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Designing a Community-Level Hypertension Management Program for Rural Vietnam

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Designing a Community-Level Hypertension Management Program for Rural Vietnam

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Abstract

Background: This paper outlines the design of a hypertension management program aimed to be piloted in a rural commune in Vietnam. The program is in collaboration with a nonprofit organization based in the U.S. and emphasizes grassroots solutions to improve healthcare access and enhance patient outcomes at the community level.

Objectives: To determine the prevalence of elevated blood pressure and associated risk factors in Ca Dy's population, examine the commune health workers' experiences at the commune health station, and design a program to manage hypertension

Method: Mixed-method analysis results informed the design of a HMP for this project. Phase I comprised a retrospective quantitative analysis of data from 2019 and 2023 mobile clinics in Ca Dy, along with qualitative data collected from a focus group discussion with commune health workers. These findings guided the program design in phase II.

Results: About one-third of adults in Ca Dy have experienced elevated BP, with prevalence on the rise since 2019 and age being the only statistically significant risk factor. For the local population, accessing care is hindered by distance and financial constraints, while the CHWs face challenges in providing care due to limited healthcare resources and financial support.

Conclusion: Given the high prevalence and increasing trend of elevated BP among adults in Ca Dy, addressing the HTN burden is critical. Empowering commune health workers with resources at a centralized commune health station may decrease the distance traveled by local residents to access care and increase preventative blood pressure management among the community

Keywords: blood pressure; chronic care; hypertension; hypertension management program; program design; rural vietnam

Designing a Community-Level Hypertension Management Program for Rural Vietnam

In recent decades, Vietnam (VN) has experienced a shift in disease patterns from communicable to non-communicable diseases (NCDs) due to factors like population growth, socioeconomic changes, and increased life expectancy with the rise of globalization (Ha et al., 2020). NCDs such as heart disease, type II diabetes, lung disease, and various cancers have risen and account for 77% of deaths in VN, with cardiovascular diseases (CVDs) being the leading cause, responsible for 31% of all deaths (World Health Organization, 2018). Elevated blood pressure (BP) in VN is projected to exceed the 15% goal for raised BP among the population for the year 2025 (World Health Organization, 2018).

High BP, or hypertension (HTN), poses significant health risks, increasing the likelihood of heart, brain, kidney, and other diseases. It contributes significantly to the global disease burden, with over a third of CVD and stroke-related deaths occurring in low and middle-income countries like VN (Nam et al., 2020; World Health Organization, 2021). Furthermore, rural mountainous communities are particularly vulnerable to HTN and other NCDs due to limited resources, socioeconomic factors, and access to preventive healthcare (Le et al., 2022).

Significance

Addressing HTN in rural VN requires grassroots level solutions to improve access to care and patient outcomes on a community level. HTN has been integrated into the Vietnamese Ministry of Health's NCD program by the Vietnamese Society of Hypertension (VSH) and Vietnam National Heart Association (VNHA), aiming to alleviate the country's disease burden (Van Min et al., 2019). Despite global initiatives improving HTN management in VN over the past decade, it remains a significant public health concern, requiring additional strategies to reduce the risks (Van et al., 2020; Minh et al., 2022).

Founded in 2009, Vietnam Health Clinic (VHC) is a U.S.-based not-for-profit organization dedicated to improving healthcare access in underserved areas of VN. Initially starting as a 2-week mobile clinic, VHC expanded its efforts through partnerships with a VN-based pharmacy since 2012 and Vietnam National University (VNU) School of Medicine since 2017. VHC identified a mountainous province in central VN called Quang Nam as a region with significant unmet healthcare needs due to geographical constraints and a shortage of human-centered resources based on VNU's 2019 health trend survey (Vietnam Health Clinic, 2024).

Quang Nam province spans 10,440 km^2 with an estimated population of 1.8 million and only 120 reported doctors (General Statistics Office of Vietnam, 2015; Veettil et al., 2020). As a result, VHC has focused its efforts on mobilizing 2-week clinics to Quang Nam since 2016, particularly targeting an area called Ca Dy within the province in 2019 and 2023.

Community Capacity

The Vietnamese Ministry of Health's healthcare system comprises four levels: central, provincial, district, and commune. Commune level care is typically provided at local outpatient clinics known as commune health centers or stations (CHSs). These government-funded facilities aim to deliver preventive healthcare and implement national health programs (Meiqari et al., 2023). However, a survey of 89 rural CHSs in northern VN found that 75% lacked the capacity to manage NCDs (Duong et al., 2019).

