Influence of student debt on health career location and specialty

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ABSTRACT

INTRODUCTION: In New Zealand (NZ), there are shortages of health professionals in rural areas and in primary care.

AIM: This study aims to examine the association of student debt levels of medical, nursing, pharmacy and optometry students with: (1) preferred geographical location of practice, specifically preference to work in urban vs. rural areas; and (2) preferred career specialties, specifically interest in primary health care.

METHODS: Medical, nursing, pharmacy and optometry students completed a questionnaire at graduation that included questions about levels of New Zealand Government Student Loan debt and preferences regarding location of practice and career specialty. In an additional survey, medical students were asked to self-rate the effect of financial factors on their career choices.

RESULTS: Debt patterns varied across programmes. Medical and pharmacy students with high debt were significantly more likely than students with low debt to prefer rural over urban practice ($P = 0.003$). There was no difference in level of interest in a primary care specialty by debt level for any programme. Medical students reported little influence of debt on career choice, although students with high debt levels were less concerned over career financial prospects than students with lower levels of debt.

DISCUSSION: Current levels of student debt do not deter students from planning a career in rural or primary care settings. Somewhat surprisingly, higher levels of debt are associated with greater rural practice intentions for medical and pharmacy students, although the underlying reasons are uncertain.

KEYWORDS: Student debt; rural practice; career preference; primary care; health professional

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Introduction

Health professional students in New Zealand (NZ) universities may accrue debt from costs associated with completing their undergraduate programmes. In 2017, annual domestic student fees at the University of Auckland for the core years of health professional programmes were (in NZ dollars) $14,788 for medicine, $8,414 for optometry, $7,484 for pharmacy and $6,652 for nursing.[1] For domestic students (NZ residents and citizens), a New Zealand Government Student Loan (NZGSL) may be used for compulsory course fees, course-related costs of up to $1,000 per year and living costs of up to $177 per week.[2] The NZGSL remains interest-free, provided the recipient does not leave NZ for longer than 6 months during the period of debt repayment. Repayments commence when annual income exceeds $19,084 before tax, with frequency of repayments based on income levels.[3]

Shortages of doctors, nurses, optometrists and pharmacists in rural areas remain a significant

WHAT GAP THIS FILLS

What is already known: Vulnerable health workforces include those in primary care and in rural areas. Studies of the effect of student debt on career location and preference for medical students report conflicting results. Little is known about the effect of debt on career for nursing, pharmacy and optometry students.

What this study adds: Higher debt levels do not dissuade health professional students from work in either rural areas or in primary care. For medical students, financial factors are of relatively low influence in deciding on specialty or location of practice.

problem that may contribute to disadvantaged health status within these communities.[4–7] Concerns have been expressed that student debt may be contributing to this geographical maldistribution of the health workforce, often based on the assumption that opportunities to earn more may be higher in urban areas.[8–10]

There has been no research evaluating the relationship of debt and intended work location for nursing, pharmacy or optometry students. For NZ medical students, the likelihood of rural medical practice is unrelated to debt levels,[11] with another study of junior doctors finding similar results.[10] Internationally, high levels of medical student debt have been associated with a choice to work rurally.[12] Moreover, programmes offering financial incentives to health professionals to work in rural areas are reported to be effective.[12,13] In NZ, the Voluntary Bonding Scheme provides financial supplements after graduation for doctors and nurses who work in non-urban areas or in priority specialties such as primary care.[14]

A single NZ study reports that student debt does not have a significant effect on preferred career specialty for medical, nursing, pharmacy or optometry students.[15] Other reports focused on medical students have conflicting results regarding the relationship between medical student debt and preferred career specialty. Some NZ studies report no relationship,[16–18] while others indicate that medical students with higher debt levels are less likely to select careers in primary care.[11] This uncertainty is mirrored in international studies;[19–22] however, most of these are from the United States, where the health and education systems are not comparable with NZ.

