

Healthcare Decentralization Impact on NCD Management: Four-Year Analysis of Thai Primary Care Centers (2021-2024)

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Abstract

Background: Thailand's public health decentralisation aimed to improve healthcare management and community participation at the local level. This study investigated the management of non-communicable diseases (NCDs), specifically diabetes and hypertension, in Tham Phannara District from 2021 to 2024. **Methods:** This descriptive cross-sectional study collected data from a community hospital, encompassing three provider types: the main hospital (PCU), Ministry of Public Health Primary Care Units, and Local Administrative Organisation Primary Care Units (LAO PHC). Data analysis focused on NCD types, medical check-ups, and key laboratory tests including Fasting Blood Sugar (FBS), Glycated Haemoglobin (HbA1c), LDL cholesterol, total cholesterol, and estimated Glomerular Filtration Rate (eGFR). **Results:** Medical check-ups significantly increased from 254 in 2021 to 1,795 in 2024. LAO PHCs emerged as pivotal providers, handling 1,273 check-ups in 2024. Most patients were female (67.60%), with an average age of 64.43 years. Hypertension was considerably more prevalent (69.70%) than diabetes (30.30%). While NCD management showed improvements in diabetes and lipid control, kidney function (eGFR < 90 mL/min/1.73m²) concerns rose significantly to 696 cases in 2024. Subdistrict Health Promoting Hospitals (SHPHs) generally demonstrated better HbA1c and LDL control compared to LAO PHCs, which exhibited more outliers and variability, indicating some inconsistent management in decentralised units. **Conclusion:** The findings confirm that decentralisation has substantially improved healthcare access and NCD management. The success of LAO PHCs highlights the potential of local-level care. Future efforts must focus on strengthening local health systems, standardising care protocols, and fostering collaboration to ensure equitable and high-quality services.

Keywords: healthcare decentralisation, non-communicable diseases, LAO primary care units, healthcare access, Thailand

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Introduction

Thailand's public health system is undergoing a significant shift, moving from centralised control to local management. The primary aim of this decentralisation is to enhance the efficiency of healthcare management at the local level by improving resource allocation and promoting community participation (Rao et al., 2023; Zon, 2021; Abimbola et al., 2019). However, the management of non-communicable diseases (NCDs), such as diabetes and hypertension, within the Tham Phannara Hospital network has faced several challenges (Belardi et al., 2024). These include a shortage of healthcare personnel and outdated health data systems, which can negatively impact the effectiveness of service planning and patient follow-up care (Klingensmith et al., 2010).

The Thai government is actively promoting the transfer of Health Promoting Hospitals (HPHs) from the Ministry of Public Health (MOPH) to be administered by Local Administrative Organisations (LAOs). While this move aims to encourage community participation, it has inadvertently led to staff shortages at HPHs. This shortage adversely affects the planning, delivery, healthcare utilisation, screening, and continuity of care for NCD patients. Consequently, patients may miss medical appointments, failing to receive proper healthcare packages like blood sugar tests and other laboratory assessments (Niyonsenga et al., 2021) (Haque et al., 2020). This situation reflects on the overall quality of healthcare services compared to the period before these facilities were transferred to LAO management (Noory et al., 2021; Mamo et al., 2024). This study examines non-communicable disease healthcare delivery in Tham Phannara district between 2021 and 2024, by analysing services from three different types of healthcare providers.

Method

This study employed a descriptive cross-sectional design to investigate the management of non-communicable diseases (NCDs) in Tham Phannara District, Nakhon Si Thammarat Province, Thailand. The research covered a four-year period, from 2021 to 2024. The main goal was to understand patient characteristics, how healthcare services were used, and the trends in annual health check-ups for individuals diagnosed with diabetes (ICD-10: E10–E14) and hypertension (ICD-10: I10–I15).

The study population included 2,471 registered patients who received NCD-related services within the Tham Phannara network during this timeframe. Data was gathered from three distinct types of healthcare providers, reflecting the decentralised public health system in Thailand. Tham Phannara Hospital (referred to as PCU): The main community hospital. Subdistrict Health Promoting Hospitals (SHPHs) under the Ministry of Public Health (MOHP PHC): These were five SHPHs that remained under central government administration. Subdistrict Health Promoting Hospitals transferred to Local Administrative Organisations (LAO PHC): These were four SHPHs that moved to local government management in 2022. Ethical approval for the study was obtained from the Ethics Committee for Research Involving Humans at Thaksin University, Thailand (COA No.TSU 2024_186 REC No.0374).

