

COST ANALYSIS OF PHYSICAL THERAPY CLINIC IN THAILAND: THE IMPACT OF THE COVID-19 OUTBREAK

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ABSTRACT

OBJECTIVE:

The aim of the study was to identify the financial burden and compare the unit costs that Coronavirus disease 2019 (COVID-19) imposed on a physical therapy clinic that are one of the primary forms of healthcare facilities in Thailand.

DESIGN AND SETTING:

The study was a retrospective study conducted at the physical therapy clinic, Khon Kaen University Community Outreach Center (KKUCOMOC) in Thailand. To assess the impact of the outbreak, the service unit was divided into two units: physical therapy (PT) and Thai massage (TM), and the annual report for the 2019-2021 fiscal year was analyzed as representative of before and during an outbreak. The study tool was the Handbook of Unit Cost Analysis from the Office of the Permanent Secretary. Revenue, expenses, and the number of patient visits were all gathered. The data was then analyzed and summarized using Microsoft Excel programs, and descriptive statistics were presented.

RESULTS:

The COVID-19 pandemic not only reduced the number of patient visits but also the revenue. During the pandemic, the percentage of expense to the facility's revenue increased in both units. Labor, material, and capital costs were the major cost components, with labor costs accounting for the majority of direct costs. The first emerged in the 2020 fiscal year, resulting in an increase in PT's and TM's unit costs of 26.66% (\$US10.24 to \$US12.97) and 22.69% (\$US6.92 to \$US8.49), respectively. Following that, it continued to rise in both units throughout the subsequent fiscal year. As a result, at the end of the study, the unit costs of PT and TM were \$US13.95 and \$US9.22 respectively.

CONCLUSIONS:

The COVID-19 pandemic reduced the number of patient visits and revenue. Furthermore, it raised the unit cost of PT and TM to \$US13.95 and \$US9.22 respectively.

KEYWORDS

COVID-19, physical therapy, clinic, unit cost.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an emerging disease caused by the SARS-CoV-2 virus. The outbreak was first reported in December 2019 in Wuhan, Hubei Province, People's Republic of China [1]. The disease caused panic among the populations around the world [2]. In Thailand, the first emergence of the pandemic began in March 2020 then following by many epidemic episodes [3-4]. Therefore, to carry out control of the disease effectively, the Center for COVID-19 Situation Administration (CCSA) was established to serve as the headquarters for COVID-19 related policies [3-4]. The social and public health protocols that have been implemented included work-from-home, temporary closure of non-essential facilities, and imposition of national curfews. In addition, the recommendations for hospitals and other health service facilities to reduce and prevent the spread of disease that affects all levels of the health system were also implemented [3-5].

When considering the health care system in Thailand, it can be classified according to the geographic information system into three levels: primary, secondary, and tertiary care respectively. Based on this information, a clinic was defined as a primary type of healthcare facility that provided outpatient services. Under Ministerial regulation of Thailand, many types of clinics, such as dental, Thai traditional medicine, or physical therapy provide health services [6-7]. With a focus on the physical therapy clinic, the impact of the COVID-19 pandemic has prompted the Royal College of Physiatrists and the Physical Therapy Council of Thailand to issue a practice guideline to prevent and reduce the transmission and to guide the practices of physical therapists. Examples include arranging the service site, suggesting cleaning protocols using alcohol and disinfectant solution, using personal protection equipment (PPE), and providing tele-rehabilitation service [8-9]. Under this situation, it consumed many resources and brought significant challenges to the physical therapy health care provider. In other words, it has exerted not only clinical pressure on the service system but also financial burden [10].

Understanding service costs and their associated factors have important implications for effective planning and budgeting. In addition, this understanding is also needed to inform many types of policy decisions [11]. Therefore, studies that provide the components of hospitalization costs during the pandemic have been reported [12-14].

However, no study has been carried out in physical therapy clinic to calculate the operating costs as well as the unit costs under the situation of COVID-19 pandemic. Therefore, the aim of the study was to identify the financial burden and compare the unit costs that COVID-19 imposed on a physical therapy clinic, one of the primary forms of healthcare service facilities. The study's findings could be used to revise service planning, set service fees, and establish budgets for running the clinic.

