Integrating NCD into Primary Health Care in Thailand: a Mix Method Study

Tuition Tuangratananon (✉ Titiporn@ihpp.thaigov.net)

International Health Policy Program <https://orcid.org/0000-0002-3479-0886>

Sataporn Julchoo

International Health Policy Program

Mathudara Phaiyarom

International Health Policy Program

Warisa Panichkriangkrai

International Health Policy Program

Nareerut Pudpong

International Health Policy Program

Walaiporn Patcharanarumol

International Health Policy Program

Viroj Tangcharoensathien

International Health Policy Program

Research

Keywords: NCD, health promotion, prevention, control, Primary health care, Thailand

Posted Date: February 17th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-208297/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background

In response to an increased burden from non-communicable diseases (NCDs), primary health care (PHC) is advocated as an effective platform to support NCD prevention and control. This study aims to assess Thailand's PHC capacity in providing NCD services, identify enabling factors and challenges and provide policy recommendations for improvement.

Methods

This cross-sectional mixed-method study was conducted between October 2019 and May 2020. Two provinces, one rich and one poor were randomly selected and then a city and rural district from each province were randomly selected. From these four sites in the two provinces, 56 officers from PHC centres were sampled purposively for a self-administrative questionnaire survey on their capacities and practices related to NCD.

A total of 79 participants from Provincial and District Health Offices, provincial and district hospitals, and PHC centres who involved with NCD participated in focus group discussions or in-depth interviews.

Results

Strong health infrastructure, competent staff, though not matched with increased workload, and secured budget boost PHC capacity to address NCD prevention, control, case management, referral and rehabilitation. Community engagement through village health volunteers improves NCD awareness, enrolls in screening and improves adherence to interventions. Collaborations between provincial and district hospitals in providing resources and technical support improve NCD capacity of PHC centres. In addition, village health volunteer, a crucial link between health sector and community, is key in supporting NCD control. Additionally, inconsistent national policy directions and uncertainty related to key performance indicators hamper progress in NCD management at the operational level.

Conclusion

PHC centres play a vital role in managing NCDs prevention and control. However, adequate human and financial resources and policy guidance are required to improve PHC performance in managing NCDs. Implementing best buy measures at national level provides synergies for NCD control at PHC level.

Background

Globally, non-communicable diseases (NCDs) contribute to 70% of total mortality¹. Moreover, around three quarters of NCD deaths and 82% of 16 million premature NCD deaths (age 30–70 years), are in low- and middle-income countries^{1,2}.

Various global health forums reiterate and foster commitment on prevention and control of NCDs, for example: an Independent high-level commission on NCDs in 2018³; the global action plan for the prevention and control of NCDs 2013–2020⁴; and the Montevideo Roadmap 2018–2030⁵. SDG target 3.4 aims to reduce premature NCD deaths by one third by 2030⁶.

In 2016 in Thailand, NCDs accounted for 74% of total mortality, while the leading causes were cardiovascular diseases (23%), cancers (18%), chronic respiratory diseases (6%), and diabetes (4%). In 2016, there were 399,100 NCD deaths, and 14% of the Thai population are at risk of premature death from NCDs⁷.

The global action plan on NCDs calls upon strengthening primary health care (PHC) for effective prevention and control of NCDs⁴, emphasizing early diagnosis, treatment and management of complications. Evidence shows positive health outcomes from integrating NCD at PHC level^{8,9}, and reduction in hospital admissions¹⁰.

Defining PHC

In line with the principle of first contact of citizens to health service, Thailand defines PHC as a network of 10–15 PHC centres and a district hospital of 30–120 beds providing services to 50,000 population in the catchment area. PHC are close to where people live. PHC centres provide a comprehensive range of services including health promotion, disease surveillance, home healthcare, out-patient services with supervision and support by medical doctors from district hospitals.

At the community level, staff at PHC centres work closely with local government, other government sectors such as school and agriculture and community leaders. Over one million village health volunteers (VHV) play critical roles to support PHC.

Three decades of PHC infrastructure development since the 1970s reached full geographical coverage in all sub-districts and district hospitals nationwide¹¹. In 2018, 9,806 PHC centres in 7,255 sub-districts provided a range of health services to an average five thousand citizens in the sub-district catchment area^{12,13}. Since 2002, Thailand achieved full population coverage through financial risk protection schemes which offered a comprehensive benefit package (including the whole range of NCD interventions) free at point of services¹¹. A study shows that the Chronic Diseases Clinic Model for diabetes and hypertension at PHC level has significantly shifted NCD patients from hospitals to PHC centres, minimising congestion in hospitals while maintaining good clinical outcomes¹⁴.

This study assessed PHC capacities in addressing NCDs, identified enabling factors and challenges, and provides policy recommendations for improvement.

