Health promotion and disease prevention services before and during the COVID-19 pandemic: A nationwide survey from Thailand

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ABSTRACT

Health promotion and disease prevention (P&P) are essential components of primary health care. This study investigated the coverage of P&P services and barriers to services among primary care units in Thailand before and during the coronavirus disease 2019 (COVID-19) pandemic. A web-based cross-sectional survey was conducted to compare the data from primary care units across the 13 health regions in two fiscal years: October 2018 to September 2019 (before the pandemic) and October 2019 to September 2020 (during the pandemic). A total of 340 primary care units responded to the questionnaire. While most participating primary care units provided basic P&P services (n = 327, 96.2%) and community-based P&P services (n = 244, 71.8%), fewer offered area-based P&P services (n = 120, 35.3%) for all target populations. The high coverage of basic P&P services remained in place during the pandemic, while coverage of community-based P&P services for vulnerable and at-risk populations improved during the pandemic. Area-based P&P services improved for pregnant and postpartum women, preschoolers, children and adolescents, adults, and older people. Lack of human resources, materials and equipment, and financial support were cited as the primary challenges to offering P&P services. The higher coverage of P&P services in several target populations during the pandemic contributed to a heavy workload. Effective resource allocation, capacity building, and support from relevant parties, such as government and local agencies, are required to maintain high P&P service coverage.

1. Introduction

The Ottawa Charter for Health Promotion (1986) defined health promotion as “the process of enabling people to increase control over, and to improve, their health” [1]. The following five goals for health promotion are identified: 1) build healthy public policy, 2) create a supportive environment for health, 3) strengthen community action, 4) develop personal skills, and 5) reorient health services [2, 1]. The 2018 Astana Declaration stated primary health care (PHC) is a cornerstone of a sustainable health system that provides universal health coverage and empowers individuals and communities [3, 4]. PHC represents the first contact with individuals and families in a community-oriented health system [5, 6, 7]. Good health and well-being is a key component of the United Nations Sustainable Development Goals [8]. PHC has a vital function to provide equal access to quality health care services [9, 10]. This concept is supported by the World Health Organization’s 2030 Agenda for Sustainable Development of universal health coverage and health equity, especially in low- and middle-income countries [11, 12, 13, 14].

In Thailand, PHC exists in primary care units within several settings including subdistrict health-promoting hospitals, community health centers, community medical units, and municipal-affiliated health care centers [10]. The integrated and comprehensive services provided in PHC settings include health promotion, disease prevention, curative care, rehabilitative care, and palliative care [10, 11]. Health promotion and
disease prevention (P&P) are important public health services according to the Thailand Ministry of Public Health’s motto, “take health promotion first, get health repairing later” [15]. Thailand has been striving for national universal health coverage since 2002 [16]. P&P services across age groups are subsidized by Thailand’s national health insurance system. The main objective of P&P is to reduce individual health-risk factors, morbidity, and mortality, and lower the overall disease burden [17]. P&P services provided by primary care units in Thailand include: 1) services for each age group according to the national public health guidelines (basic P&P), 2) policy-based services specific to the context and needs of each geographic area (area-based P&P), and 3) community-based services focused on the health of people at the community level rather than the individual level (community-based P&P).

The coronavirus disease 2019 (COVID-19) pandemic contributes to a huge impact on health systems and the provision of P&P services [18, 19, 20]. In addition, the effects on the health system and individual lives (e.g., a reduction in non-urgent services, COVID-19-related personal health recommendations, travel restrictions) have altered P&P service capacity. This raised an important question according to the changes in P&P services at the national level due to the COVID-19 pandemic. To gain a better understanding and fill this knowledge gap, this study aimed to investigate the coverage of P&P services and barriers to services among primary care units in Thailand during fiscal years 2019 (before COVID-19 pandemic) and 2020 (during COVID-19 pandemic).