Additionally, the 2019 VNU survey in Quang Nam (N=196) revealed that 60% of residents traveled farther to district health stations compared to the 11% utilizing CHSs, despite the CHS being more than 5 km closer for most. Consequently, there has been an observed trend

of the over-utilization of provincial and central level hospitals and the under-utilization of CHSs as the burden of NCDS increases in VN (Duong et al., 2019).

Commune health workers (CHWs) are community-based advocates often without formal medical training but proven effective in under-resourced healthcare settings (Le et al., 2022). CHWs can improve preventative HTN control for patients through home BP monitoring, promoting medication compliance, and education on lifestyle modifications (Ha, 2020). However, the study by Le et al. (2022) found only a third of education from CHWs focused on preventive health and NCDs. Thus, further investigation is needed to understand factors affecting CHWs' and CHSs' capacity for NCD interventions, particularly in preventive BP screening and HTN management.

Problem Statement

In interviews with national and regional policy makers and staff at a CHS located in the Hai Duong region of northeastern VN, the most frequently reported barrier with CVD prevention programs were the lack of practical guidelines, risk factor screenings, and financial resources for providing patient education (Hanh et al., 2020). Through discussion with the CHWs in Ca Dy, VHC has identified a need for additional resources to support BP screenings and HTN management at the CHS, and strives to address this gap by implementing a community-level hypertension management program (HMP) for the CHS.

Objectives

The objectives for this project are:

1. To gain insight to the prevalence of elevated BP and associated risk factors for the residents in Ca Dy
2. To explore opinions and experiences of the CHWs regarding managing HTN at the CHS

3. To design a program to management HTN for the CHS based on quantitative and qualitative findings

Methods

For this DNP project, findings from a mixed method analysis were used to design a deliverable HMP. Phase I involves a retrospective quantitative analysis using data collected from local residents during 2019 and 2023 mobile clinics in Ca Dy, and a qualitative collection and analysis with findings from a focus group discussion (FGD) with the CHWs at the CHS. For phase II, Wagner's Chronic Care Model (CCM) as a conceptual framework, in addition to utilizing the findings from phase I to design a community-level program to manage HTN (see Appendix A, Figure 1).

Setting

The project was carried out in a remote hybrid setting, spanning both the U.S. and VN. Quantitative analysis occurred in the U.S., while qualitative data collection took place with the research team based in the U.S. and participants located in VN. Prior to data collection, qualitative analysis was conducted and finalized in the U.S. The program design development was a collaborative effort with VHC.

Participants

The only component of this project requiring participants was for the FGD and were recruited among the CHWs at the CHS in Ca Dy. The inclusion criteria for the participants were to be (1) 18 years old or older, (2) employed by the CHS for at least 6 months or longer, and (3) able to communicate in English or Vietnamese. Participants who did not meet the criteria above were not eligible. Four individuals including the vice director of the CHS, a doctor, a midwife, and an administrative personnel participated in the discussion.

Phase I: Data Collection & Analysis

Quantitative Study

Data was provided by the organization through a file stored on a secure drive. The data was captured by either a trained volunteer or healthcare professional during the encounter. The local residents' demographics, reported barriers to care, and BP measurement, along with HTN-associated risk factors, status of known HTN diagnosis, and status of available HTN medications if diagnosed were extracted. The analysis was explorative and examined the following:

1. The prevalence of elevated BP in adults living in Ca Dy for year 2019 and 2023
2. The population-specific risk factors associated with elevated BP
3. The resident reported barriers to accessing healthcare

The HTN staging parameters were based on the VSH and the VNHA guidelines, elevated BP was defined as a systolic BP (SBP) $\geq$ 130 mmHg and/or a diastolic BP (DBP) $\geq$ 85 mmHg (Minh et al., 2022). For this analysis, any resident that was 18 years or older and had both a SBP and DBP measured during the mobile clinic that year was included. SBP is generally a stronger metric for CVD risk independent of age and sex compared to DBP, therefore, the inclusion criteria for this study was a SBP $\geq$ 130 mmHg regardless of measured DBP (Christensen, 2021).

