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Career choice in medical graduates – A national, quantitative analysis over five years

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Abstract

Introduction: A valid, longitudinal approach is critical for service planning in healthcare and to understand career choice in medical graduates.

Methods: We quantitatively analysed self-reported influences underlying career choice in a national cohort of medical graduates over the first five years of their careers. Participants rated career influences on importance across 26 items using a 5-point Likert scale (1=not at all, 5=a great deal).

Results: We included 659 New Zealand medical graduates (mean 25.4 years old, 376 F, 283 M) from the University of Auckland and the University of Otago, graduating in 2012 and 2013 (85% response rate). Responses were linked longitudinally over their post-graduate years 1, 3 and 5, and underwent principal component analyses. At graduation the factor rated as the most important in career choice had a mean (SD) item score of 3.9 (0.7) and comprised: Medical School Experiences; Specialty Experience; Mentors; and Self-Appraisal – consistent with graduates securing initial employment. Factors which explained the most variance in career choice over the five years after graduation indicated that the costs of medical school and further training were consistently rated as the least important in career choices, while flexibility in working hours were consistently rated as the most important. Factors remained relatively stable over time, showing variation in scores of only a median of 0.5 Likert points, indicating further opportunities for career choice research.

Conclusion: Our results regarding costs of medical training are reassuring, and suggest that greater flexibility in working hours may attract graduates to underserved specialties.

Keywords: *Medical Education, Career Choice, Career Influences, Cost, Debt, Measurement, Medical Graduates, National Longitudinal Study, Working Hours, Work Culture*

I. INTRODUCTION

A common strategic aim of medical schools throughout the world is to supply the range of graduates who will best meet the healthcare needs of their communities (Gorman, 2018). However, fulfilling this aim is far from straight-forward, with perhaps the most critical difficulty involving understanding the influences that underlie career choice in medical graduates and how these vary over time.

The financial burden of completing medical school and further training has been one of the most widely studied influences underlying career choice, with suggestions that rising costs may encourage graduates to pursue specialties perceived to be more highly paid, often in cities, thus undersupplying primary healthcare and rural locations. However, in New Zealand medical graduates are otherwise free to choose their preferred career path and choices may be influenced by many things other than training costs and debt, including personal interest, employment conditions, specialty availability and

lifestyle preferences (Webster et al., 2020; Webster et al., 2017).

Therefore, in the following, we analyse the self-reported influences underlying career choice in a national cohort of medical school graduates during the first five years of their careers using quantitative data drawn from the existing longitudinal Medical Schools Outcomes Database (MSOD).

II. METHODS

The MSOD project is a bi-national longitudinal questionnaire study that aims to improve healthcare delivery in Australia and New Zealand (Poole et al., 2019). At graduation and in postgraduate years (PGY), graduates are asked to specify their preferred area(s) of medicine, and complete a schedule of influencing items, indicating the degree to which each was important in their choice, using a 5-point Likert scale with anchors of 1 (not at all) to 5 (a great deal) – see Supplementary Table 1 for full question set.

A. Data Analysis
We conducted a series of principal component analyses (SPSS v27, IBM Corporation, New York) of the responses to the 26 influencing item questions at each

time point to identify factors within responses, and describe them over time.

III. RESULTS

Data from a national cohort of 659 New Zealand medical school graduates who had graduated from the University of Auckland and the University of Otago in 2012 and 2013 were included. The response rate for completed questionnaires in the Exit cohort was 85% – representing a sampling margin of error of only 1% at the 95% level of confidence. The mean (SD) age of participants in the cohort was 25.4 (2.7) years, with a higher proportion of female graduates (376 F vs 283 M). Over the next five years, this Exit cohort self-reported on the same set of influences underlying career choice at PGY1, PGY3 and PGY5 – maintaining a response rate between 53% and 56%, and a sampling margin of error of 3%.

We used conventional settings during analysis, comprising varimax rotation and suppression of loadings below 0.3. The Kaiser-Meyer-Olkin measure of sampling adequacy across time points demonstrated a median (range) of 0.77 (0.75 to 0.82), indicating distinct and reliable factors at each time point. In addition, Bartlett's test of sphericity was highly significant at each time point, ($2338 < \chi^2 < 3498$, $p<0.0001$), demonstrating correlation with little redundancy in items (Kaiser, 1974).

