborators and checkpoints in order to provide better hypertension services.

*“The advantages of the training program of CH2 were that they invited cardiac experts, Dr. Phuong, leader of the Heart Institute, to talk about cardiology and some professional trainers. In media training, they invited experts who had communication skills to deliver group training sessions. Attending some sessions, I found that their training was in-depth and very good.” (A representative of Public Health Station)*

A healthcare worker at the commune level reported that these courses at different levels were useful to their collaborators/checkpoint volunteers and expressed his satisfaction toward the accuracy in collaborator/checkpoint screening skills.

*“The overall quality of the training courses is good. At the city-level, training courses had been well-organized in terms of content and services. At community-level, training was also rich in content, including how to measure BP, hypertension index and complications, and counseling skills for health collaborators. Almost 90% of people referred by checkpoints for hypertension diagnosis were accurate.” (A healthcare worker of CHS)*

After strengthening the network capacity, the CH2 program piloted a health-service-provider network that could provide standardized hypertension services across the continuum of care. However, several barriers remained. Firstly, the patients’ unmet information needs on hypertensive medication and side effects were frequently reported as a barrier for collaborators/checkpoint volunteers. Healthcare workers indicated that their collaborators and checkpoint volunteers were confronted by uncooperative patients since they could not consult them on hypertensive drug side effects or the interaction between drugs.

*“Taking about medical knowledge, people do not trust collaborators; people say collaborators know nothing about medicines. If they need consultation/BP checked, they would go to hospitals, clinics because collaborators know nothing about drugs” (A healthcare worker of CHS)*

Secondly, regarding the referral process in the continuum of care, a leader of the District Health Center expressed his concern about poor services for referred patients at CHSs. He emphasized that unmet services could drive patients to quit the management of their condition in CHSs.

*“When a referred person, who is wondering if their BP was normal or not, on being invited to CHS, they received nothing but the diagnosis. They needed to monitor their hypertension, but the health staff in (the) CHS only confirmed that this patient had got hypertension, that and almost nothing else, just that, there’s no follow up.” (Leader of District Health Centre)*

Finally, there were reported challenges with the continuum with care. Many patients with suspected hypertension were referred to the hospital as per the list provided by the CH2 program but there was no referral reports/feedback from the upper-level (hospitals/private sectors) back down to CHSs or CH2 network about the uptake of the referral process or the outcome (including treatment, patient hypertension status, or their prescriptions).

*“It’s very complicated to work with the hospitals because they have many departments that take care of many diseases in each department, even responsible (for) 2 to 3 diseases. Therefore, the importance of hypertension seems to be not their priority. Again, we cannot work with the hospital (in follow-up patients)”. (Head of CHS)*

*“The management card (CH2 referral card) here (the hospitals) use for registration and check-in counters, but when the patient goes to see the doctor, they do not use it anymore. Hospital check and track medical records, but did not keep the card”. (A healthcare worker in hospital)*

### **Management of hypertension patients and follow-up by healthcare workers** DQA and data management system

In order to strengthen the referral systems and case management, DQA and data management system (eHypertension.Tracker) were integrated in the CH2 program.

The eHypertension.Tracker software is a digital tool for NCD management that was designed to support health workers at different levels to manage hypertensive patients. Healthcare workers at both district and commune levels were impressed by the multi-function, especially the risk factor analysis, of the eHypertension.Tracker software that was introduced by PATH's training courses.

*“I attended the training course (of E-Tracker); the software was very good. Because as a manager, it helped me manage information of hypertensive patients effectively, then analyze all related factors, risks, and then prescribe adequate treatment and medication, even with handling drug combinations. Less depend much on the doctor’s capacity, so I thought it was too good” (A program manager of District Health Centre)*

However, due to barriers in the continuum care listed above, such as the challenges of patient management through the continuum of care, in the end-phase, the eHypertension.Tracker software was not fully functional and implemented across facilities yet. The head of the private clinic expressed his dissatisfaction with the pending implementation of the eHypertension.Tracker.

*“In the early phase of the program, they said that they would provide some management software; however, there was nothing. So now, we could only give an estimate, not the exact number.*

*How many newly detected hypertension cases? How many hypertensive people and their health conditions?” (Leader of Private Clinic)*

Regarding the verification process in DQA, collaborators were required to follow-up and collect patients' personal information (i.e., ID card number, telephone number, etc.) to reduce the loss to follow-up. Healthcare workers reported that it was challenging for their collaborators to visit all patients and retrospectively review as well as verify the CH2 records that, in many cases, were recorded several years ago. He also reported that the CH2 program should have given the CHS and the collaborators these requirements in the initial phase.

