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Evaluating Access to Dental Services in Primary Health Care Units: A Cross-Sectional Study of the Rotational Dentist Model in Rural Thailand

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Abstract:

Objective: To evaluate access to dental services and identify the associated factors following the implementation of a rotational dentist model in primary care units in rural Thailand.

Material and Methods: A cross-sectional study was conducted in seven Subdistrict Health Promoting Hospitals in Krasang District, Buriram Province. A total of 497 participants across six age groups were selected using proportional stratified random sampling. Data were collected through a validated questionnaire based on the five dimensions of access: availability, accessibility, accommodation, affordability, and acceptability. Chi-square tests and logistic regression identified predictors of service utilization.

Results: Most participants were female farmers with low household income and covered by the Universal Coverage Scheme. Overall, participants reported favorable access across all dimensions. Logistic regression showed that dental service utilization declined progressively with age, with utilization lowest among older adults ≥60 years (AOR=0.07; 95% CI: 0.02–0.23; p-value<0.001). Denture need was also positively associated with utilization (AOR=2.41; 95% CI: 1.30–4.47; p-value=0.005). Three access-related factors were strong predictors of utilization: awareness of service schedules (AOR=3.88; 95% CI: 2.40–6.28; p-value<0.001), awareness of basic services (AOR=9.50; 95% CI: 3.21–28.13; p-value<0.001), and ability to receive care without prior appointments (AOR=3.62; 95% CI: 1.96–6.69; p-value<0.001).

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Conclusion: The rotational dentist model showed better access across multiple dimensions in primary care. However, disparities in access to dental services remain, particularly among older adults. Addressing these inequities requires enhanced service awareness and more flexible appointment systems. These findings can inform community-based oral health strategies and support the development of equitable policies in rural Thailand.

Keywords: community dentistry, dental services, health services accessibility, primary health care, rotational dentist model

Introduction

Thailand's dental service system operates under a universal health coverage framework, emphasizing accessibility and equity across all population groups[1]. Dental services are delivered through a three-tiered structure: primary care at Subdistrict Health Promoting Hospitals (SHPHs), secondary care at district hospitals, and tertiary care at provincial or regional hospitals[2]. At the secondary and tertiary levels, full-time dentists provide both general and specialized treatments. However, no full-time dentists are stationed at SHPHs, where services are primarily delivered by dental public health officers—also known as dental nurses—who mainly provide preventive care and basic treatments such as oral health education, scaling, simple extractions, and fillings. Their limited scope of practice, equipment, and legal authority restricts the management of more complex needs[3].

To strengthen service delivery and coordination, Thailand introduced the Contracted Units of Primary Care (CUPs), which link district hospitals with their affiliated SHPHs[1]. CUP-Krasang in Buriram Province includes Krasang District Hospital and 17 SHPHs. In 2020, building on this framework and responding to local challenges, CUP-Krasang implemented a rotational dentist model. Under this initiative, hospital-based dentists rotate weekly to SHPHs to collaborate with dental public health officers and deliver procedures beyond routine care, such as removable dentures. Although unique to this district, the model reflects national priorities outlined in Thailand's Oral Health Service Plan[2] and aligns with global strategies that promote the decentralization of care[4]. However, empirical evidence on its impact on access to dental services at the primary care level remains limited.

Despite its policy relevance, the lack of such evidence represents a critical research gap. Previous reviews have emphasized the potential of rotational service delivery to reduce inequities in rural populations[5], yet few studies have rigorously evaluated its outcomes. Internationally, studies of rotational or visiting health service models in rural and primary care settings have reported mixed results—showing improvements in service reach, but persistent challenges related to continuity of care, patient awareness, and logistical constraints[6]. Situating the Thai experience within this global discourse underscores the importance of generating local evidence.