2. Methods

2.1. Study design and setting

This cross-sectional study was conducted between December 2020 and April 2021. The online questionnaire was used to collect data of fiscal years 2019 (October 2018 to September 2019) and 2020 (October 2019 to September 2020). The target population for the survey was 10,925 primary care units in 77 provinces representing all 13 health regions of Thailand. An in-charge staff for P&P at each primary care unit was invited to participate in the study. Primary care units that were not listed in the national database during fiscal years 2019 and 2020 were excluded.

The sample size was calculated with the sample size calculator program called n4Studies, using a function for estimating a finite population proportion [21]. The values of proportion \( \pi = 0.5 \), error \( \epsilon = 0.05 \), and alpha \( \alpha = 0.1 \) were applied [21]. The sample size was calculated as 626, and after adding 20% to compensate for non-respondents, 756 was defined as the target sample of primary care units [22, 23]. A multistage sampling approach was conducted by classifying the primary strata (health region) into 13 regions and weighting the number of primary care units in each region (Figure 1). The sample size of each province was determined as proportional to the number of primary care units in the province.

2.2. Data collection

Printed invitation letters with a link and a QR code for accessing the online questionnaire on Google Form were sent to the target primary care units. The regional coordinators followed up with each primary care unit after 2–4 weeks by phone and email. A second reminder was made by phone and email 2 weeks after the first reminder. Primary care units that did not respond to the questionnaire after the second reminder were defined as non-respondents. Data were collected between February 1, 2021, and April 30, 2021.

The questionnaire was developed by the research team based on characteristics of primary care units in the Thai context and the literature on the Thai health insurance schemes and the Ottawa Charter for Health Promotion [1, 24]. Subsequently, public health academics and workers from different health regions reviewed and provided comments on the questionnaire (content validity). Several rounds of reviews and revisions were made. The questionnaire was piloted by three PHC providers from non-participating primary care units for wording and content appropriateness (face validity). Minor issues were addressed to finalize the questionnaire. The questionnaire included four sections (Supplementary file 1).

Section 1 primary care unit demographics included general information about the primary care units: 1.1) type of primary care units (i.e., municipal-affiliated health care center, health-promoting hospital, other), 1.2) affiliations (name of the Ministry), and locations (health region, province, and district).
Section 2 P&P service characteristics included 2.1) coverage of each target population during fiscal years 2019 and 2020 for area-based P&P (ten target populations), basic P&P (five target populations), and community-based P&P (eight target populations). The service coverage of each target population was labeled as “very low” (0–25% of the target population), “low” (26–50% of the target population), “moderate” (51–75% of the target population), or “high” (76–100% of the target population). The rest of questions in section 2 were collected: 2.2) names of relevant agencies for each target population, 2.3) levels of participation for each target population (score ranged from 1 (low) to 4 (high)), and 2.4) challenges for each target group. The data obtained from 2.2 and 2.3 were context-specific and reported in a Thai version of full research report (Supplementary file 2).

Section 3 P&P service processes consisted of the questions with regard to 3.1) building healthy public policies (i.e., availability in fiscal years 2019 and 2020 (yes/no), patterns (multiple options that commonly established in Thailand and a space for other options), names of financial sources (multiple options and a space for other options)); 3.2) strengthening the community (i.e., availability in fiscal years 2019 and 2020 (yes/no), target populations (village health volunteers, community leaders, youth, elderly, other), patterns (multiple options that commonly established in Thailand and a space for other options), names of financial sources (multiple options and a space for other options)); and 3.3) developing personal skills (i.e., availability in fiscal years 2019 and 2020 (yes/no), target populations (village health volunteers, community leaders, youth, elderly, other), target skills (self-care, health literacy, public policy implementation, other), methods (frequency of activities), names of financial sources (multiple options and a space for other options)). The data collected from section 3 were context-specific and reported in a Thai version of research report (Supplementary file 2).

Section 4 P&P service comments and needs were open-ended questions as qualitative data: 4.1) comments on P&P services in fiscal years 2019 and 2020 and 4.2) recommendations on P&P services for primary care units.