Patient service data was extracted from Tham Phannara Hospital's Hosxp system. This involved identifying patients with diagnoses of diabetes, hypertension, or both. The research team prioritised variables that clearly showed how services were delivered and used by each patient, ensuring accuracy and completeness of the records. Data cleaning began with records from 2024 and was then traced backward to include information from 2023, 2022, and 2021

(Table 1). This allowed patient data to be categorised into the three aforementioned service groups (PCU, MOHP PHC, and LAO PHC).

Table 1

Diabetes and Hypertension Cases Treated at Tham Phannara Hospital (2021-2024)

Year	Number	Hospital DM/HT	SHPH DM/HT	LAO_SHPH DM/HT
2024	1,795	102/261	53/106	389/884
2023	1,389	75/203	39/86	306/680
2022	280	56/179	12/33	_*
2020	245	52/167	9/26	_*

Note. * = Data were collected from SHPHs during the period before the transfer to LAO

The data collected included demographic information, the specific types of NCDs (diabetes or hypertension), details of medical check-ups, and results from key laboratory tests. These laboratory tests included Fasting Blood Sugar (FBS), Glycated Haemoglobin (HbA1c), Low-Density Lipoprotein (LDL), total cholesterol, and estimated Glomerular Filtration Rate (eGFR). For analysis, descriptive statistics were used to summarise general patient information, service pathways, and costs. This involved calculating frequency distributions, percentages, means, and standard deviations. Microsoft Office Excel was used for initial data entry and organisation, while SPSS version 22 (Xiao et al., 2024) was employed for the main data analysis.

Results

The results of this study provide a comprehensive overview of non-communicable disease (NCD) management within the Tham Phannara district healthcare network from 2021 to 2024. The findings highlight significant trends in patient numbers, healthcare service utilisation, patient demographics, and the effectiveness of care delivery across the three main types of healthcare providers: Tham Phannara Hospital (PCU), Subdistrict Health Promoting Hospitals (SHPHs) under the Ministry of Public Health (MOHP PHC), and Subdistrict Health Promoting Hospitals transferred to Local Administrative Organisations (LAO PHC).

Overall Trends in Healthcare Utilisation and Patient Numbers

A substantial increase in the number of NCD patients and medical check-ups was observed throughout the study period. The total number of patients receiving care for diabetes and hypertension across all providers rose sharply from 245 in 2020 to 1,795 in 2024. This represents a nearly seven-fold increase in patient volume over these four years, indicating improved accessibility to healthcare services and greater public engagement in NCD management.

Looking specifically at medical check-ups, the number of cases increased from 254 in 2021 to 1,795 in 2024 (Table 2). In 2024, the distribution of these check-ups among the different provider types clearly demonstrated the emerging and crucial role of the decentralised LAO PHCs. In that year, LAO PHCs accounted for the highest volume, facilitating 1,273 check-ups. This figure far surpassed the 363 check-ups conducted by Tham Phannara Hospital (PCU) and the 159 check-ups by MOHP PHCs. This trend underscores the growing importance and capacity of local-level service providers, suggesting that decentralisation has played a significant role in expanding access to NCD care.

Table 2*General Characteristics of NCDs Patients by Type of Health Care Providers*

Characteristics	Health care providers			Total
	Hospital (n = 363)	MOHP PHC (n = 159)	LAO PHC (n = 1,273)	
Gender				
Male	123	63	396	582
Female	240	96	877	1,213
Total	363	159	1217	1,795
NCDs (Pdx)				
DM	102	53	389	544
HT	261	106	884	1,251
Check-up*()				
2021	219	35	-	254
2022	235	45	-	280
2023	278	125	986	1,389
2024	363	159	1273	1,795

Table 3*Results of the Annual NCD Health Examination Laboratory According to Standard Criteria*

Medical check-up*	Health care providers			Total
	PCU (mean)	NPCU (mean)	LAO NPCU (mean)	
1. DM				
1.1 FBS < 100				
2021	47(109.80)	8(128.51)	-	55
2022	67(128.17)	14(152.70)	-	81
2023	110(119.78)	47(126.62)	383(122.28)	540
2024	168(114.41)	71(119.51)	536(119.47)	775
1.2 HbA1C < 7.5				
2021	2(7.3)	1(0)	-	3
2022	33(8.7)	4(7.20)	-	13
2023	35(8.3)	17(8.42)	111(8.3)	163
2024	64(7.59)	28(7.48)	238(7.67)	330
2. HT				
2.1 LDL < 100				
2021	15(121.80)	54(121.46)	-	69
2022	61(107.71)	281(111.52)	-	342
2023	122(101.64)	47(108.54)	395(103.60)	564
2024	131(106.59)	47(102.35)	411(110.35)	589
2.2 Cholesterol < 200				
2021	14(208.29)	45(204.86)	-	59
2022	33(199.85)	138(199.44)	-	171
2023	39(131.54)	12(159.73)	111(137.18)	162
2024	15(134.29)	4(50.98)	45(134.16)	64
3. eGFR < 90				
2021	22(84.90)	7(88.02)	-	29
2022	66(74.74)	12(79.83)	-	78
2023	103(71.10)	43(76.50)	348(75.00)	494
2024	161(72.70)	59(75.76)	476(74.11)	696

Quality of Care: Laboratory Indicators and Control

The study also assessed the quality of NCD management by analysing annual health examination laboratory results according to standard criteria, focusing on key indicators for diabetes, lipid levels, and kidney function.

