



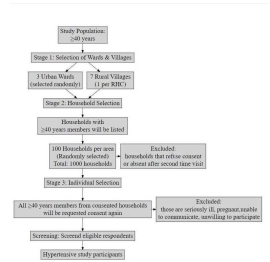
Feb 24, 2025

Determinants of awareness, treatment and control of hypertension among 40 years and above population in Myanmar from community perspective: A community-based, cross-sectional study

DOI

<https://dx.doi.org/10.17504/protocols.io.bp2l6dpjzvqe/v1>May Sabai Soe¹, Su Su Hlaing², Aye Sandar Mon³¹Department of Public Health, Ministry of Health, Myanmar;²Epidemiology Department, University of Public Health, Yangon, Myanmar;³Department of Biostatistics & Medical Demography, University of Public Health, Yangon, Myanmar**May Sabai Soe**

Department of Public Health, Ministry of Health, Myanmar



Create & collaborate more with a free account

Edit and publish protocols, collaborate in communities, share insights through comments, and track progress with run records.

[Create free account](#)OPEN  ACCESS**DOI:** <https://dx.doi.org/10.17504/protocols.io.bp2l6dpjzvqe/v1>**External link:** <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0312186>



Protocol Citation: May Sabai Soe, Su Su Hlaing, Aye Sandar Mon 2025. Determinants of awareness, treatment and control of hypertension among 40 years and above population in Myanmar from community perspective: A community-based, cross-sectional study . **protocols.io** <https://dx.doi.org/10.17504/protocols.io.bp2l6dpjzvqe/v1>

Manuscript citation:

Soe MS, Hlaing SS, Mon AS, Lynn KT (2024) Prevalence of hypertension and factors associated with the utilization of primary health care services for hypertension among hypertensive population aged 40 years and above in Pyin Oo Lwin Township, Myanmar. PLoS ONE 19(10): e0312186. <https://doi.org/10.1371/journal.pone.0312186>

License: This is an open access protocol distributed under the terms of the **Creative Commons Attribution License**, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited

Protocol status: Working

We use this protocol and it's working

Created: January 28, 2025

Last Modified: February 24, 2025

Protocol Integer ID: 119200

Keywords: Cascade of care, hypertension, Myanmar, prevalence of awareness, prevalence of treatment, prevalence of control, hypertensive population in myanmar, evaluation of hypertension care, hypertension care, control of hypertension, journey of hypertension care, prevalence of uncontrolled hypertension, hypertensive study population, hypertensive population, number of hypertensive study population, higher proportions of uncontrolled hypertension, uncontrolled hypertension, population in myanmar, prevalence at each cascade, prevalences of each cascade, cascade of care analysis, myanmar, necessary health strategy, prevalence, third reduction of premature death, premature death, health system, care analysis, determinants of awareness

Abstract

Background – Higher proportions of uncontrolled hypertension can hinder achieving Sustainable Development Goal of one-third reduction of premature deaths caused by major NCDs by 2030. For evaluation of hypertension care, this study aims to assess the determinants of awareness, treatment and control of hypertension among 40 years and above hypertensive population in Myanmar.

Methods - Community-based cross-sectional study will be done in Pyin Oo Lwin Township, Myanmar in 2023. Cascade of care analysis for hypertension will be conducted. Prevalences of each cascade of care will be calculated using fixed denominator, number of hypertensive study population. Unadjusted and adjusted logistic regression using different sub-samples at each stage of the cascade will be conducted to find out the determinants of awareness, treatment and control of hypertension. Statistical significance level will be set at $p < 0.05$.

Results – The prevalence at each cascade - awareness, treatment and control of hypertension - will be presented, along with the magnitude of drop-offs at each cascade. Determinants of awareness, treatment and control of hypertension on the journey of hypertension care will also be presented.

Conclusion – Along the continuum of care, acknowledging potential drop-offs points, magnitude of unmet needs and determinants of those needs will help the health system formulate necessary health strategies and action plans to reduce the prevalence of uncontrolled hypertension and its related morbidity and mortality.

Attachments



Blood pressure monit...