Influencing items*	Factor numbers and item loadings				
	A: Exit (yrs 2012 and 2013)				
	1	*2*	*3*	*4*	*5*
Costs Voc. Training	0.855				
Costs Med. School	0.832				
Insurance Risk	0.675				
Parents/Relatives	0.536				
Prestige	0.528				
Training Yrs	0.508				
Financial Prospects	0.463				
Research/Teaching	0.442				
Location	0.440				
Flexible Hrs		0.862			
Working Hrs		0.838			
Domestic Circum.		0.633			
Work Culture		0.416			
Career Prospects			0.725		
Procedural Work			0.698		
Job Security			0.555		
Voc. Training Avail.			0.409		
Med. School Exp.				0.836	
Specialty Exp.				0.787	
Mentors				0.752	
Self-Appraisal				0.388	
Typical Patients					0.643
Helping People					0.642
Intel. Content					0.532
Variance explained, %	15.8	11.1	9.5	9.3	7.3
Factor score, mean (SD)**	2.3 (0.7)	3.6 (0.8)	3.3 (0.9)	3.9 (0.7)	3.8 (0.7)
	B: PGY1 (yrs 2013 and 2014)				
	2	*1*	*4*	*3*	*5*
Working Hrs	0.847				
Flexible Hrs	0.831				

	1	2	3	4	5
Domestic Circum.	0.673				
Training Yrs	0.538				
Voc. Training Avail.	0.494				
Location	0.411				
Job Security	0.391				
Costs Voc. Training		0.836			
Costs Med. School		0.765			
Insurance Risk		0.673			
Research/Teaching		0.547			
Specialty Exp.			0.791		
Med. School Exp.			0.777		
Training Exp./Doc.			0.590		
Helping People			0.393		
Post-Grad. Work			0.302		
Prestige				0.730	
Financial Prospects				0.712	
Procedural Work				0.576	
Intel. Content					0.604
Career Prospects					0.566
Work Culture					0.451
Typical Patients					0.395
Self-Appraisal					0.368
Variance explained, %	12.4	11.4	9.2	8.8	8.3
Factor score, mean (SD)**	3.1 (0.8)	1.8 (0.7)	3.6 (0.7)	2.7 (0.9)	3.6 (0.6)

C: PGY3 (yrs 2015 and 2016)

	1	2	5	4	3
Costs Voc. Training	0.806				
Costs Med. School	0.803				
Financial Prospects	0.635				
Prestige	0.621				
Insurance Risk	0.596				
Career Prospects	0.544				
Job Security	0.511				
Research/Teaching	0.367				
Flexible Hrs		0.849			
Working Hrs		0.827			
Domestic Circum.		0.732			
Voc. Training Avail.		0.399			
Intel. Content			0.669		
Training Exp./Doc.			0.581		
Work Culture			0.576		
Post-Grad. Work			0.558		
Typical Patients			0.540		
Self-Appraisal			0.451		
Procedural Work			0.374		
Specialty Exp.				0.911	
Med. School Exp.				0.892	
Training Yrs					0.521
Location					0.476
Helping People					0.464
Variance explained, %	13.7	13.1	11.5	7.5	5.4
Factor score, mean (SD)**	2.3 (0.7)	3.4 (0.9)	3.8 (0.6)	3.1 (1.2)	3.1 (0.7)

D: PGY5 (yrs 2017 and 2018)

	2	3	1	5	4
Flexible Hrs	0.822				
Working Hrs	0.791				
Domestic Circum.	0.687				
Location	0.454				
Career Prospects		0.790			
Prestige		0.633			
Job Security		0.613			
Financial Prospects		0.604			
Procedural Work		0.521			
Research/Teaching		0.508			
Voc. Training Avail.		0.355			
Costs Voc. Training			0.859		
Costs Med. School			0.831		
Insurance Risk			0.604		
Training Yrs			0.563		
Parents/Relatives			0.350		
Typical Patients				0.600	
Helping People				0.585	
Intel. Content				0.562	
Self-Appraisal				0.507	
Work Culture				0.464	