METHODS

STUDY DESIGN

The study was a retrospective cost analysis, using existing data from a public physical therapy clinic in Khon Kaen province, Thailand. It was approved by the Khon Kaen University Ethical Committee (HE652071). Informed consent was waived due to the analysis being performed anonymously, based only on aggregate data, and the authors did not have direct access to personal information of individual patients.

STUDY SETTING

The study was conducted at a physical therapy clinic, the Khon Kaen University Community Outreach Center (KKUCOMOC), Thailand. It was classified as a primary care center that offered outpatient treatment services. It is a two-story commercial structure with 2.5 booths and a total service area of approximately 240 square meters. It is composed of two service units: physical therapy (PT) and Thai massage (TM).

According to its annual report, the clinic's revenue came from only one major source: patient expenses. Additionally, patients were categorized into two groups. Firstly, cash-pay and privately insured patients contributed the majority of total revenue, with their payment received immediately after treatment provision. Secondly, patients with public health insurance whose payments were delayed by approximately three months due to medical bills which had to be audited by relevant agencies before the clinic was reimbursed.

DATA COLLECTION

The research was carried out over three fiscal years, from October 2018 to September 2021, and covered the years before, and during the COVID-19 pandemic. The information was gathered from a variety of existing sources. The first source was the KKUCOMOC's annual report and its business continuity plan. Another source was the clinic's

monthly report, which included a database of patient numbers, revenue, reimbursement, procurement details, and financial management.

COST ANALYSIS

The study uses a traditional costing method developed by Thailand's Ministry of Public Health to assess the effects of the COVID-19 pandemic on the clinic's unit cost from the perspective of providers [15]. The costing process could be broken down into several steps. The first step was to examine and categorize the clinic's organizational structure into two major cost centers: patient care cost centers (PCCs) and supportive cost centers (SCCs). Furthermore, the PCCs were divided into two units: PT and TM units. SCCs that provided administrative, security, and other services to PCCs were also classified. Following that, the total direct cost of each cost center was calculated, including labor, material, and capital costs. Actual prices were used to calculate the material costs. Market prices were used to estimate the values of some durable items and non-durable medical supplies that were donated during the pandemic. The expenses for services provided by external organizations, e.g., cleaning and laundry costs, were included as part of the material cost. Furthermore, the straight-line depreciation method was used to annualize the costs of durable items based on their respective life years and the salvage value of 1 Thai Baht (THB), which was approximately \$US0.03. In the following step, the total cost from SCCs was then allocated to PCCs using the allocation factors. The allocation criteria used in the study were floor area (electricity, water, cleaning, and security service), estimated actual use (laundry and maintenance), and administration, office expense, and telephone (number of patients' visits). In the final step, the unit cost, which refers to the cost of providing a single service, was calculated using the formula.

Physical therapy unit cost per visit:

= total cost of physical therapy service/total number of visits

Thai massage unit cost per visit:

= total cost of Thai massage service/ total number of visits

RESULTS

The study evaluated the costs that COVID-19 imposed on the physical therapy clinic in Thailand. Separating into three fiscal years from October 2018 to September 2021, with the first fiscal year representing the year before the pandemic, and the two fiscal years following representing the first and second emerged. Table 1 presents the patient

visits during the study period. For PT unit, the first emergence of the COVID-19 pandemic in the 2020 fiscal year resulted in a 14.43% (12,526 to 10,719) decrease in patient visits, which then decreased to 7.03% (10,719 to 9,965) the following fiscal year. The study also discovered that more than 58% of TM's visits (6,686 to 2,791) were significantly reduced when compared to before the pandemic.

Table 2 depicts the revenue and expenses in USD for both service units. The total expenses among the three fiscal years were \$US174,777.03, \$US173,931.41, and \$US164,591.03 respectively. The percentage of expense to the unit's revenue increased during the pandemic. Furthermore, the study discovered that TM's unit has been overspending by 2.56% since before the pandemic, with projections of 54.04% and 36.22% in the two fiscal years following. The percentage of the cost component in Figure 1 indicated that direct costs accounted for the majority of expenses in both service units. According to the data gathered, labor costs accounted for the majority of direct costs (Table 2). The clinic's structure allowed it to hire only four permanent employees: two physical therapists, one finance and accounting officer, and one clerical officer. As a result, part-time employees were hired to enhance the service. According to this fact, labor costs included not only salaries but also performance-based commissions, chartered wages, and overtime costs.