Methods

This study was conducted between October 2019 and May 2020; it applied mixed-methods, using both qualitative and quantitative approaches. A literature review focused on NCD management at PHC centres, essential resources such as staff, essential medicines and diagnostic equipment, and referral systems to secondary and tertiary facilities. Findings from literature reviews were used to design self-administered questionnaire and interview guidelines for key informants who are healthcare professionals in selected PHC facilities.

Study sites

The study sites were selected based on provincial economic status and NCD mortality rate. Firstly, gross provincial product per capita, a proxy of socioeconomic status, was utilised. High and low socioeconomic provinces were defined as the top ten richest and poorest provinces in Thailand. Secondly, the provincial specific NCD mortality rate from the Department of Disease Control was retrieved. The average NCDs mortality rate in Thailand in 2018 was 114.28 per 100,000 population (min: 64.56, max: 199.49)¹⁵. In these ten richest and ten poorest provinces, out of the provinces which had higher than national average NCD mortality, one province was randomly selected. Saraburi province in the Central Region represented the highest socioeconomic province with an NCD mortality rate of 146.42 per 100,000 population, whereas, Phrae province in the Northern Region represented the lowest socioeconomic province with an NCD mortality rate of 176.33 per 100,000 population. Both provinces have higher than national average NCD mortality rate.

One city and one rural district of the two provinces were randomly selected to participate in this study. (See Table 1). In the four districts, all PHC centres including district (in rural area) or provincial hospital (in city), district public health offices were invited and participated in this study.

Table 1
Summary of the study sites characteristics

	Gross provincial product per capita (2017) (THB)	Economic status rank	NCD mortality rate 2018 (per 100,000 population)
Saraburi	330,750	10th out of 77	146.42
Phrae	67,057	69th out of 77	176.33
National average	228,398		114.28

Source: socioeconomic data from Office of the National Economic and Social Development Council ³² and NCD mortality rate from Division of Non-Communicable Diseases, Ministry of Public Health ¹⁵

Data collection

Quantitative data was collected by self-administered questionnaire surveys, one survey form for each PHC centre. In total 56 PHC facilities responded to the survey (38 in Phrae and 18 in Saraburi). The questionnaire comprised three parts: facility characteristics, responsibilities, and availability of essential resources.

Qualitative information was collected from in-depth interviews and focus group discussions (FGD) conducted among 79 participants purposively chosen from healthcare professionals who are responsible for NCDs in the PHC facilities, district hospitals staff who provide technical support to PHC and treatment of referral cases, and officers at District Health Offices and Provincial Health Offices. Ten sessions of FGD were convened prior to 18 sessions of in-depth interviews to solicit key information for further assessment. (Table 2) Each interview lasted 40–60 minutes. Interviews were audio-recorded after written consent, and transcribed for qualitative analysis. Key findings were triangulated by related documents, interviews and observations by the research team.

Table 2
Number of key informants in two selected provinces

PHC category	Saraburi		Phrae		Total
	Urban area (N)	Rural area (N)	Urban area (N)	Rural area (N)	
PHC centres	10	8	25	13	56
District hospital	-	3	-	1	4
Provincial hospital	9	-	2	-	11
District Public Health Office	1	1	1	2	5
Provincial Public Health Office	1	-	2	-	3
Total participants	21	12	30	16	79

Data analysis

Quantitative findings from questionnaires were analysed using descriptive statistics, namely mean, standard deviation and percentage to describe size, distribution, and profile of PHC. For qualitative data, thematic analysis was applied, grounded by deductive and inductive approaches. Deductive methods were used to draft questionnaires and interview guidelines. Inductive analysis was performed when new information emerged after completion of fieldwork.

Ethical approval

Ethical approval was granted by the Institute for Human Research Protection, Thailand (Reference: IHRP 096/2562). All data are kept anonymous and dissemination of data is for academic purpose without individual attribution.

Results

All 56 PHC facilities provided complete survey questionnaires (100% response rate), while 79 key informants participated in sessions of in-depth interviews and FGD.

PHC stakeholders from the two selected provinces fully engaged in ten sessions of FGD, which followed by 18 sessions of in-depth interviews relating to PHC's role in managing NCDs. Interviewees were selected based on their responsibility in managing or supporting NCD work at PHC level.

Three thematic areas emerged from key findings from questionnaire survey, FGD, in-depth interviews and triangulation with literature reviews and other key informants. .

