

Original Article
Article original

Issues related to medical students' engagement in integrated rural placements: an exploratory factor analysis

Tyrone Donnon, PhD
Medical Education and Research Unit, Department of Community Health Sciences, Faculty of Medicine, University of Calgary, Calgary, Alta.

Wayne Woloschuk, PhD
Undergraduate Medical Education, Faculty of Medicine, University of Calgary, Calgary, Alta.

Doug Myhre, MD
Associate Dean, Distributed Learning and Rural Initiatives, Faculty of Medicine, University of Calgary, Calgary, Alta.

Correspondence to:
Dr. Tyrone Donnon, Medical Education and Research Unit, G705, Undergraduate Medical Education, Faculty of Medicine, University of Calgary, 3330 Hospital Dr. NW, Calgary AB T2N 4N1; fax 403 270-2681; tldonnon@ucalgary.ca

This article has been peer reviewed.

Objective: The purpose of this study was to identify and investigate the factors derived from the rural integrated community clerkship (RICC) questionnaire that influenced the decision of medical students to pursue a 36-week rural community placement option.
Methods: A total of 162 first-year (n = 92) and second-year (n = 70) medical students completed the 35-item RICC questionnaire. We used qualitative interviews to develop questionnaire items, and we used subsequent descriptive statistics and exploratory factor analyses to analyze the data.
Results: Students with origins in rural communities were not significantly more likely to consider a RICC than their urban counterparts. However, students who identified family medicine as their discipline of choice were 3 times more likely to consider a RICC. Exploratory factor analysis, based on correlation of questionnaire items, determined 7 factors (themes) for the questionnaire. The questionnaire had strong internal reliability (Cronbach α = 0.94).
Conclusion: Although generally supportive of the rural clerkship option, students are less concerned about the clinical experience than they are about the practical implications of moving to a rural community. The RICC questionnaire was shown to have strong reliability and construct validity in measuring students' perceptions of a long-term clerkship placement in a rural community.

Objectif : Cette étude avait pour but de repérer et d'analyser au moyen du questionnaire sur le stage clinique intégré en milieu communautaire rural les facteurs ayant influencé la décision des étudiants en médecine d'opter pour un stage en milieu rural de 36 semaines.
Méthodes : En tout, 162 étudiants en médecine (première année, n = 92, et deuxième année, n = 70) ont répondu au sondage en 35 questions sur le stage clinique intégré en milieu communautaire rural. Nous avons préparé les éléments du questionnaire à partir d'entrevues qualitatives et nous avons utilisé des statistiques descriptives et des analyses de facteurs exploratoires subséquentes pour procéder à la synthèse les données.
Résultats : Les étudiants originaires de communautés rurales n'ont pas semblé significativement plus susceptibles d'envisager un stage clinique intégré en milieu communautaire rural que leurs collègues citadins. Toutefois, les étudiants qui avaient choisi la médecine familiale étaient 3 fois plus susceptibles d'envisager un stage clinique intégré en milieu communautaire rural. L'analyse des facteurs exploratoires fondée sur une corrélation entre les éléments du questionnaire a permis de recenser 7 facteurs (thèmes) pour le questionnaire, qui comportait au demeurant une forte fiabilité interne (coefficient α de Cronbach = 0,94).
Conclusion : Bien que généralement favorables à l'option de stage clinique en milieu rural, les étudiants semblent moins préoccupés par le contenu clinique que par les répercussions de leur déménagement en milieu rural. Le questionnaire sur le stage clinique intégré en milieu communautaire rural s'est révélé doté d'une fiabilité et d'une validité conceptuelle suffisamment solides pour rendre possible une évaluation des perceptions des étudiants quant à l'option d'un stage clinique prolongé en milieu rural.

© 2009 Society of Rural Physicians of Canada

INTRODUCTION

It is clear that the shortage of primary care physicians has become critical in rural communities. In general, the 2 most important factors that have been linked with a physician's decision to pursue a rural practice are whether they have originally come from a rural background and whether they have had previous training experience in a rural community setting.[1–4] One method that clearly increases students' exposure to a rural setting is for medical schools to promote an entire year of undergraduate clinical curriculum as a rural integrated community clerkship (RICC).[1,5–8]

