

Cost of medical education, financial assistance and medical school demographics in Singapore

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ABSTRACT

Introduction: Medical tuition fees have been rising in many countries, including in Singapore. No formal study has been conducted to evaluate the financial situation of medical students in relation to the cost of medical education in Singapore. This study was conducted to determine the financial profile of Singaporean medical students and the financial expenses they incur over the five-year duration of their undergraduate medical course.

Methods: A questionnaire study was conducted among Year one to Year five medical students in the Yong Loo Lin School of Medicine, National University of Singapore. The following quantifiable parameters were analysed: monthly household income, financial assistance, monthly allowances and expenses.

Results: 64.3 percent (735) of the 1,143 undergraduates completed the survey. 21.9 percent came from families with a monthly income of less than S\$3,000, with another 26.2 percent from families with monthly incomes of S\$3,000–S\$5,000. The total tuition fees for a five-year medical course amounted to S\$87,450. The average annual expenditure of medical students amounted to S\$4,470. 31.1 percent of respondents were on loans. 14.6 percent received scholarships or bursaries.

Conclusion: A five-year medical course can cost more than S\$100,000 and pose a significant financial burden for students. The proportion of students who came from lower-income families was lower in medical school than at the national level, while the proportion from high-income families was significantly higher than at the national level. A significant proportion of students took loans to pay for tuition, and a smaller percentage was under scholarships and

bursaries. More substantial financial assistance is required, particularly for students from lower-income families.

Keywords: education costs, medical education, medical student

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INTRODUCTION

Medical education is expensive worldwide. High tuition fees have translated into mortgage-sized debts for fresh graduates in Singapore and beyond.⁽¹⁻⁵⁾ Young doctors in Singapore can potentially accrue over S\$100,000 in debt over the course of their undergraduate medical training. This enormous financial burden is expected to have major implications on the accessibility of medical school to students from lower-income families,^(1,2,6,7) the socio-economic diversity of medical school,^(3,4) the choice of specialities,⁽⁸⁻¹²⁾ and the lifestyles of young doctors,^(1,8,10) as have been documented in other countries. University tuition fees have been rising in Singapore (Table I). A medical undergraduate who entered medical school in 2003 and graduated in 2008 would be required to pay S\$84,450 in tuition fees alone for his MBBS degree. In contrast, an undergraduate in any course other than Medicine and Dentistry pays S\$24,690 for a four-year course from 2003 to 2007, less than a third of what a medical undergraduate has to pay for his degree.

The various financial assistance schemes provided by the National University of Singapore (NUS) (Table II) are sufficient to provide a loan to cover up to 100% of the tuition fees. Assuming a medical undergraduate pays 90% of his tuition fees via the Tuition Fee Loan (TFL) and the remaining 10% via the NUS Study Loan, which also provides him with \$3,600 annually as a living allowance, he or she will accumulate a debt of S\$102,450 upon graduation. While there has been a long-standing recognition of the high costs of medical education within the medical fraternity, no formal study has been conducted to evaluate the financial situation of medical students in relation to the cost of medical education in Singapore to date. In contrast, these issues have been well-studied in

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Table I. A five-year trend of tuition fees per annum for an MBBS degree in NUS.

Academic year	Full tuition fee (S\$)	Government tuition grant (S\$)	Amount payable by student (S\$)
03/04	80,800	64,600	16,200
04/05	80,800	64,600	16,200
05/06	81,610	64,600	17,010
06/07	82,120	64,600	17,520
07/08	97,020	79,500	17,520

Table II. Financial aid schemes available in NUS (as of December 2006).