2.3. Data analysis

Descriptive statistics were presented as frequencies and percentages for the following variables: health region, geographic region, coverage of area-based P&P, basic P&P, and community-based P&P, and performance coverage in each target population. Chi-square test was used to investigate the differences between area-based, basic, and community-based P&P services during fiscal years 2019 (before COVID-19 pandemic) and 2020 (during COVID-19 pandemic). All analyses were performed using R statistical software (version 4.0.5) [25]. P < 0.05 was considered statistically significant. The qualitative data obtained from the open-ended data were grouped into themes and the frequencies were counted.

2.4. Ethics approval

This study was approved by the Human Research Ethics Committee of WalaIkul University (Project No. WU-EC-MD-3-001-64). All respondents provided informed consent at the beginning of the online questionnaire by selecting a checkbox to confirm their willingness to participate in the study.

3. Results

3.1. Participating primary care units

Of 756 invitations, 340 questionnaires were received (45.0% response rate). The highest response rate was in the health region 1 (97.6%), followed by the health region 4 (92.3%) and the health region 2 (83.7%). The majority of respondents were in the northern region (81.1%) (Table 1). The majority of participating primary care units were under the Ministry of Public Health (n = 323, 95.0%), followed by the Ministry of Interior (n = 10, 2.9%), the Ministry of Justice (n = 4, 1.2%), and the Ministry of Education/the Ministry of Higher Education, Science, Research and Innovation (n = 3, 0.9%). Most participants were categorized into sub-district health-promoting hospitals (n = 307, 90.3%), primary care units affiliated with public hospitals (n = 16, 4.7%), municipal-affiliated health care centers (n = 11, 3.2%), and others (n = 6, 1.8%).

3.2. Health promotion and disease prevention services

Most participating primary care units provided basic P&P services for all target populations (n = 327, 96.2%). A total of 244 primary care units (71.8%) provided community-based P&P services, while 120 (35.3%) provided area-based P&P services for all target populations (Table 2).

3.3. Coverage of P&P services during fiscal years 2019 (before COVID-19 pandemic) and 2020 (during COVID-19 pandemic)

3.3.1. Coverage of area-based P&P services

The majority of primary care units rated their coverage of area-based P&P for all target populations at moderate to high. The number of primary care units that rated their services as high coverage increased significantly during the COVID-19 pandemic for pregnant and post-partum women, preschoolers, children and adolescents, adults, and the elderly (Table 3).

| Table 1. Distribution of respondents by health region and regional area of Thailand. |
|---------------------------------|-----------------|-------------------|------------------|
| **General information** | **Sample size** | **Respondent (n)** | **Response rate (%)** |
| Health region | | | |
| Health region 1 | 83 | 81 | 97.6 |
| Health region 2 | 49 | 41 | 83.7 |
| Health region 3 | 43 | 20 | 46.5 |
| Health region 4 | 65 | 60 | 92.3 |
| Health region 5 | 61 | 27 | 44.3 |
| Health region 6 | 62 | 12 | 19.4 |
| Health region 7 | 61 | 21 | 34.4 |
| Health region 8 | 63 | 5 | 7.9 |
| Health region 9 | 70 | 11 | 15.7 |
| Health region 10 | 62 | 12 | 19.4 |
| Health region 11 | 57 | 17 | 29.8 |
| Health region 12 | 69 | 30 | 43.5 |
| Health region 13 | 10 | 3 | 30.0 |
| Region of Thailand | | | |
| Northern | 175 | 142 | 81.1 |
| Central | 198 | 102 | 51.5 |
| Southern | 126 | 47 | 37.3 |
| Northeastern | 256 | 49 | 19.1 |

| Table 2. Frequency and percentage of health promotion and disease prevention services. |
|---------------------------------|-----------------|------------------|
| **Services** | **Number (N = 340)** | **Percentage** |
| Area-based P&P (10 target populations) | | |
| Cover all target populations | 120 | 35.3 |
| Cover some target populations | 104 | 30.6 |
| No activities | 116 | 34.1 |
| Basic P&P (5 target populations) | | |
| Cover all target populations | 327 | 96.2 |
| Cover some target populations | 8 | 2.4 |
| No activities | 5 | 1.5 |
| Community-based P&P (8 target populations) | | |
| Cover all target populations | 244 | 71.8 |
| Cover some target populations | 74 | 21.8 |
| No activities | 22 | 6.4 |
Table 3. Coverage of area-based P&P services during fiscal years 2019 and 2020.