Another important component of the expense was material costs (Table 2). Before the pandemic, major material expense included the costs of non-durable medical supplies, i.e., ultrasonic gel, alcohol, kinesio tape, massage oil, and herbal balls, as well as kitchen work materials and office supplies. Then, on the first emerged of COVID-19, the 2020 fiscal year, the clinic had been temporarily closed for PT (1.5 months) and TM services (2.5 months) according to the guidelines based on regulations issued by the CCSA. Therefore, the material cost that normally accompanied the patient's visit was decreased. In addition, under the pandemic, material costs, notably for PPE—medical masks, gloves, a face shield, a bouffant cap, alcohol gel, and disinfectant liquid—were incurred.

The study also calculated the percentage of expense to the unit's revenue (Table 2). As shown in Table 2, the capital cost was the lowest cost component. The therapeutic equipment was purchased in accordance with the business continuity plan. Furthermore, major capital items, including the cost of equipment and adapting existing space to the rehabilitation services guidelines in the

situation of the COVID-19 outbreak, were also invested in the screening station, waiting area, and treatment area.

The unit costs of both service units are shown in Figure 2. The first emergence of the COVID-19 pandemic in the 2020 fiscal year resulted in a 26.66% (\$US10.24 to \$US12.97) and

22.69% (\$US6.92 to \$US8.49) increase in PT's and TM's unit costs, respectively. In addition, it continued to increase by 7.56% (\$US12.97 to \$US13.95) and 8.60% (\$US8.49 to \$US9.22) across both units in the following fiscal year. As a result, at the conclusion of the study, the unit cost of PT and TM was \$US13.95 and \$US9.22, respectively.

TABLE 1: THE NUMBER OF PATIENTS VISITS DURING THE STUDY PERIOD

Fiscal year	Physical therapy's unit	Thai massage's unit
2019	12,526	6,686
2020	10,719	4,092
2021	9,965	2,791

TABLE 2: THE TOTAL REVENUE AND EXPENSES DURING THE STUDY PERIOD

Fiscal year/ service's unit	Revenue	Labor cost (%)	Material cost (%)	Capital cost (%)	Expenses (%)
2019					
: PT	175,431	110,177 (62.80)	13,401 (7.64)	4,865 (2.77)	128,443 (73.22)
: TM	45,179	34,567 (76.51)	9,833 (21.77)	1,934 (4.28)	46,334 (102.56)
2020					
: PT	163,483	115,963 (70.93)	9,527 (5.83)	5,842 (3.57)	139,169 (80.33)
: TM	27,654	37,747 (136.50)	2,982 (10.78)	1,870 (6.76)	34,763 (154.04)
2021					
: PT	167,058	118,571 (70.98)	14,081 (8.43)	6,251 (3.74)	138,903 (83.15)
: TM	18,858	18,737 (99.36)	5,200 (27.57)	1,751 (9.28)	25,688 (136.22)

PT: physical therapy unit, TM: Thai massage unit

Remark: The data is presented in USD. (USD 1 = THB 37)