These long-term rural training periods have led to criticisms that the academic standards of the medical students are being compromised by political agendas.[5] In contrast, recent studies have shown that students who have participated in a long-term rural placement have performed as well as or better than their urban counterparts on licensing examinations. A study by Worley and colleagues[9] focused on the specific effects that a rural community placement would have on medical students' academic performance during year 3, compared with those students who chose either a tertiary teaching or regional secondary referral hospital. Post hoc tests of means adjusted for age, sex and year-2 academic performance showed that the medical students placed in rural and regional secondary hospital settings performed significantly better on achievement examinations than the students placed in urban teaching hospital settings. In comparisons between rural integrated community and traditional block-rotation clerkships, Verby[7] in Minnesota and, more recently, Schauer and Schieve[8] in North Dakota found no difference in the performances of medical students on licensure examinations, and the latter showed significantly higher scores on internal medicine clinical preceptor assessments for the students in the rural program. In general, the findings provide support for the academic rigour and clinical experiences that a rural community clerkship placement option provides to undergraduate medical education programs.

In addition to ensuring academic quality, most medical schools tend to encourage and recruit rural-oriented medical students to their rural community clerkship programs.[10,11] In particular, studies of rural physicians from various countries have shown that they are more likely than urban physicians to have lived previously in a rural community.[2–4] As shown by Rourke and colleagues,[4] rural physicians, compared with their urban colleagues, were significantly more likely to have been raised in a rural community (35% v. 15%), have had rural clerkship training during medical school (55% v. 35%) and have had 8 or more weeks postgraduate residency training in a rural location (39% v. 20%). In a retrospective study of Jefferson Medical College graduates who had participated in a rural medical education stream and were practising in Pennsylvania at the time, regression analysis showed that previous rural background, over all other independent variables (e.g., participation in rural placement, specialty interest), was the overwhelming predictor of eventual practice in a rural community.[3]

The main purpose of the present study was to determine the factors that influence the decisions of medical students to consider a RICC option. In addition, we investigated the reliability and validity of the 35-item RICC questionnaire we developed to identify the perceived advantages and disadvantages of a long-term rural community clerkship placement.

METHODS

All preclerkship students in both the first year (class of 2009) and the second year (class of 2008) of the Undergraduate Medical Education Program at the University of Calgary were surveyed in the fall of 2006 about their potential interest in a proposed 36-week RICC experience during the third year of their program. This study received approval from the Conjoint Health Research Ethics Board of the University of Calgary.

Instrument

In the development of the RICC questionnaire, we used interviews with medical students from the first and second years of the University of Calgary's Undergraduate Medical Education Program to initially identify common themes. Subsequently, 35 positively worded items, measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), were developed, along with a set of demographic questions about sex, age, marital status and size of the community in which the respondent was primarily raised (e.g., rural, small city, medium city, metropolitan centre). In addition, the students were asked to either select from a list or identify in writing their potential career path on graduation from medical school and respond to a question as to whether they would consider the RICC option for their third

year. It should be noted that the class of 2009 was the first class to be eligible for the RICC option as part of the redesigned clerkship curriculum initiative currently underway at the medical school.

Analysis

We used descriptive statistics to analyze the demographic data. Using SPSS software, we used an exploratory factor analysis to look at patterns in responses to see if there were inter-item correlations both within and between students as a function of how they responded to the items on the questionnaire. Items that correlate highly load together as a factor and are a measure of a common theme. For example, if 9 questionnaire items load on a factor, the wording of each of the 9 items is integrated to develop a description of the theme.

RESULTS

The overall response rate was 66% based on 162 of the 245 preclerkship students returning the questionnaire, with responses from 92 first-year and 70 second-year students. Overall, an equal number of male and female students responded; 51% of the first-year students and 48% of second-year students were male. The average age of the first-year respondents was 24.8 (standard deviation [SD] 4.38) years and 27.7 (SD 4.41) years for the second-year respondents. With respect to marital status, 81% of first-year and 70% of second-year students indicated that they were single (and without children). In response to a question about the type of community in which they were primarily raised, 22% of the first-year students and 19% of the second-year students indicated that they lived in a rural community with a population of less than 10 000 people.

Although 34% (n = 55) of the students indicated that they would consider the RICC option in their clerkship year, more interest in this option was expressed by the first-year students (40%) than the second-year students (27%). First-year students were also found to be more "undecided" (40%) than second-year students (7%) about their medical career plans beyond graduation, but comparably similar with respect to their interest in pursuing a family medicine discipline (first year 17%, second year 21%). Students who identified their community of origin as rural were not significantly different from students from an urban origin when asked if they would consider the RICC option (χ^2 [1108] = 1.79, p = 0.18). However, those students that identified family medicine as their planned discipline on graduation from medical school were almost 3 times more likely to consider the RICC option than those students looking to pursue a specialty discipline (88% v. 29%; χ^2 [1.83] = 23.67, $p < 0.001$) (Table 1). As illustrated in Table 1, students from both rural and urban origins who were undecided about their career plans were nearly identical in their consideration of the RICC option.