| Target group | 2019 (Before COVID-19 pandemic) | 2020 (During COVID-19 pandemic) | Goodness of fit | Chi-square | P-Value |
|--------------|---------------------------------|---------------------------------|----------------|------------|---------|
|               | n (%)                           | n (%)                           | n (%)          |            |         |
|               | High                            | Moderate                        | Low            | Very low   | Total   |
|               | 220 (100)                       | 221 (100)                       | 222 (100)      | 220 (100)  | 10.80   | 0.01*   |
| Pregnant postpartum women | 150 (68.2) | 53 (24.1) | 8 (3.6) | 9 (4.1) | 220 (100) | 171 (78.1) | 34 (15.5) | 8 (3.7) | 6 (2.4) | 219 (100) | 10.80 | 0.01* |
| Preschoolers (0–5 years) | 163 (73.4) | 47 (21.2) | 7 (3.2) | 5 (2.3) | 222 (100) | 178 (80.9) | 35 (15.9) | 4 (1.8) | 3 (1.4) | 220 (100) | 6.57 | 0.04* |
| Children & adolescents | 133 (59.6) | 75 (33.6) | 13 (5.8) | 2 (0.9) | 223 (100) | 150 (67.9) | 61 (27.6) | 6 (2.7) | 4 (1.8) | 221 (100) | 6.49 | 0.04* |
| Adults (18–60 years) | 148 (66.7) | 61 (27.5) | 11 (5.0) | 2 (0.9) | 222 (100) | 164 (74.2) | 50 (22.6) | 6 (2.7) | 4 (1.8) | 221 (100) | 6.51 | 0.04* |
| Elderly (>60 years) | 169 (76.5) | 42 (19.0) | 8 (3.6) | 2 (0.9) | 221 (100) | 184 (84.8) | 30 (13.8) | 2 (0.9) | 1 (0.5) | 217 (100) | 9.76 | 0.01* |
| Prisoners | 43 (35.8) | 22 (18.3) | 13 (10.8) | 42 (35.0) | 120 (100) | 47 (39.5) | 19 (16.0) | 15 (12.6) | 38 (31.9) | 119 (100) | 1.47 | 0.24   |
| People with chronic illnesses | 128 (57.9) | 65 (29.4) | 20 (9.0) | 8 (3.6) | 221 (100) | 139 (64.1) | 52 (24.0) | 15 (6.9) | 11 (5.1) | 217 (100) | 5.96 | 0.11   |
| People with addictions | 81 (42.2) | 56 (29.2) | 28 (14.6) | 27 (14.1) | 192 (100) | 86 (46.2) | 49 (26.3) | 27 (14.5) | 24 (12.9) | 186 (100) | 1.41 | 0.70   |
| Vulnerable people | 60 (41.1) | 27 (18.5) | 19 (13.0) | 40 (27.4) | 146 (100) | 58 (41.4) | 25 (17.9) | 19 (13.6) | 38 (27.1) | 140 (100) | 0.07 | 0.99   |

* P-value < 0.05.
### Table 4. Coverage of basic P&P services during fiscal years 2019 and 2020.