The purpose of this study was to examine the relationship between student debt and career choice preferences in medical, nursing, pharmacy and optometry students from one institution in NZ. The specific aims were to assess whether preference for working in an urban setting, as opposed to a regional or rural setting, is related to levels of NZGSL debt; and to determine whether the choice of a primary healthcare specialty is affected by levels of NZGSL debt.

Methods

Data and definitions

Since 2006, the University of Auckland Faculty of Medical and Health Sciences Tracking Project (Tracking Project) has collected information on student debt, income sources and future career intentions from medical, nursing and pharmacy students at the end of their respective programmes.[23] Data from optometry students were added from 2013 onwards. Since 2012, the Tracking Project for medical students has been combined with the Australian and NZ Medical Schools Outcomes Database and Longitudinal Tracking Project (MSOD).[24,25] The Tracking Project and MSOD have current ethics approval from the University of Auckland Human Participant Ethics Committee. Data were provided to the investigators in an anonymised form.

For the present study, international students were excluded from analyses as they are not eligible for a NZGSL. Students reported their NZGSL debt at exit from the programme by choosing from a table of debt levels arranged in $15k increments. In addition, students indicated their preferred future geographical location of practice and preferred career specialty (or specialties) from a list of possible options. Not all students answered every question.

For analysis, the preferred geographical location of practice was divided into two categories. Students were deemed to have an 'urban' preference if they selected an option with a population

over 100,000 people, and a 'rural' preference was defined as selection of an option with a population of 100,000 or fewer.

Students were asked to assess their interest in a range of career options by reporting either 'strong interest', 'some interest' or 'no interest' for each potential specialty. Thus, they might have a 'strong interest' in more than one option. For this study, career preferences were dichotomised based on whether or not a student indicated a 'strong interest' in a primary healthcare choice.

A primary healthcare choice was defined for each discipline as follows: for medical students, General Practice; for nursing students, Primary Care Nursing; for pharmacy students, Community Pharmacy; and for optometry students, Private Practice or Corporate Optometry.

As the format used for the 2012–16 medical student MSOD exit surveys is slightly different to that in the Tracking Project with respect to the question of debt and career choice, these cohorts were analysed separately. In this analysis, we included data from all students who reported a 'first choice' specialty. Furthermore, these latter medical cohorts rated over 20 factors influencing career preference. This allowed us to examine the relationship of NZGSL debt and self-reported effect on career choice in terms of training costs, debt and future earnings.

Analytic approach

Categorical variables were: 'Preferred Geographical Location of Practice' (either Urban or Rural) and 'Level of Interest in a Primary Care Career' (either 'strong interest', 'some interest' or 'no interest'). Chi-square tests were used to determine if there was a statistically significant difference between choice options in the proportion of responses. Post-hoc Chi-square testing used the method of residuals with a Bonferonni correction for multiple comparisons.[26]

Data on medical students from 2012 to 2016 relating career influences to debt level was also used. The career influences: 'perceived financial prospects', 'cost of vocational training' and 'cost of medical education and debt' were measured on a scale of 1 ('not at all') through 5 ('a great deal') and analysed using the Kruskal–Wallis test. Post-hoc testing used the Mann–Whitney *U* test with a Bonferroni correction for multiple comparisons.

Results

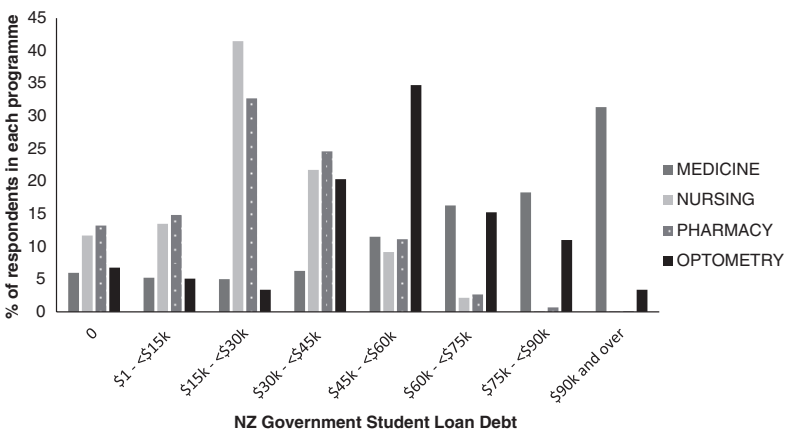
From 2006 to 2016, there were 171 medical and 24 nursing students who were international students and excluded from further analyses. No international students were identified in pharmacy or optometry.