FIGURE 1: THE PERCENTAGE OF THE COST COMPONENT DURING THE STUDY PERIOD; (A) PHYSICAL THERAPY UNIT, (B) THAI MASSAGE UNIT

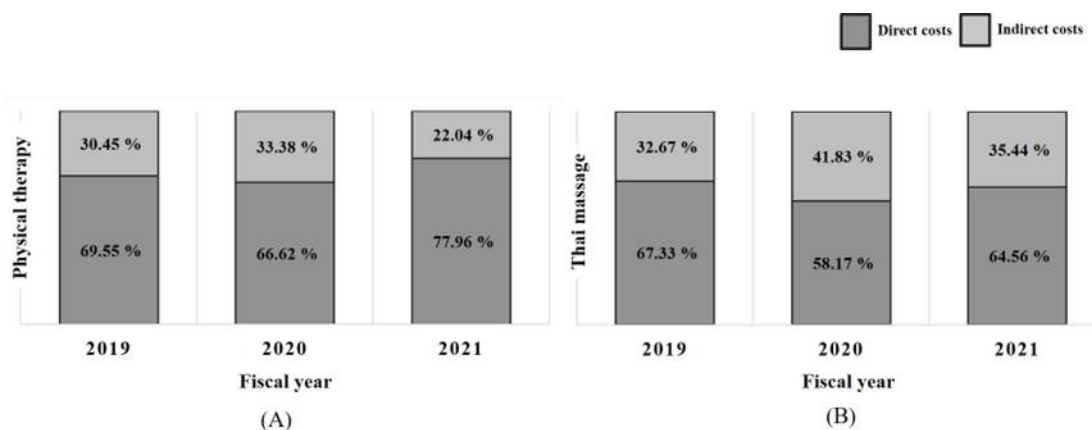
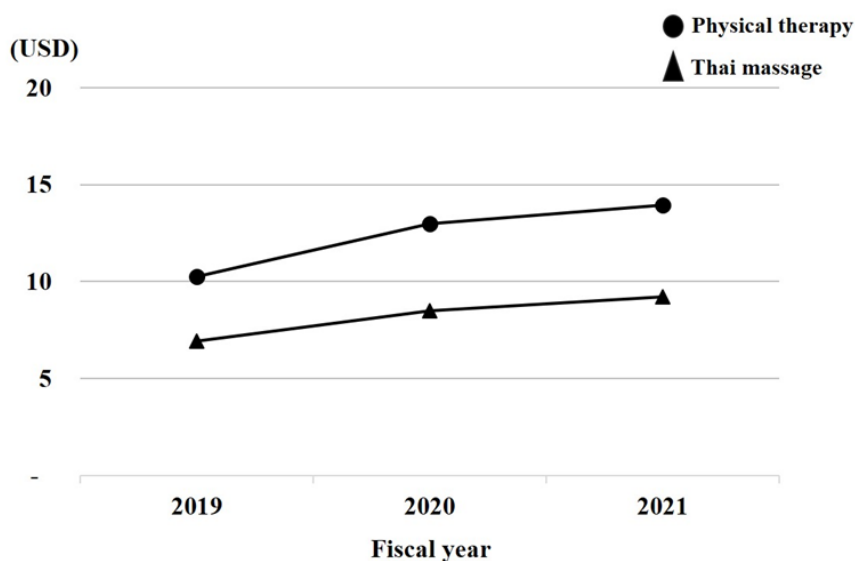


FIGURE 2: THE UNIT COST DURING THE STUDY PERIOD REMARK: USD 1 = THB 37



DISCUSSION

To the authors knowledge, the study was the first to analyze physical therapy clinic costs of COVID-19 in Thailand. It performed costings not only before but also during the pandemic. The results of the study reflect the impact of COVID-19 on physical therapy clinic, KKUCOMOC, as follows:

The first is the impact on a decreasing of revenue and the number of patient visits. This finding was explained by the fact that because the clinic's patients' primary goal was to relieve their pain from musculoskeletal problems. When focus on the pain, based on the classification of urgency in interventional pain procedures was ranged from elective to urgent. The term "elective" means that a patient could normally wait longer than four weeks to undergo the procedure based on the unique circumstances, and no

significant harm to the patient is expected if the procedure is postponed. While the term "urgent" implies that postponing a procedure will result in a significant exacerbation and worsening of the condition [16]. According to this classification, the clinic's intervention for pain relief procedure was primarily served at the elective level. Thus, at a time when the pandemic has begun to emerge, the clinic has had to temporarily halt operations for 1.5 months for PT services and 2.5 months for TM services. As a result, the number of operating days in the 2020 fiscal year is lower than the previous year, which will contribute in part to a decrease in revenue and number of visits provided by both service units. In addition, it should be noted that the panic over COVID-19 may account for a decrease in patient visits as well as the effect of temporarily halting operations, due to a significant decrease in the number of patients per day observed following the clinic's return to service.

