



# Health Service Readiness, Availability, and Utilization of Primary Health Care Facilities for Non-Communicable Diseases in Shan State, Myanmar

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## Abstract

**Background:** Non-communicable diseases (NCDs) are increasing in Myanmar. There have been limited studies to assess the health service system for NCDs patients at the primary health care (PHC) level. We aimed to assess and compare the health service readiness, availability, and utilization of PHC facilities for NCDs in districts in Myanmar.

**Methods:** This cross-sectional study collected data by questionnaires from 242 health care providers working at PHC facilities in three districts in Shan State, Myanmar from January 2020 to January 2021. Differences were calculated with the ANOVA test for NCD capacity readiness and NCD service availability and the Kruskal-Wallis test for NCD service utilization.

**Results:** PHC facilities had a mean score of greater than 70% for NCD capacity readiness of health workforces, health information systems, and essential medicines and equipment domains, but there were large gaps for improvement in financing and governance of health. Almost all PHC facilities had NCD services available, and the differences were not significant among the three districts. However, the mean scores of NCD services availability for chronic respiratory diseases and cancers were lower in all districts. Regarding NCD service utilization, the screening and new patient rates had significant differences among districts ( $P$ -value  $< 0.05$ ).

**Conclusion:** We revealed the situation and gaps in managing NCDs in Myanmar's PHC facilities. These findings can inform policymakers at the state and district levels to implement programs for improving health services for NCDs, particularly in rural areas.

**Keywords:** Non-communicable diseases; Primary health care; Readiness; Availability; Utilization

## Introduction

Non-communicable diseases (NCDs) are the top killers in the South-East Asia region. From 2010 to 2020, NCD mortality are expected to increase by 15%, resulting in over 10 million deaths (1). In Myanmar, NCDs are responsible for approximately 68% of deaths each year (2). Communica-

ble diseases (CDs) were the leading causes of death in Myanmar, but NCDs were now increasing in severity from 46.9% in 2000 to 68% in 2018. Consequently, Myanmar must deal with the epidemiological transition from CDs to NCDs (2,3).



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In 2017, the Ministry of Health and Sports (MOHS) announced the national strategic plan for prevention and control of NCDs (2017-2021) in Myanmar. It developed the Package of Essential Non-communicable diseases (PEN) protocol based on the WHO, PEN package for treatment and referral of NCDs patients (4,5). The expected outcomes of the WHO PEN interventions are to increase the readiness and availability of health service systems, thus increasing the utilization of PHC facilities for the prevention and control of NCDs (4). Myanmar implemented the PEN protocol for the whole country (330 townships) at the end of 2019. The PEN project's activities include enhancing the health system with an emphasis on primary health care (PHC) (5).

PHC facility is the most available healthcare service to cater to NCDs patients' long-term needs in Myanmar (6). In Myanmar, public health services are delivered to communities by basic health staff (BHS) from PHC facilities. PHC in Myanmar was typically orientated toward CDs, and BHS did not usually have training in preventing and controlling NCDs (7). There are significant gaps in policies to ensure the readiness and availability of essential medicines and equipment, strengthen BHS capacity specifically required for NCDs care, and create proper referral and health information systems (7,8). Utilization of services for NCD care at PHC facilities has not increased due to the lack of infrastructure and drugs for managing NCD patients at PHC facilities (9).

The WHO PEN assessment's study in 2018 showed that 64% of the sanctioned posts were filled and lacked adequate human resource in facilities; 90% of those appointed were trained in PEN. Fundamental essential medicines for PEN were available in half of the facilities and were found to be wanting with frequent stock-outs (10). Although Shan State has already implemented the WHO PEN guidelines, no previous study has assessed the program's effectiveness in this region. To the best of our knowledge, this study is the first to assess the health service system for NCDs in Shan State applying the WHO PEN's assessment tools.

We aimed to assess the readiness, availability, and utilization of PHC facilities for NCDs in Shan State, Myanmar, and compare the results among districts.