Theme 1 PHC foundation and enabling factors

Findings show that strong foundation for PHC is the result of continue policy and financial support, improved management and human resources,

1. PHC functions

Self-administered questionnaire surveys found that PHC's key function is to provide a comprehensive range of health services such as health promotion and disease prevention, treatment, and rehabilitation. This accounts for 55% of the total workload, of which NCDs take a major share. Around one third of the workload contributes to community engagement such as support to disabled, home-bound and bed-ridden patients. Intersectoral collaboration with local government units, which address the social determinants of health and empower citizens, accounts for 18% of PHC centres' workload. (See Figure 1)

From the survey, PHC centres provide all services such as diseases surveillance, environment health, mental health, home visits, NCD-related services and treatment, but dental health services are not provided by one third of 54 PHC centres due to the lack of dental personnel. (Figure 2)

2. PHC essential resources

Self-administered questionnaire surveys also assessed essential resources for the functioning of PHC centres, include human resources and essential medicines.

Healthcare workers

This study categorizes PHC centres by the size of the catchment population: small (< 3,000 population), medium (3,000- 8,000) and large size (> 8,000). The survey results revealed slight difference in numbers of staff by size. (See Table 3).

Total numbers of healthcare professional (including nurses, public health officers and dental nurses) were three, five, and eight in small, medium and large size PHC centres. There is no difference in the number of health care workers between richer (Saraburi) and poorer (Phrae) provinces. The number of registered nurses, mostly post-graduate trained as Nurse Practitioners increased by the size of catchment population to accommodate more curative service workloads. In contrast, there are, on average, two public health officers who are four year trained regardless of size. A four-year trained dental nurse and dental unit are only available in medium and large PHC centres.

Table 3

Human resources in three sizes of PHC centres

Size of PHC centre (Catchment population)	Number of PHC centres	Average Nurse	Average Public Health Staff	Average Dental Nurse	Average total healthcare professional staff
Small (< 3,000)	20	1	2	0	3
Medium (3,000-8,000)	33	2	2	1	5
Large (>8,000)	1	3	2	1	8

VHVs play a significant role in supporting PHC including screening of diabetes (blood strip test) and hypertension (electronic blood pressure instrument), supporting PHC staff during home visits and outreach school health services, and creating awareness of seasonal diseases, such as Dengue and influenza.

Monthly meetings between the VHVs and PHC centre staff are mandatory for refreshing VHV's knowledge and getting updates on national health [L4, L7, H3, H6]. For example, to minimize exposure to COVID-19 infection at hospitals, NCDs cases were shifted to PHC centres, and medicines were delivered by post. VHVs also support local quarantine of individuals travel from high infection areas or who have exposure to confirmed COVID-19 cases.

"We need to work hand-in-hand with local government units, community leaders and VHV. It is impossible to work successfully without support from other sectors and volunteers who know community very well" [L7]

Strengthen capacity of healthcare workers

In the past few years, the Ministry of Public Health (MOPH) earmarked budget for capacity building of PHC for NCD case managers through training of trainers. Although the budget was interrupted, some district hospitals initiated a mini-refresher course for their staffs to be NCD case managers [L5, L7].

Within the province, all health facilities adhered to the clinical guidelines for case management and referral systems [L4, L6, H2, H5, H6]. Health professionals at PHC centres are well-qualified, while equity of health workforce density prevails as the number of PHC staff is linked with the catchment population, regardless of the wealth of the province.

Availability of essential medicines

Essential medicines for NCD case management suggested by WHO's Package of Essential NCD Interventions ¹⁶ is intended for use by physicians in PHC. (Table 4) Though most PHC centres in Thailand do not have a full-time physician, some part-time doctors from district hospitals provide NCD services on-site in larger PHC centres. The survey reports availability of essential medicines for diabetes, hypertension, and dyslipidaemia. The following medicines are available in health centres at the following proportion: Enalapril (98.1%), Simvastatin (98.1%), Metformin (98.1%), Aspirin (96.3%), Atenolol (96.3%), Amlodipine (94.4%), and Glucose injectable solution (92.6%). Only 27.8% of studied PHC centres reported availability of Glibenclamide as there are common renal side effects and it must be prescribed by physicians who come part time to some PHC centres. Certain items are not widely available in PHC centres, such as Isosorbide dinitrate (87.0%), Furosemide (85.2%), Thiazide diuretic (77.8%), Insulin (33.3%), and Spironolactone (20.4%) as these medicines required physician's prescription.

Table 4

Essential medicines available in PHC centres

Medicines	% available	Medicines	% available	Medicines	% available
Amoxicillin	100	Furosemide	85.2	Spironolactone	20.4
Paracetamol	100	Salbutamol	79.6	Diazepam	14.8
Ibuprofen	100	Thiazide diuretic	77.8	Codeine	11.1
Enalapril	98.1	Dextrose	72.2	Magnesium sulphate	7.4
Simvastatin	98.1	Erythromycin	64.8	Penicillin	7.4
Metformin	98.1	Sodium Chloride infusion	53.7	Hydrocortisone	7.4
Aspirin	96.3	Senna	51.9	Beclomethasone	5.6
Oxygen	96.3	Epinephrine	38.9	Morphine	1.9
Atenolol	96.3	Glyceryl trinitrate	33.3	Heparin	0
Amlodipine	94.4	Insulin	33.3	Promethazine	0
Glucose injectable solution	92.6	Glibenclamide	27.8		
Isosorbide dinitrate	87.0	Prednisolone	24.1		

Note: **Bold** text refers to medicines for management of NCDs.