*“More than 2 years since people had their BP screened and was detected hypertension. For such a long time, (the program requires collaborators) just went to review all patients' condition, to follow-up and collect their information.” (A healthcare worker of CHS)*

#### *Patient empowerment*

The CH2 program rolled out an SMS service (mHealth) to encourage medication adherence and lifestyle changes. Among those patients who received the messages from mHealth, they were satisfied with the contents of the SMS. They implied that receiving messages motivated them to adhere to the treatment.

*“I found that the “healthy heart” here had been good, sometimes I forget to check my BP. But then I received the message to remind me, I was happy. I was excited about my health to stay healthy. A1: I also received such messages. Most of us (a group of 5 patients) received.” (Focus group with patients)*

Besides, patients indicated that they were encouraged by the collaborator's consultations and the BP diary to build healthier habits.

*“A2: In my family, the children and grandchildren are familiar with a bland diet; they eat less salty fish, dried fish, salted fish. They used to eat dried fish a lot before; now they do not dare to buy those because they are so scared (of hypertension).” (Focus group with patients)*

However, some collaborators and patients noted that there was a technology gap and that many messages were not useful for older people or those not using phones regularly.

*“Then I went to the households to visit, and I asked them if they received any messages (from the program). They asked, “Did it have?” They didn't pay attention to the phone; they think that spam messages should not be read. And then I helped them to open the messages so they can check those.” (Collaborator)*

*“A1: so they (PATH) just send it (information and messages) to smartphones.  
 A2: Simple phone (basic phone feature) not received, that's right. Only smartphones will receive. The majority of the elderly, they use relatives' phone (do not have a cellphone)  
 A3: To be honest, I do not notice the messages.” (Focus group of patients)*

### **Sustainability and scale-up**

#### *Overall experiences of CH2 in terms of sustainability*

As a CH2 network member and working closely with the residents, a collaborator emphasized that the program had some initial impacts on increasing hypertension knowledge, which motivated patients' treatment adherence.

*“When people lacked hypertension knowledge, they would not adhere to their treatment; they would not take any medication. This program was really helpful in enabling patients to actually understand their hypertension condition, and hence to prevent its complications actively.” (Collaborator)*

#### Suggestions for an effective scale-up

However, stakeholders and healthcare workers were concerned about the sustainability of the program. They reported that many BP checkpoint volunteers and the collaborators' work seemed less active in the end-phase. Some collaborators also reported that the data collection or verification activity was left in the end-phase, as per the following quote.

*“From the beginning, the program was said (that) the duration is 2 years; people (collaborators/volunteers) thought that only 2 years. After 2 years, they just left the insufficient data, which I did not verify yet. The collaborators of 2 wards did not report anymore, and they said they did not have any new client (to report). However, they still provide screening BP for hypertensive people or when they request.” (Collaborator)*

According to health workers at central district hospitals and CHSs, there were reports that the inaccuracy and insufficiency of the data would be of deep concern to program replication.

*“If PATH wants to replicate their program, I suggest they (PATH) go deeper, and they can take care of those people (newly detected as reported) to see if it (case report) was correct or not and know the quality of their (PATH's) collaborators' report form. If they wish, they can supervise some special case and collaborate with us, we (doctors and a manager in the Department of Health) cannot handle it alone.” (A representative of HCMC Department of Health)*

Overall, a leader of the District center who contributed to the design of the CH2 program expressed positive views and support for the program. He emphasized that if the program had been implemented at a smaller-scale, with a higher quality of selected checkpoints, it would have achieved sustainability. He also suggested the importance of the recruitment process and capacity of the non-healthcare workers, which should have been done in the initial phase.

*“In fact, when it requires a certain level of knowledge of people (collaborators/volunteers) in order to be eligible for providing hypertension care, for example, measuring BP, (CH2 program) should require clear criteria for collaborators in the early phase, such as qualifications, skills, health condition, and age. Many collaborators, but they have cancer, for example, they only work for a few months and then they die, some of them are old, they have tuberculosis, COPD, etc.” (Leader of District Health Centre)*

*“Instead of a cover hypertension service for all CHS like that, the program could add further services to upgrade the quality of several stations to highlight them as different from the others. And then “let the work speak for itself” when it comes to impressing the community.” (Leader of District Health Centre)*

## DISCUSSION

The CH2 program was initiated to overcome a lack of local people's knowledge around hypertension and to increase their access to hypertension services. Prior to the program, healthcare workers and collaborators indicated that the residents' awareness and understanding of hypertension and available services were limited and that people not yet diagnosed with hypertension rarely checked their BP. Overall, many involved stakeholders

interviewed had expressed their perspectives on the facilitators, barriers and the usefulness of the CH2 program.