The sample of adults was classified based on gender, age, and self-reported alcohol and tobacco usage. Within each category, the prevalence of elevated BP was determined, and a chi-square test was conducted to assess statistical significance among the variables. Moreover, the association between the number of adults with elevated BP and their status of a diagnosed HTN, as well as the availability of HTN medication, was analyzed statistically. Responses

regarding available HTN medication were disregarded if a patient had not reported a known diagnosis of HTN.

Lastly, reported barriers to care were assessed using responses collected during the 2023 clinic intake forms. The residents were asked to select from the following reasons: distance from healthcare facilities, financial limitations, no caretaker, no time or other responsibilities, or other. Multiple responses were allowed. Note that VHC did not formally ask this question during the 2019 mobile clinic.

Qualitative Study

A remote FGD was conducted through convenience sampling. After reviewing intentions, risk mitigation plans, participant rights, and obtaining informed consent, the discussion was conducted. Led by the research team and a bilingual Vietnamese and English moderator, a question template was used to explore the CHWs' experiences on their roles at the CHS, approaches to BP management, and opinions on a long-term HMP. Participants received $10 USD compensation. Subsequently, the collected data was securely stored, translated, and transcribed from Vietnamese to English.

A narrative analysis was applied with these steps:

1. Data Familiarization: Transcribing and re-reading the data set
2. Initial Code Generation: Labeling and organizing data items into groups
3. Generating Initial Themes: Mapping themes and their defining properties
4. Theme Review: Identify overlapping themes, refining codes and themes

Instruments

To analyze the quantitative data, a HIPAA compliant drive was accessed and Microsoft Excel was used to calculate prevalence and statistical significance. To conduct the FGD, a free

messaging application called Zalo was used to conduct the FGD with the CHWs. The FGD was guided by a template (see Appendix B) containing engagement, exploratory, and exit questions. Findings from the qualitative data collection were also stored in the HIPPA compliant drive for analysis.

Ethical Considerations

For the quantitative analysis, age and gender served as indirect identifiers, while de-identified information included systolic and diastolic measurements, HTN-associated risk factors, and relevant medical history. Access to this HIPAA-compliant data was authorized by the organization solely for research purposes, with strict adherence to security and privacy protocols mandated by the university and organization.

Regarding the qualitative analysis, participants were briefed on FGD intentions and protocols before consenting. They were advised that the FGD would involve sharing experiences and challenges related to their role, potentially causing emotional or mental distress. Participants were informed that once the discussion concluded, the disclosure of others' responses would be beyond the control of the university or research team. This DNP project was reviewed and approved by Seattle University's Institutional Review Board.

Results

Quantitative Results

During the 2019 mobile clinic conducted by VHC, among male and female residents (44% and 56% respectively), females (19%) exhibited a higher prevalence of increased BP compared to males (15%). Conversely in 2023, a higher prevalence of increased BP was observed in males (25%) compared to females (22%). Data collected in Ca Dy for both 2019 and 2023 revealed that approximately 34% and 47% of adults each year respectively had elevated BP

measurements with SBP ≥ 130 mmHg (see Appendix C, Tables 1 and 2). However, no association was found between gender and elevated BP for the population in either year.

In 2019 and 2023, age was the sole statistically significant factor associated with elevated BP compared to sex, alcohol, and tobacco use (see Appendix C, Tables 1 and 2). Elevated BP was most prevalent among individuals ages 62 years or older in both years, with a noticeable increase across all age groups in 2023 compared to 2019.

The adults (n =145) with elevated BP during 2023 mobile clinic were also asked if they were ever informed by a healthcare professional that they had HTN and whether they had current antihypertensive medication (see Appendix C, Table 3). Only 8% (n=11) with an increased BP were aware of their HTN and had medication, while a third (n= 48) knew about their HTN but did not have medication. About 1% (n=2) had an elevated BP with no known diagnosis of HTN. Available antihypertensive medication was not calculated for those with an elevated BP but no known diagnosis of HTN. Overall, 40% of adults with elevated BP had access to medical care in some type of setting but only 8% had antihypertensive medication.

Local resident responses regarding barriers to accessing healthcare were collected during VHC's 2023 mobile clinic, revealing that distance from healthcare facilities (49%) was the most common barrier among adults (n= 309) followed by financial limitations (28%). Though this statistic was not related to lack of transportation because only 2% of adults endorsed transportation as a challenge (see Appendix D, Figure 2).