Since the launch of Universal Coverage Scheme (UCS) in 2002, the National Health Security Office (NHSO) contracted District Health Systems to fund PHC centres and district hospital for outpatient services using capitation payment method. All medicines and vaccines at PHC centres are procured and supplied monthly or bi-monthly by professional pharmacists in district hospital. This ensures uninterrupted supplies of quality medical products at PHC centres. The capitation budget is adequate to provide services.

Additional financial resources

Since 2007, the NHSO has invested in Local Health Promotion Fund (LHPF) at sub-district level; it transfers 40 Baht per capita of catchment population in the sub-district, with an equal matching fund from sub-district local government¹⁷. The Fund is an additional resource to respond to local health priorities. New NHSO guidelines in 2019 revised the scope of LHPF for the following priorities 1. health services as prioritized by local community; 2. health promotion and disease control activities; 3. services for specific populations such as pre-school child development centres, the elderly and disabled people; 4.

administrative cost of not more than 15% of the Fund to improve efficiency of Fund management; 5. control of disease outbreak and public health emergencies.

PHC plays a critical role in mobilizing resources generated by the Fund to support priority health problems in communities, with full engagement by citizens and local governments¹⁸. Most projects relate to behavioural modifications and improved health literacy in relation to NCD [L4-7, H2, H3, H5]. Some projects support target populations, such as monks, older people, disabled people and pregnant women.

“Paper media is outdated; we need secure funding for digital advertising media, we are able to mobilize resources from the Local Health Promotion Fund” [L1]

3. PHC service provision

In addition to providing maternal and child health services such as antenatal care, family planning, immunization and child development clinics, PHC centres provide a wide range of screening and continue medication of well controlled hypertension and diabetes, cervical cancer screening and follow-up for confirmed diagnosis of abnormal pap smear and treatment at provincial hospitals. Poorly-controlled diabetic and hypertensive patients are referred to district hospitals. PHC centres also provide home visits for stroke, homebound and bedridden patients. All these services are mostly provided by postgraduate trained nurse practitioners. Some district hospitals with sufficient physicians, assign physicians to work at large PHC centres [H3].

“We have performed so many services, but health behaviour is entirely on patients’ practices which closely link with their health literacy.” [H3]

Local collaborations were initiated through multiple methods such as a Memorandum of understanding (MOU) between the Provincial or District Health Office and the local authorities (under the Ministry of Interior), or MOUs between the Provincial and District Health Office, District Health Coordinating Committee (DHCC), local nursing colleges, and private sectors [L1, L5, H2, H4, H5]. Some district or provincial hospitals establish NCD committees, which comprise a multidisciplinary team, [L7, H2, H5]. Intra-sectoral collaborations (Provincial/ District Health Office, hospitals, and PHC centres) help foster effective working processes in their network, while multi-sectoral collaborations such as with local government authorities through the DHCC, support law enforcement such as smoke-free public spaces, legal sanction for violation of sales to under-age children and unlicensed sales of alcohol [L5].

4. Monitoring systems

Clear national commitment is reflected by the key performance indicators (KPI) through a Quality Outcome Framework. All public healthcare facilities must participate. For example, in the last five years a target was set for 80% of diabetic and hypertensive individuals be screened for Chronic Kidney Disease (CKD); 90% of Thai population aged 35-74 are screened for Diabetes Mellitus (DM) through fasting blood

sugar and at least 70% of DM type two had achieved HbA1c <7%. A cumulative 80% of women aged 30-60 be screened for cervical cancer¹⁹.

In line with the national KPI, regional, provincial and district targets are set and translated into annual work plans and regular monitoring [L1] and district hospitals and PHC centres are required to achieve these NCDs targets, with financial incentives if reached.

Theme 2 Confusion and policy incoherence

This theme mainly analyses the incoherence of financial resources, confusion of policy communication and its duplication, limited human resources and data management. This theme reflects the reality from the ground.

Discrepancy between policy and resources

Policy incoherence causes confusion at the local level

Multiple MOPH Departments have their own NCD-related responsibilities; lack of harmonization leads to duplications of data requests and reporting from local level [L1, L5, H3]. Incoherent policy is evident in three different age groups for hypertension screenings (over 25, 30 and 35 years) responsible by three Departments [H3]. It should be noted that the Health Promotion Division of the Department of Health and the NCD Division of Department of Diseases Control are both responsible for NCDs.