Title	Value	Eligibility	Interest rates	Term of repayment
NUS Tuition Fee Loan (TFL)	Up to 90% of tuition fees.	Most undergraduates.	Interest payment begins after graduation. Prime interest rates of DBS Bank and OCBC Bank. (5.88% p.a. as of June 2007).	20 years maximum.
Central Provident Fund (CPF) Education Scheme (CES)	Up to 100% of tuition fees. Up to 40% of the amount in a parent's or guardian's Ordinary CPF Account.	All full-time undergraduates.	Interest payment begins after graduation. Prime CPF interest rates (2.50% p.a. as of July 2007).	12 years maximum.
NUS Study Loan	Subdivided into a number of schemes. Up to 20% of tuition fees, with or without a living allowance of S\$3,600 p.a.	Financially needy undergraduates who have received financing between 80% and 100% of tuition fees under TFL, CES or Mendaki TTFS.	Interest payment begins after graduation. Prime interest rates of DBS Bank and OCBC Bank. (5.88% p.a. as of June 2007).	Between 5 and 20 years maximum, depending on scheme.
NUS Subsistence Loan	Varies according to the individual's financial circumstance.	Needy undergraduates who are in receipt of, or have been offered, a NUS bursary.	Interest-free.	3–5 years maximum.
Mendaki Tertiary Tuition Fee Subsidy (TTFS)	70%–100% of tuition fees.	Needy Malay undergraduates.	No repayment required.	–
Scholarships administered by NUS and YLL SoM	Varies. Maximum covers full tuition fees + living allowance.	Undergraduates who demonstrate all-rounded excellence.	No repayment required.	–
Bursaries administered by NUS and YLL SoM	Up to S\$3,600.	Financially needy medical undergraduates.	No repayment required.	–
Work-study assistance	Offered work on campus. Paid hourly.	Needy undergraduates who are in receipt of at least one financial aid scheme.	–	Not a bursary or loan.

NUS: National University of Singapore; YLL SoM: Yong Loo Lin School of Medicine

some other countries, including the USA, UK, Canada and New Zealand. In an attempt to shed some light on these issues in the local context and to generate interest in these issues, we embarked upon this study to examine some pertinent aspects of the financial situation of current medical students in October 2006.

METHODS

We developed a questionnaire-based survey to gather the information we required in order to investigate the

financial situation of medical students. The questionnaire was organised into two major sections, viz. Income and Expenses. The "Income" section required respondents to:

1. Indicate the range that their household income falls under. The ranges were similar to those used in the national household expenditure survey. Students were also asked to list the financial aid schemes they were in receipt of from a given list, with the option to include any that were not listed.
2. Specify their monthly allowance.

Table III. Response rate of medical students by class (year of study as of academic year 06/07).

Class	No. (%) of respondents
Year 1	95 (42.0)
Year 2	174 (76.3)
Year 3	179 (79.2)
Year 4	205 (88.0)
Year 5	82 (36.0)
Total	735 (64.3)

Table IV. Monthly household income of medical students and the nation.

Monthly household income (S\$)	No. (%) of medical students	National (%)
< 3,000	155 (21.9)	32.3
3,000–5,000	186 (26.2)	22.8
5,000–7,000	126 (17.8)	16.0
> 7,000	242 (34.1)	28.8

3. Indicate whether they are currently working to supplement their income, and if so, the number of hours they work per week, and their monthly income from their outside work.

The "Expenses" section required respondents to:

1. Indicate the amounts they spend on transportation, food, lodging (if they have to pay for their accommodation), phone bills, internet bills and textbooks.
2. Select from a list of medical instruments they own, e.g. ophthalmoscopes and stethoscopes.
3. Indicate any other expenses, e.g. medical bills.

We elected to maintain the anonymity of the respondents because of the sensitivity of some of the information. As such, respondents were not required to provide their names or identification numbers. However, for purposes of analysis, they were required to specify their current year of study. For non-clinical students, questionnaires were handed out to them when they were present together as a class during lectures. The forms were then collected after the purpose of the survey had been explained to the students. For the clinical students, the Associate Deans of the various teaching hospitals assisted in conducting of the survey and in the collection of the questionnaires.