134KB



Protocol.pdf

374KB



Materials

1. Equipment and Instruments

- Omron (HEM-7120) digital BP cuffs for measuring blood pressure
- American Heart Association blood pressure measuring guidelines
- Pre-tested questionnaires

2. Software and Digital Tools

- Online survey tool - Kobo collect

3. Participant-Related Materials

- Informed consent form

4. Guidelines and Reference Documents

- JNC7 for hypertension classification as diagnostic criteria

Protocols "Determinants of awareness, treatment and control of hypertension among 40 years and above population in Myanmar from community perspective: A community-based, cross-sectional study - Cascade of care analysis for hypertension"

1 Introduction

- 1.1 Majority of adults with hypertension (nearly 80%) live with uncontrolled hypertension worldwide (1) because of unmet needs for hypertension care within a community, which are lack of awareness or diagnosis, treatment and control of hypertension (2). Globally, only 54% of hypertensive individuals were diagnosed, a mere 42% received treatment and only 21% were under control, which resulted attributing to 19.2% of all global deaths (1,3). Hypertension related morbidity and mortality has burdened financially to the nations and patients' entire families causing direct or indirect enormous economic loss and impoverishment. Therefore, hypertension has become global public health challenges and reducing a third of premature mortality attributed by major NCDs by 2030 has been pledged as Sustainable Development Goal target 3.4 to achieve (4).

Low-and-Middle-Income countries (LMICs), where 80% of global CVD mortality were occurred, are suffering the most burden of CVD (5), and have called for the action to deliver effective interventions with greater emphasis. Also in Myanmar, recognizing hypertension as public health priority in National Health Plan; Ministry of Health, national health policy and plan of actions were developed in 2012 while adopting WHO PEN intervention in PHC settings (6–8). The interventions emphasize on every stage of hypertension care continuum – screening, treatment (initial and follow-up), control and health education about prevention and control of hypertension, and are implemented in primary health care facilities with a intent of cost-effectiveness, feasibility and more access by community (9).

However, successful management of care for long term need continuous monitoring to identify and address gaps in the care system, and adaptability in order to be sustainable. So, prevalence of awareness, treatment and control of hypertension of Myanmar, although, has improved (1,10), prevalence of hypertension has also increased and uncontrolled hypertension has not declined yet to meet the global target (1,10). As a consequence, complications of uncontrolled hypertension, stroke and coronary heart diseases, are holding responsible one in every four deaths, often premature deaths (11). Thus, now is high time to evaluate public health sustainability

for hypertension care and reform accordingly in order to improve prevention, detection and management of high blood pressure in great pace.

This study intends to do cascade analysis for hypertension care which can evaluate how well a healthcare system manages hypertension and enable to point out unmet needs in care continuum at the stages of awareness, treatment, and control among hypertensive population. Identifying the unmet needs from health system perspective are needed to establish a better solution for challenges of hypertension control within a community. This study will explore unmet needs and discuss their determinants for better management of hypertension care.

2 Objectives

2.1 *General Objective*

To identify the determinants of awareness, treatment and control of hypertension among 40 years and above hypertensive population in Pyin Oo Lwin Township, Myanmar

2.2 *Specific Objectives*

1. To estimate the prevalence of awareness, treatment and control of hypertension along the hypertension care continuum among 40 years and above hypertensive population in Pyin Oo Lwin Township, Myanmar
2. To quantify magnitude of drop-offs from each stage of hypertension care continuum and assess the unmet needs for hypertension among 40 years and above hypertensive population
3. To identify the determinants of awareness, treatment and control of hypertension among 40 years and above hypertensive population in Pyin Oo Lwin Township, Myanmar

3 Materials and Methods

3.1 *Settings*

Since 2012, NCD control program of Myanmar adopt PEN intervention to decentralize NCD care in primary health care settings (7). By the end of 2019, the PEN protocol had been established in all 330 townships across the country after giving cascade training to almost all of the basic health staff (BHS) from Public Health Department, for provision of NCD control and care to the community with great efficiency and effectiveness (8,12). Since then, essential NCDs care services are embedded in the primary health care level of public health sectors (6).

As a national response, the country has developed national strategic plan for prevention and control of NCDs including hypertension and released evidence based

treatment protocols for major NCDs and CVDs for medical officer and BHS (1,6,13,14). Indicators for high blood pressure and proportions of people who receive treatment for CVDs have also been set as national targets (1,14).

In spite of providing the community with universal access to effective and affordable prevention and treatment of CVDs through primary care, especially for poor people, frequent stock-outs of essential medicine and equipment are not uncommon within the program (7,8). Whenever there is shortage of medical supply in health facilities, patients have to purchase medicines and medical equipment at retail pharmacies which cost patients with OOP money (15,16). However, blood pressure measurement and essential hypertension-related medicines are generally available in primary health care facilities of the public sector in Myanmar (1,10,14).