Of the 3121 domestic health professional students who reported their NZGSL debt at the end of their programme, 1355 were from medicine, 786 nursing, 862 pharmacy and 118 from optometry. This corresponded to an overall response rate of 77.1% (72.3% for medicine, 82.5% for nursing, 81.7% for pharmacy and 60.1% for optometry).

Distribution of debt by health professional programme

Distributions of self-reported debt for each programme are shown in Fig. 1. Medical student debt is skewed towards the higher end, with 31.4% of medical students with a debt of $90k or more. Using the midpoint of each category as an estimate, and $100k in the top category, median medical student debt is $67.5k. In contrast, nursing and pharmacy debt is unimodal, with median debt for both groups being $22.5k and few students with a debt of greater than $60k.

Figure 1. Distribution of NZ Government student loan debt



The median debt for optometry students is $52.5k with a wide spread.

Preferred geographical location of practice

There were 2258 students from 2006 to 2016 who reported both their preferred geographical location of practice and their NZGSL debt. The proportions of students by programme, preferred location of practice and debt level are shown in Table 1. Medical and pharmacy students preferring rural practice were more likely to have higher levels of NZGSL debt than those intending to go into urban practice ($P = 0.003$ and $P < 0.001$ respectively). There was no significant association of student debt level with preferred location for nursing and optometry. The grey cells show the comparisons for medicine and pharmacy that reached statistical significance in post-hoc testing (both $P < 0.001$).

Future career preferences

There were 2428 students who reported both their level of interest in a primary care career as defined for this study, and their level of NZGSL debt. The proportions of students in each of medicine, nursing, pharmacy or optometry who recorded a 'strong interest' in a primary care career were 32.1%, 30.6%, 48.3% and 72.0% respectively. The numbers of students in each category are shown in Table 2. There were no significant differences in degree of primary care interest by debt level for any of the four programmes.

From 2012 to 2016, there were 638 medical students who reported a first choice of specialty as well as their NZGSL debt level. The proportion of first choices when categorised into either general practice or another specialty did not vary by debt level ($P = 0.847$).

Debt and influence on career choice for medical students 2012–16

There were 708 medical students who reported their NZGSL debt level as well as rating the influence on career choice of 'perceived financial prospects', 'costs of medical education/debt' and 'cost of vocational training'. The mean scores (and standard deviation) for each influencing factor by debt level are shown in Table 3.

Of the three financial factors investigated, 'perceived financial prospects' had the most overall effect on future career preference (3.06/5), while 'costs of medical education/debt' had the least effect (1.77/5). There was a statistically significant negative association between NZGSL debt level and 'perceived financial prospects', but no association for the other two influencing factors. Post-hoc testing showed a significantly lower influence of 'perceived financial prospects' on

Table 1. Preferred location of practice by New Zealand Government Student Loan (NZGSL) debt level (% of students with an urban or rural intention, by programme)

Programme	Medicine (n = 1068)		Nursing (n = 570)		Pharmacy (n = 535)		Optometry (n = 85)	
NZGSL	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
$0	6.6	3.2	12.2	11.1	15.2	8.2	3.1	9.4
$1 to <$15k	4.4	5.5	13.2	15.8	16.1	14.8	6.2	5.6
$15k to <$30k	4.8	4.9	41.0	30.1	34.0	23.9	6.2	3.7
$30k to < $45k	6.1	6.2	20.9	28.5	23.1	30.5	34.3	15.0
$45k to < $60k	12.3	9.1	9.4	14.2	9.9	14.0	28.1	41.5
$60k to <$75k	16.2	12.7	2.9	0.0	0.7	7.4	9.3	13.2
$75k to <$90k	19.7	16.0	0.2	0.0	0.7	0.8	6.2	7.5
$90k or more	29.4	41.9	0.0	0.0	0.0	0.0	6.2	3.7
P (χ^2, d.f. 7)	0.003		0.338		<0.001		0.511	

Grey cells show the comparisons that were statistically significant in post-hoc testing (both $P < 0.001$).
d.f., degrees of freedom.