The questionnaire was shown to have strong internal reliability (Cronbach α = 0.94). The exploratory factor analysis of the RICC questionnaire resulted in the identification of 7 discrete RICC factors or themes as follows: 1) physician role/responsibility/exposure/preparation, 2) practice exposure/exam preparation, 3) collaboration with other health care professionals, 4) exposure to rural medicine, 5) support of undergraduate medical education program/medical school, 6) personal implications for a rural community placement and 7) maintain existing/develop new professional relationships (Table 2). As shown in Table 2, some of the factors were represented by a greater number of items than others and subsequently are a better measure of the reliability of the factor. The mean scores for select items from each of the 7 identified factors illustrate that the perceived advantages of a RICC placement include an opportunity to increase both exposure to diverse patients and responsibility for patient care, as demonstrated by students' responses to items such as "I will have more opportunity for hands-on learning (procedures)" (mean score 4.32,

Table 1. Percentages of medical students who would consider a rural integrated community clerkship, by community of origin and identified family medicine or specialty discipline*

Community of origin, no. (%)	Career plans/ residency discipline	Would consider RICC (across career plans), %	
		Yes	No
Rural, 24 (22)			
	Family medicine	91	9
	Specialty	0	100
	(Undecided)	(71)	(29)
Urban, 84 (78)			
	Family medicine	85	15
	Specialty	32	68
	(Undecided)	(67)	(33)
Total, 108 (100)			
	Family medicine	88	12
	Specialty	29	71
	(Undecided)	(68)	(32)

RICC = rural integrated community clerkship.
*Missing responses to community of origin, career plans or undecided on RICC not included.

SD 0.64) and "I will gain valuable exposure to rural medical practice" (mean score 4.69, SD 0.61), respectively. The main concerns students appear to have about the RICC option are related to the "Personal implications of a rural community placement" factor such as "Moving (including my family) to a

Table 2. Mean responses of medical students using a 5-point Likert scale and salient item loadings for the 35 items from the 7-factor model for the rural integrated community clerkship questionnaire*

To what extent do you agree or disagree with the following statements about the RICC?†	Mean (SD) score	Item loading
1) Physician role/responsibility/exposure/preparation (9 items; $\alpha = 0.89$)		
I will have more opportunity for hands-on learning (procedures).	4.32 (0.64)	0.75
I will have more opportunity to become a valuable member of the medical team.	4.17 (0.64)	0.75
I will be given more responsibility for patient care than in the traditional clerkship.	4.23 (0.67)	0.67
My preceptors will be able to write a more impactful reference letter for CaRMS.	4.03 (0.85)	0.66
I will receive more extensive teaching/feedback than in the traditional clerkship.	3.75 (0.82)	0.57
Continuity with a small number of preceptors will be enhanced.	4.27 (0.63)	0.57
I will have a greater opportunity to develop personal relationships with my preceptors and other physicians.	4.30 (0.63)	0.61
I will be better prepared to respond to comprehensive questions about patient care on the MCC exam.	3.66 (0.76)	0.53‡[2]
I will be more effective when I begin residency training.	3.46 (0.89)	0.46
2) Practice exposure/exam preparation (7 items; $\alpha = 0.79$)		
I will receive sufficient exposure to different practice styles.	3.67 (0.79)	0.70
I will receive adequate exposure to all areas of medicine.	3.52 (0.93)	0.65
I will be well prepared to write the MCC exam.	3.96 (0.66)	0.65
I will receive more comprehensive exposure to clinical presentations offered in the UME curriculum.	3.38 (0.81)	0.57
I expect to be better prepared for clerkship assessment examinations.	3.25 (0.80)	0.55
There will be more opportunity to understand how the management of a hospital/clinic is achieved.	3.91 (0.84)	0.44
I will have opportunity to learn more about all areas of medicine through patient-focused experiences.	3.74 (0.78)	0.40
3) Collaboration with other health care professionals (5 items; $\alpha = 0.85$)		
It will allow me to explore more comprehensive relationships with other allied health care professionals (e.g., pharmacists, nurses).	3.93 (0.74)	0.72
I will have more opportunity to get to know other members of the hospital/clinical community.	4.11 (0.68)	0.72
I expect to develop better collaborations with the other allied health care workers (e.g., pharmacists, nurses).	3.88 (0.68)	0.70
It will prepare me to be more patient-focused as a resident.	3.78 (0.74)	0.55
It will give me greater opportunity to work with nurses one-on-one.	3.95 (0.71)	0.51
4) Exposure to rural medicine (4 items; $\alpha = 0.72$)		
I will gain valuable exposure to rural medical practice.	4.69 (0.61)	0.72
I will receive valuable exposure to allied health care in the community.	4.29 (0.64)	0.66
I will learn more about the role of a physician in the community.	4.30 (0.59)	0.51
I will receive extensive exposure to continuity of patient care.	4.28 (0.68)	0.50‡[1]
5) Support of UME program/medical school (4 items; $\alpha = 0.65$)		
I'm satisfied that there is an adequate "safety net" for students if the RICC does not work out.	3.08 (0.76)	0.64
I will receive the same support from the UME Office as other clerkship options.	3.91 (0.71)	0.62
I will be treated fairly academically by the UME Office if a conflict with my preceptor arises.	4.09 (0.68)	0.60
I will see a wide range of undifferentiated patient problems.	4.00 (0.65)	0.59
6) Personal implications of a rural community placement (4 items; $\alpha = 0.64$)		
Moving (including my family) to a small community for 8 months is doable /practical.	2.86 (1.31)	0.75
I am not concerned about the social implications of living in a smaller community outside of the city.	2.94 (1.28)	0.71
Costs (e.g. accommodations, travel) of participating in the RICC are manageable.	3.72 (0.85)	0.50‡[5]
I will receive greater exposure to physician lifestyle than in the traditional clerkship	3.52 (0.42)	0.42
7) Maintain existing/develop new professional relationships (2 items; $\alpha = 0.54$)		
Although physically removed from the medical school I will be able to stay "connected" to my classmates.	2.85 (0.87)	0.70
I will have a greater opportunity to develop personal relationships with my preceptors and other physicians.	3.46 (0.94)	0.61