Sudden discontinuity of policy causes programme interruption; for example, school and community-based behavioural modification projects were terminated after a few years of implementation [L4]. This led to confusion at the PHC centres [H6]. There were also unclear NCD job descriptions in the Health Promotion Unit and the NCD Unit in the Provincial Health Office. [L1]. Clear job description is essential to ensure synergies and avoid duplication of efforts.

Insufficient or inappropriate budget management

Key informants raised the issue of conflict on budget allocation. The budget is transferred to the District Health Network (consisting a district hospital and a network of PHC centres), and usually the Director of the district hospital is the chair and the Head of District Health Office is the deputy chair of the network. Achieving targets of NCDs screening require major contributions by PHC centres, but they often lack adequate budget, resulting in internal conflicts in the network [L1-4, H1]. For example, PHC did not received adequate budget for screening HbA1C. [H4]

"NCDs quality standard comprises several indicators, but often without adequate budget allocation to fulfil these mandates. As a result, our performance will be marked in the red zone due to budget shortfalls." [L7]

Limited human resources for health

Some NCDs services once provided by hospitals are increasingly shifted to PHC centres. There is increased demand for achieving KPIs. [L4, L7, H3, H6] Yet incentive does not match the increased workload shouldered by the PHC centre staff. There is no dental assistant to increase scope such as annual oral check-ups for school children and a lack of physiotherapist limits rehabilitation services and multidisciplinary home visits [L4, L6, L7, H3, H4, H6].

“The heart of PHC settings should be health promotion and prevention, but currently our effort focuses on the treatments of NCDs, though these are the immediate needs of the citizens” [L7]

Challenges of health information systems

Although the problem of data inaccuracy at the national Health Data Centre maintained by MOPH has improved, challenges remain. Varieties of hospital software and information platforms lead to fragmentation of health data despite efforts to harmonize and improve inter-operability [H5, H6]. Patient information is sometime manually entered and transferred, resulting in human errors.

Non-MOPH public healthcare facilities such as those under the Ministry of Interior and Ministry of Defence have their own data systems, software and platforms, which are yet to incorporate into the National Health Data Centre for monitoring service coverage and health outcomes. [H1, H4].

Theme 3 Dynamic social context: an emerging challenge Urbanization and socialization rapidly transform local context and bring on board challenges including lifestyles diseases. This is another concern raised by local PHC and echoed throughout the study.

Urbanisation and social influences

Rural PHC centres facilitate easy access to services and maintain good relationships with villagers and community leaders. Key informants confirm that patients prefer to seek health services from their local PHC centres rather than visiting over-crowded hospitals [L3, L4]. Trust and interpersonal relationships within the community, built over years, influence people’s decisions to visit PHC centres [L7, H6].

“People always choose the best option for themselves, therefore, easy access to PHC centres in their community are considered their best choice” [L7]

Greater challenges are echoed by key informants from urban PHC centres. Patients in urban areas, with various choices of private and public clinics and hospitals, often bypass PHC centres [H3]. In addition, some private companies offer private insurance to employees who often use private hospital services. Coverage of NCDs screening and treatment outcomes by the private sector are unknown, as this information is not captured by the MOPH information system. [H6].

Urban populations live in obesogenic environment, having more access to fast food, sweetened beverages and inadequate physical activity compared with rural counterparts. Energy-dense foods are key risks to obesity and NCDs [L4, L7, H2, H5]. Key informants also voiced that health promotion around

smoking, alcohol, and physical activity is less effective if the population is not interested [H2, H3, H6]. Addressing commercial determinants of tobacco, alcohol and unhealthy diet through implementing WHO best buys measures is important, but beyond the capacity of PHC workers²⁰.

Health literacy at the heart of NCD prevention and control

Many key informants suggested promoting health literacy through mass or local media and that the MOPH should monitor and take legal actions against the promotion of falsely claimed products related to NCDs. [L7] Promoting healthy diets through schools and community-based interventions requires parallel reforms for conducive food environments [L1, L7].

“We have been discussing ‘Health Literacy’ for years without applying it in context. We should apply these principles instead of repeating our talk.” [L3]

Figure 3 Thematic area related to NCD responses by PHC

Figure 3 depicts enabling factors which contribute to strong PHC foundation, which in turn successfully integrate NCD prevention and control at PHC. Challenges are identified in the callout boxes.

Discussion

Thailand achieved UHC in 2002 with the whole population covered by financial risk protection systems. The 9,806 PHC centres in 7,255 sub-districts nationwide provide the foundation for implementing UHC, as full geographical coverage contributes to equitable access to health services by all citizens ^{11,21} In past decades, PHC contributed to improved maternal and child health status, control of malaria and other infectious diseases and today PHC is also good for NCD epidemics. In 2017, government health spending was high at 15.03% of general government expenditure, and household out-of-pocket payments were 11.15% of health expenditure ²². Spending on PHC as proportion of current health expenditure is unknown. Though the national health accounts have yet to estimate this figure, our field assessment found it adequate as there is no access gap and no stock-outs of essential medicines.