Training Exp./Doc.				0.432	
Post-Grad. Work				0.429	
Specialty Exp.					0.896
Med. School Exp.					0.881
Variance explained, %	12.1	11.3	11.1	8.3	7.8
Factor score, mean (SD)**	3.4 (0.9)	2.8 (0.7)	1.8 (0.7)	3.9 (0.6)	2.9 (1.2)

*See Supplementary Table 1 for full item descriptors
**Mean (SD) of 5-point Likert scores making up factor

Table 1. Principal component analyses of influences underlying career choice in medical graduates to five years after graduation

Table 1 shows the results of the principal component analyses, demonstrating well-formed factors at each time point. Factors are reported in the descending order of their variance explained (VE), and with a factor score, being the mean (SD) of the Likert question scores making up the factor. The VE is a measure of the amount of variability in the participants' responses that can be explained by the factor, hence higher levels of VE indicate agreement by a larger number of graduates. The factor score indicates the degree to which graduates consider the factor to be important or unimportant in their choices.

For example, at Exit from medical school (Table 1A), Factor 1 accounts for the largest VE (15.8%), comprising the 9 question items that are, on average, the least influential in determining career choice for graduates, with a factor score of 2.3 (out of 5). These least influential items are: Costs of Vocational Training; Costs of Medical School; Insurance Risk; Parents/Relatives; Prestige; Training Years; Financial Prospects; Research/Teaching; and Location. By contrast, Factor 4 at Exit, with the highest factor score of 3.9 and explaining 9.3% of the variance, contains the 4 items rated as the most influential by graduates in determining career choice. These most influential items are: Medical School Experiences; Specialty Experience; Mentors; and Self-Appraisal. These results are consistent with new graduates making the most of their abilities and opportunities to secure their first healthcare role. Other factors at Exit fall within these two extremes.

It is worth noting that the item Parent/Relatives fails to load over the 0.3 threshold on any factor at PGY1 or PGY3 (hence does not appear). Some change in factor structures over time do occur, reflecting changing priorities for graduates. For example, Factor 2 at Exit has a relatively high factor score of 3.6 (VE=11.1%) indicating that the items Flexible Hours, Working Hours, Domestic Circumstances, and Work Culture are important for new graduates. However, by PGY1 (Table 1B) this factor then picks up the items of Training Years, Vocational Training Availability, Location and Job Security, and becomes important to a greater number of graduates by becoming the factor with the largest variance explained (VE=12.4%). This result suggests that graduates are adjusting to their new working lives and are planning for their futures in terms of further training.

Factor 1 and Factor 2 consistently demonstrate high levels of variance explained and contain a common core of three influencing items. Factor 1, with a median (range) score of 2.1 (1.8 to 2.3) across all time points, continues to describe influences on career choice rated as the least important for medical graduates, and consistently contains the items Costs of Vocational Training, Costs of Medical School, and Insurance Risk. By contrast, Factor 2 is consistently rated as relatively important, with a median (range) score of 3.4 (3.1 to 3.6) across time points, and consistently contains the items Flexible Hours, Working Hours, and Domestic Circumstances.

Our results demonstrate the existence of well-formed factors in the MSOD data at each time point. Despite some change in factor structure over time, the scores for each factor remain relatively stable, with a median (range) variation in scores of only 0.5 (0.3 to 1.0) Likert points. Table 1 contains results which allow substantial scope for hypothesis formation and future research, including targeted work to better understand the decision points in the critical first five years of a graduate's career.

IV. DISCUSSION

Better understanding the influences underlying career choice in medical graduates is a strategically important and practical concern when aiming to match graduate production with professional and community needs. This study is the among the first to conduct a quantitative analysis of the self-reported influences underlying medical graduate career choice in a prospective, national cohort of the same graduates over the critical first five years of their careers.

The financial burden of completing medical school and vocational training is one of the most widely studied influences in career choice for medical graduates. It is therefore reassuring that our findings demonstrate that these costs are among the least influential considerations at all time points in the five years after graduation for our cohort.