Qualitative Results

Four themes were identified from the qualitative analysis: 1) approach to BP management, 2) perceived barriers to providing care, 3) capacity and limitations, and 4) thoughts in response to a HMP.

Approach to BP Management

When asked about their approach to managing BP, the CHWs reported dispensing HTN medications, educating on lifestyle changes, and conducting follow up visits. Despite no reported challenges with these tasks, socio economic issues experienced among the residents in Ca Dy makes it challenging for the CHWs to promote treatment compliance. One CHW stated that:

> "Sometimes residents do not or cannot pay much attention to their own health, because they still have to worry about making a daily living and this can make it more difficult for a patient to prioritize taking care of their blood pressure."

Another mentioned how "... most residents are ethnic minorities and having economic resources or means is still hard for them to achieve in [the] region."

Perceived Barriers to Providing Care

The CHWs stated that their primary barrier to providing care was a lack of resources at the CHS. One shared that "...the main problem here at the CHS is the lack of equipment, human resources, and medication." Similar feedback echoed across various questions. Regarding government-funded health initiatives at the CHSs, one cited a children's nutrition program facing minimal funding and experiencing challenges due to a lack of community coordination and cooperation.

CHWs' Capacities and Limitations

In terms of capacity to provide care to the community, the CHWs reported that they:

> "Mainly communicate and educate [residents] about their health, instructing them about eating, resting, and advising them on changing incorrect lifestyle behaviors that directly affects their health, give them medicine and make a follow-up

appointment after taking all the medicine or if their health condition is not good on any day, we urge them go to the nearest medical or treatment facility."

While the CHWs can conduct these tasks, they highlighted how a lack of "staffing capacity and staff qualifications" is a common challenge for the entire commune [there in Ca Dy] and district."

Thoughts in Response to a HMP

In response to implementing a program to manage HTN, one CHW said if "high BP can be managed long-term for the local community here at the CHS, the residents's health status will be better controlled, and complications for patients will be minimized and less of a burden." This was followed up by asking about the support required to pilot a HMP, one expressed hoping to have "enough medical equipment, human resources, medicine, and financial support to better manage, improve, and address health concerns for residents in the area under [their] care." When asked about metrics to define a successful program for the local population, it was mentioned how responsiveness and cooperation from the community would define a "successful program" for them.

Discussion

For both years, our study findings revealed that neither sex, alcohol, or tobacco use were statistically significant factors associated with elevated BP among adults in Ca Dy. These results align with a cross-sectional study conducted in a mountainous province, which measured BP in an equal number of male and female adults and found an overall HTN prevalence of 30%, with gender not identified as a risk factor (Nam et al., 2020). Risk factors such as self-reported alcohol and tobacco use are more likely to be underreported compared to biological markers like sex (Khalili et al., 2021). However, a report by Nguyen & Trevisan (2020) cited that Vietnamese

males exhibit a higher prevalence of high BP compared to females, particularly in rural communities; and highlights that high levels of alcohol and tobacco were associated with sex.

For our population, age was the only factor found to be statistically significant with elevated BP. The prevalence of elevated BP increased for all in 2023 compared to 2019 with ages 18-39 displaying the greatest increase among all groups at 12% (see Appendix C, Table 1 and Table 2). Not only is there a need for BP management among the older adults, this finding underscores that preventative screening measures are necessary to reduce the risk of HTN for the younger population in Ca Dy.

For the residents of Ca Dy, the most reported barrier to receiving care is distance from a healthcare facility followed by financial limitations. Results from VHC's 2023 mobile clinic coincided with the 2019 VNU survey that reported locals traveling farther to the district health centers and bypassing the CHS (Vietnam Health Clinic, 2024). Our data also shows that among those with an elevated BP measured during 2023 mobile clinic, 33% knew about their HTN but did not have available medication, compared to the 8% who knew about their HTN and had available medication. Additional investigation is required to explore the factors impacting how residents have access to a healthcare provider but are unable to obtain antihypertensive medication.

As highlighted in the qualitative findings, the CHWs identified a lack of financial support, medical equipment, and human resources as the primary obstacles they face. They also noted that patients often find it challenging to prioritize their health due to socioeconomic constraints. These qualitative findings mirror the quantitative findings from residents in Ca Dy. Historically, the residents travel farther to a more equipped district health station, and results from VHC's 2023 mobile clinic showed that distance from healthcare facilities and financial

constraints were the top two barriers to accessing care reported. The challenge for locals having to travel farther distances to access care involves several aspects, such as travel time, availability of means to travel, and the potential loss of income due to time away from work.

