

# Economic burden of becoming a dentist in developing country

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## Article

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# Abstract

**Objectives:** To determine the financial expenses incurred over the duration of the undergraduate dental course in Thailand

**Methods:** A cross-sectional survey was conducted among all 658 dental undergraduates in Mahidol University, Thailand. Data were collected through the self-administered questionnaire, including (1) "Background": household income, hometown, and residence during study, financial source(s), (2) "Expenses": *Living costs* including foods, transportations, rents, utility bills, and recreational expenses; *Education-related expenses* including textbooks, stationeries, uniforms, and student activities fees.

A cost-median was used as a representation of the actual cost of each item. The mean differences of all expenses between groups before estimation was assessed by analysis of variance (ANOVA). The statistically significant difference was at  $p < 0.001$ .

**Results:** A higher proportion of the participants' families financially supported, with household income between THB50,001 - 100,000 (2,118.1 – 4,235 USD), while only 5% have additional funding. Students who rented accommodation spent significantly higher yearly expenses than those who were not ( $p < 0.001$ ). The estimated adjusted cost of becoming a dentist is THB1,265,027 (53,580 USD) and THB1,823,027 (77,214 USD) for students living at home and renting accommodation, respectively.

**Conclusion:** The cost of Thai dental education can be a significant financial burden, especially for students from disadvantaged socioeconomic status.

## Introduction

The financial burden is one of the main barriers to pursuing a dentistry career, especially for those from a socioeconomically disadvantaged background.<sup>1–3</sup> In Thailand, the government spends enormous money to subsidise public dental schools, which has raised the tuition fees to be comparatively very low compared to private universities.<sup>4</sup> The government also issued a policy for students to loan low-interest rates for tuition fees.<sup>5</sup> However, paying for their living expenses sometimes cannot be fully covered by that loan which is unaffordable for many average Thai families.

Consequently, the education cost in dentistry can be deprived an opportunity to pursue a dental career for qualified candidates from low-income families. These issues have been well-studied in other countries, including the USA, UK, Canada, and New Zealand.<sup>1,6–8</sup> While the high costs of dental education have been long-standing recognised, nevertheless, up until now, there is no systematic study that aims to evaluate the financial burdens of dental students that were stemmed from the cost of dental education in Thailand.

In Thailand, eighteen dental schools have produced around 500–700 registered dentists per year for the last decade. Faculty of Dentistry, Mahidol University, is one of Thailand's most prominent dental schools. Every year around 20% of all graduates are from Mahidol University.

Therefore, the goals are to explore the magnitude of dental students' financial burden and generate public interest in these financial issues. This study was conducted to determine the financial profile of Mahidol's dental students and the financial expenses they incurred over the six-year duration of their undergraduate dental course.

## Methods

A cross-sectional survey was conducted among all 658 dental undergraduate students in January 2016. The self-administered questionnaire was distributed to those students after classes. Confidentiality of information was strictly kept, and verbal consent was granted before filling out the questionnaire.

We developed a questionnaire-based survey to gather information for the investigation of dental students' financial situation. The questionnaire was organised into two major sections: Background and Expenses.

The "**Background**" section required respondents to indicate: The range of their household income, hometown and residence during the study, and source(s) of financial support.

The "**Expenses**" section required respondents to indicate the amounts they spend on: Living costs, including foods, transportation, rents, other living costs (utility bills, laundry), and social and recreational expenses; education-related expenses, including textbooks, stationeries, extra laboratory equipment,<sup>3</sup> uniforms, and student activities fees.

The expenses section was developed using expense categories from 'Thailand Household Socio-Economic Survey' as a reference,<sup>9</sup> and adjusted by a focus group discussion of twelve Mahidol dental students. Developed questionnaires were piloted on twenty dental students to

check the accuracy of questions understanding of respondents. The respondents were not required to provide names, ID numbers or any data that could reveal their identities.

Education Management Department, Faculty of Dentistry, Mahidol University, provided the data on tuition and license examination fees. The expenses are presented in Thai Baht (THB) and US dollar (USD), which were adjusted by Purchasing Power Parity (PPP) by Big Mac Index 2016.<sup>10</sup>

## Ethical Consideration

This study was received ethical approval by Faculty of Dentistry/Faculty of Pharmacy, Mahidol University, Institutional Review, Board (MU-DT/PY-IRB), project number 2015/DT076(COA.NO.MU-DT/PY-IRB2016/004070)

## Data Analysis

The actual expense of dental students can be challenging to assess. Besides the tuition fees, other costs are varied from student to student depending on their socioeconomic statuses (SES) and lifestyles. In order to avoid data upward distribution by the spending of wealthy students, we adopted a cost-median as a representation for the actual cost of each item.