Health workforce and financial resources: key determinants for functioning PHC

The cutting edge of PHC is the availability of qualified nurses and other health professionals in every PHC centre, often recruited from local communities for training and home-town placement upon graduation. Implementing rural health workforce retention policies such as local recruitment and hometown placements, and financial and non-financial incentives result in higher rural retention ²³. Qualified staff contribute to trust in quality PHC services by citizens ²⁴.

This study shows difficulties in recruiting adequate numbers of dental nurses in small PHC centres due to limited posts and lack of career paths. The MOPH recognizes the problems but solutions have yet to be decided. A study shows 72.8% of dental nurses resign due to frustration and heavy workloads²⁵.

VHVs (1.054 million in 2020) are lay people in communities who are recruited to support PHC functions. Six three-hour modules are required for initial training of a new VHV²⁶ and a mandatory monthly one-hour refresher course is organized by PHC centres. Under the MOPH budget, VHVs are entitled to a monthly honorarium adjusted to 1,000 Baht (US\$ 35) in December 2018 from of 600 Baht (US\$ 20) in 2008. When the COVID-19 pandemic peaked in March 2020, VHV played critical roles to monitor population mobility from high-risk areas and support home- and state- quarantine. During the 2004 H5N1 outbreak in Thailand, they also played critical roles to search and report sick and dead poultry in their villages²⁷. They now support NCD screening as PHC centres purchased digital blood pressure monitors for each VHV. See Supplement 1 for a sample of a diabetic and hypertension screening form conducted by VHV.

PHC response to NCD: a mixed outcome

The Astana Declaration defines three mandates for PHC. First, meet people's health needs through providing a comprehensive range of health service throughout the life course; second, address the determinants of health through multi-sectoral actions; and third, empower individuals, families and communities to optimize their health, and support people as co-developers of health and social services²⁸.

Findings from this study confirm PHC can fulfil the first mandate on service provision and PHC centre health workers are fully trained for this purpose including for NCDs. For example, 4 of 67 KPIs in 2020 are related to NCDs²⁹ and district, provincial and regional health authorities are required to report quarterly progress. Essential medicines for NCDs are available in more than 90% of PHC centres. Rotation of physicians to PHC centres boosts quality of care.

Challenges remain on intersectoral actions which address the determinants of health, as PHC is not designed, with inadequate competency to implement WHO best buy interventions³⁰ which can be most effectively implemented through national-level policy actions, effective law enforcement, such as increased tax and price, and control of alcohol availability. Despite these challenges, one study shows successful results in advocating fizzy-drink-free schools by working closely with PHC centres, communities, local government and civil society organizations³¹. Scaling up these projects are underway.

Although PHC has empowered communities to optimize their health through working with community leaders, local government and VHV; challenges remain as these interventions are not effective compared with WHO best buys, which requires national synergies

Figure 4 depicts the district health system, as a key PHC platform for integrating NCD prevention and control in Thailand. Different key actors provide full support for the functioning of PHC including NCD services.

Study limitations

A few limitations exist. First, the small sample size of PHC centres in two selected provinces limits generalizability of findings. Second, the majority of participants were from PHC centres and in-depth interviews are dominated by PHC staff perspectives. Third, the COVID-19 situation in 2020, which enforced physical distancing and limit travel, did not allow interviews with the community representatives. Finally, there is an unavoidable reflexivity bias of results as the researchers are also working in the public health sector.

Conclusion And Recommendations

From the 1970s it took three decades by successive governments to achieve a full geographical coverage of PHC centres and district hospitals in the 1990s. An average of three to eight staff members in small, medium and large size PHC centres can accomplish the PHC mandate in providing comprehensive health services throughout the life course, including NCDs interventions for the sub-district catchment population. PHC staffs are trained to perform these functions well, and are supported by adequate supplies of essential medicines. Over one million VHVs play critical roles in bridging PHC centres and communities and support diseases surveillance in times of public health emergencies.

Challenges remain to empower individuals and citizens to optimize their health, particularly in urban contexts. PHC has limited capacity concerning multi-sectoral collaboration to address social determinants of health as community-based interventions are not effective in implementing WHO best buy interventions.

To empower citizens and address social determinants through multi-sectoral action on NCDs, synergies and national-level support is needed for interventions such as tax and price policies on tobacco, alcohol and sweetened beverages, control of advertising, enforcing smoke free environments, and the availability and marketing of alcohol.

Declarations

Conflict of interests:

The authors declare no conflict of interests.

Ethical issues:

Ethical approval was received from the Institute for Human Research Protection, Thailand (IHRP 096/2562)

Acknowledgements:

The authors gratefully acknowledge a support from Dr Suwit Wibulpolprasert. We sincerely thank the officers in Provincial and district Health Offices, district and provincial hospital staff and PHC centre

officers, and International Health Policy Program Foundation staff for their great collaborations and contributions.