Limitations

The quantitative data collected presented a potential for underreporting bias concerning self-reported alcohol and tobacco use. Limitations with the qualitative component of phase I of this project included a small sample size due to staffing constraints at the CHS, sampling bias resulting from the use of convenience sampling during the FGD, and the potential for researcher bias during data analysis.

Phase II: Program Design

There are currently long-term programs for managing hypertension (HTN) at communes in the rural regions of VN. For instance, a 17-month program was initiated in 2006 at a CHS located in the Ha-Tay province of northern Vietnam. Independence was achieved by gradually decreasing support from the sponsoring organization, while collaboration with local healthcare organizations and stakeholders increased, playing a vital role in sustaining program operations (Nguyen et al., 2011). With this in mind, the quantitative and qualitative findings from phase I of this project were instrumental in shaping the design of the HMP.

This initiative aims to pilot the HMP at the CHS in Ca Dy by collaborating with VHC and the CHS care team as key stakeholders. Secondary stakeholders include local residents and community healthcare leaders in Ca Dy. Funding for piloting HMP will be provided by VHC. The HMP spans three phases, preparation, implementation, and independence, with a 20-month pilot period. All communication with the CHS care team regarding the HMP will be conducted in Vietnamese.

Conceptual Framework

The CCM was selected as the framework for this program design because of its multilevel, intersectional approach that encourages quality chronic disease management. The HMP design aims to address barriers faced by CHWs and local residents, enhancing outcomes and sustaining the program through stakeholder collaboration. With this model, it was imperative to recognize that some settings may lack the capacity to implement specific components.

Preparation

First, VHC will review the proposed timeline, HMP financial budget, and program recommendations. The HMP financial budget will include cost of equipment and antihypertensive medications, the allocated budget for training and compensating CHWs, and other operating expenses. During the preparation phase, the focus will be on capacity building for the CHWs through a collaborative effort between VHC and the CHS care team.

A pre-training assessment questionnaire will evaluate the CHWs' current clinical knowledge and skills. The HMP training modules, based on the VSH task force and VNHA practice guidelines, will target gaps in knowledge and skill. Theoretical training modules will be tailored to the CHWs' learning preferences, followed by a post-training assessment to gauge effectiveness of the training modules. Results will inform the need for additional training. Inventory of necessary medical equipment and antihypertensive medications at the CHS will be conducted. Local pharmacies in VN will be engaged to supply medications based on demand. The HMP workflow and eligibility criteria will be collaborated on with the organization and CHS care team. A seven-month period will be allocated for preparation and collaboration.

Implementation

The HMP will be initiated during VHC's 2025 mobile clinic in Ca Dy. This phase involves distributing BP equipment and antihypertensive medications to the CHS. An organization-led hands-on skill workshop will review clinical skills and the HMP workflow, with a proficiency checklist assessing CHWs' readiness. The CHWs will be invited to participate in screening, enrolling, and scheduling local residents into the program during the mobile clinic; cultivating rapport with the locals and strengthening the CHS' role as a community resource. After VHC's 2-week mobile clinic, correspondence with the CHS director and stakeholders will ensure continuous support. Enrolled patients will be directed to receive care at the CHS. Approximately 12 months will be allocated for the implementation phase.

Independence

The path to independence should be gradual and requires involvement from VHC, the CHS care team, as well as local community and healthcare leaders in Ca Dy. Independence marks the culmination of the program's pilot phase. Prior to independence, the following considerations are important:

1) Identify short-term and long-term HMP metrics (e.g., enrollment numbers, visit adherence rate, dropout rate, prevalence of controlled BP over time) to evaluate program effectiveness, resource allocation, and quality improvement revisions.
2) Assess the capacity of the CHS and local healthcare system to manage patient safety and adverse clinical outcomes (e.g., medication errors, adverse drug reactions, misdiagnoses). Develop a response plan including monitoring and evaluation of these events.
3) Conduct a stakeholder analysis and review HMP goals, current and potential impact, and return on investment with key stakeholders to secure long-term funding from groups prioritizing the needs of the CHS and local population in Ca Dy.