In addition, multiple individual and contextual factors—such as age, socioeconomic status, income sufficiency, and prosthodontic treatment needs—are known to influence the utilization of dental services in rural populations[7]. These determinants may interact with the five dimensions of access described by Penchansky and Thomas—availability, accessibility, accommodation, affordability, and acceptability[8]—shaping patterns of service use across groups. Understanding these determinants alongside access dimensions provides the rationale for this study.

This study aimed to evaluate access to dental services in SHPHs under CUP-Krasang following the implementation of the rotational dentist model. Specifically, it sought to identify factors associated with service utilization among rural residents. By applying Penchansky

and Thomas's framework[8], this study provides empirical evidence to inform both national and international policy discussions on strengthening primary oral health care and addressing inequities in rural populations.

Material and Methods

Study design and setting

A cross-sectional descriptive study was conducted between August and November 2023 in the primary care setting of CUP-Krasang, Buriram Province, Thailand. Data were collected from seven SHPHs where the rotational dentist model had been implemented.

Participants and eligibility criteria

Participants were residents listed in the household registry or those who had continuously lived in the catchment areas of SHPHs for at least three years (from 2020 onward). Individuals were eligible if they were able to provide information directly or via caregivers (for children aged 0–12 years). Exclusion criteria were the inability to communicate or complete the interview.

Sample size and sampling

Sample size was calculated using two approaches: (1) a single-proportion formula based on the average proportion of dental service users at the seven SHPHs in 2022 (P=0.53, N=14,185, d=0.05), yielding 379, and (2) rules of thumb for logistic regression were applied. With 16 predictors (5 personal and 11 access-related factors), Green's guideline recommends N>50 + 8 m (178) or N >104+m (120), and 10–30 cases per predictor suggests 160–480 participants. Thus, a target of ~490 was sufficient. The final sample included 497 participants[9].

A two-stage proportional stratified random sampling technique was employed. In the first stage, the sample size was proportionally allocated across the seven SHPHs according to the number of dental service users recorded in the previous year. In the second stage, participants within each SHPH were stratified into six age groups, and the sample was further allocated proportionally to reflect the age distribution of the local population. In total, 497 participants were included in the study, with the following age-group distribution:

1. Preschool children (0–5 years): 30 participants (6.0%)

2. Primary school-aged children (6–12 years): 62 participants (12.5%)

3. Adolescents and early working-age adults (13–24 years): 67 participants (13.5%)

4. Middle working-age adults (25–39 years): 88 participants (17.7%)

5. Late working-age adults (40–59 years): 129 participants (26.0%)

6. Older adults (≥60 years): 121 participants (24.3%)

Data collection and measurement

Data were collected through face-to-face structured interviews conducted at SHPHs or village halls. The questionnaire comprised seven sections covering the following domains:

1. Demographic information: residence status, sex, age, marital status, occupation, highest educational attainment, annual household income, income sufficiency, health insurance scheme, underlying health conditions, and denture needs.

2. Utilization of dental services: defined as having received dental care at SHPHs within the past three years, coinciding with the implementation of the rotational dentist model. For uncertain responses, clinical records were reviewed to verify service history.

3. Availability factors: awareness of dental service schedules (yes/no), awareness of available dental procedures (e.g., basic services, denture services; yes/no), and awareness of dentist availability at SHPHs (yes/no).

4. Accessibility factors: Perceived travel convenience, including travel time, ability to travel independently (yes/no), and overall convenience of transportation (Likert 0–4).

5. Accommodation factors: perceived service flexibility, including ability to receive care without prior appointments (never/sometimes/always), perceived responsiveness of the service system when a dentist is present (unchanged/increased), and satisfaction with the overall SHPH service system (Likert 0–4).

6. Affordability factors: financial concern about paying (yes/no) and previous experiences related to payment for dental services at SHPHs (yes/no).

7. Acceptability factors: users' perceptions of service quality and provider attitudes, assessed through overall satisfaction with SHPH services (Likert 0–4) and perceived quality of care compared to hospital-based services (better/same/worse).