Authors' contributions:

Conceptualization: T.T., W.Pan., and V.T.; Methodology: T.T., W.Pan. ; Validation: T.T., W.Pan., S.J., and M.P.; Data Analysis: T.T., W.Pan.; Validation: T.T., W.Pan., S.J., and M.P.; Data Management: S.J. and M.P.; Writing—Original Draft Preparation: T.T., W.Pan., S.J., and M.P.; Writing—Review: N.P. and W.Pat.; Visualisation: T.T.; Supervision: V.T.

Source(s) of support/funding:

Thai Health Promotion Foundation and Thailand Science Research and Innovation (TSRI) to the International Health Policy Program (IHPP) under the Senior Research Scholar on Health Policy and System Research [contract no. RTA6280007].

References

1. World Health Organization. Noncommunicable Diseases Progress Monitor 2020 2020 [Available from: <https://www.who.int/publications-detail/ncd-progress-monitor-2020>].
2. WHO Department of Communications. Noncommunicable diseases prematurely take 16 million lives annually, WHO urges more action 2015 [updated 19 JANUARY 2015; cited 2020 5 June]. Available from: <https://www.who.int/mediacentre/news/releases/2015/noncommunicable-diseases/en/>.
3. World Health Organization. Time to Deliver: report of the WHO Independent High-level Commission on Noncommunicable Diseases 2018 [Available from: <https://www.who.int/ncds/management/time-to-deliver/en/>].
4. World Health Organization. Global Action Plan for the Prevention and Control of NCDs 2013-2020 2013 [Available from: https://apps.who.int/iris/bitstream/handle/10665/94384/9789241506236_eng.pdf?sequence=1].
5. World Health Organization. MONTEVIDEO ROADMAP 2018-2030 on NCDs as a sustainable development priority 2017 [Available from: <https://www.who.int/conferences/global-ncd-conference/Roadmap.pdf>].
6. World Health Organization. (2015). Health in 2015: from MDGs MDGs, Sustainable Development Goals. World Health Organization. <https://apps.who.int/iris/handle/10665/200009>.
7. World Health Organization. Noncommunicable diseases country profiles 2018 2018 [233]. Available from: <https://apps.who.int/iris/handle/10665/274512>
8. Borja-Aburto VH, González-Anaya JA, Dávila-Torres J, Rascón-Pacheco RA, González-León M. Evaluation of the impact on non-communicable chronic diseases of a major integrated primary health care program in Mexico. *Family practice*. 2016;33(3):219-25.

9. Macinko J, Starfield B, Shi L. The contribution of primary care systems to health outcomes within Organization for Economic Cooperation and Development (OECD) countries, 1970–1998. *Health services research*. 2003;38(3):831-65.
10. Fausto MCR, Bousquat A, Lima JG, Giovanella L, de Almeida PF, de Mendonça MHM, et al. Evaluation of Brazilian primary health care from the perspective of the users: accessible, continuous, and acceptable? *The Journal of Ambulatory Care Management*. 2017;40(2 Suppl):S60.
11. Tangcharoensathien V, Witthayapipopsakul W, Panichkriangkrai W, Patcharanarumol W, Mills A. Health systems development in Thailand: a solid platform for successful implementation of universal health coverage. *The Lancet*. 2018;391(10126):1205-23.
12. Health Service Support Department Ministry of Public Health. Primary Health Care Inspection Guideline B.E.2563. Nonthaburi: Ministry of Public Health; 2020.
13. Provincial Affairs Bureau. Local government information Bangkok: Provincial Affairs Bureau; 2017 [updated 21 Apr, 2017; cited 2020 4 June]. Available from: <https://multi.dopa.go.th/pab/news/cate9/view46#!>
14. Sadtrakulwatana V. The Development of A Chronic Diseases Clinic Model (Diabetes, Hypertension) in Primary Health Care Units, Mueang District, Sing Buri Province. *Journal of Preventive Medicine Association of Thailand*. 2018;8(1):24-36.
15. Division of Non Communicable Diseases Mistry of Public Health. Non Communicable Diseases cases and mortality rate in B.E. 2559-2561 Nonthaburi: Bureau of Non Communicable Disease [NCD] 2019 [updated 20 Oct, 2019; cited 2020 4 June]. Available from: <http://www.thaincd.com/2016/mission/documents-detail.php?id=13653&tid=32&gid=1-020>.
16. World Health Organization. Core list of medicines required for implementing essential NCD interventions in primary care. 2010. In: Package of essential noncommunicable (PEN) disease interventions for primary health care in low-resource settings [Internet]. Geneva, Switzerland: World Health Organization; [27]. Available from: https://www.who.int/ncds/management/Required_medicines.pdf?ua=1.
17. NHSO ARCHIVES. History 5 : Local Health Promotion Fund 2018 [updated 21 November, 2018; cited 2020 4 June]. Available from: <https://www.nhso.go.th/ARCHIVES/history/detail5.aspx>.
18. Udomsak Saengow, Tharin Phenwan, Tanai Ketwongkot, Apinya Laohaprapanon, Ruttiya Asksonthong. Assessment of community health fund, Public Health Region 11, to support the next phase of policy making. Center of Excellence in Health System and Medical Research (CE-HSMR) Walailak University; 2018.
19. National Health Security Office. National Health Security Office Annual Report 2019. Bangkok, Thailand: National Health Security Office 2020. Contract No.: 4 June.
20. Tangcharoensathien V, Chandrasiri O, Kunpeuk W, Markchang K, Pangkariya N. NCD prevention and control: sustainable and comprehensive solutions; a response to recent commentaries. *International Journal of Health Policy and Management*. 2020;9(8):360-2.