CaRMS = Canadian Resident Matching Service; MCC = Medical Council of Canada; RICC = rural integrated community clerkship; SD = standard deviation; UME = undergraduate medical education.

*Internal reliability of the 35-item RICC questionnaire is 0.94 (Cronbach α). Seven factor model accounts for 60% of the variance.

†1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

‡[#]Indicates that this item also loads > 0.40, but below this reported value, on another factor identified by a corresponding number (e.g., ‡[2] = this item also loads > 0.40 on the factor numbered "2").

small community for 8 months is doable/practical" (mean score 2.86, SD 1.31) and the "Maintaining existing professional relationships" factor in response to the item "Although physically removed from the medical school I will be able to stay connected to my classmates" (mean score 2.85, SD 0.87).

Significant differences were not observed between first- and second-year medical students' responses on any of the 35 RICC items. Significant differences were also not observed between male and female students for any of the 7 factors using an independent paired sample t test. Students who were married, with or without children, or single with children were, however, significantly more likely to rate the "Support for placement in rural community" factor lower than single students (t [158] = 2.39, $p < 0.05$). For students primarily raised in rural communities versus urban centres, a significant difference was not observed between these groups on any of the 7 factors identified. In comparing those students who chose a specialty that would limit them primarily to an urban-based practice, to those who had the potential to seek rural practices as a family doctor, the RICC placement option was scored significantly lower overall, and on all factors except the "Support of undergraduate medical education program/medical school" factor.

DISCUSSION

The main findings of the present study are as follows: 1) an exploratory factor analysis of the 35-item RICC questionnaire supports 7 factors that influence the decision of medical students to consider a RICC option, 2) students generally agree that there are educational benefits to be derived from a RICC placement option, 3) the major concerns of preclerkship students about a RICC placement are related to the personal implications of moving to a rural community and their ability to maintain existing professional relationships with classmates, 4) having a rural or urban community origin did not influence students' responses toward the RICC option, 5) students who are married or have children are significantly more likely to be concerned about the social and practical implications of accepting a rural community placement, 6) students' perceived career path as a family physician or specialist has a significant influence on whether a rural community clerkship placement would be considered.

As shown above, an exploratory factor analysis of the RICC questionnaire identified 7 factors that looked at a comprehensive list of students' concerns for consideration of a long-term rural community clerkship placement. In support of the content validity of the instrument, each of the named factors corresponded with themes identified in the interviews with students before the development of the specific items. One of the limitations of this study, however, was the relatively small sample size used for the factor analysis and the limited number of potential items used that could have supported the measurement of some factors.