The CCM underscores the interconnectedness of community and health systems, along with components like community resources, self-management support, and clinical decision support (Grudniewicz et al., 2023). As displayed in the logic model (see Appendix G, Figure 4), the goal of the HMP is to strengthen capacity at the CHS, positioning it as a vital resource for the residents Ca Dy, fostering community engagement, and ultimately decreasing the prevalence of HTN.

Conclusion

With over one-third of adults experiencing elevated BP and an increase in prevalence observed with time, the disease burden of HTN in Ca Dy should not be dismissed. To effectively address HTN, grassroots strategies that are multifaceted are required. By leveraging CHWs and supporting them with the appropriate resources for capacity building, a preventive HMP can be implemented at the CHS and potentially reduce barriers to care for the local community in Ca Dy. Addressing these challenges may demand complex solutions, but focusing on one individual disparity at a time such as enhancing capacity at the CHS that is more geographically centralized, may have a beneficial downstream effect and alleviate determinants of health for the community over time.

Implications For Advanced Practice

Using CHWs to integrate at-home blood pressure screenings into the workflow can improve clinical outcomes and patient safety. The 2022 recommendation guidelines from the VSH and VNHA highlight the importance of at-home BP monitoring in the treatment of HTN. This method can assist in identifying masked or white-coat HTN, assessing the effectiveness of in-office treatment, and guiding the adjustment of antihypertensive therapy (Minh et al., 2022). For the local residents, incorporating at-home BP screenings can diminish the resources and time expended to travel to the CHS and increase treatment compliance.

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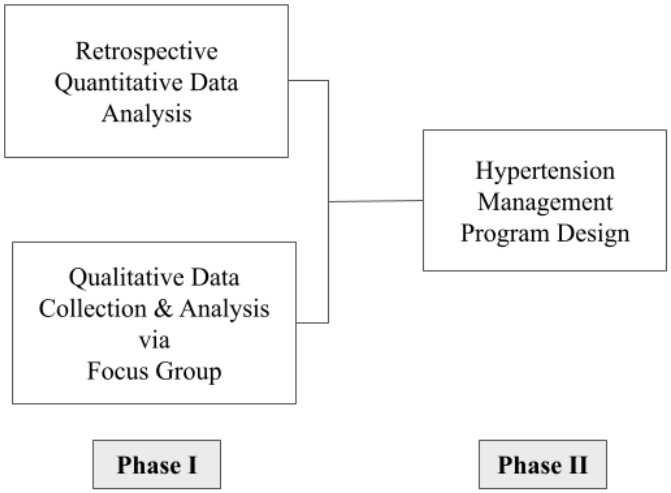
Appendix A

Figure I
Diagram of Project Interventions By Phase



Appendix B

Focus Group Question Template

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1. What is your role at the CHS? How long have you been working here?
2. What do your tasks or role at the CHS look like on a day-to-day basis?
3. How is BP currently managed at the CHS?
4. How do you feel about this approach?
    a. What aspects of managing BP are the most difficult for you and why?
5. What are your thoughts about a long-term hypertension program at the commune health station?
    a. What aspects would be the most challenging for the care team? And why?
6. What kind of support do you think is needed to manage a long-term hypertension program at the commune health station?
    a. How would you define success for a program like this? (e.g. number of participants in the program, amount of government funding received etc.)
7. Can you tell me about any government-operated health programs that the CHS participates in?
    a. What challenges or barriers does the care team face with these programs? (e.g. not enough support from the government, minimal participation from the local community etc.)
8. Is there anything else you would like to share about your needs or experiences as a CHW and managing BP for the patients in Ca Dy?

Appendix C

Table 1

Prevalence of Elevated Blood Pressure By Factors Among Adults (N=287) During 2019 Clinic in Ca Dy

Factors		**Total Number** (n)	**Normal Blood Pressure** n (%)	**Elevated Blood Pressure** n (%) SBP ≥ 130 mmHg
Sex				
	Male	126	84 (66%)	42 (33%)
	Female	161	106 (40%)	55 (34%)
Age Group*				
	18-39	81	66 (81%)	15 (19%)
	40-61	116	74 (64%)	42 (36%)
	62+	90	50 (56%)	40 (46%)
Alcohol				
	Yes	209	141(67%)	68 (33%)
	No	8	4 (50%)	4 (50%)
Tobacco				
	Yes	185	124 (67%)	61 (33%)
	No	8	4 (50%)	4 (50%)

