

Medical Student Perspective of Undergraduate (Honours) Research Training

ABSTRACT

At the University of Adelaide, students in the 6-year undergraduate Bachelor of Medicine and Bachelor of Surgery (MBBS) program interested in pursuing research can complete either a 1-year full-time intercalated or 2-year part-time concurrent BMedSc Honours/MBBS program. These research degrees are an important mechanism to provide early research exposure and supervisor mentorship to undergraduate medical students. This study aimed to explore factors motivating medical students to undertake an Honours research degree, how the Honours degree influences future research intentions and the perceived differences between full-time and part-time study modes.

An anonymous questionnaire was administered to all 38 graduates of the Honours program from 2002-2011. Ten of 19 individuals from the 2009-2011 graduating cohorts responded; there were no responses from earlier cohorts. All 10 respondents stated that Honours was worthwhile and nine had undertaken additional research since Honours. Factors favourably affecting enthusiasm for research were supervisor support and the experience compared to expectations. Enthusiasm for research was significantly higher after Honours than before this experience (Wilcoxon signed-ranks test, $p=0.007$). Students who undertook Honours full-time tended to consider the full-time option ideal, whereas the part-time students tended to consider the part-time option ideal. This was strongly supported by the qualitative comments.

This study found that Honours research degrees are a beneficial experience for undergraduate medical students and increase interest in future research careers. While the study was limited by the small population of students completing the Honours program, uptake at the University of Adelaide is similar to Commonwealth universities. The low response rate is also considered reasonable for a professional population, however future research should address both this and why few medical students undertake research study.

AUTHORS

Joule J. Li
School of Medicine,
University of Adelaide
M. Anne Hamilton-Bruce
School of Medicine,
University of Adelaide;
Department of Neurology,
The Queen Elizabeth
Hospital

Ray Peterson
School of Medicine,
University of Adelaide

Stuart Howell
Data Management
and Analysis Centre,
Discipline of Public
Health, University of
Adelaide

Simon A. Koblar
School of Medicine,
University of Adelaide

Introduction

Internationally there is a recognised need to promote academic medicine, and in particular the role of the clinician-scientist, as an attractive medical career pathway (ICRAM, 2004). One common method to promote academic medicine is an Honours research degree option provided to medical students during university.

The traditional full-time Honours option is undertaken after commencement, but before completion, of medical school, via an approved 1-year leave of absence during a student's medical degree. This is described in the literature as an 'intercalated' Honours degree, because the 1-year full-time Honours is inserted in between years of medical school study, rather than undertaken after medical school has been fully completed (Park et al. 2010). Recent studies have found a strong relationship between intercalated research degrees for medical students and a desire for academic medicine (Jones et al. 2013). A previous study found that intercalated research degrees are considered worthwhile (Park et al. 2010), however, little information exists as to the factors motivating students to undertake Honours and how Honours degrees influence desire to pursue future research. There are also few studies investigating the perceived differences between full-time (intercalated) research degrees and part-time (concurrent) research degrees. We undertook a study at the University of Adelaide, Australia, to explore these questions.

METHODS

The University of Adelaide Bachelor of Medicine and Bachelor of Surgery (MBBS) program is an integrated 6-year undergraduate course. An Honours research degree, the Honours Bachelor of Medical Science, is available to all medical students any time after successful completion of Year 3 of the MBBS. Students may undertake the Honours degree as either a 1-year full-time intercalated option or a 2-year part-time option concurrent with MBBS studies. In 2012, an anonymous questionnaire (Appendix 1) similar to that used in previous research (Park et al. 2010) was constructed and sent to all students

who undertook the Honours Bachelor of Medical Science at the University of Adelaide between 2002 and 2011. The questionnaire utilised five-point Likert scales (1=strongly disagree, 5=strongly agree) and qualitative open-text responses to examine factors motivating the study of Honours, the Honours research degree experience, the factors affecting desire to undertake future research, and the perceived differences (advantages and disadvantages) between the full-time and part-time study modes. Visual analogue scales from 1 to 10 assessed qualities including desire to pursue a research career, whether Honours was worthwhile and enjoyable, and enthusiasm for research before, during, and after Honours (1=no quality, 10=strongest possible quality).