Table 2. Level of interest in a primary care career, by debt level and programme (n)

Debt	Interest in a primary care career	Medicine (2006–11)	Nursing (2006–16)	Pharmacy (2006–16)	Optometry (2013–16)
$0	No interest	11	19	0	2
	Some interest	26	41	36	5
	Strong interest	11	28	77	9
$1 to <$15k	No interest	10	17	1	1
	Some interest	20	47	28	6
	Strong interest	17	29	97	5
$15k to <$30k	No interest	12	56	7	3
	Some interest	14	159	80	1
	Strong interest	13	90	193	4
$30k to <$45k	No interest	19	31	5	7
	Some interest	21	79	49	19
	Strong interest	14	49	152	18
$45k to <$60k	No interest	24	15	5	2
	Some interest	36	30	21	30
	Strong interest	27	25	69	50
$60k to <$75k	No interest	31	7	1	6
	Some interest	52	7	3	17
	Strong interest	49	2	18	13
$75k to <$90k	No interest	30	0	0	2
	Some interest	50	1	2	14
	Strong interest	31	0	4	10
$90k or more	No interest	26	0	0	1
	Some interest	36	0	0	3
	Strong interest	36	1	1	2
	Total	616	733	849	230
	P (χ^2, d.f. 14)	0.702	0.573	0.345	0.055

d.f., degrees of freedom.

career choice for students with ≥$90k debt than those with a debt of either $1–$15k ($P < 0.001$) or $30k–$45k ($P = 0.001$). 'Perceived financial prospects' also had a significantly lower influence on students with a debt of $60k–$75k compared to those with a debt of $1–$15k ($P = 0.001$).

Discussion

Previous studies have shown that accruing a large debt may affect on the lives and future intentions of medical and nursing students,[17,27,28] but this has not been addressed for pharmacy or optometry students. This paper extends what is known on the issue by evaluating data from students in four health professional programmes at one institution, over the same time period. This allowed a comparison of debt profiles by programme, along with the extent of the effect of debt on career intention to work in a rural area or in a general practice or primary care career. All except medical students have NZGSL debt levels that are normally distributed, whereas medical students have a heavily right-skewed distribution, with just under one-third of medical students with a debt ≥ $90k at graduation.[17,18,27] Previously, we have found this burden falls more on older medical students, but there is no gender difference.[29] Further studies may be useful to determine if being a postgraduate student influences preferred

Table 3. Mean scores (SD) for influencing factors by New Zealand Government Student Loan (NZGSL) debt level for medical students from 2012 to 2016, on a five-point scale (1 = not at all and 5 = a great deal)

NZGSL debt	Perceived financial prospects	Cost of vocational training	Costs of medical education/debt
0	2.84 (1.29)	2.26 (1.39)	1.58 (0.96)
$1 to <$15k	3.63 (1.09)	2.54 (1.35)	1.58 (0.83)
$15k to <$30k	3.07 (1.29)	2.22 (1.31)	1.78 (1.05)
$30k to <$45k	3.55 (1.27)	2.57 (1.47)	1.93 (0.98)
$45k to <$60k	2.83 (1.34)	1.95 (1.15)	1.62 (0.72)
$60k to <$75k	2.81 (1.15)	2.07 (1.08)	1.83 (0.96)
$75k to <$90k	2.97 (1.21)	2.21 (1.23)	1.81 (0.95)
$90k or more	2.76 (1.21)	2.10 (1.18)	1.99 (1.08)
Mean score	3.06	2.24	1.77
P	0.003 (Kruskal–Wallis)*	0.448 (Kruskal–Wallis)	0.062 (Kruskal–Wallis)

*After Bonferroni correction $P < 0.0018$ is designated as significant for post-hoc tests.
SD, standard deviation.

location of practice and specialty, after accounting for debt.