Diabetes Management (FBS & HbA1c)

For diabetes, improvements were noted in both fasting blood sugar (FBS) and glycated haemoglobin (HbA1c) control. The number of diabetic patients achieving an FBS level below 100 mg/dL steadily increased, reaching 775 cases in 2024. Similarly, the number of patients with an HbA1c level below 7.5% also rose, reaching 330 cases in 2024. Looking at specific provider performance, in 2023, PCUs demonstrated the best glycemic control with an average FBS of 101.64 mg/dL. By 2024, LAO PHCs showed optimal glycemic control, with an average FBS of 102.35 mg/dL (Table 3).

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Looking at specific provider performance. In 2023, PCUs demonstrated the best glycemic control with an average FBS of 101.64 mg/dL. By 2024, LAO PHCs showed optimal glycemic control, with an average FBS of 102.35 mg/dL. Figure 2 illustrates that while median FBS values across all patient groups remained above the target threshold of < 126 mg/dL, the overall trend indicated that most patients maintained acceptable fasting blood glucose levels relative to standard criteria, despite some outliers. However, Figure 1 revealed a disparity in HbA1c control: SHPH patients generally achieved better HbA1c control (median < 7%), whereas LAO_SHPH patients showed more than 30% outliers and greater variability in their HbA1c results. This inconsistency in diabetes management within LAO PHCs points to a need for targeted improvement strategies.