| Target group               | 2019 (Before COVID-19 pandemic) | 2020 (During COVID-19 pandemic) | Goodness of fit |
|----------------------------|---------------------------------|---------------------------------|-----------------|
|                            | n (%)                           | n (%)                           | Chi-square P-Value |
|                            | High | Moderate | Low | Very low | Total | High | Moderate | Low | Very low | Total | Chi-square P-Value |
| 1. Pregnant women          | 242 (72.7) | 66 (19.8) | 16 (4.8) | 9 (2.7) | 333 (100) | 254 (76.3) | 57 (17.1) | 14 (4.2) | 8 (2.4) | 333 (100) | 2.18 | 0.53 |
| 2. Preschoolers (0–5 years) | 272 (81.7) | 51 (15.3) | 9 (2.7) | 1 (0.3) | 333 (100) | 286 (85.9) | 36 (10.8) | 10 (3.0) | 1 (0.3) | 333 (100) | 5.23 | 0.07 |
| 3. Children & adolescents | 229 (68.6) | 93 (27.8) | 10 (3.0) | 2 (0.6) | 334 (100) | 236 (70.7) | 86 (25.7) | 10 (3.0) | 2 (0.6) | 334 (100) | 0.74 | 0.69 |
| 4. Adults (18–60 years)    | 246 (73.7) | 75 (22.5) | 12 (3.6) | 1 (0.3) | 334 (100) | 246 (73.9) | 75 (22.5) | 11 (3.3) | 1 (0.3) | 333 (100) | 0.07 | 0.96 |
| 5. Elderly (≥60 years)     | 280 (84.3) | 46 (13.9) | 5 (1.5) | 1 (0.3) | 332 (100) | 277 (83.2) | 49 (14.7) | 6 (1.8) | 1 (0.3) | 333 (100) | 0.39 | 0.82 |

### Table 5. Coverage of community-based P&P services in fiscal years 2019 and 2020.

| Target group               | 2019 (Before COVID-19 pandemic) | 2020 (During COVID-19 pandemic) | Goodness of fit |
|----------------------------|---------------------------------|---------------------------------|-----------------|
|                            | n (%)                           | n (%)                           | Chi-square P-Value |
|                            | High | Moderate | Low | Very low | Total | High | Moderate | Low | Very low | Total | Chi-square P-Value |
| 1. Maternal & child health | 226 (72.2) | 71 (22.7) | 9 (2.9) | 7 (2.2) | 313 (100) | 229 (72.9) | 70 (22.3) | 16 (1.9) | 9 (2.9) | 314 (100) | 1.62 | 0.66 |
| 2. Youth and family        | 196 (62.2) | 88 (27.9) | 23 (7.3) | 8 (2.5) | 315 (100) | 198 (63.3) | 91 (29.1) | 15 (4.8) | 9 (2.9) | 313 (100) | 3.04 | 0.39 |
| 3. Elderly                 | 244 (77.2) | 67 (21.2) | 50 (1.6) | 0 (0.0) | 316 (100) | 256 (81.0) | 54 (17.1) | 5 (1.6) | 1 (0.3) | 316 (100) | 3.31 | 0.19 |
| 4. People with disabilities| 226 (71.7) | 74 (23.5) | 12 (3.8) | 3 (1.0) | 315 (100) | 236 (75.4) | 64 (20.4) | 8 (2.6) | 5 (1.6) | 313 (100) | 2.06 | 0.36 |
| 5. People with addictions  | 126 (46.7) | 68 (25.2) | 52 (19.3) | 24 (8.9) | 270 (100) | 131 (49.6) | 71 (26.9) | 39 (14.8) | 23 (8.7) | 264 (100) | 3.57 | 0.31 |
| 6. Illegal migrants        | 92 (37.4) | 58 (23.6) | 42 (17.1) | 54 (22.0) | 246 (100) | 105 (43.0) | 58 (23.8) | 41 (16.8) | 40 (16.4) | 244 (100) | 5.52 | 0.14 |
| 7. People with health risks| 192 (61.7) | 92 (29.6) | 20 (6.4) | 7 (2.3) | 311 (100) | 207 (67.4) | 70 (22.8) | 18 (5.9) | 12 (3.9) | 307 (100) | 10.28 | 0.02* |
| 8. Vulnerable people       | 161 (53.5) | 87 (28.9) | 28 (9.3) | 25 (8.3) | 301 (100) | 179 (60.5) | 68 (23.0) | 22 (7.4) | 27 (9.1) | 296 (100) | 26.15 | 0.01* |

* P-value < 0.05.
Figure 2. Challenges of providing area-based P&P services.

Figure 3. Challenges of providing basic P&P services.
disabilities, people with addiction, and illegal migrants, were also found, but these changes were not statistically significant.