Interestingly, most of the preclerkship students were supportive of the RICC placement on the factors related to the roles and responsibilities of being a physician, such as having more opportunity for hands-on learning, becoming a valuable member of a medical team, developing comprehensive relationships with other health care professionals and gaining valuable exposure to the practice of rural medicine. The major concerns had less to do with whether or not the students felt that they would obtain a rigorous clerkship experience in preparation for the future than with the practical aspects of dealing with a long-term move to a rural community. In particular, the greatest concerns expressed were related to the implications of simply moving to a rural community, dealing with the social limitations of living there, staying connected with existing classmates or colleagues, and knowing that the medical school would provide an appropriate way out of the RICC placement if the educational experience began to deteriorate.

Although the apparent popularity of the RICC option is positive, with up to 40% of first-year students indicating that they would consider the placement for their third-year clerkship, the students' concerns outlined above will need to be addressed appropriately if the program is to be successful. For example, undergraduate medical education programs will need to consider arrangements that support those students who are married and/or with children in making the move to the rural location, assist them in connecting with people in the community and provide reliable means of staying connected to their classmates and the medical school itself.

Most importantly, students who self-identified a residency discipline in family medicine that could quite possibly result in future practice in a rural location were significantly more likely to consider the rural placement option than those who were considering a specialty (88% v. 29%, respectively). Correspondingly, students' rural or urban community of origin was found to be nonsignificant when considering a RICC placement as a potential option for

clerkship. Although this contradicts previous findings of existing physicians in practice,[2–4] the results from the present study provide insight into the potential influence that students' career aspirations have on the eventual pursuit of a rural practice in family medicine. Limited by sample size in the present study, further research will be needed to investigate the confounding effects of students' discipline expectations on their subsequent decision to pursue rural medicine regardless of their initial community of origin. Support for initiatives that provide information and promote the generalist or family medicine discipline during transitional periods into second and third years of medical school are advised, as this may eventually translate into more students willing to commit to practice in a rural setting.

CONCLUSION

The 7 identified factors for the RICC questionnaire assisted in defining the general categories of advantages and concerns that preclerkship students have about a long-term rural community clerkship placement. The emphasis on ensuring that the practical aspects of dealing with the transitions of moving to a rural community appears to be of great concern to students, possibly more so than the issue of gaining a meaningful and rewarding clerkship experience in preparation for future practice on graduation. Further research in this area will examine the longitudinal development of the RICC questionnaire and monitor the performance of students in the RICC program.

Acknowledgement: The authors gratefully acknowledge the ongoing support of the Undergraduate Medical Education Program Office at the University of Calgary.

Competing interests: None declared.

REFERENCES

1. Undergraduate general practice [editorial]. *Lancet* 1989;I:702-3.
2. Fryer GE Jr, Stine C, Vojir C, et al. Predictors and profiles of rural versus urban family practice. *Fam Med* 1997;29:115-8.
3. Rabinowitz HK, Diamond JJ, Hojat M, et al. Demographic, educational and economic factors related to recruitment and retention of physicians in rural Pennsylvania. *J Rural Health* 1999;15:212-8.
4. Rourke JTB, Incitti F, Rourke LL, et al. Relationship between practice location of Ontario family physicians and their rural background or amount of rural medical education experience. *Can J Rural Med* 2005;10:231-9.
5. Pathman DE, Konrad TR, Dann R, et al. Retention of primary care physicians in rural health professional shortage areas. *Am J Public Health* 2004;94:1723-9.
6. Worley P, Silagy C, Prideaux D, et al. The parallel rural community curriculum: an integrated clinical curriculum based in rural general practice. *Med Educ* 2000;34:558-65.
7. Verby JE. The Minnesota Rural Physician Associate Program for medical students. *J Med Educ* 1988;63:427-37.
8. Schauer RW, Schieve D. Performance of medical students in a nontraditional rural clinical program, 1998–99 through 2003–04. *Acad Med* 2006;81:603-7.
9. Worley P, Esterman A, Prideaux D. Cohort study of examination performance of undergraduate medical students learning in community settings. *BMJ* 2004;328:207-9.
10. Magnus JH, Tollan A. Rural doctor recruitment: Does medical education in rural districts recruit doctors to rural areas? *Med Educ* 1993;27:250-5.
11. Rosenthal TC, McGuigan HM, Anderson A. Rural residency tracks in family practice: graduate outcomes. *Fam Med* 2000;32:174-7.

Doctors Speak Out

Podium — Letters to the Editor — Editorials

We invite physicians to speak out on issues that concern them.
Send your submissions to Suzanne Kingsmill, Managing Editor,
CJRM, P.O. Box 4, Station R, Toronto ON M4G 3Z3; cjrm@cjrm.net