Validity and reliability

The questionnaire was content-validated by three experts (IOC≥0.67) and pilot-tested with 30 participants at a comparable SHPH. Internal consistency was high (Cronbach's α=0.86). Interviewers (the researcher and trained assistants) underwent standardized training to minimize interviewer bias.

Ethical considerations

Written informed consent was obtained from all participants or their caregivers prior to data collection. Ethical approval was granted by the Human Research Ethics Committee, Faculty of Dentistry, Prince of Songkla University (EC6604-028, May 23, 2023).

Data analysis

Data were analyzed using IBM Statistical Package for the Social Sciences (SPSS) Statistics version 23. Descriptive statistics (frequency, percentage, mean±S.D.) summarized participant characteristics and access dimensions. Bivariate associations were assessed using chi-square tests. Variables with p-value<0.05 were subsequently entered into a binary logistic regression model (Enter Method). Sociodemographic confounders (age, sex, education, income) were controlled. Model performance was assessed using Nagelkerke R^2. Odds ratios (ORs) with 95% confidence intervals (CIs) were reported. Each access dimension was analyzed at the item level rather than by creating composite or mean scores, and significant individual items were subsequently entered into the regression analysis. To further examine age-specific differences in access, the access-related predictors that were statistically significant in the logistic regression model were selected for subgroup analysis and compared across age groups.

Results

A total of 497 participants were included in the study, with a mean age of 38.77±22.76 years. The majority were female (76.7%) and married (62.6%). Most participants were farmers (50.7%), had completed primary education (44.3%), and reported an annual household income below 40,000 THB (53.2%). Regarding household income sufficiency, 58.1% indicated insufficiency. Most participants (85.3%) were covered by the Universal Coverage Scheme, and 26.2% reported having an underlying health condition. More than half (53.7%) resided in areas where a rotational dentist visited once a week, and 22.5% expressed a need for dentures (Table 1).

Table 1 General characteristics of participants (n=497)

General characteristics (n=497)	Number (%)
Age	
Mean±S.D.	38.77±22.76
Sex	
Female	381 (76.7)
Male	116 (23.3)

Table 1 (continued)

General characteristics (n=497)	Number (%)
Marital status*	
Single	128 (25.8)
Married	311 (62.6)
Widowed/divorced	58 (11.7)
Occupation*	
None	53 (10.7)
Farmer	252 (50.7)
Government officer	13 (2.6)
Self-employed	59 (11.9)
Employee	64 (12.9)
Student	56 (11.3)
Highest educational attainment*	
No formal education	17 (3.4)
Primary education	220 (44.3)
Secondary/vocational	191 (38.4)
Diploma/high vocational certificate	14 (2.8)
Bachelor's degree or higher	55 (11.1)
Annual household income (THB)	
0-20,000	137 (27.6)
20,001-40,000	127 (25.6)
40,001-60,000	71 (14.3)
60,001-80,000	30 (6.0)
≥80,001	132 (26.6)
Household income sufficiency*	
Insufficient	289 (58.1)
Sufficient without savings	133 (26.8)
Sufficient with savings	75 (15.1)
Health insurance scheme	
Universal coverage scheme	424 (85.3)
Social security	35 (7.0)
Civil servant medical scheme	38 (7.6)
Underlying health condition	
No	367 (73.8)
Yes	130 (26.2)
Rotational dentist service at nearby SHPHs	
1 day/week	267 (53.7)
2 days/week	230 (46.3)
Need for dentures	
No need	385 (77.5)
Need present	112 (22.5)

*Data reported by parents (for age groups 0–5 and 6–12 years)
SHPHs=subdistrict health promoting hospitals