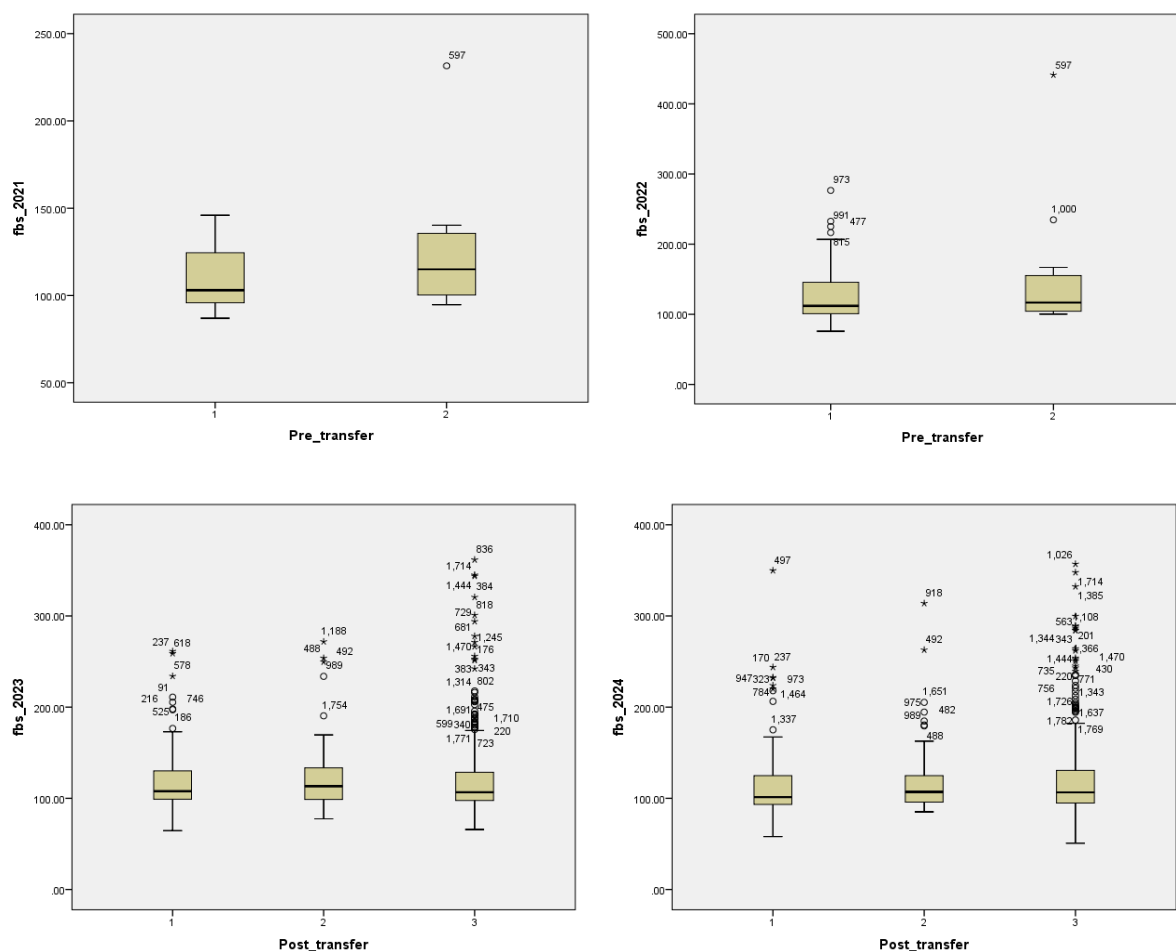
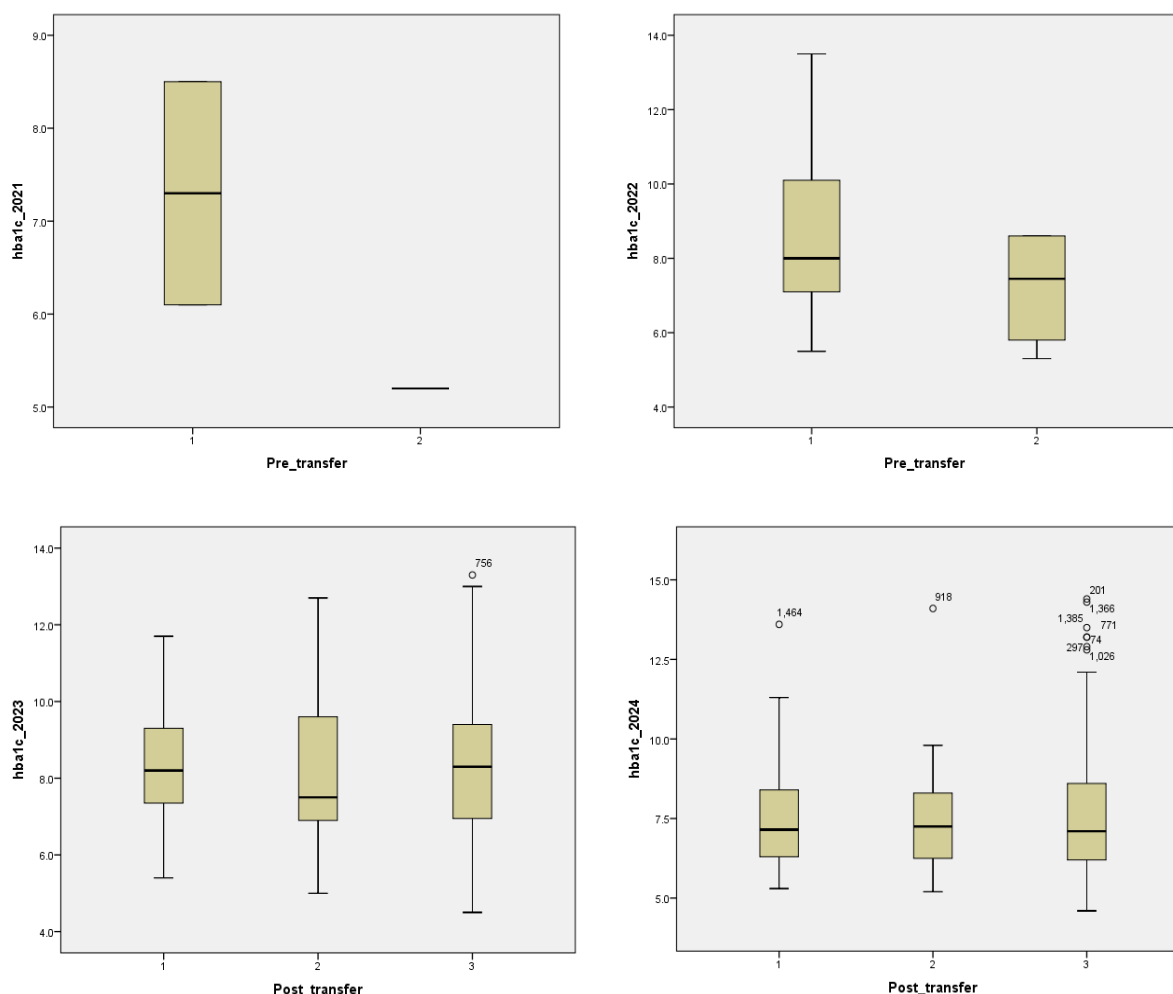
Figure 1*Comparison of FBS Test Results in Diabetic and Hypertensive Patients (2021-2024)*