*Note: *= $\chi^2 = 13.311$, $p = 0.0003$, significant at $p < 0.01$*

Table 2

Prevalence of Elevated Blood Pressure By Factors Among Adults (N=309) During 2023 Clinic in Ca Dy

Factors	**Total Number** (n)	**Normal Blood Pressure** n (%)	**Elevated Blood Pressure** n (%) SBP ≥ 130 mmHg
Sex			
Male	147	70 (48%)	77 (52 %)
Female	162	94 (58%)	68 (42%)
Age Group*			
18-39	42	30 (69%)	13 (31%)
40-61	126	73 (58%)	53 (42%)
62+	141	62 (44%)	79 (56%)
Alcohol			
Yes	95	48 (51%)	47 (49%)
No	214	116 (54%)	98 (46%)
Tobacco			
Yes	147	81 (55%)	66 (45%)
No	162	83 (51%)	79 (49%)

Note: * = $\chi^2 = 10.19$, $p=0.0014$, significant $p < 0.01$*

Table 3

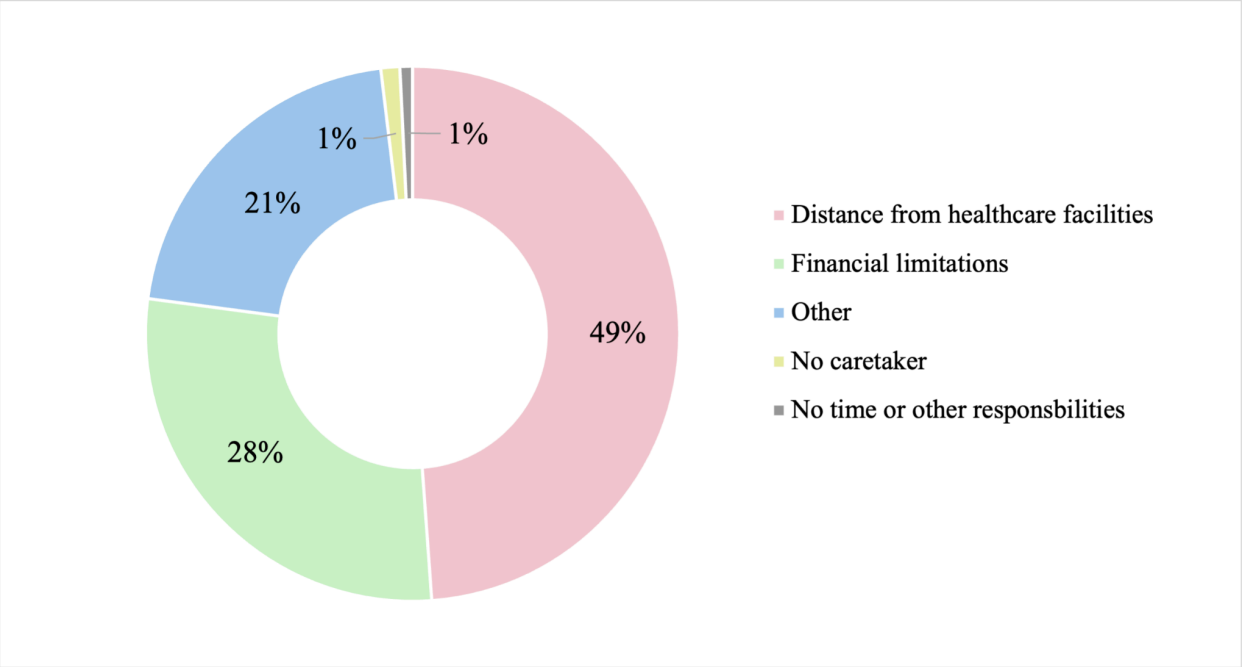
Known Diagnosis of Hypertension and Available Medication Among Adults with Elevated BP (N =145) During 2023 Clinic in Ca Dy

Diagnosis of Hypertension	**Available Hypertension Medication**	**Reported** n (%)
Yes	Yes	11 (8%)
Yes	No	48 (33%)
No	N/A	2 (1%)