The median debt for each of the four groups of health professional students exceeds the median of $14,904 per NZ tertiary student in 2016.[30] In contrast, starting salaries for health professionals are generally higher than starting salaries for other occupations.[31,32] While the base salaries for first year nurses, optometrists and pharmacists are in the $45–60k range, medical graduates usually earn more because of longer hours and have greater increments as they progress through their training. This may allow them to cope more easily with larger debts.

We were surprised to see for both medical and pharmacy students an association between higher levels of NZGSL debt and a preference for rural practice. This is an encouraging signal that, on average, high debt levels do not deter students from a rural career. While it is not possible to determine cause or effect from the current data, there are multiple plausible explanations. Among these are that students see living in a rural area or purchasing a business there as less expensive than in the city, or, in contrast to commonly held views, there may be greater financial returns associated with rural practice. Some medical graduates with high debt may intend taking up the Voluntary Bonding Scheme, which provides a financial bonus to graduates who work in areas or specialties of need for 3 years.[14] There may be a common underlying factor such as graduates who are older having both more debt and a greater interest in rural practice. However, an international study of medical students did not find significant differences in the age composition of rural-intending students.[13] Students with higher debt may not be as motivated by future income as others. Finally, market forces may be at play with competition for urban placements somehow favouring those with lower debt levels. Future studies addressing the reasons behind this relationship could be of use in suggesting ways to address the current shortage of health professionals in rural areas.

NZGSL debt levels were found to be unrelated to primary care specialty intention for students from all four programmes. Again, this is reassuring for medicine and nursing where there are shortages in primary care. For pharmacy and optometry, it may not be surprising. Non-primary care positions such as in hospitals, academic institutions, industry or with other specialists, are relatively rare and competitive.

The ongoing nature of the Tracking Project has led to the collection of data on over 3300 students in 11 graduating cohorts. This large dataset, coupled with high response rates and the internal consistency of student responses from different cohorts over time, suggests that these results are fairly robust. Our estimates of debt are likely to be conservative given that only NZGSL debt was considered and that the highest debt category (≥ $90k) was open-ended. The most notable effect would be on medical students, of whom over 30% had a NZGSL debt falling in this category. We have no reason to think there is systematic under- or over-reporting of debt, but determining true NZGSL debt levels requires information from the NZ Inland Revenue Department, and still would not include any other sources of debt.

For medical students, there was no association between debt level and general practice intention found in two separate groups of students over time, using two slightly different methods for asking about career choice. Furthermore,

the higher debt levels for medical students were not associated with increased effect of the three financial factors investigated on career preference. The highest mean 'influence' score reported at any debt level was only 3.63 (on a scale of 1–5), which suggests that financial factors have, at most, only a moderate effect on career preference at exit. This could be a moderate positive influence towards a particular specialty or a moderate deterring influence from another. The moderate level of influence may reflect high employability as well as the adequacy of salaries across all specialties, including general practice, or even that the full effect of an individual's debt has not yet been realised at time of graduation. Starting salaries for a first-year house officer range from $55,944 to $102,564 depending on hours worked.[33]

Any survey has limitations, including unreliability introduced by potentially ambiguous questions or recall bias. Missing data may also be important. However, there is no reason to believe the responses from these students differ significantly from other students. Furthermore, the large numbers and high response rates would mitigate differences. As the data used in this study were sourced from students at exit from their programmes, it can only indicate future career intentions, which may be subject to change. As the MSOD project surveys medical graduates at various postgraduate time points, refinement of our findings will be possible for this group.

While the effect of student debt continues to be debated, the high debt levels in this study did not seem to have a negative effect on the preference for either a rural or primary care career for health professional students, at least at the time of graduation. Other career influences are likely to be more important. We suggest a continued focus on the effect of debt on individuals, their career choices and work location for all health professional students.

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COMPETING INTERESTS
The authors declare no competing interests. The authors' opinions are not necessarily those of the University of Auckland.