Figure 2*Comparison of HbA1c Test Results in Diabetic and Hypertensive Patients (2021-2024)****Lipid Management (LDL & Cholesterol)***

Lipid control also showed mixed results. The number of patients with LDL cholesterol below 100 mg/dL improved, reaching 589 cases in 2024. In 2024, NPCU demonstrated optimal lipid management with an average LDL of 102.35 mg/dL. Figure 4 further detailed this, showing that SHPH patients achieved better lipid control, with median LDL levels meeting the target of < 100 mg/dL. In contrast, LAO_SHPH patients exhibited a higher number of LDL outliers and greater variability, suggesting inconsistent lipid management and a potentially higher risk of cardiovascular disease in this group. Regarding total cholesterol, while Figure 3 indicated that median values across all patient groups were close to or exceeded the standard threshold of < 200 mg/dL, generally remaining within an acceptable range, the overall control trend for total cholesterol declined slightly across the study period.

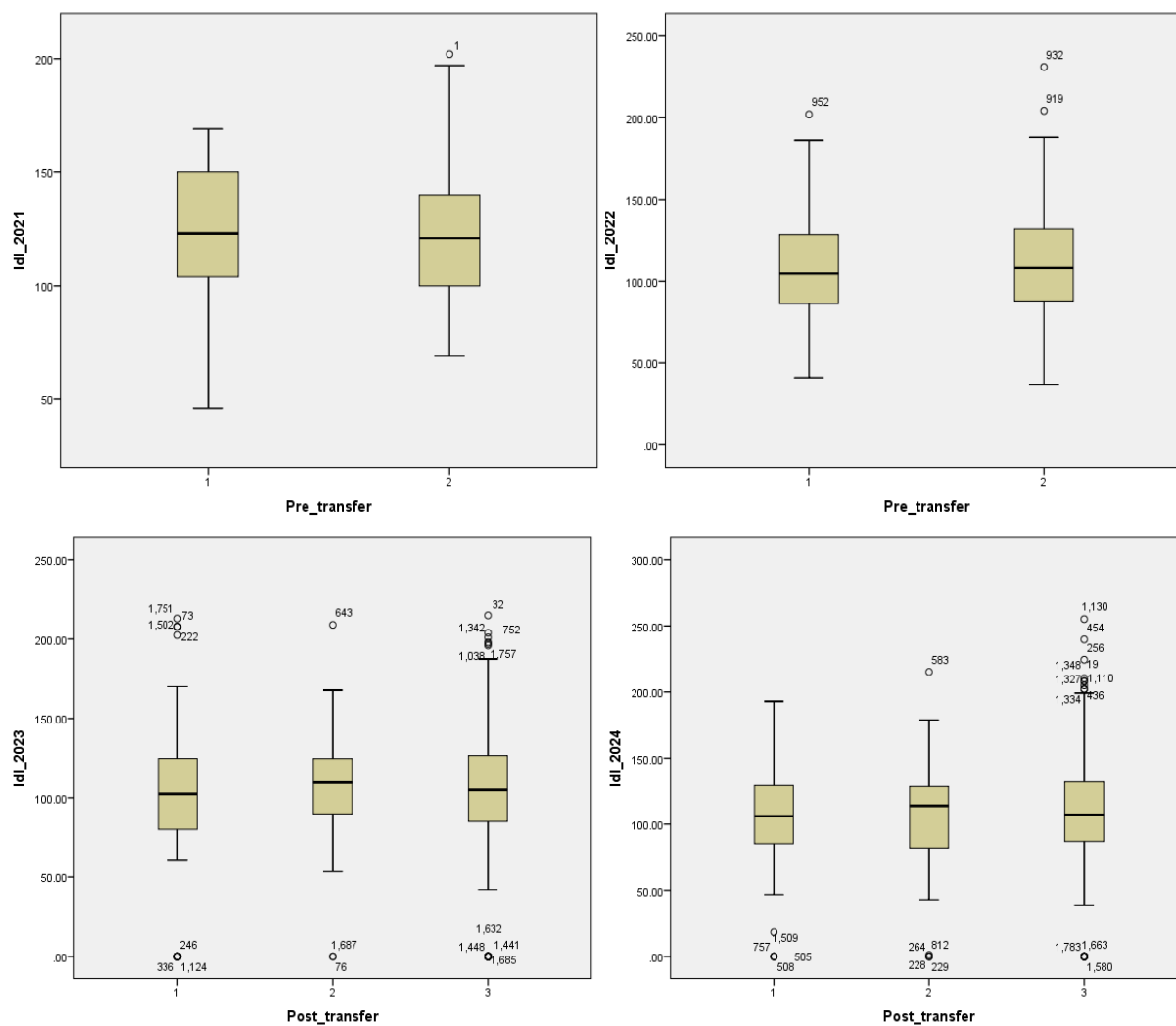
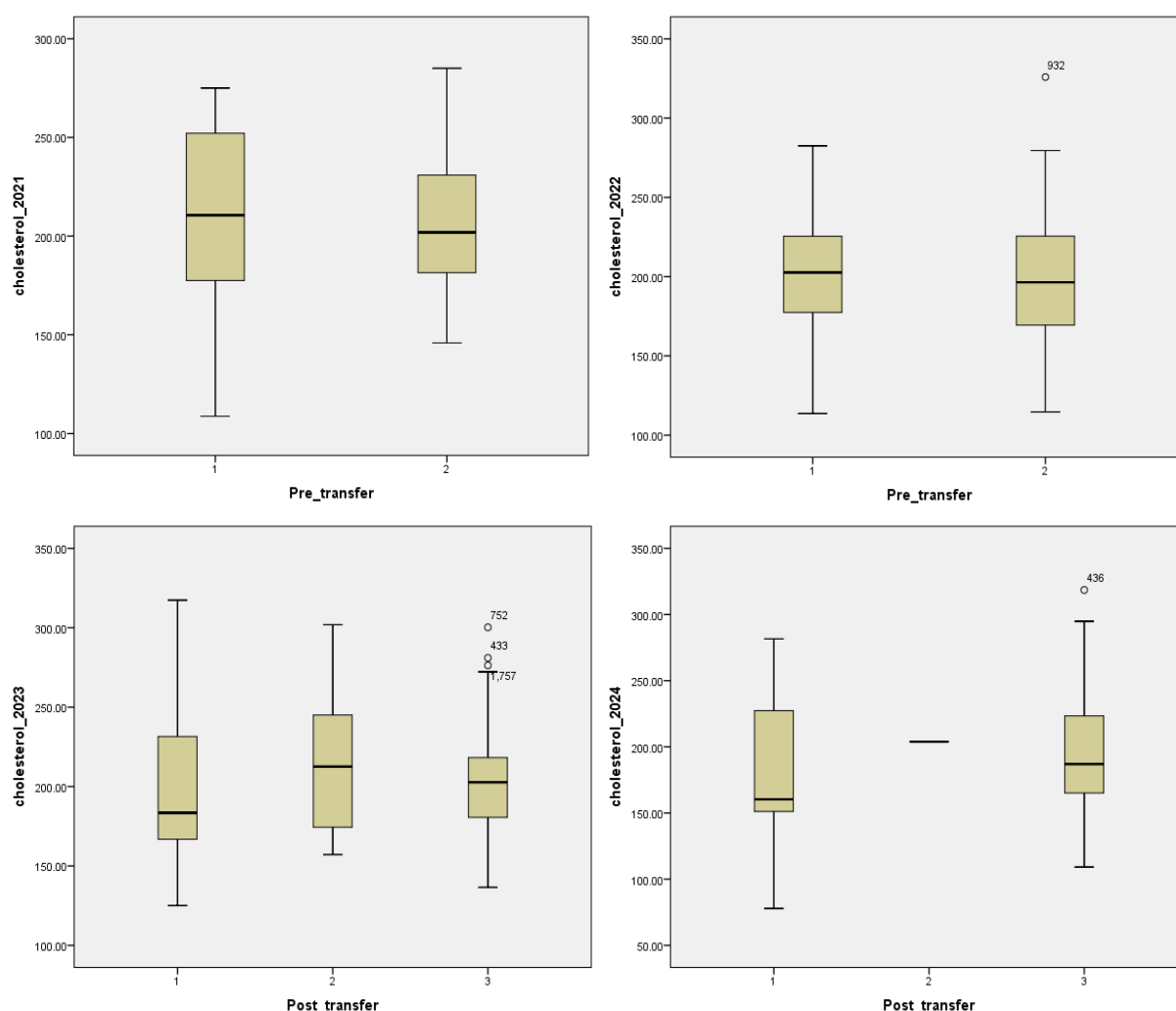
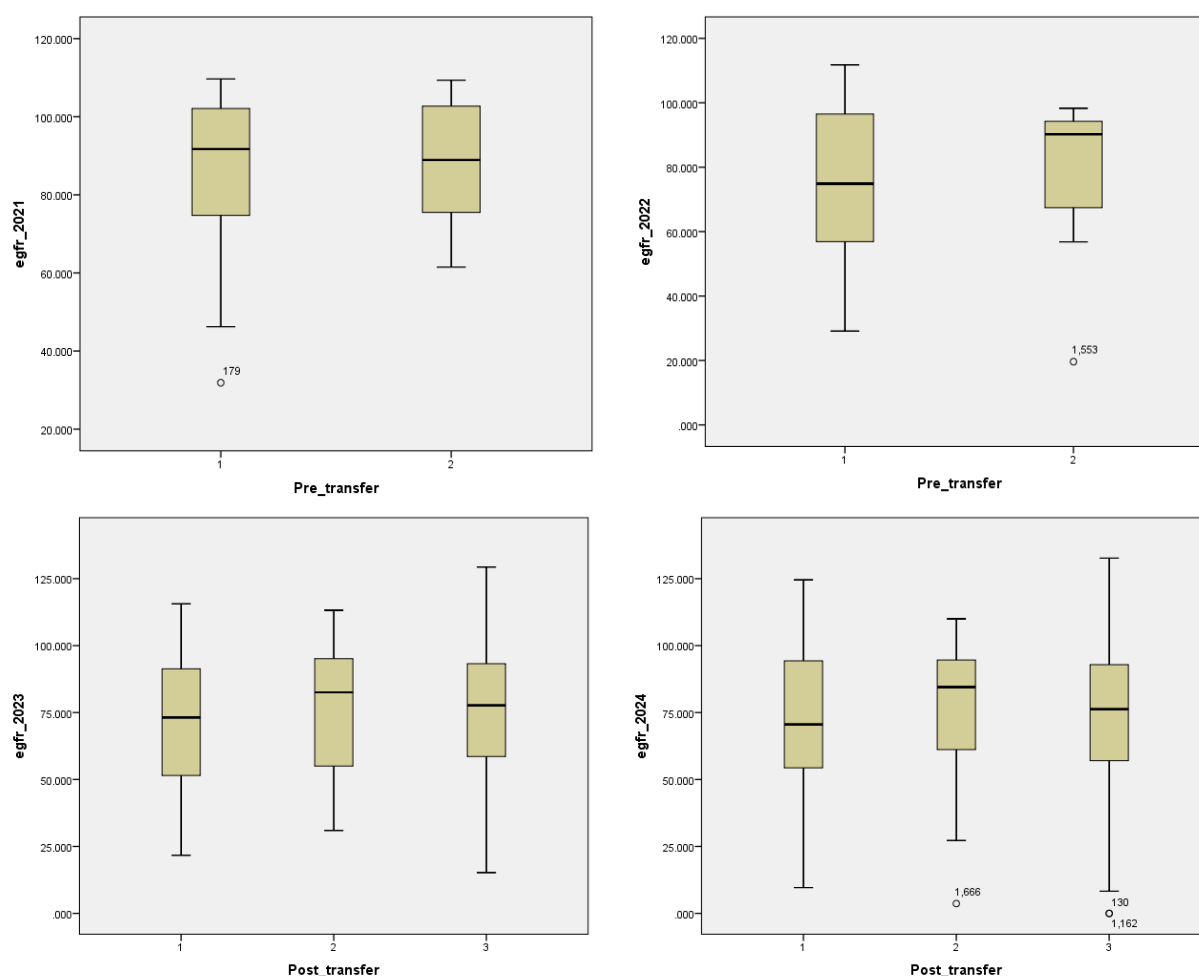
Figure 3*Comparison of LDL Test Results in Diabetic and Hypertensive Patients (2021-2024)*