Data were analysed using SPSS version 20.0 (SPSS Inc., Chicago, USA). Likert scale responses were analysed by determining the median and interquartile range. Univariate associations were determined using Fisher's exact test. The visual analogue scale responses were analysed by determining the mean and standard deviation (SD), with the differences analysed using the Wilcoxon signed-ranks test.

Ethics approval for this project was obtained from the University of Adelaide Human Research Ethics Committee (approval number: H-2012-096).

RESULTS

Ten of 19 individuals from the 2009-2011 graduating cohorts responded, with no responses from individuals from earlier cohorts (a total of 38 questionnaires was sent to the 2002-2011 graduates). There were equal numbers of male and female respondents. The mean age was 25.2 (standard deviation [SD] 1.9) years. All respondents received a First Class Honours grade. Seven of the

Table 1. Student assessment of Honours research degree experience

	Median	Interquartile Range
Motivation to undertake Honours		
Career progression and/or curriculum vitae	4.5	3.8-5.0
Pathway to another research degree	3.5	2.8-4.0
Chance of publishing a peer-reviewed article	4.0	2.8-5.0
General interest in research and/or academic medicine	4.0	3.8-4.3
Specific interest in area researched during Honours	4.0	2.8-5.0
Improve academic or general research ability and skills	4.0	4.0-5.0
Time off to do other activities	4.0	2.5-4.5
Take a break from Medicine	3.0	3.0-4.5
Extending university by 1 year	1.0	1.0-3.0
Peer pressure	1.0	1.0-2.0
Senior role model undertook Honours	2.5	1.0-4.0
Adequacy of Honours research experience		
Performing independent research	4.0	4.0-4.0
Reading and reviewing research literature	4.5	4.0-5.0
Writing and submitting for publication	4.0	3.8-5.0
Planning the research project	4.0	3.8-4.0
Applying for ethics and other approval	4.0	3.0-5.0
Gaining useful contacts for the future	4.0	3.0-5.0
Gaining an insight into research in general	5.0	5.0-5.0
Gaining an insight into the specific area researched	4.0	4.0-5.0
Gaining an insight into research funding	3.0	3.0-4.0
Broadened knowledge base	3.0	2.0-4.0
Improved learning habits and/or time management skills	4.0	3.8-4.3
Gaining new personal and professional skills	4.0	4.0-5.0
Factors favourably affecting research enthusiasm		
Support from research Supervisor	5.0	4.0-5.0
Publication of a peer-reviewed article	3.5	3.0-4.0
Challenge of undertaking Honours research	4.0	3.0-4.0
Grade received for Honours degree	4.0	3.8-5.0
Actual experience compared to expectations	4.0	3.8-5.0

	Median	Interquartile Range
Validity of reason for choosing full-time Honours		
Honours full-time allows enough time to complete research properly	4.5	1.8-5.0
Honours full-time allows commitment to research without distraction	4.0	3.8-5.0
Honours full-time allows complete immersion into research	4.0	2.8-5.0
Flexibility to attend social and professional networking functions	2.5	1.8-5.0
Flexibility to cope with unexpected events	5.0	3.0-5.0
Flexibility to cope with surges in research workload	4.5	3.8-5.0
Validity of reason for choosing part-time Honours		
Part-time Honours saves a year of university	3.5	3.0-5.0
Students choosing part-time option have sufficient motivation to adequately commit to completing the research project	3.0	2.0-4.3
Allows students to graduate from the MBBS young enough to still apply for Rhodes or similar scholarships	3.5	1.0-5.0
Allows student to continue studying alongside pre-clinical year level and friends	3.5	1.0-5.0

5-point Likert scale where Strong Agreement = 5 through to Strong Disagreement = 1.

10 respondents undertook Honours full-time between Years 3 and 4 of the MBBS, one undertook Honours full-time between Years 5 and 6 of the MBBS, and two (2/10) undertook Honours part-time over 2 years.

Eight of the 10 respondents had research output (poster, presentation or paper) from their Honours research. Nine expressed interest in or had already undertaken a further research degree, and these respondents had all undertaken further research projects since Honours graduation. The mean rating for current desire to undertake a research career was 7.4 out of 10 (SD 1.2). The Likert results are reported in Table 1.