3.2 **Study design, area and period**

A community-based cross-sectional study will be conducted in Pyin Oo Lwin Township, Myanmar during September to November, 2023.

3.3 **Study population**

Target population of this study will be 40 years and above hypertensive population of Pyin Oo Lwin Township.

Inclusion criteria – all ambulatory 40 years and above residents who currently are living in the study area for at least 6 months prior to data collection

Exclusion criteria - those who are seriously ill, pregnant, unable to communicate (unable to listen and talk), unable to consent and unwilling to participate in the study

3.4 **Sample size**

Evidence from other study done in Myanmar is considered to calculate the sample size for this study:

$$n = \frac{z_{(1-\alpha/2)}^2 pq}{\Delta^2}$$

$$n = \frac{1.96^2 * 0.278 * 0.722}{0.05^2}$$

n = 309 (if added 20% non-response rate) ~ 370

where,

1 – α = 95% confidence interval,

α = 5% acceptable error(alpha),

Δ = 5% margin of error,

p = 27.8 %prevalence of awareness of hypertension (17)

$$q = 1 - p$$

This calculation determines the required sample size of 370.

$$\text{Total screened} = \frac{370}{0.368} = 1005.4 \approx 1006$$

As the prevalence of hypertension among the general population was 36.8% (1). So, 1006 general population will be required for screening of hypertension to obtain the sample size of 370 hypertensive participants within a community.

3.5 ***Sampling procedure***

A multistage sampling method will be used to recruit the 40 years and above participants, Figure (1).

Figure(1) Sample selection process

- First, 3 out of 10 wards from urban and 7 villages from rural (one under each rural health centers (RHCs) and there are 7 RHCs in total) will be randomly selected.
- Second, households which have at least one 40 years and above person will be listed from 3 wards and 7 villages, and 100 households each from each ward and villages will be randomly selected afterwards.
- Third, on the day of data collection, all 1000 households will be asked consent for participation. From all consented households, all 40 years and above household members will be requested consent again for screening. Participants who are in line with inclusion and exclusion criteria will be recruited.

Joint National Committee (JNC7) classifications will be used to confirm hypertension. Hypertension is defined when Systolic blood pressure (SBP) ≥ 140 mmHg or Diastolic blood pressure (DBP) ≥ 90 mmHg or both at the average of two measurements, or with the self-reported adherence of anti-hypertensive medication (18).

3.6 ***Data collection methods and tools***

Data collection tools will be WHO certified Omron (HEM-7120) digital BP cuffs and pretested interviewer administered questionnaire developed in Kobo platform. Ten auxiliary midwives who do not work in the study area will be recruited and trained for AHA BP measuring guidelines and using Kobo collect mobile application for 2 days before data collection.

Data collection methods will be via face-to-face interviews and measuring blood pressures at participants' residences. BP will be measured two times for each individual using the same device and by the same practitioner at the right arm in sitting position; which are 10 minutes apart; after taking a rest for at least 5 minutes.

All resultant hypertensive participants will continue face-to-face interviews by using questionnaire. Questionnaires will consist of socio-demographic, socio-economic factors, patients' knowledge and perception of hypertension, health status and comorbidities and health system factors, which all have been developed based on literature and validated questionnaires from other studies (19–21).

Pretesting of the questionnaires will be carried out with individuals who are not part of the sample in order to validate the understanding and clarity of the items and necessary modifications will be performed. During conducting data collection, data set will be checked daily to reduce the occurrence of missing and errors.

Measurements

Awareness, treatment and control of hypertension

Awareness of hypertension is defined by prior knowledge of being hypertensive which was diagnosed by doctors or other health workers.

Treatment of hypertension is defined as the use of any antihypertensive drugs at least within last 30 days.

Control of hypertension is defined as SBP < 140/90 mmHg at the average of two measurements with reported use of medication according to Joint National Committee (JNC7) classifications.

Socio-demographic and socio-economic-factors

Socio-demographic factors include *age, sex, residence, marriage, ethnicity, religion, family history of hypertension*; and socio-economic factors include *education, employment status, monthly family income* in Myanmar Kyats (MMK). *Social and financial support* as social relationships is also included in the questionnaires.

Patients' factors

In the questionnaires, patients' health needs will be assessed with *self-rated health status* which is graded as "poor" and "good", and *comorbidities* by self-reporting. Questionnaires also include 20 questions about the *knowledge* on control and complications of hypertension, where every unprompted correct answer will be granted 2 points and each prompted correct response will be 1 point, prompted incorrect response, 0 point and "Don't know", 0 point. Total score can possibly range 0 – 38 and those with ≤ 19 ($\leq 50\%$) for low, and > 19 ($> 50\%$) for high knowledge.