Appendix D

Figure 2

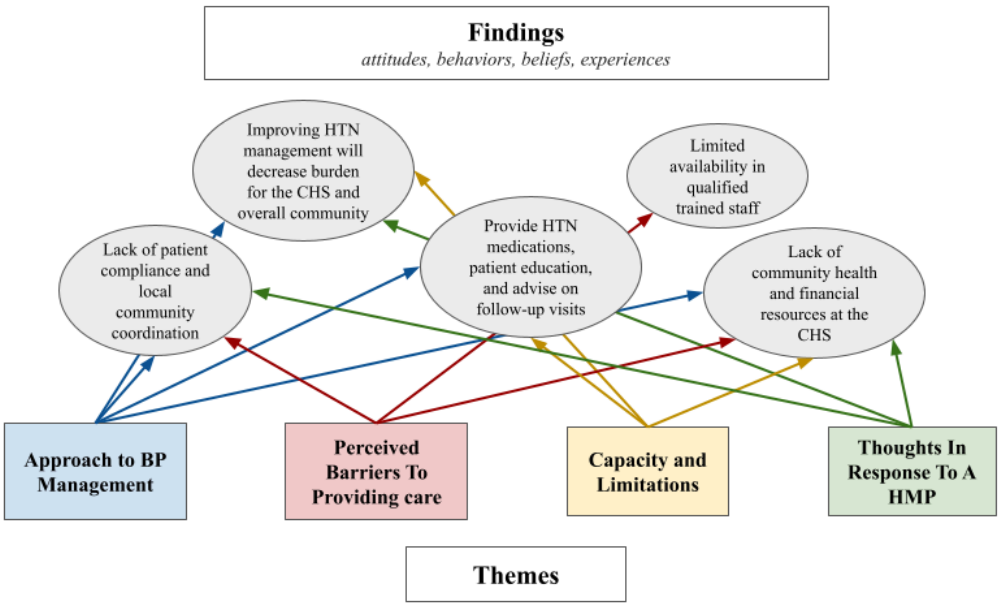
Reported Barriers to Care Among Adults (N=309) From 2023 Clinic in Ca Dy



Appendix E

Figure 3

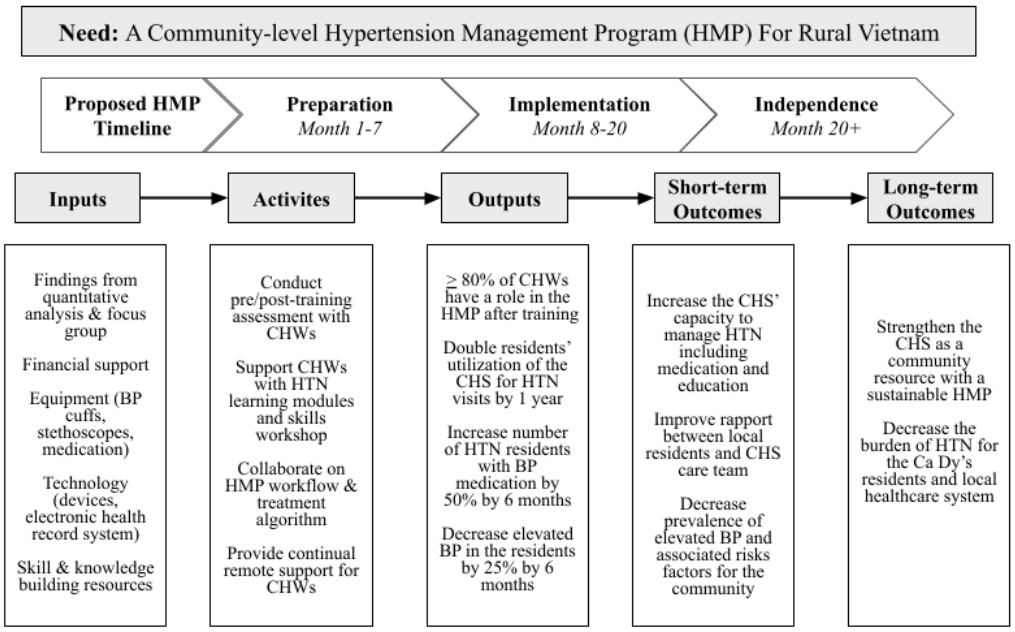
Thematic Mapping of Focus Group Finding



Appendix G

Figure 4

Hypertension Management Program Logic Model



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