Access to dental services was assessed across the five dimensions of access (Table 2). In terms of availability, 63.8% of participants were aware that dentists visited SHPHs, 48.7% were aware of the service schedule, 88.3% knew about basic dental services, and 55.1% were aware of prosthodontic services. Regarding accessibility, 86.3% could travel independently to SHPHs, with an average travel time of 8.72 minutes and a perceived travel convenience score of 3.51 out of 4. In the accommodation, 33.4% reported being able to use services without prior appointments, and 73.6% expressed increased intention to visit when a dentist was present. Satisfaction with the service system was rated highly, with a score of 3.60 out of 4. For affordability, 20.3% expressed concerns about paying for services, although only 0.4% had actually experienced out-of-pocket expenses. Regarding acceptability, the overall satisfaction score was 3.61 out of 4, with 75.1% rating SHPH services as comparable to hospital services, 11.5% rating SHPHs better, and 13.5% favoring hospital services.

Chi-square analysis identified 13 variables significantly associated with dental service utilization at SHPHs; however, when entered into a binary logistic regression model to identify independent predictors, only 8 remained statistically significant (Table 3). Significant personal factors included age group (p-value<0.001), frequency of rotational dentist services (p-value=0.027), annual household income (p-value=0.004), household income sufficiency (p-value<0.001), and need for dentures (p-value=0.049). In the availability dimension, awareness of dental service schedules (p-value<0.001) and awareness of basic dental services (p-value<0.001) were significantly associated with service utilization. For the accommodation dimension, the ability to receive care without appointments (p-value<0.001) also showed a significant association. No significant associations were found for variables in the accessibility, affordability, or acceptability dimensions. The final model demonstrated acceptable explanatory power, with a Nagelkerke R^2 of 0.501, indicating that approximately half of the variance in utilization was explained by the predictors.

Table 2 Access to dental services across 5 dimensions

Access to dental services (n=497)			Number (%)
Availability	Awareness of dentist visits at SHPHs		317 (63.8)
	Awareness of dental service schedules		242 (48.7)
	Awareness of available dental procedures	Basic services	439 (88.3)
		Prosthodontic services	274 (55.1)
Accessibility	Ability to travel independently to SHPHs		429 (86.3)
	Mean travel time (minutes)		8.72
	Perceived travel convenience (score 0–4)		3.51
Accommodation	Ability to receive care without prior appointments	No/must book in advance	131 (26.4)
		Sometimes	200 (40.2)
		Always	166 (33.4)
	Perceived service responsiveness when dentist is present	Unchanged	131 (26.4)
		Increased intention to visit	366 (73.6)
	Satisfaction with SHPHs service system (score 0–4)		3.60
Affordability	Concern about paying for services		101 (20.3)
	Experience of having paid		2 (0.4)
Acceptability	Overall satisfaction with SHPHs services (score 0–4)		3.61
	Perceived quality of care compared to hospital	SHPHs better	57 (11.5)
		About the same	373 (75.1)
		Hospital better	67 (13.5)

The data in this table represent aggregated responses from all participants (n=497), not disaggregated by age group
SHPHs=subdistrict health promoting hospitals

Logistic regression analysis showed that participants aged 13–24 years (AOR=0.25; 95% CI: 0.08–0.84; p-value=0.025), 25–39 years (AOR=0.13; 95% CI: 0.05–0.38; p-value<0.001), 40–59 years (AOR=0.11; 95% CI: 0.03–0.33; p-value<0.001), and ≥60 years (AOR=0.07; 95% CI: 0.02–0.23; p-value<0.001) were significantly less likely to utilize services compared to those aged 0–5 years. Participants living in subdistricts where rotational dentist services were provided two days per week were more likely to utilize services than those with only one day per week (AOR=1.86; 95% CI: 1.19–2.92; p-value=0.007). Regarding financial factors, participants with an annual household income between 20,001–40,000 THB were significantly less likely to use services compared to those earning less than 20,000 THB (AOR=0.26; 95% CI: 0.13–0.52; p-value<0.001), as were those earning between 60,001–80,000 THB (AOR=0.29; 95% CI: 0.10–0.85; p-value=0.024). In contrast, participants who reported having sufficient income without savings were more likely to utilize services (AOR=2.71; 95% CI: 1.55–4.69; p-value<0.001). Additionally, participants who reported needing dentures had higher odds of utilizing dental services (AOR=2.41; 95% CI: 1.30–4.47; p-value=0.005).