## **Materials and Methods**

### *Study design and sample selection*

This cross-sectional study collected data from health care providers working at PHC facilities in three districts in Shan State, Myanmar, from January 2020 to January 2021. The study addressed 1,129 PHC facilities in Shan State, Myanmar. The sample size of 182 was calculated using the formula of finite population proportion (11). Based on a previous study (10), the proportion of the health workforce available for NCDs was 64%. The margin of error (10% of the proportion) was set to 0.064, and the alpha was set to 0.05. After including a non-response rate of 30%, 242 PHC facilities were contacted for participation in this study.

This study used the multi-stage sampling method. Firstly, southern Shan State was purposively selected because it is the center of medicine in the eastern part of the country (12). Secondly, three districts of southern Shan State (Taunggyi, Loilem, and Linkhae) were selected with stratified random sampling according to their geographical settings (urban, sub-urban, and rural). Thirdly, PHC facilities from those three districts were selected through stratified random sampling, and the total number of PHC facilities was 476. Finally, 242 PHC facilities were selected with simple random sampling according to proportion allocation. The respondents from each PHC facility were health care providers who were at least 20 years of age and responsible for NCD management.

### *Assessment instruments and criteria*

We used an English-language questionnaire to collect its data. The questionnaire was developed based on the WHO PEN's assessment tools (13) and the WHO's framework for health systems (14). The questionnaire consisted of three main

components: NCD capacity readiness (5 domains and 35 questions), NCD service availability (14 questions), and NCD service utilization (6 questions). The answers were given as dichotomous values (“yes” or “no”).

NCD capacity readiness was measured as the five domains related to 1) health workforces, 2) health information systems, 3) medicines and equipment (cross-referenced between the national essential drugs list for NCD management in Myanmar (15) and the MOHS PEN guidelines (5)), 4) financing, and 5) governance of health. NCD service availability was measured as the availability of health services related to the prevention, screening, and treatment of NCDs (5).

Each domain of NCD capacity readiness and NCD service availability was calculated as the mean score of items expressed as a percentage. For example, there were six items in the health information systems domain, and if a facility had five items, the readiness of health information systems for that facility was calculated as  $5 \times 100 / 6 = 83.3\%$ . The NCD capacity readiness and NCD service availability were then computed as the average of the domain. To compare and display a level of readiness and availability among districts, a cutoff point of 70% was determined as other studies (16, 17). PHC facilities with a mean score greater than 70% demonstrate the readiness and availability to manage NCDs.

NCD utilization was measured by calculating three rates: screening, referral, and new patient rates per 1000 population (5). Screening rate was calculated by the formula; the number of screenings was divided by target population for screening. Referral rate was calculated by the formula; the number of referrals was divided by the number of visits. New patient rate was calculated by the formula; the number of new patients was divided by the total population.

To determine the content validity, the questionnaire was submitted to three experts. After experts' feedback, the validity of the instrument's content was assessed with item-objective congruence values (18) and got the results values ranged from 0.67 to 1.00. After experts' agreement, a pilot study for reliability test was conducted with

40 samples in a different area with the same characteristics as those used in the present study. The reliability was determined using Kuder–Richardson Formula 21 (19) and received the results values ranged from 0.60 to 0.75.

### ***Data collection***

Data were collected with an interviewer-administered questionnaire that was asked to health care providers responsible for NCD management in 242 PHC facilities in three districts. Data collection training was given to ten research assistants from three districts. These assistants were supervised as they completed the questionnaires and checked for survey accuracy. After three weeks, the questionnaires were returned, with a response rate of 100%.

### ***Ethics approval***

This study obtained ethics approval from the institutional review board (IRB) of Naresuan University (NU), Thailand (0603.01.13(1)/NU-IRB 3820). The participants from each PHC facility were provided with information about the study and gave their written consent.

### ***Data analysis***

The data were analyzed with SPSS software. NCD capacity readiness and NCD service availability were calculated by the percentages. The ANOVA test was used to compare differences in NCD capacity readiness and NCD service availability by districts. Due to the non-normal distribution of the data, the Kruskal-Wallis test followed by pairwise Mann-Whitney test was employed to compare NCD service utilization among the three districts.