The main original motivators to undertake Honours were career progression and/or curriculum vitae, general interest in research and/or academic medicine, and improvement of academic or general research ability and skills. All respondents indicated that 'with the benefit of hindsight, at least one of their original reasons was valid'. Honours research enabled respondents to perform independent research, read and review literature, write and submit for publication, plan the research project, gain an insight into research, improve learning habits and/or time management skills, and gain new personal and professional skills.

All respondents believed that 'Honours provided an adequate preparation for a research career'. Factors favourably affecting enthusiasm for research included supervisor support, the experience compared to expectations and the grade received. In hindsight, respondents believed that the ability to commit to research without distraction and the ability to cope with surges in research workload were the two most valid reasons for choosing the full-time study option. Saving a further year of university study was of equivocal importance for the part-time concurrent study option (median 3.5, interquartile range 3.0-5.0).

Respondents considered Honours to be both worthwhile (mean 8.8, SD 0.6) and enjoyable (mean 7.4, SD 1.4). However when comparing the two descriptions, they felt it was more worthwhile than enjoyable (Wilcoxon signed-ranks test, $p=0.018$). Enthusiasm for research was significantly higher after the Honours year than before this experience ($p=0.007$). There was no significant difference between research enthusiasm before Honours and during Honours ($p=0.093$) or between research enthusiasm during and after Honours ($p=0.216$).

Students who undertook full-time Honours tended to suggest full-time Honours as the ideal mode of study, whereas part-time Honours students tended

to suggest part-time Honours as the ideal (8 students full-time and 2 students part-time; Fisher's exact test, borderline significance, $p=0.067$). This was also supported in qualitative comments. One full-time Honours respondent remarked 'Absolutely not' in regards to part-time Honours, whereas one part-time Honours respondent wrote 'Strongly believe the part-time option is the best. Clinicians rarely become full-time researchers. Clinicians need to learn, experience and develop skills in balancing clinical and academic roles/time'. This respondent also stated 'I would NOT choose to do Honours as a full-time 1 year degree during a year off of MBBS. I strongly support the re-engagement of the part-time Honours programme'.

All but one respondent (6/7) who undertook Honours between Years 3 and 4 stated that in hindsight the ideal time to undertake Honours was between Years 5 and 6. These six respondents stated in qualitative comments that the main reason was because students have a greater understanding of clinical medicine and their desired specialty choice after two years of clinical experience (Years 4 and 5 of the MBBS) and this would have better informed their research interests.

DISCUSSION

This study found that an Honours research degree increased student enthusiasm for research. The positive experience was due to supervisor support and the experience compared to expectations. These findings suggest that medical schools should identify and acknowledge effective supervisors, and emphasise the quality of research supervisors to medical students considering an Honours research degree. Research exposure and supervision are two major motivators for becoming a physician-scientist (Park et al. 2010; Greenberg et al. 2013), and this study indicates that Honours research degrees are an important mechanism for providing both these factors to medical students early in their careers.

This study also found that students were originally equivocal about undertaking Honours as a pathway to another research degree, but nine students had undertaken or were interested in undertaking another research degree after Honours completion. Ratings of research enthusiasm were also significantly higher after Honours completion than prior to the experience. This supports previous studies which found that Honours research degrees act to increase research enthusiasm, and are associated with a higher level of future research (Straus et al. 2006).

Unfortunately however, this study did not collect data on the type of further research undertaken by the students.

There was a tendency towards students considering their chosen study mode (full- or part-time) as the ideal preference; this was strongly supported by the qualitative comments. This has important implications for medical schools, as it indicates schools should consider retaining both full-time and part-time Honours study options if future careers in academic medicine are to be encouraged maximally. Indeed, the desire not to undertake an additional year of study is a major barrier to uptake of intercalated degrees (Nicholson et al. 2010), so the existence of part-time study options may encourage increased uptake by those students who are interested in research but do not wish to extend their university by an additional year. Honours research degrees have the distinct advantage of a short duration, and unlike longer research degrees (such as MD-PhDs), Honours research degrees allow for research exposure without an adverse effect on clinical medical knowledge (Dyrbye et al. 2007).

In qualitative comments, the full-time students described a preference towards undertaking Honours later in the course (between Years 5 and 6, in contrast to between Years 3 and 4), because the two additional years of clinical training better informed their research interests. While currently students are able to undertake Honours at either time point, highlighting this finding to future students who are considering Honours should be considered to better inform their decisions as to when to undertake Honours.