In terms of availability, participants who were aware of dental service schedules (AOR=3.88; 95% CI: 2.40–6.28; p-value<0.001) and those aware of basic dental services provided at SHPHs (AOR=9.50; 95% CI: 3.21–28.13; p-value<0.001) were significantly more likely to utilize services. For accommodation, the ability to access services without prior appointments was also a strong predictor of utilization (AOR=3.62; 95% CI: 1.96–6.69; p-value<0.001).

Age-specific analysis was conducted to further examine differences in access-related predictors and service utilization across age groups (Table 4). This analysis focused on the three access-related predictors—awareness of dental service schedules, awareness of basic dental services, and the ability to access services without prior appointments—that were identified as statistically significant predictors of utilization in the logistic regression model.

Table 3 Factors associated with dental service utilization

Factors associated with dental service utilization	Received dental services at SHPHs (%)				p-value (χ^2)**	AOR	95% CI	p-value (logistic regression)***
	Never used		Ever used					
Age[a] (years)								
0–5	10	(33.3)	20	(66.7)	<0.001*	Ref.		
6–12	18	(29.0)	44	(71.0)		1.50	0.50–4.47	0.471
13–24	39	(58.2)	28	(41.8)		0.25	0.08–0.84	0.025*
25–39	54	(61.4)	34	(38.6)		0.13	0.05–0.38	<0.001*
40–59	75	(58.1)	54	(41.9)		0.11	0.03–0.33	<0.001*
≥60	84	(69.4)	37	(30.6)		0.07	0.02–0.23	<0.001*
Rotational dentist service at SHPHs[a]								
1 day/week	163	(61.0)	104	(39.0)	0.027*	Ref.		
2 days/week	117	(50.9)	113	(49.1)		1.86	1.19–2.92	0.007*
Annual household income[a] (THB)								
0–20,000	79	(57.7)	58	(42.3)	0.004*	Ref.		
20,001–40,000	87	(68.5)	40	(31.5)		0.26	0.13–0.52	<0.001*
40,001–60,000	31	(43.7)	40	(56.3)		0.65	0.29–1.40	0.288
60,001–80,000	18	(60.0)	12	(40.0)		0.29	0.10–0.85	0.024*
≥80,001	65	(49.2)	67	(50.8)		0.59	0.29–1.23	0.162
Household income sufficiency[a]								
Insufficient	181	(62.6)	108	(37.4)	<0.001*	Ref.		
Sufficient without savings	53	(39.8)	80	(60.2)		2.71	1.57–4.69	<0.001*
Sufficient with savings	46	(61.3)	29	(38.7)		0.85	0.43–1.70	0.649
Need for dentures[a]								
No need	226	(58.7)	159	(41.3)	0.049*	Ref.		
Need exists	54	(48.2)	58	(51.8)		2.41	1.30–4.47	0.005*
Awareness of dental service schedules[b]								
Unaware	184	(72.2)	71	(27.8)	<0.001*	Ref.		
Aware	96	(39.7)	146	(60.3)		3.88	2.40–6.28	<0.001*
Awareness of available basic dental services[b]								
Unaware	53	(91.4)	5	(8.6)	<0.001*	Ref.		
Aware	227	(51.7)	212	(48.3)		9.50	3.21–28.13	<0.001*
Ability to receive care without appointments[c]								
No/must book in advance	96	(73.3)	35	(26.7)	<0.001*	Ref.		
Sometimes	115	(57.5)	85	(42.5)		1.69	0.94–3.04	0.083
Always	69	(41.6)	97	(58.4)		3.62	1.96–6.69	<0.001*