21. Rajata Rajatanavin, Somsak Chunharas, Winai Sawasdivorn, Pongpisut Jongudomsuk, Jadej Thammatacharee. Resilient health system and UHC. 1 ed. Bangkok, Thailand: Ministry of Public Health; 2019. 242 p.
22. Thailand Data [Internet]. The World Bank. 2020 [cited May, 2020]. Available from: <https://data.worldbank.org/country/thailand>.
23. Putthasri W, Suphanchaimat R, Topothai T, Wisaijohn T, Thammatacharee N, Tangcharoensathien V. Thailand special recruitment track of medical students: a series of annual cross-sectional surveys on the new graduates between 2010 and 2012. Human resources for health. 2013;11(1):47.
24. Patcharanarumol W, Tangcharoensathien V, Limwattananon S, Panichkriangkrai W, Pachanee K, Pongkantha W, et al. Why and how did Thailand achieve good health at low cost. Good health at low cost'25 years on What makes a successful health system. 2011:193-223.
25. Yanarueng S, Yadhapiyakul A, Chalchuy P. Problem of job's progress and professional practice of dental nurses. Thai Dental Nurse Journal. 2018;29(1 January-June 2018):49-56.
26. Ministry of Public Health. Standardized Training Curriculums for Village Health Volunteers (VHVs) Health manager by age group B.E. 2557. Thai Dental Nurse Journal. Nonthaburi: Ministry of Public Health; 2014.
27. Tiensin T, Chaitaweesub P, Songserm T, Chaisingh A, Hoonsuwan W, Buranathai C, et al. Highly pathogenic avian influenza H5N1, Thailand, 2004. Emerg Infect Dis. 2005;11(11):1664-72.
28. World Health Organization, United Nations Children's Fund. A vision for primary health care in the 21st century: towards universal health coverage and the Sustainable Development Goals. Geneva: World Health Organization; 2018 2018. Contract No.: WHO/HIS/SDS/2018.15.
29. Strategy and Planning Division, Office of the Permanent Secretary, Ministry of Public Health. KPI Template 2020. 2019.
30. World Health Organization. 'Best buys' and other recommended interventions for the prevention and control of noncommunicable diseases. 2017 [cited June 2020]. Geneva, Switzerland: Department for Management of NCDs, [cited June 2020]. Available from: <https://apps.who.int/iris/bitstream/handle/10665/259232/WHO-NMH-NVI-17.9-eng.pdf?sequence=1&isAllowed=y>.
31. Sukajittra Wanapirak. The Participatory Healthy Policy Formulation: No carbonated soft drinks, candies and unhealthy snacks in Primary School, Phrae Province. Thai Dental Nurse Journal. 2008;13(2):20-31.
32. Office of the National Economic and Social Development Council. Table of Gross Regional and Provincial Product (2004-2017) Bangkok, Thailand: Office of the National Economic and Social Development Council; 2019 [cited 2019 11 June]. Available from: https://www.nesdc.go.th/main.php?filename=gross_regional.

Figures

Figure 1

Three major functions of PHC centre, percentage of workload

Figure 2

Services profiles provided by PHC centre, % of PHC centres. Note: NCD- Non-communicable disease

Figure 3

Thematic area on NCD responses by PHC: enabling factors and challenges Note: Abbreviations: NCD- Non-communicable diseases; PHC- Primary Healthcare Centre HCW- Healthcare Worker; VHV- Village Health Volunteer; UCS- Universal Coverage Scheme; KPI- Key Performance Index Dotted call outs refer to enabling factors and broken line call outs refer to challenges

Figure 4

District health system: a key PHC platform for integrating NCD prevention and control in Thailand
 Abbreviations: PHC- Primary Healthcare Centre; MoPH- Ministry of Public Health; NHSO- National Health Security Office

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Supplement1.docx](#)