There are significant differences in daily spending between the one who lives at home and the one who lives in rental accommodation (such as numbers and cost of a meal per day and daily transportation costs). To estimate the total cost of dental education, we divided dental students into two groups based on accommodation type during their years of study.

The analysis of variance (ANOVA) was employed to assess the mean differences of all expense variables between student groups before estimation. For example, the expense of food between classes of students in the same mode of accommodation was not significant differences except for the first-year student (due to different campuses) ( $p < 0.001$ ). Hence estimation of food expenditure was computed together in year 2-to-6 students in the same accommodation mode. In contrast, the first year's expense on food was estimated separately.

We also included the opportunity costs of an additional two years of study; this longer-than-normal duration of bachelor's degree study can be a significant burden for students' families. All statistical analysis was conducted on SPSS version 18.0.

## Results

We received complete information from 486 dental undergraduates of the Faculty of Dentistry, Mahidol University (75.0% response rate). The majority of students are females (71.8%). 87.9% came from Bangkok Metropolitan Region and municipal areas. The students are financially supported by their families, and household income between THB50,001–100,000 (2,118.1–4,235 USD) were a higher proportion among participants (Table 1).

Table 1  
Characteristics and Economic background (N = 486)

	N	%
<b>Total</b>	486	100%
<b>Gender</b>		
Male	137	28.2%
Female	349	71.8%
<b>Place of residence</b>		
Bangkok Metropolitan Region	310	63.8%
Provinces (Municipality)	117	24.1%
Suburb	59	12.1%
<b>Student year</b>		
Year 1	74	15.2%
Year 2	126	21.8%
Year 3	71	14.6%
Year 4	77	15.8%
Year 5	49	10.1%
Year 6	109	22.4%
<b>Source of financing</b>		
Fully Family	453	93.2%
Family support with Loan	12	2.5%
Family support with Scholarship	16	3.3%
N/A	5	1%
<b>Household income (THB)</b>		
< 10,000 (> 424 USD)	3	0.6%
10,000–15,000 (424–635 USD)	3	0.6%
15,001–30,000 (645.1–1,270 USD)	25	5.1%
30,001–50,000 (1,270.1–2,118 USD)	73	15.0%
50,001–100,000 (2,118.1–4,235 USD)	214	43.9%
> 100,000 (> 4,235 USD)	168	34.5%

THB: Thai Baht; USD: US Dollar; N/A Non- applicable

Table 2. Sources of Financial Support by Household Income (N = 23)

Household Income (THB)		Government Loan Fund	Others sources	Total
< 10,000	(< 424 USD)	1	0	1
10,000–15,000	(424–635 USD)	1	0	1
15,001–30,000	(645.1–1,270 USD)	5	1	6
30,001–50,000	(1,270.1–2,118 USD)	1	5	6
50,001–100,000	(2,118.1–4,235 USD)	2	1	3
> 100,000	(> 4,235 USD)	2	4	6
<b>Total</b>		12	11	23
THB: Thai Baht; USD: US Dollar				

## Financial support

All respondents received direct monetary support from their parents or relatives. Only twenty-three out of four-hundred-eighty-seven respondents (5.0%) obtain partial financial aid from other sources. The most common source of additional financial support is Student Loan Fund, the low-interest rate student loan by the government. Other students who got financial aid received a partial scholarship from various sources, such as a scholarship from their parents' workplaces or scholarships for a civil servant's child (Table 2). The support they got ranged from THB2,000 (62 USD) to THB60,000 (2,541 USD) with cost median THB30,000 (1,270 USD) (Table 3).

Table 3  
Amount of student loan or Scholarship (N = 23) (SD: Standard Deviation;  
SEM: Standard Error of Mean)

Descriptive values	Student loan and Scholarship per annum (THB)	
Min (THB)	2,000	(85 USD)
Max (THB)	60,000	(2,541 USD)
Mean(THB)	28,068	(1,189 USD)
Median(THB)	30,000	(1,270 USD)
SD	15,879	(672 (USD)
SEM	3,175	(134 USD)
THB: Thai Baht; USD: US Dollar		

## Yearly expense

Table 4 shows the estimated yearly expenses of two groups of dental students divided by mode of accommodation. The figure is given in four categories of expenses, i.e., living costs, tuition, other education-related expenses and license examination fee. The living cost and other education-related expenses were estimated by the sum of the median cost of all items in each category.