*Significant difference (p-value<0.05) **Pearson chi-square ***Binary logistic regression
[a]Personal factors, [b]Availability factors, [c]Accommodation factors
SHPHs=subdistrict health promoting hospitals, AOR=adjusted odds ratio, CI=confidence interval, THB=Thai Bath

Children aged 6–12 years demonstrated the highest rate of service utilization at SHPHs (71.0%), while the lowest was observed among older adults aged ≥60 years (30.6%) (p-value<0.001). In terms of availability, awareness of dental service schedules was highest among those aged 40–59 years (62.0%) and lowest in the 13–24 years group (23.9%) (p-value<0.001). Similarly, awareness of basic dental services was lowest among the 13–24-year

Table 4 Age-specific comparison of access-related predictors of dental service utilization

Access Item	Age group (categorized age ranges, %)							p-value
	0–5 yrs	6–12 yrs	13–24 yrs	25–39 yrs	40–59 yrs	≥60 yrs	Total	
Received dental services at SHPHs	20 (66.7)‡	44 (71.0)‡	28 (41.8)	34 (38.6)	54 (41.9)	37 (30.6)†	217 (43.7)	<0.001*
Awareness of dental service schedules[a]	17 (56.7)	32 (51.6)	16 (23.9)†	49 (55.7)	80 (62.0)‡	48 (39.7)	242 (48.7)	<0.001*
Awareness of available basic services[a]	27 (90.0)	55 (88.7)	56 (83.6)†	75 (85.2)	122 (94.6)‡	104 (86.0)	439 (88.3)	0.161
Ability to receive care without appointments[b]	9 (30.0)	20 (32.3)	13 (19.4)†	33 (37.5)	43 (33.3)	48 (39.7)‡	166 (33.4)	0.110

SHPHs=subdistrict health promoting hospitals, yrs=years
*significant difference (p-value<0.05) chi-square/one-way ANOVA
[a]availability factors, [b]accommodation factors
†Indicates notably low values compared to other age groups, ‡Indicates notably high values compared to other age groups

group (83.6%) and highest among adults aged 40–59 years (94.6%), although the difference was not statistically significant (p-value=0.161). Regarding accommodation, the ability to access services without appointments was lowest in the 13–24-year group (19.4%) and highest among those aged ≥60 years (39.7%), though this difference did not reach statistical significance (p-value=0.110).

Discussion

This study assessed access to dental services in primary health care settings following the implementation of a rotational dentist model in rural Thailand. The findings showed generally favorable access across all five dimensions—availability, accessibility, accommodation, affordability, and acceptability. Nonetheless, disparities persisted across age groups and socioeconomic strata, underscoring the need for targeted improvements in dental service delivery[5]. Importantly, the age distribution of participants was comparable to that of the local population, suggesting that the sample was representative of the community and thereby enhancing the external validity of the findings.

In terms of availability, awareness of dental service schedules and available dental procedures appeared to be important determinants of utilization at SHPHs. Participants who were aware of service schedules and basic dental services were more likely to seek care. These findings align with previous research emphasizing the role of community-level information dissemination in promoting service uptake[10]. However, awareness was lowest among adolescents (13–24 years), highlighting a communication gap that could be addressed by leveraging school-based networks, social media, and peer-driven strategies to increase service visibility among younger populations[11,12].

Accessibility was rated favorably, with minimal geographic barriers and short average travel times. The rotational dentist model seemed to contribute to reducing travel barriers, which is consistent with global strategies that endorse rotating workforce models and mobile clinics to strengthen primary care delivery in remote populations[6,13]. Slightly lower levels of independent travel among older adults likely reflected age-related mobility limitations, indicating the need for supportive measures such as community-based transportation or home-visit programs.

Such adaptations are consistent with international best practices for addressing rural dental deserts[14].