## **Results**

We assessed a total of 242 PHC facilities in three districts. Details are written in Table 1. Regarding NCD capacity readiness, the health facilities in Taunggyi were more appointed in terms of their health workforces and the NCD management training for those appointed health work-

forces. The difference among the three districts was not significant ( $P = 0.282$ ). Taunggyi also had the best results for health information systems, medicines and equipment, and the differences were not significant among the three dis-

tricts. Financial readiness was low in all districts. Linkhae showed the best results for governance of health, and the difference was not significant ( $P = 0.759$ ) among the three districts (Table 1).

**Table 1:** Mean score comparison of NCD capacity readiness between districts

<i>Variables</i>	<i>Total (n = 242) (%)</i>	<i>Taunggyi (n = 135) (%)</i>	<i>Loilem (n = 62) (%)</i>	<i>Linkhae (n = 45) (%)</i>	<i>P-value<sup>a</sup></i>
Health workforces					
- Appointed	77.70	89.60	61.30	64.40	
- NCD management training for the appointed health workforces	70.20	95.00	78.90	86.20	
Mean domain score ( $\pm$ SD)	73.95 5.30	92.30 3.82	70.10 12.45	75.30 15.41	0.282
Health information systems					
- Patient record-form	100.00	100.00	100.00	100.00	
- Patient register	99.60	100.00	98.40	100.00	
- Stocks for medicines and equipment	99.20	100.00	96.80	100.00	
- Referral form	97.50	99.30	98.40	91.10	
- Report to higher level	99.60	100.00	98.40	100.00	
- Feedback from township/state health office	91.70	100.00	83.90	77.80	
Mean domain score ( $\pm$ SD)	97.93 3.18	99.88 0.29	95.98 6.01	94.82 9.06	0.367
Medicines					
- Gliclazide	99.20	100.00	98.40	97.80	
- Metformin	99.20	99.30	100.00	97.80	
- Amlodipine	99.60	99.30	100.00	100.00	
- Atenolol	83.90	82.20	83.90	88.90	
- Enalapril	92.60	97.80	82.30	91.10	
- Aspirin	90.90	99.30	77.40	84.40	
- Atorvastatin	86.80	97.00	71.00	77.80	
Mean domain score ( $\pm$ SD)	93.17 6.40	96.41 6.35	87.57 11.87	91.11 8.12	0.214
Equipment					
- Blood pressure measuring devices	100.00	100.00	100.00	100.00	
- Weighing machines	99.60	100.00	98.40	100.00	
- Glucometer	99.60	100.00	98.40	100.00	
- Glucometer test strips	93.40	94.10	96.80	86.70	
- Measuring tape	98.30	99.30	95.20	100.00	
- Stethoscope	98.80	99.30	96.80	100.00	
- Lancet	98.80	97.80	100.00	100.00	
- WHO CVD risk score chart	94.60	97.80	87.10	95.60	
- Health education material	99.20	99.30	98.40	100.00	
- PEN Manual	96.70	100.00	87.10	100.00	
Mean domain score ( $\pm$ SD)	97.90 2.27	98.76 1.84	95.82 4.82	98.23 4.28	0.213

Financing					
- Free of charge services	93.40	94.80	90.30	93.30	
- Donations from community	15.40	3.00	6.50	11.10	
- Community health fund	5.80	6.70	3.20	6.70	
Mean domain score	38.20	34.83	33.33	37.03	0.996
(±SD)	48.04	51.97	49.36	48.78	
Governance of health					
- Community participation	83.50	86.70	71.00	91.10	
- Supports given by community	93.40	98.50	77.40	100.00	
- Health committee with community	36.40	39.30	37.10	26.70	
- Social organizations	13.60	12.60	16.10	13.30	
- Village health volunteers	63.20	71.10	37.10	75.60	
- Vehicle for patient transfer	21.90	19.30	22.60	28.90	
- Peer health education	20.70	20.70	16.10	26.70	
Mean domain score	47.53	49.74	39.63	51.76	0.759
(±SD)	32.39	35.26	25.23	35.83	

a = ANOVA test; \*significant value <0.05

Regarding NCD service availability, the health facilities in Taunggyi had better NCD health service availability than those in other districts. The

differences were not significant ( $P = 0.789$ ) among the three districts (Table 2).