This study was, however, limited by the small population of students who complete the Honours program, although uptake at the University of Adelaide is similar to Commonwealth universities (Park et al. 2010). The response rate was reasonable for a professional population (Baruch 1999), and may be considered representative of the Honours students at the University of Adelaide from 2009-2011 (Baruch & Holtom 2008). However, if the students all graduated with a first class honours, they may not be representative of Honours students at the University of Adelaide. Students attaining a lower grade may have had less enthusiasm for further research on completion of the program, and such students may also have given information that highlights areas where the program is failing some students. The fact that few students undertake a research study also requires further investigation.

CONCLUSION

This study found that Honours research degrees are a beneficial experience for undergraduate medical students, and increase interest in future research careers. Given the crisis in the future academic medicine workforce (ICRAM, 2004; Lawson McLean et al. 2013), Honours research degrees should be encouraged. Undergraduates are generally uninformed about Honours research degrees (Nicholson et al. 2010; Burgoyne et al. 2010), and initiatives to increase student knowledge and understanding of Honours research degrees should also be encouraged. Research investigating innovative methods to decrease barriers for student uptake of Honours degrees should be supported.

ACKNOWLEDGEMENTS

Dr David Butler (Maths Learning Centre, University of Adelaide), Dr Galina Gramotnev and Mr Thomas Sullivan (Discipline of Public Health, University of Adelaide) for preliminary statistical and/or design advice, and Mr Austin Milton (Basil Hetzel Institute for Translational Health Research, The Queen Elizabeth Hospital) for editing support. JJL received conference support funding from:

- Adelaide Medical Students' Foundation Benevolent Fund (Personal and Community Development Grant No. 201304)
- Australian Neurology Research, the Hospital Research Foundation, Woodville South, for Conference attendance (2013).

REFERENCES

International Working Party to Promote and Revitalise Academic Medicine. ICRAM (the International Campaign to Revitalise Academic Medicine): agenda setting. *BMJ* 2004;329(7469):787-9. doi: 10.1136/bmj.329.7469.787.

Park SJ, Liang MM, Sherwin TT, McGhee CN. Completing an intercalated research degree during medical undergraduate training: barriers, benefits and postgraduate career profiles. *NZ Med J.* 2010;123(1323):24-33.

Jones M, Hutt P, Eastwood S, Singh S. Impact of an intercalated BSc on medical student performance and careers: a BEME systematic review: BEME Guide No. 28. *Med Teach.* 2013;35(10):e1493-510. doi: 10.3109/0142159X.2013.806983.

Greenberg RB, Ziegler CH, Borges NJ, Elam CL, Stratton TD, Woods S. Medical student interest in academic medical careers: a multi-institutional study. *Perspect Med Educ.* 2013;2(5-6):298-316. doi: 10.1007/s40037-013-0051-6.

Straus SE, Straus C, Tzanetos K and the International Campaign to Revitalise Academic Medicine (2006). Career choice in academic medicine: systematic review. *J Gen Intern Med.* 2006;21(12):1222-9. doi: 10.1111/j.1525-1497.2006.00599.x.

Nicholson JA, Cleland J, Lemon J, Galley HF. Why medical students choose not to carry out an intercalated BSc: a questionnaire study. *BMC Med Educ.* 2010;10:25. doi: 10.1186/1472-6920-10-25.

Dyrbye LN, Thomas MR, Natt N, Rohren CH. Prolonged delays for research training in medical school are associated with poorer subsequent clinical knowledge. *J Gen Intern Med.* 2007;22(8):1101-6. doi: 10.1007/s11606-007-0200-x.

Baruch Y. Response rate in academic studies - a comparative analysis. *Human Relations.* 1999;52(4):421-38. doi: 10.1177/001872679905200401.

Baruch Y, Holtom BC. Survey response rate levels and trends in organizational research. *Human Relations.* 2008;61(8):1139-60. doi: 10.1177/0018726708094863.

Lawson McLean A, Saunders C, Velu PP, Iredale J, Hor K, Russell CD. Twelve tips for teachers to encourage student engagement in academic medicine. *Med Teach.* 2013;35(7):549-54. doi: 10.3109/0142159x.2013.775412.

Burgoyne LN, O'Flynn S, Boylan GB. Undergraduate medical research: the student perspective. *Med Educ Online.* 2010;15. doi: 10.3402/meo.v15i0.5212.