Accommodation appeared to be an important factor in dental service utilization at SHPHs. Participants who could access services without prior appointments were more likely to use them, underscoring the importance of organizational flexibility in rural healthcare settings[15]. Older adults (≥60 years) appeared most responsive to walk-in opportunities, while adolescents were least responsive. This suggests the importance of tailoring communication and scheduling systems across age groups and aligns with the principle of person-centered design, which emphasizes structuring healthcare services around the needs, preferences, and life contexts of diverse users rather than standardized approaches[16,17].

Affordability did not present a substantial barrier, as almost no participants incurred out-of-pocket costs—consistent with Thailand's Universal Health Coverage policy[2,18]. Interestingly, income sufficiency rather than absolute household income was a stronger predictor of service use, suggesting that subjective financial security may play an important role in care-seeking behavior[19]. This pattern has also been observed in international studies examining socioeconomic inequalities in health service utilization[9,20].

Acceptability was rated positively overall, with most participants expressing satisfaction with SHPH services and perceiving them as comparable to hospital care. Yet, low utilization among older adults persisted despite favorable perceptions, suggesting that positive attitudes alone may be insufficient to overcome structural or physical barriers such as dependence on caregivers or reduced perceived treatment needs[21]. Similar challenges have been noted in studies from other countries, indicating that oral health service access for aging populations is a global issue[20].

Beyond these access dimensions, age-specific analysis provided further insights. Preschool-aged (0–5 years) and primary school-aged children (6–12 years) showed the highest utilization rates, while working-age adults (25–59 years) and older adults were less likely to use services at SHPHs. This contrasts with global patterns, where younger populations often underutilize dental services[22]. In Thailand, however, national oral health policies and performance indicators have long emphasized early prevention through early childhood programs and school-based initiatives[23,24]. This prevention-oriented framework likely contributed to the high utilization observed among young children. In contrast, working-age adults may face time constraints and competing responsibilities, while older adults may encounter structural and mobility-related barriers that limit access[25].

The findings suggest several policy implications. Service visibility should be reinforced through the clear communication of schedules and available treatments. Flexible systems—such as walk-in opportunities or telehealth support—could enhance responsiveness more effectively than simply extending hours[26]. Standardized communication channels, adequate staffing and equipment at SHPHs, and interprofessional collaboration are also needed to reduce persistent inequities, particularly for adolescents and older adults, where disparities remain evident[27]. While Thailand's Universal Coverage Scheme and decentralized service delivery have reduced physical and financial barriers[1], inequities persist across age and socioeconomic groups, requiring more tailored interventions.

This study has limitations. The cross-sectional design precludes causal inference, and the observed associations should be interpreted as descriptive. Reliance on self-reported data may introduce recall or social desirability bias. Although the sample was representative of the study area, the findings may not be generalizable to all rural regions.

Future research should examine the long-term sustainability of rotational dentist models and test

interventions tailored to different age and income groups. Innovative approaches—such as mobile dental clinics, digital health promotion, and tele-dentistry—also warrant exploration for their potential to reduce inequities and expand reach in underserved populations. Comparative studies across regions or countries implementing rotational or mobile workforce models could further situate the Thai experience in a broader international perspective[2].

Conclusion

The rotational dentist model was associated with better access to dental services across multiple dimensions in rural primary care. Key factors influencing utilization included age, frequency of rotational dentist services, household income and income sufficiency, denture needs, awareness of service schedules and basic services, and the ability to receive care without prior appointments. Despite reduced physical and financial barriers under universal coverage and decentralized delivery, disparities in access to dental services remain, particularly among older adults. To ensure equitable and sustainable oral health care, future efforts should prioritize clear communication, flexible scheduling, and interprofessional collaboration among dental, primary care, and community health personnel. These findings provide evidence to support community-based oral health strategies and guide policy development in rural Thailand.

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Conflict of interest

There are no conflicts of interest to declare.

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