Table 4  
Yearly expense of dental student (N = 486)

Year	Accommodation	Living cost		Tuition fee		Other education-related expense		License Exam Fee		Total Yearly Expense		Yearly Expense: Average Thais Household yearly Expenditure (%)†
		THB	(USD)	THB	(USD)	THB	(USD)	THB	(USD)	THB	(USD)	
1	Home	N/A		N/A		N/A		N/A		N/A		N/A
	Rental	162,294	6,873	29,550	1,252	6,638	281	0	0	198,482	8,406	78.2%
2	Home	103,800	4,396	28,000	1,185	4,000	169	0	0	135,800	5,752	53.5%
	Rental	215,400	9,123	28,000	1,186	4,000	169	0	0	247,400	10,479	97.5%
3	Home	103,800	4,396	27,600	1,169	7,195	305	0	0	138,595	5,870	54.6%
	Rental	215,400	9,123	27,600	1,169	7,195	305	0	0	250,195	10,597	98.6%
4	Home	103,800	4,396	29,000	1,228	12,900	546	3,000	127	148,700	6,298	58.6%
	Rental	215,400	9,123	29,000	1,228	12,900	546	3,000	127	260,300	11,024	102.6%
5	Home	103,800	4,396	28,600	1,211	5,150	218	0	0	137,550	5,826	54.2%
	Rental	215,400	9,123	28,600	1,211	5,150	218	0	0	249,150	10,552	98.2%
6	Home	103,800	4,396	29,800	1,262	7,300	309	5,000	211	145,900	6,179	57.5%
	Rental	215,400	9,123	29,800	1,262	7,300	309	5,000	211	257,500	10,906	101.5%
†Compared with average Thais household yearly expense form Thai National Household Survey 2016; conducted by National Statistic Office												
THB: Thai Baht; USD: US Dollar; N/A: Non-applicable												

The student who had to reside in a rental accommodation spent significant higher yearly spending than those who lived at home [99% confidence interval,  $t(9) = -9.572$ ,  $p < 0.001$ ]. Overall, the yearly expense of fourth and six-year students are relatively high compared to other classes due to an increase in other educational-related expenses (clinical uniforms for fourth-year and laboratory equipment costs for sixth-year students). Tuition fees can be considered a minor expense; they accounted for 19.5–20.8% of yearly expenses for the student who lived at home and only 11.41–14.89% of yearly expenses for those who lived in rental accommodation.

## Cost of becoming a dentist

An estimated total expense that a dental student has to pay for six years is THB905,027 (38,332 USD) and THB1,463,027 (61,966 USD) for the student who mainly resides at home and in rental accommodation, respectively. The opportunity cost of the extra additional two years of bachelor's degree studying has been included. We used the minimum wage for a bachelor's degree graduated civil servant in Thailand<sup>11</sup>, which is THB15,000 (635 USD) per month, as a reference; as a result, the adjusted estimation are THB1,265,027 (53,580 USD) and THB1,823,027 (77,214 USD) for the student who lived at home and rental accommodation, respectively (Fig. 1).

## Discussion

Surprisingly, in dental education, tuition fees amount to minor expenses. The significant expense is the living cost which can be considered extremely expensive. The fact that the Faculty of Dentistry, Mahidol University, is in central Bangkok and there is no University dormitory for students also profoundly affected the cost that the stay-in-rental students have to pay. The average yearly expenditure of a Thai Household is 253,728 THB (10,747 USD)<sup>9</sup>. In comparison, the estimated spending of a dental student (living cost only) amounts to 135,800 – 148,700 THB (5,693–6,235 USD) per year for a student who lives at home and 198,482 – 260,300 THB (8,406–11,024 USD) per year for a student who resided in rental accommodation. As could be seen, the yearly expense of being a dental student is at least more than 54.2% of a yearly expenditure of an average Thai household. This higher-than-normal expenditure can be catastrophic for the entire family. Therefore, we can imply that average Thai families cannot afford to pay the cost of dental education, even in public universities. Additionally, only 5.0% of students had additional financial support, and 65 per cent of students who received (or seek for) financial aid came from families with household incomes above THB30,000. This data poses the question of the availability and appropriateness of education financial support schemes.

Arguably, the estimated cost in this study might reflect the cost of general higher education in Thailand since there is no comparison with a student's expenses in other faculties. Although the findings have some uniqueness, such as the high cost of clinical uniforms and laboratory equipment, further study is needed to determine the differences between the cost of general higher education and dental education in Thailand.

The high cost of medical and dental education is recognised internationally.<sup>1,8,12</sup> Most common consequence of the high cost of medical and dental education is the potential of massive student debt, which has been an issue in developed countries such as the United States of America, United Kingdom, Canada, and New Zealand for decades.<sup>1,13-16</sup> Student debt can negatively affect dental students, dental schools, individual dentists, and the profession. For example, potential student debt could affect the students' choice of dental school because some of them could not afford the rent if they enrol in a school far from their residents<sup>1</sup>. Student debt can also determine the career choices of dental graduates; for instance, they would be less likely to work in a rural area, primary care sector or academic.<sup>1,14,17,18</sup> Moreover, it can potentially affect the clinical practices of dentists in debt by conveying overbill and overtreatment.<sup>8</sup>