Through various communication channels, the CH2 program was effective in raising community awareness and hypertension knowledge. The diversity in handling communication activities, the adherence to the protocol of the network's members, and their interactions with people having high BP were appreciated by stakeholders. With support from key stakeholders, the CH2 established a community-based network of non-physicians to increase the number of screenings for community residents. Such contributions received positive feedback among the stakeholders in the program. By strengthening the role of primary health facilities, the CH2 collaborators/checkpoint volunteers and CHS staff gained credibility from the community, which in turn, helped bring more people back to the CHS. In fact, several training courses and the establishment of a community health collaborator network were noted as valuable parts of this intervention. In addition, the ongoing implementation of DQA and the eHypertension.Tracker software improved the management and follow-up of hypertensive patients. Finally, people with hypertension were satisfied with receiving the CH2 program services (SMSs, BP diary, etc.), and some of them were motivated to make changes in their lifestyle in order to better control their BP.

Our findings suggest that the CH2 program had difficulty reaching different targeted populations, in part due to the limited number of health talks and communication activities. The heavy workload among collaborators in the CH2 network is an important consideration of this study. Without financial incentives, the added quota and DQA activities had unintentionally increased their work and affected their enthusiasm to deliver the services. Since this study was conducted in the end-phase, where most CH2 activities (communication activities and BP screening) had reduced to the post-intervention phase, we noted that this may lead to a lower participants' motivation in the end-line phase. Poor and inadequate referral services for patients in the full continuum of care, such as the unmet needs of patients in terms of information on hypertensive medication and the challenges to coordinate care with higher-levels, were mentioned the most as the main barriers encountered by the collaborators and healthcare workers. Finally, the barrier to effectively integrating the eHypertension.Trackers and mHealth component needs to be assessed and how it could be improved.

The CH2 program is an early model for tackling the problem of hypertension in Vietnam. This model highlights the establishment of the community-based network of non-health workers to engage in the health system, capacity building for the network participants to deliver full patient-center care. Over the 3 years of the program, it achieved an improvement in people's knowledge about hypertension and the early detection and management of hypertension. Our community survey results showed that CH2 patients' knowledge increased, including identification of normal BP range, hypertension risk factors, and at least 3 modifiable risk factors and symptoms.<sup>19</sup> However, at the end-phase, stakeholders expressed their concern about less active checkpoints, long-term sustainability, and the potential to scale-up among the CH2 networks. The viewpoints from these frontline workers may suggest some limitations in program design that challenged the goal of hypertensive patient management in the large-scale. However, our study also highlights the positive perception among stakeholder as well as their ready support to produce a wider impact of the program. A leader of the District Health Center suggested that if the CH2 program's focus is to build a distinctive checkpoint, the program should be able to show the evidence on how it is function and be sustainable in the long run. Our finding suggests financial support is essential to

sustain the community-based network of collaborators/checkpoints, and it is possible to integrate useful training courses to strengthen the healthcare workers and collaborators, particularly at the commune levels.

Overall, within the field of health promotion, various literature indicates that community-based programs can achieve population-level changes in risk behaviour.<sup>20</sup> In the fight against NCDs, with constraint of the health workforce in LMIC,<sup>21</sup> many studies show positive outcomes of community-based interventions in the management of hypertension, especially in the task-shifting of physicians to other cadres of the health workforce. These studies were conducted in Malaysia,<sup>22</sup> India,<sup>23</sup> South Africa,<sup>22</sup> Kenya,<sup>24</sup> and Ghana.<sup>25,26</sup> The positive outcomes of these studies or that of CH2 should warrant further implementations of community-based programs in other Vietnam provinces for the improved prevention and management of hypertension.

Some limitations of this study should be noted. First, this study was not designed to assess causality and comparison purposes. Second, this study did not involve the other group appraisal of patients involved in the CH2 program. Therefore, this paper, with a small sample size and little observation, was based mainly on participants' report and their impressions about the CH2 program. Third, this study was conducted in the end-phase may lead to some bias in recall memory. Additionally, there was possible courtesy bias on the part of all respondents, in that they may have told the researcher the positive views of a program. Finally, given that several quality controls were made to interpret the full meaning of the content from interviews, there remain some limitations in regards to the differences and translation between Vietnamese and English.

The CH2 program enhanced knowledge about hypertension and its early detection, but challenges remain, such as sustaining the collaborator network of volunteers in the community, and the need for further capacity building in order for it to be integrated and scaled nationally. More attention should be focus on the recruitment process, development of the fully-functional eHypertension.Tracker software to support the referral process prior to scaling-up to ensure the program sustainability. We therefore suggested that the CH2 program should continuously engage stakeholders at all levels to scale-up this model in other provinces in Vietnam.

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