Comparisons were made in terms of family income between the financial profile of respondents and the financial profile of the general Singaporean population, represented by the Key Household Income Trends 2006, a study conducted by the Singapore Department of Statistics.⁽¹³⁾ The Household Expenditure Survey (HES) was chosen as the representation for the national financial profile as it is the most comprehensive survey conducted at the national level that examines the income and expenditure of Singaporeans from every social stratum. A total of 1,009,500 households were involved in the HES. A comparison of various factors, including the proportions of students in each of the four ranges for family income, was also made across the five classes. Differences among groups were tested for statistical significance by applying the Student's *t*-test and the Fisher's Exact Test, and using the GraphPad Prism Programme (GraphPad Software, San

Diego, CA). A *p*-value of < 0.05 defined a statistically-significant result.

RESULTS

A total of 735 out of the 1,143 medical undergraduates from the NUS Yong Loo Lin School of Medicine completed the survey, accounting for a response rate of 64.3%. The number and proportion of respondents from each of the five classes are charted in Table III. The highest response rates were from students in Years four, three and two. The proportion of medical students and the Singapore population (data from the Key Household Income Trends Study 2006)⁽¹³⁾ in the various household income ranges are tabulated in Table IV. It can be observed that while 32.3% of Singaporean households have a monthly household income of < S\$3,000, a significantly lower proportion of medical students (21.9%) fall under this range (*p* < 0.001). At the other end of the spectrum, while 28.8% of Singaporean households have a monthly income of > S\$7,000, a much higher proportion (34.1%) of medical students fall under this range (*p* < 0.001).

The proportion of medical students in receipt of major financial assistance schemes is illustrated in Table V. The most widely used scheme is the NUS TFL, which is taken up by approximately one-quarter of the students. The scholarships and bursaries support much smaller proportions of the students, with the most generous being the Toh Kian Chui Scholarship and Bursary which covers close to two percent of the medical students overall. Most students function on an allowance of between S\$150 and S\$400 a month, which compares with an expenditure of about S\$330 a month, leaving relatively little for discretionary spending, such as examination fees, entertainment and ad hoc courses. The average monthly allowance of medical students is tabulated in Table VI, while average expenditure is detailed in Tables VII, VIII and IX.

Residential life on the medical school campus is no longer a key feature of clinical student life. As can be observed from Table IX, the proportion of students staying on the NUS Kent Ridge campus is higher among

Table V. Proportion of students under the various financial assistance schemes.

Financial assistance scheme	% of students
NUS Tuition Fee Loan	27.8
NUS Study Loan	4.4
Toh Kian Chui Scholarship/Bursary	1.9
Mendaki TTFS	1.5
Other scholarships/bursaries*	6.8
Other loans†	3.3

*includes the Singapore Armed Forces (SAF) Local Merit Scholarship (LMS), the NUS Scholarship, the OCBC Bank and UOB Scholarships and Bursaries, and miscellaneous scholarships and bursaries awarded by various corporate companies.

†includes mainly the CPF Education Scheme loan, and miscellaneous loans from the relatives of students.

the non-clinical students (Years one and two), and lower among the clinical students. This is most likely due to the distribution of medical student postings in all the restructured hospitals which means that living on campus in Kent Ridge is no longer more convenient for the clinical medical student. From Tables VII, VIII and IX, the basic annual cost of living for the average medical student is approximately \$4,000 and goes up to \$7,326 when including on-campus accommodation.

DISCUSSION

The high cost of medical education is a worldwide problem that is afflicting many countries. Singapore is no exception. In some countries, the costs of medical education are entirely government-funded as a form of social investment. Greece is one such country.⁽¹⁴⁾ However, most other countries require some cost contribution from the medical students. While the true cost of medical education can be difficult to assess,⁽¹⁵⁾ the effects of the high costs of medical education on students, the medical school and the medical profession have a number of societal implications, especially where there are significant taxpayer subsidies for medical education, as in Singapore. This study was conceived to paint an accurate picture of the financial situation of medical students in Singapore and provide a baseline from which more in-depth analyses or interventional studies can be conducted.