Utilization of health services is determined by utilization of public PHC services for hypertension, which is defined as being screened or treated or taking medication or going follow-up at PHC health facilities or outreach or mobile clinics or by basic health staff within 6 months for hypertension. *Usual source of care* is also determined by the most frequent use of health facilities which are "public health facilities", "public hospitals", "private hospitals/ specialist clinics/ GP clinics", "AMW/CHW" and "Not use any".

Health system factors

Health systems resources and processes which include availability, accessibility and affordability of resources will be assessed with *presence of public primary health care facilities in their wards or villages, convenience with clinic opening hours, geographic proximity to the nearest public PHC facilities such as travel time and perceived cost of travel*. They fell into the trade-offs category, as well. Whether having awareness of model of care or not will be determined by asking having *awareness of available hypertension services* (screening, monitoring, treating) at the facilities. Supply-side barriers like (i) *perceived lack of health providers* and (ii) *medicines*, (iii) *poor perceived quality of* or (iv) *trust on health providers and services*, (v) *long waiting time*, (vi) *not getting treated with respect*, (vii) *not having in good communications with the providers* and (viii) *satisfaction of services* will be assessed by using 4 point Likert scale. "Strongly agreed" and "Agreed" will be categorized as agreed and the rest will be disagreed.

3.7 Statistical analysis

The collected data extracted from Kobo collect platform in excel format will be validated and cleaned by using statistical software R (4.3.3 version). Exploratory data analysis will be performed first to check for missing values and influential outliers. Thereafter, descriptive analysis – frequency (%) – will be conducted to estimate the prevalence of each stage of the cascade of care, awareness, treatment and control of hypertension. Each prevalence will be calculated using fixed denominator, the number of hypertensive study participants. After all, all variables will be grouped into respective categories

Univariable logistic regression methods will be applied to different sub-samples at each stage of the cascade to assess the association between sample variables and outcome from each cascade and to estimate crude odds ratios (ORs). Variables $p < 0.2$ in bivariate analyses of each stage will be retained for further analysis. Multiple logistic regression will then be conducted to identify the determinants of awareness, treatment and control of hypertension. Statistical significance will be set at $p < 0.05$.

3.8 Ethical considerations



This study is based on an already approved research project, which obtained ethical clearance from the Institutional Review Board of University of Public Health, Yangon under approval number, UPH-IRB (2023/MPH/10) at 18th September, 2023. The approval was obtained for the original research in 2023 (19) which includes the methodology and data used in the present analysis. No new participants or modifications will be added beyond the initial study design. There is no direct interaction with participants, and no additional risks or burdens are imposed. Since the planned analysis falls within the scope of the original study objectives, no further ethical approval is required.

Since the beginning of the study, all participants had provided written informed consent before participation. They were also informed of the study's purpose, the procedures involved, and their right to withdraw from the study at any time without consequence. All newly diagnosed hypertensive participants and all hypertensive participants who were not under treatment and control were referred to the nearest primary health care facilities. After collecting data, participant data are anonymized and stored securely to maintain confidentiality. Personal identifiers are removed from all data to ensure privacy, and all data are stored on encrypted devices in accordance with data protection regulations.