Factor 2 in the present study consistently contains the items Flexible Hours, Working Hours and Domestic Circumstances, and is rated as important over the first five years of graduates' careers. Flexibility around working hours and a desire to practice part-time has traditionally been thought of as largely important for female medical graduates (Heiliger & Hingstman, 2000). However, this is no longer the case, with many male graduates in recent decades also desiring more lifestyle-friendly working arrangements allowing the flexibility to spend more time with family (Heiliger & Hingstman, 2000). Taken together with the evidence that the costs of medical school and further training are the least influential in career choice, our results therefore strongly suggest that the ability to offer greater flexibility in working hours is likely to be useful in recruiting medical graduates to underserved specialties.

It is a practical and pressing necessity that healthcare workforce planning is guided by the best available evidence. A strength of the current study is the ability to link the same participants longitudinally, thus eliminating an important source of bias. Women in the current study made up 57% of medical graduate respondents, reflecting the fact that in recent years in New Zealand and Australia female graduates have outnumbered male graduates. A further strength is the high response rates, yielding a sampling margin of error of only 3% or less at all time points, which compares favourably with many questionnaire studies of medical graduates.

V. CONCLUSION

Despite widespread concern over rising debt levels and the cost of medical school, our results are reassuring in that the costs of medical school and vocational training were consistently rated as the least important influences in career choice. Our results also suggest that offering greater flexibility around working hours may assist in attracting medical graduates to underserved specialties. Our description of well-formed factors in the influences underlying career choice in the national MSOD questionnaire data provides a useful basis for further research to better understand key decision points in the critical first five years of graduates' careers.

Notes on Contributors

Craig Webster was involved in the conceptualisation of this paper, data analysis, writing and revision.

Jack Forsythe was involved in the conceptualisation of this paper, data analysis, writing and revision.

Antonia Verstappen was involved in accessing data for this paper, writing and revision.

Phillippa Poole was involved in the writing and revision of this paper.

Tim Wilkinson was involved in the writing and revision of this paper.

Marcus Henning was involved in the writing and revision of this paper.

Ethical Approval

This study was carried out in accordance with all regulations of the host organisations and with the approvals of the Human Participants Ethics Committees of the University of Auckland (approval numbers 022388 and 018456) and the University of Otago (approval number 07-155), New Zealand. All participants gave written informed consent to participate in the study, including for anonymised aggregated data to be published.

Data Availability

The ethics approval for the longitudinal MSOD project currently does not permit the sharing of non-aggregated data. However, this restriction is under review and so non-aggregated data may be available from the corresponding author in the near future.

Declaration of Interest

All authors have no potential conflicts of interest.

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Supplementary Table 1. Influencing items underlying career choice

On a scale of 1-5, where 1 = not at all, 5 = a great deal and 3 is in the middle, how much did each of the following influence your most preferred areas of medicine?	Short name
1. Perceived amount of working hours	Working Hrs
2. Perceived opportunity to work flexible hours	Flexible Hrs
3. Self-appraisal of own skills / aptitudes	Self-Appraisal
4. Influence of training experiences (e.g. mentors, consultants) as a doctor*	Training Exp./Doc.
5. Experience of specialty as a medical student	Specialty Exp.
6. General medical school experiences (e.g. mentors, discipline placements)	Med. School Exp.
7. Self-appraisal of own domestic circumstances	Domestic Circum.
8. Influence of parents / relatives	Parents/Relatives
9. Perceived financial prospects	Financial Prospects
10. Intellectual content of the specialty	Intel. Content
11. Work experience since graduation*	Post-Grad. Work
12. Geographical location of most preferred specialty	Location
13. Perceived prestige of the discipline	Prestige
14. Financial costs of medical school education and / or debt	Costs Med. School
15. Financial costs of vocational training	Costs Voc. Training
16. Type of patients typical of the discipline	Typical Patients
17. Number of years required to complete training	Training Yrs
18. Opportunity for research and / or teaching	Research/Teaching
19. Perceived job security	Job Security
20. Perceived career advancement prospects	Career Prospects
21. Opportunity for procedural work	Procedural Work
22. Atmosphere / work culture typical of the discipline	Work Culture
23. Availability of a vocational training placement	Voc. Training Avail.
24. Risk of litigation and associated insurance costs	Insurance Risk
25. Interest in helping people	Helping People
26. Influence of consultants / mentors**	Mentors

*These items were not included in the Exit MSOD questionnaire.
**This item was not included in questionnaires after Exit.