This study demonstrated that a large proportion of medical students come from families that are affluent. But a significant minority do not, with 21.9% of medical students coming from families with a monthly income of < S\$3,000. Comparing this figure with the 32.3% at the national level, it is apparent that the lower-income group is under-represented in medical school ($p < 0.01$). The converse is also true, with 34.1% of medical students coming from families with a monthly income > S\$7,000,

Table VI. Average monthly allowance of medical students.

Monthly allowance (S\$)	No. (%)	SEM (95%CI)
< 150	66 (10.65)	0.007 (9.31–11.99)
150–250	151 (24.35)	0.009 (22.49–26.21)
250–400	280 (45.16)	0.011 (43.00–47.32)
> 400	123 (19.84)	0.009 (18.11–21.57)

SEM: standard error of the mean; CI: confidence interval

greater than the 28.8% at the national level ($p < 0.01$). Multiple factors may be in play in bringing about this phenomenon, which warrants further study. High tuition fees may be an important deterrent for students from lower-income families. Indeed, studies in other countries have shown that the deterrent effect of high tuition fees cannot be underestimated.^(1,2,6,7) For instance, studies conducted in the US and Canada have shown that as tuition fees rose, the socioeconomic status of medical students was correspondingly elevated,^(1,16,17) and that schools with the lowest tuition fees attracted the greatest number of students from low socioeconomic backgrounds.⁽¹⁷⁾

The skewing of socioeconomic diversity in medical school is also worthy of attention. No studies have been conducted locally on the effects of this phenomenon, although there are reports of the adverse health effects of economic inequality in Singapore.⁽¹⁸⁾ Reports from other centres have suggested that reduced diversity in medical schools can have an adverse effect on the medical care of underserved populations. The advantages of socioeconomic diversity in medical students and the effects of the loss of this diversity have been demonstrated in a number of studies.^(7,19,20) We found that the amount of money a medical student required in the academic year 06/07 is conservatively estimated to range between S\$21,462.74 and S\$24,846.00. An extrapolation of these figures demonstrates that five years of medical education can conservatively cost between S\$107,313.70 and S\$124,230.00. This can pose a significant burden to low-income families. We emphasise the expression “conservative” because the list of expenses that were examined in this study is far from exhaustive. We restricted the list of expenses to those that were compulsory, for example, tuition fees, or for the most indispensable items so as to limit the variation due to the different lifestyles in the sample population.

While current financial assistance schemes can provide loans that can adequately cover the tuition fees and living expenses for students in need of financial assistance, the majority are not interest-free. What effects will this mortgage-sized debt have on the performance

Table VII. Average basic expenses of medical students.

Basic expenses	Amount (S\$)
Transport / month	105.82
Food / month	200.85
Textbooks / year	262.70

Table VIII. Proportion of students who pay phone and internet bills and average monthly amount.

Monthly bills	% of class	Amount (S\$)	SEM (95% CI)
Phone	30.75	36.57	0.010 (28.57–32.57)
Internet	13.2	43.86	0.007 (11.73–14.67)

*SEM: standard error of mean; CT: confidence interval

Table IX. Proportion of students who stay in on-campus accommodation and average cost per semester (inclusive of lunch and dinner).