**Table 2:** Mean score comparison of NCD service availability between districts

<i>Variables</i>	<i>Total</i> ( <i>n = 242</i> ) (%)	<i>Taunggyi</i> ( <i>n = 135</i> ) (%)	<i>Loilem</i> ( <i>n = 62</i> ) (%)	<i>Linkhae</i> ( <i>n = 45</i> ) (%)	<i>P-value</i> <sup>a</sup>
- Measurement of Blood Pressure	100.00	100.00	100.00	100.00	
- Blood Glucose Test	100.00	100.00	100.00	100.00	
- Measurement of Weight	100.00	100.00	100.00	100.00	
- Measurement of Height	98.30	97.00	100.00	100.00	
- Calculation of BMI	100.00	100.00	100.00	100.00	
- Assessment of 10 years of CVD risk	90.90	88.10	90.30	100.00	
- Health Education	100.00	100.00	100.00	100.00	
- Diagnosis and management for diabetes	99.60	99.30	100.00	100.00	
- Diagnosis and management for CVDs	99.20	99.30	98.40	100.00	
- Diagnosis and management for chronic respiratory diseases	81.80	85.90	83.90	66.70	
- Assessment and referral of suspected cancers	74.80	81.50	58.10	77.80	
- Referral Function	98.80	100.00	96.80	97.80	
- Outpatient beds for severe patient	85.10	86.70	88.70	75.60	
- System for loss of follow up patients	94.60	97.80	98.40	80.00	
Mean domain score	94.51	95.40	93.90	92.71	0.789
(±SD)	8.24	6.67	11.54	11.95	

a = ANOVA test; \*significant value <0.05

Regarding NCD service utilization, the differences among the medians of screening rate and

new patient rate were statistically significant ( $P$ -value = 0.04) (Table 3).

**Table 3:** Comparison of the median NCD service utilization rates between districts

<i>Utilization rate (per 1000 population)</i>	<i>Taunggyi (n = 135) Median (IQR)</i>	<i>Loilem (n = 62) Median (IQR)</i>	<i>Linkhae (n = 45) Median (IQR)</i>	<i>P-value<sup>k</sup></i>
- Screening rate	187.1 (157.18–196.95)	192.39 (167.49–312.03)	178.14 (120.71–205.81)	0.04*
- Referral rate	12.82 (0–45.45)	0 (0–29.41)	0 (0–30.02)	0.05
- New patient rate	4.58 (3.23–6.75)	4.14 (3–10.11)	6.23 (4.35–9.71)	0.04*

k = Kruskal-Wallis test; IQR = interquartile range; \*significant values < 0.05

## Discussion

The PHC facilities are vital for dealing with the burden of NCDs (20). Many countries have attempted to develop PHC to manage NCDs using various strategies and policies (21, 23). In this study, the WHO PEN guideline (13) and WHO's framework for health systems (14) were used for the first time in Myanmar to assess NCD capacity readiness, NCD service availability, and NCD service utilization at PHC facilities. The findings revealed that the total mean domain score of the health workforce, health information systems, and medicines and equipment met the 70% cut-off (16,17), demonstrating that they are well prepared to manage NCDs. This might be the result of the implementation of the national strategic plan for prevention and control of NCDs (2017-2021) in Myanmar and the PEN guideline (5). However, some domains of NCD capacity readiness and NCD services need to be developed.

The results showed that the total mean domain score of health workforces was high (73.95%). 77.70% of health workforce was appointed and 70.20% of those appointed had been trained for NCD management. This study's result was consistent with another study in Myanmar (10). The study found that 64.0% of the human resources were appointed, and 90.0% of those appointed had been trained (10). Nevertheless, the mean domain score of health workforces in Taunggyi (urban) (89.60%) had more appointed than those in Loilem (sub-urban) and Linkhae (rural)

(61.30%, 64.40%, respectively). Similarly, a study from Ghana reported that health workers in urban facilities had more readiness than that in rural facilities (24).