Figure 4*Comparison of Cholesterol Test Results in Diabetic and Hypertensive Patients (2021-2024)***Kidney Function (eGFR)**

Assessment of kidney function using estimated Glomerular Filtration Rate (eGFR) revealed a concerning trend. The number of individuals with eGFR below 90 mL/min/1.73m² rose significantly, reaching 696 cases in 2024, indicating an increased risk of kidney impairment within the NCD patient population. Figure 5 highlighted that eGFR tended to decrease slightly each year in both SHPH and LAO_SHPH groups. However, the SHPH group was able to maintain its eGFR within the normal range (≥ 90 mL/min/1.73 m²) better than the LAO_SHPH group. The LAO_SHPH group showed a clear trend of falling below the normal value, placing them at a higher risk of developing chronic kidney disease. This suggests that while overall kidney function remained relatively stable, with disease progression being moderately controlled, continued attention is needed to preserve kidney function, particularly within the LAO PHC managed population.

Figure 5*Comparison of eGFR Test Results in Diabetic and Hypertensive Patients (2021-2024)*

In summary, these results underscore the positive impact of healthcare decentralisation on expanding access to NCD care and increasing patient engagement in Tham Phannara district. However, they also reveal areas where further improvements are needed, particularly in standardising care quality and managing specific NCD indicators, like HbA1c and lipid levels, and preventing kidney function decline within the decentralised LAO PHC settings.