Another significant effect of the high cost of medical and dental education is skewing socioeconomic diversity of the dental and medical workforce<sup>7</sup>. No studies in Thailand have been conducted on the causes and effects of this phenomenon. In contrast, reports from other countries have suggested that reduced diversity in medical and dental schools can adversely affect the medical care of underserved populations. For example, the evidence from the USA has suggested that a more diverse background of medical students promotes a greater understanding of others from various sociocultural backgrounds, thereby enhancing their ability to provide healthcare to people with different backgrounds.<sup>19,20</sup> Physicians from a minority group are more likely to work in underserved communities<sup>19,20</sup>, which is a desirable outcome for the healthcare system.

Students from disadvantaged backgrounds are also found underrepresented in our study. A low proportion of students from a household income of less than THB30,000 (1,270 USD) per month, 6.4% of respondents fall in this category compared to 73.3% of average Thai households falling in the same class (Table 5).

Table 5  
Monthly household income of dental students and the national average. (N = 486)

Monthly Household Income (THB)		No. of Dental Students (%)	National (%)
< 10,000	(< 424 USD)	3 (0.61%)	20.9%
10,000–15,000	(424–635 USD)	3 (0.61%)	18.6%
15,001–30,000	(645.1–1,270 USD)	25 (5.13%)	33.8%
30,001–50,000	(1,270.1–2,118 USD)	73 (14.98%)	15.6%
50,001–100,000	(2,118.1–4,235 USD)	214 (43.94%)	8.9%
> 100,000	(> 4,235 USD)	168 (34.50%)	2.3%
THB: Thai Baht; USD: US Dollar; No.: Number			

Inequity in access to public dental school can be the consequence of the high cost of dental study, which affects career choices of high school graduates<sup>12,21</sup> or enrolment method, which mainly relies on academic achievement<sup>7,22</sup>, which is in favour of students from an affluent background.<sup>23,24</sup>

However, there were some limitations in this study. The fact that 78.5% of participated dental students came from two richest deciles of the Thai population might overestimate the cost of dental education in our study. Another limitation was that we estimated the total cost of six years in dental school by the yearly expenses of each student class. In a real-life situation, one student has to spend six years in dental school. Therefore, their living cost will be affected by the inflation rate. However, the data Ministry of Commerce indicates the average inflation rate in Thailand in the past ten years at around 1.3%<sup>25</sup>. Hence our estimations are not far deviated from the actual figures.

Even though the government has provided very low-interest student loans for the entire length of the studying duration, the maximum amount of loan a dental student can take out<sup>5</sup> is significantly lower than the current costs of dental education. There is a need to increase support from governmental and non-governmental sources for more bursaries, scholarships, and interest-free loans for dental students. Needs-based financial assistance would greatly assist many prospective students, especially those from lower SES, to pursue a dental education and help them to reduce their financial hardship.

Tuition fees of public dental schools are low compared to other countries<sup>6,26</sup>. Still, this can be a financial barrier for a student from a disadvantaged background to enter a dental career. The rising tuition fee should be minimised to avoid the adverse effect of the high tuition fee

mentioned above. It is particularly crucial because transforming into autonomous universities of public universities in Thailand can consequently increase tuition fees, including dental faculties.<sup>27</sup> The fact that the Dental Faculty Consortium of Thailand agreed to raise tuition fees of all public dental schools to THB100,000 (4,193 USD) per years<sup>28</sup> will soon turn tuition fees into a significant barrier for students from disadvantaged backgrounds.

The diversity of students' SES in dental school should be acquired more attention even though the effects of inequitable SES on dental students in the Thai context need more understanding and further study. However, from a social justice viewpoint, providing equitable access to students from underrepresented backgrounds is the obligation of public dental schools subsidised by taxpayers. A particular enrolment track should include SES background in the criteria, and the dental school enrolment method should take account of factors other than academic performance. We understand this issue possesses high political quality since providing an advantage for poor students can impair the right of other students and assessing student background is a complicated task. Yet, we think this issue is worth mentioning to ignite more debate about the societal implications of future dental and healthcare professional education.

## Conclusion

In summary, the cost of dental education in Thailand can be a significant financial burden, especially for students from disadvantaged SES. The effects of the high cost of dental study in the Thai context warrant further study, as well as the causes and consequences of inequity and lack of diversity in dental education. This study was conceived to pose the outlook of the financial situation of students in dental school and provide a baseline for more in-depth analysis or research. We hope our study can create much-needed attention to this issue and provide a footprint for further studies, hopefully providing equal dental education opportunities for all Thai students.

## Declarations

### DECLARATION OF INTERESTS

All authors declare there are no conflicts of interest in relation to this study.

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## Figures

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### Figure 1

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