Class	No. (%)	SEM (95% CI)	Cost (S\$) / semester
Year 1	19 (20.00)	0.009 (18.27–21.73)	1,428
Year 2	38 (17.24)	0.011 (35.90–40.10)	1,428
Year 3	11 (6.15)	0.007 (9.64–12.36)	1,428
Year 4	6 (2.93)	0.005 (4.97–7.03)	1,428
Year 5	2 (2.44)	0.003 (1.39–2.61)	1,428

*SEM: standard error of mean; CT: confidence interval

of medical students, or the career and lifestyle choices of young doctors? Again, more studies are warranted. From our data, a student who is in receipt of the various loan schemes begins his or her house-officership with a debt of more than \$100,000. With a repayment period of ten years and a prime interest rate of 5.88% per annum for the DBS Bank and OCBC Bank as the basis of computation, a young House Officer (HO) will be required to fork out approximately \$1,131 monthly for ten years in order to pay off his loan. For a HO whose monthly take-home salary is approximately \$2,500, almost half of his earnings will go towards the repayment of these education loans. This is likely to have a significant impact on the quality of life of these young medical graduates and their families.

Studies overseas have shown that students with high levels of debt are less likely to choose careers in primary care.⁽⁸⁻¹⁰⁾ A study in New Zealand showed that a significant proportion of junior doctors experienced increased levels of stress as a result of their student loans, and that their loan repayments made it more difficult to save for their future, impeded applications for other loans, and also influenced their decisions on whether to have children.⁽⁸⁾ Medical students who have higher levels of debt worry more about their finances and experience higher levels of stress.^(21,22) Again, the societal implications of these findings for Singapore need to be carefully considered. From our study, only 10.2% of medical students are on some form of financial aid that does not require repayment in monetary terms, such as scholarships and bursaries. In the United States, a study of 118 medical schools revealed that 44% of medical students received scholarships from medical school or university sources alone, while 70% of medical schools had fund-raising campaigns to increase the amount of scholarship support available to medical students.⁽²³⁾

There are clearly indications for raising support from governmental and non-governmental sources for more bursaries, scholarships and interest-free loans for medical students. Of late, this need has come to the attention of the Singapore Medical Association (SMA),⁽²⁴⁾ the Yong Loo Lin School of Medicine, the NUS Medical Society and the Medical Alumni, thus leading to the establishment of a number of new bursary schemes, including the SMA Medical Students' Assistance Fund and the Yong Loo Lin School of Medicine Medical Student Bursary Funds. Fund-raising events are already underway. The SMA Medical Students' Assistance Fund caters to the daily expenses of medical students, while the Yong Loo Lin School of Medicine bursary funds supplement existing financial aid packages available to medical students. These schemes represent concerted efforts by key elements of the medical community to render aid to the youngest members of the medical profession who are in need. It is hoped that they will go some way towards reversing a trend that threatens to alter the demographics of the professional community with potential adverse effects on Singapore's society and healthcare as a whole.

Details of the monthly allowances, income and expenses of students, as well as the proportions of students in receipt of various financial assistance schemes, were studied and analysed to provide a quantitative appreciation of the financial situation of medical students. This makes possible the calculation of the overall cost of medical education, including living expenses. Also, a detailed breakdown of the individual components of students' expenses permits a detailed examination of their finances. One limitation was that we had to rely on self-reported data on monthly household income and expenses. This is inherently non-verifiable. Another limitation was that

we could not obtain a 100% response rate, although we managed to get a 63.4% response rate, which provided us significant statistical power and lowered response bias. Additionally, the inconsistency in response rates across the years, in particular the lower response rates from the students in Year one and Year five, led to difficulties and potential errors when comparing parameters across the five batches of students surveyed.

In summary, medical education in Singapore can be a major financial burden, particularly for a significant 21.9% of medical students who come from families with a monthly income of < S\$3,000. While the current financial assistance schemes are sufficient to provide for tuition fees and living expenses, most of these schemes are loans that require repayment at considerable interest rates for young HOs. Greater efforts are required to help these students. We are concerned about whether the level of debt will rise to a level at which medical training is no longer economically affordable for the less affluent Singaporean. On a positive note, we are now witnessing a renewed attention to the issue. A concerted effort within the medical community—its leaders, the School of Medicine and medical students themselves—to help these students in need is underway. It is our hope that this study can ignite a greater interest in this issue, and provide an impetus for further studies.

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