This study found that 93.40% of PHC facilities did not charge for their services. This finding was in line with the health policy of Myanmar, which supports universal access to generic medicines on the national essential list with the government's budget (25). Nonetheless, the total mean domain score of financing was 38.25%, and it was much lower than the cutoff point of 70%. This is mainly caused by the community giving few donations, and Myanmar does not have a community health fund policy. These two facts are essential for health expenditures because they can raise additional funds for essential public health services, thus increasing access to care while lowering out-of-pocket costs (26). In other countries, community health fund policies aim to reduce the determinants of NCDs at the community level by addressing critical principles, including the community empowerment and multi-sectoral actions (27,28). This implies that an effective community health fund policy and more community contributions are needed to improve financial readiness in Myanmar.

The total mean domain score for the governance of health was low (47.53%), owing to low participation through health committees, insufficient cooperation with social organizations in the community, less involvement of village health volunteers and peer support in managing NCDs,

and lacking community support for ambulance service. The WHO proposes that governance of health based on community participation is a communal deliberative process that contributes to community empowerment and healthcare governance to ensure the right to healthcare access for everyone (29).

NCD service availability is the pathway from the inputs of NCD capacity readiness to NCD service utilization (14). Almost every PHC facility in our study had a high total mean domain score for the availability of NCD services, but the mean scores for chronic respiratory diseases and cancer care were relatively low in all districts. One reason could be that the early phase of the Myanmar MOHS' implementation of the PEN guideline placed a greater emphasis on the management of cardiovascular diseases (CVDs) and diabetes mellitus (5). Consequently, Myanmar's MOHS attempted to improve these challenges by modifying the earlier PEN guideline in 2020, placing a greater emphasis on the management of chronic respiratory diseases and cancer, and providing refresher training to BHS (30).

There were no statistically significant differences between the three districts regarding NCD capacity readiness and NCD service availability. However, Taunggyi typically had a higher mean score in almost domains. Possible reasons for this may be caused by that Taunggyi is more urban than other two districts. This finding is consistent with another study conducted in Zambia (16). We recommend the Myanmar' MOHS to focus on improving the readiness and availability of services for NCD patients in sub-urban and rural areas.

According to the WHO's framework, NCD service utilization is the outcome of NCD capacity readiness and NCD service availability (14). The study found that the screening and new patient rates among three districts were significantly different for geographical reasons. This was consistent with a study from Vietnam that compared three different geographical regions (31). In this study, Linkhae (rural) had the lowest screening rate but the highest new patient rate. The lowest screening rate in this rural district could be direct-

ly associated with its lower score of NCD capacity readiness and NCD service availability. The highest new patient rate in this rural district might be related to NCD risk factors such as lifestyle and health behaviors of people in rural areas. These findings agree with another study conducted in Yangon Region, Myanmar (32). The results indicated that rural areas had a higher prevalence of behavioral risk factors than urban areas for all included factors, such as alcohol drinking and low fruit & vegetables consumption (32). We suggest that preventive measures, such as NCD screening services, are required to prevent the behavioral risk factors of NCDs among people, especially in rural areas.

### *Limitations of the study*

Because this cross-sectional survey study used a questionnaire for data collection and analysis, it cannot determine the causal factors across the building blocks of service systems for the prevention and control of NCDs. Besides, this study was conducted in public healthcare facilities in one state in Myanmar. Although we attempted to select the districts that would best represent Myanmar as a whole, the results might differ in other areas.

### **Conclusion**

PHC facilities had a mean score of greater than 70% for NCD capacity readiness of health workforces, health information systems, and essential medicines and equipment domains, but there were significant gaps for improvement in financing and governance of health domains. Overall, NCD services availability was sufficient to provide NCD services except for the availability of diagnosis and management for chronic respiratory diseases and assessment and referral of suspected cancer. There were no statistically significant differences in NCD capacity readiness and NCD service availability among the three districts. However, this study discovered that PHC facilities in Taunggyi (urban) had a higher mean score of NCD capacity readiness and NCD ser-

vice availability than those in Loilem (sub-urban) and Linkhae (rural). Lower mean scores on these two dimensions seem to be associated with lower NCD services utilization in rural areas. Therefore, the policymakers should emphasize developing the readiness and availability of NCDs services, especially in rural areas.

## Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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## Conflicts of interest

The authors declare that no conflict of interest.

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