Differences in the coverage of area-based P&P services before and during the COVID-19 pandemic were observed. Significant increases in service coverage were found in pregnant and postpartum women, preschoolers, children and adolescents, adults, and the elderly. These target groups composed the majority of the population. The national policies for controlling COVID-19 and promoting health in the population might lead to a higher coverage in the majority population rather than in other minority groups (e.g., prisoners, people with disabilities, people with mental illnesses, people with addictions, and vulnerable people).

4.1. Implication

P&P services are a vital component of PHC. While basic P&P services were remained during the pandemic, the coverage of community-based and area-based P&P services were improved. Increasing service coverage without additional support resulted in a heavy workload for primary care units. To compensate for the imbalance, sufficient human resources were needed to serve P&P during the pandemic [30, 31, 32]. Insufficient funding was another important issue for P&P service provision [33]. Adequate materials and equipment, such as technology systems that could support virtual home visits and health education, were...
essential during the pandemic [34]. The findings regarding the needs for P&P services are consistent with previous studies. Primary care units required effective management to reduce workload, improve staff morale, and develop the capacity to strengthen service delivery [35]. A system-based partnership is an approach to enhance cooperation between networks to provide P&P services in PHC [36].

4.2. Recommendations

The findings of this study highlighted essential considerations of P&P services in Thailand. There were statistical differences of the coverage of P&P services in some target populations during the COVID-19 pandemic, while P&P services among several target populations were not found statistically significant. However, the percentages of ‘high coverage’ increased in all target populations. This manifested the importance of P&P and required more efforts or heavier workload of primary care units during the pandemic. To deal with this challenge, this study showed that effective resource allocation, capacity building, and support from relevant parties were expected; however, these strategies may be idealistic. Context-specific strategies have the potential to support P&P services. For example, primary care units may allocate budget for some limited services during the pandemic (e.g., in-person rehabilitative care) to P&P services. Primary care unit executive teams can provide clear management directions and strengthen staff’s management skills to enhance the effectiveness of P&P services. Relevant parties outside the health care sector (e.g., schools) can be a good partner to support P&P services among children and adolescents.

4.3. Strengths and limitations

The main strength of this study was the representativeness of primary care units across all the health regions of Thailand. Types of participating primary units were various, such as subdistrict health-promoting hospitals, primary care units affiliated with public hospitals, and municipal-affiliated health care centers. The survey questionnaire was designed based on the context of Thailand and revised according to the public health experts/workers’ perspectives. This study had several limitations. First, the response rate was low. Data collection occurred during the COVID-19 pandemic. Many primary care units were busy and not able to respond to the questionnaire after the second reminder. Second, the questionnaire was not tested for some types of validity (e.g., construct validity, concurrent validity) and reliability (e.g., test-retest reliability, inter-rater reliability) [37]. In addition, the questionnaire asked participants to provide information about their services in the previous fiscal years. This may have resulted in recall bias. Third, this study did not explore the details of the change in services, such as vaccination, between fiscal years 2019 and 2020. Fourth, the study did not investigate the associations between independent variables (e.g., characteristics of primary care units, numbers of COVID-19 cases) and dependent variables (i.e., the coverage of P&P services).

5. Conclusions

This study highlighted the importance of P&P services and changes in service provision that occurred before and during the COVID-19 pandemic. The coverage of P&P services among several target populations was higher during the pandemic. This contributed to a heavy workload for primary care units. Effective resource allocation, capacity building of primary care units and staff, and support from the government, as well as public and private sectors, are required to improve P&P service delivery by primary care units.

Declarations

Author contribution statement

Nuntaporn Klinjun, Apichai Wattanapisit, Supattra Srivanichakorn, Patcharin Pingmuangkaew: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents; materials, analysis tools or data; Wrote the paper.

Chutima Rodniam, Thanawan Songpraserth, Kannika Srisomthrong, Pornchanuch Chumphun, Pattara Sanchsuriya: Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data associated with this study has been deposited at https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/BK0KM8.

Declaration of interest’s statement

The authors declare no conflict of interest.

Additional information

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