Protocol references

1. World Health Organization. Global report on hypertension: the race against a silent killer. Geneva; 2023. p. 291.
Available from: <https://www.who.int/publications/i/item/9789240081062>
2. Berry KM, Parker WA, Mchiza ZJ, Sewpaul R, Labadarios D, Rosen S, et al. Quantifying unmet need for hypertension care in South Africa through a care cascade: evidence from the SANHANES, 2011-2012. *BMJ Glob Health*. 2017;2(3):e000348.
3. GBD 2019 Risk Factors Collaborators. Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020 Oct 17;396(10258):1223-49.
4. Mills KT, Stefanescu A, He J. The global epidemiology of hypertension. *Nat Rev Nephrol*. 2020 Apr;16(4):223-37.
5. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018 Nov 10;392(10159):1736-88.
6. Ministry of Health and Sports. National Strategic Plan for Prevention and Control of NCDs (2017-2021). Naypyitaw: The Republic of the Union of Myanmar; 2017. Available from: <https://www.mohs.gov.mm/Main/content/publication/ncd-national-strategic-plan-for-prevention-and-control-of-ncds-2017-2021>
7. Lwin Lwin Aye, Tripathy JP, Thae Maung Maung, Oo, Mya Lay Nwe, Hlaing Moh Moh Thu, et al. Experiences from the pilot implementation of the Package of Essential Non-communicable Disease Interventions (PEN) in Myanmar, 2017-18: A mixed methods study. *PLoS One*. 2020;15(2):e0229081.
8. Aung WH, Kitreerawutiwong N, Keeratisiroj O, Jariya W. Health Service Readiness, Availability, and Utilization of Primary Health Care Facilities for Non-Communicable Diseases in Shan State, Myanmar. *Iran J Public Health*. 2022 Jun;51(6):1303-12. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9659547/>
9. World Health Organization. Package of essential noncommunicable (PEN) disease interventions for primary health care in low-resource settings. 2010. Available from: <https://www.who.int/publications-detail-redirect/9789241598996>
10. World Health Organization. Myanmar Hypertension Fact Sheet 2020. Geneva; 2020 p. 43-4. Available from: https://cdn.who.int/media/docs/default-source/country-profiles/hypertension/mmr_en.pdf?sfvrsn=ae4c091_9
11. World Health Organization. WHO Myanmar Newsletter - Issue 63, Vol. 17 | United Nations in Myanmar. 2020. Available from: <https://myanmar.un.org/en/88415-who-myanmar-newsletter-issue-63-vol-17>, <https://myanmar.un.org/en/88415-who-myanmar-newsletter-issue-63-vol-17>
12. Win Moh Moh Thit, Kyaw Myint Myat Thein, Khin Thiri Maung, Jat TR, Ko Ko, Kyawt San Lwin, et al. Policy brief-2 Integrating NCD_services into primary health care through package of essential non-communicable disease interventions in Myanmar. Yangon: Help Age International; 2017 Oct. Available from: <https://themimu.info/node/114968>
13. World Health Organization. Noncommunicable Diseases Progress Monitor 2022. Geneva; 2022. Available from: <https://www.who.int/publications/i/item/9789240047761>

14. World Health Organization. Noncommunicable diseases country profiles 2018. Geneva; 2018. Available from: <https://www.who.int/publications/i/item/9789241514620>
15. Ministry of Health and Sports. Myanmar National Health Account (2016–2018). Naypyitaw; 2020. p. 17–20. Available from: <https://mohs.gov.mm/page/11970>
16. Than Tun Sein, Phone Myint, Nilar Tin, Htay Win, San San Aye, Than Sein. The Republic of the Union of Myanmar Health System Review. Geneva: World Health Organization; 2014. (Health Systems in Transition; vol. 4). Available from: <https://iris.who.int/handle/10665/208211>
17. Htet AS, Bjertness MB, Oo WM, Kjøllesdal MK, Sherpa LY, Zaw KK, et al. Changes in prevalence, awareness, treatment and control of hypertension from 2004 to 2014 among 25–74-year-old citizens in the Yangon Region, Myanmar. *BMC Public Health*. 2017 Oct 26;17(1):847.
18. James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *JAMA*. 2014 Feb 5;311(5):507–20.
19. Nwe Nwe, Ko Ko Zaw, Sein Hlaing. Care-seeking Behavior and Detection of Target Organ Involvement among Hypertensive Patients in Yangon Region (2014–2015). *Myanmar Health Sciences Research Journal*. 2016;28(3).
20. Machaalani M, Seifeddine H, Ali A, Bitar H, Briman O, Chahine MN. Knowledge, Attitude, and Practice Toward Hypertension Among Hypertensive Patients Residing in Lebanon. *Vasc Health Risk Manag*. 2022 Jul 13; 18:541–53. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9289573/>
21. Liu J, Yin H, Zheng T, Ilia B, Wang X, Chen R, et al. Primary health institutions preference by hypertensive patients: effect of distance, trust and quality of management in the rural Heilongjiang province of China. *BMC Health Services Research*. 2019 Nov 20;19(1):852. Available from: <https://doi.org/10.1186/s12913-019-4465-7>
22. Soe MS, Hlaing SS, Mon AS, Lynn KT. Prevalence of hypertension and factors associated with the utilization of primary health care services for hypertension among hypertensive population aged 40 years and above in Pyin Oo Lwin Township, Myanmar. *PLoS One*. 2024;19(10):e0312186.

Acknowledgements

The authors would like to thank to all study participants, data collectors and the Institutional Review Board of University of Public Health, Yangon for giving ethical clearance.