The second impact is changing the clinic's physical characteristics. Due to the transmission of COVID-19 is associated with distance in the spread of pathogens. As a result, the CCSA advised healthcare facilities to modify physical attributes to reduce the risk of infection spreading. To comply with the recommendation, the clinic's structure was modified to reduce the number of patients per treatment area. The physical therapy unit was modified by providing more space between treatment beds than ever before. However, because the Thai massage service area was limited by the floor space, every other bed service pattern was provided during the emergency. Furthermore, only patients who were awaiting treatment at the time of their appointment would be permitted to wait in the clinic, while the waiting room for relatives was being prepared outside. The barrier was installed in some service areas, such as reception and the financial service counter, to reduce the possibility of disease spreading. In addition, an air purifier, UV-C disinfection lighting, and a ventilator fan were installed to comply with the Physical Therapy Council of Thailand's guidelines, which classified the clinic's treatment interventions as having low to moderate exposure risk levels [9]. Notably, the physical restructuring, as discussed above, has all affected the clinic's capital costs.

The third impact is on revision of the clinic's service planning. Based on the study's findings, areas where efficiency improvements could result in significant cost savings were identified. Based on the fact that an emergence of COVID-19 causes a shortage of both medical and non-medical supplies, as well as an increase in price. The 2020 fiscal year procurement report identified medical masks, alcohol, gloves, and disinfectant liquid were the most difficult medical and non-medical supplies to find. In addition, its price was higher than three times before the pandemic. Based on the fact that the physical therapy clinic is to be operated as a public clinic, the procurement must follow the procedures and methods prescribed by the Ministry of Finance, which have different methods depending on the type as well as the value of the goods to be purchased [17]. Under the pandemic situation, the methods are complicated and time-consuming to complete, making it impossible to obtain medical supplies in an appropriate, adequate, and reasonable manner. As a result, learning from the COVID-19 pandemic, it might be suggested that further study be conducted to consider an efficiency rationale for purchasing and improving stock supplies. Another issue concerns space utilization. For a private or charity hospital, the land cost was included in the

capital cost [18]. In Thailand, public hospitals operate normally without having to pay land rent. Unfortunately, the physical therapy clinic's operation costs are comprised of land and building rental costs. As a result, optimal space utilization must be prioritized, especially on the second floor, which only a few patients in appropriate health can access.

The final impact is on the service charge revision. According to the findings, the PT's and TM's unit costs increased 36.23% (\$US10.24 to \$US13.95) and 33.24% (\$US6.92 to \$US9.22), respectively, in the fiscal year 2021, compared to before the pandemic. In Thailand, the Comptroller General's Department (CGD), Ministry of Finance, fully reimbursed the government officer's physical therapy service charge. Furthermore, employees of state enterprises and local government organizations were also fully reimbursed by their affiliated agencies. In contrast, the Thai massage expense was reimbursed at a rate of \$US6.76 per treatment session. As a result, the emergence of the COVID-19 disease has resulted in a lower margin than ever before for the PT's service unit. In addition, it had a greater financial impact and contributed to TM's dire situation because its expenses were massive in comparison to its revenue. To cover its unit cost, the actual service charge for the fiscal year 2021 should be more than \$US9.22 per session; however, it cannot be compensated by the CGD and other affiliated agencies. Based on this fact, the cost-to-charge ratio should be further investigated [15, 19]. The finding will suggest that the clinic revise the charge price. Furthermore, if the reimbursed price is limited by the CGD, the clinic may need to charge additional fees to cover the overage expense.

STUDY LIMITATIONS

The findings of the study should be interpreted with caution. First, the data for the study came from a single physical therapy clinic, so the results may not be representative of other clinics in Thailand. Second, despite being a public clinic, the KKUCOMOC ran the clinic as a business. As a result, the clinic's two-story commercial building rental fee is a direct cost, and it was not waived despite the clinic's temporary closure during the 2019 fiscal year. Third, the CGD determines the treatment fee for COVID-19 pandemic treatment sectors in Thailand. In the case of physical therapy, the treatment fee is fully reimbursed as charged by the clinic. In contrast, the treatment fee for Thai massage was reimbursed at a fixed cost of around \$US6.76

per session. As a result, it might be different in other countries or under other conditions.

CONCLUSION

Based on the findings, it is possible to conclude that COVID-19 had a negative impact on KKUCOMOC's physical therapy clinic by reducing patient visits and revenue. It also increased the percentage of expenses to the unit's revenue. By the end of fiscal year 2021, the unit costs of PT and TM had risen from \$US10.24 to \$US6.92 to \$US13.95 and \$US9.22, respectively.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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