Discussions

The findings from this study shed light on the significant impact of healthcare decentralisation on the management of non-communicable diseases (NCDs) in Tham Phannara District, Thailand, between 2021 and 2024. The primary objective was to investigate the management of NCDs, specifically diabetes and hypertension, by examining patient demographics, healthcare service utilisation, and trends in annual health check-ups. Overall, the study demonstrates notable progress in expanding access to NCD care, while also highlighting areas requiring further attention to ensure consistent quality of care.

A sharp increase in the number of NCD screenings and services was a prominent finding, with medical check-ups rising from 254 in 2021 to 1,795 in 2024. This substantial growth indicates improved accessibility to healthcare and a greater engagement from the public in

managing their NCDs. This positive trend is particularly evident with the emergence of Local Administrative Organisation Primary Care Units (LAO PHCs) as crucial providers of NCD care. In 2024, LAO PHCs accounted for the highest volume of check-ups, facilitating 1,273 cases, which was significantly more than the main hospital (PCU) and Ministry of Public Health Primary Care Units (MOHP PHCs). The success of LAO PHCs is likely due to their stronger ties with the community, greater flexibility in managing resources, and an enhanced ability to deliver patient-centred care. This aligns with Thailand's Universal Health Coverage goals and suggests that decentralised systems can effectively address local health needs.

Analysis of patient demographics revealed that females constituted the majority of NCD patients at 67.60%, with an average age of 64.43 years. This reflects established gendered patterns in healthcare utilisation, particularly among older adults. Furthermore, hypertension was considerably more prevalent than diabetes, accounting for 69.70% of NCD cases compared to 30.30% for diabetes. This high prevalence of hypertension underscores the ongoing need for targeted interventions to manage cardiovascular risk factors within the district's aging population.

Regarding the quality of NCD management, measured through annual health examination laboratory results, the picture is mixed but generally positive with areas for improvement. For diabetes, the number of patients achieving desired fasting blood sugar (FBS) levels (< 100 mg/dL) increased, reaching 775 cases in 2024. Similarly, the number of patients with well-controlled glycated haemoglobin ($HbA1c < 7.5\%$) also rose to 330 cases. While PCUs showed the best glycemic control in 2023, by 2024, LAO PHCs demonstrated optimal average FBS control. However, it is important to note that SHPH patients generally achieved better $HbA1c$ control compared to LAO PHC patients, where over 30% of results were outliers, indicating inconsistent diabetes management in the decentralised units. This inconsistency highlights the urgent need for targeted improvement strategies within LAO PHCs.

In terms of lipid management, the number of patients with LDL cholesterol below 100 mg/dL improved, reaching 589 cases in 2024. In 2024, NPCU (MOHP PHC) showed optimal lipid management. Similar to diabetes control, SHPH patients demonstrated better lipid control with median LDL levels meeting the target. Conversely, LAO PHC patients exhibited a higher number of LDL outliers and greater variability, suggesting inconsistent lipid management and a potentially higher risk of cardiovascular disease in this group. Although total cholesterol levels remained generally within an acceptable range, the overall control trend showed a slight decline.

A concerning trend was observed in kidney function, where the number of individuals with estimated Glomerular Filtration Rate (eGFR) below 90 mL/min/1.73m² rose significantly to 696 cases in 2024. While kidney function remained relatively stable overall, the SHPH group maintained its eGFR within the normal range better than the LAO PHC group, which showed a tendency to fall below the normal value, increasing their risk of developing chronic kidney disease. This indicates that despite moderate control over disease progression, continuous attention is needed to preserve kidney function, especially within the LAO PHC managed patient.

While the study underscores the potential benefits of decentralisation in expanding primary healthcare access and improving NCD management, it also acknowledges several limitations. These include the study's reliance on data from a single hospital, which limits

generalisability, and the use of retrospective secondary data, which may lead to inconsistencies. The cross-sectional design also prevents establishing causality or tracking patient progress over time.

To sustain these gains and address existing challenges, future policy efforts should focus on strengthening the capacity of local health systems. This includes providing LAO PHCs with adequate training and resources, standardising care protocols, ensuring robust monitoring, and facilitating collaboration between the Provincial Administrative Organisation (PAO) and the Ministry of Public Health. Prioritising efficiency, equity, and quality in decentralised service delivery, with particular attention to high-burden conditions like hypertension, will be essential for improving patient outcomes.

Conclusion

Conclusion The study highlights that healthcare decentralisation has substantially increased non-communicable disease (NCD) screenings and services in Tham Phannara District. This clearly indicates improved access to healthcare and better NCD management. The emergence of Local Administrative Organisation Primary Care Units (LAO PHCs) as crucial providers demonstrates the success of this decentralised approach. Although diabetes and lipid control have shown progress, the high prevalence of hypertension requires targeted interventions, urging a focus on enhancing primary healthcare models for greater efficiency and equity, especially for hypertension patients.

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