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Should I apply to medical school? High school students and barriers to application

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Introduction: A major goal of the Faculty of Medicine at the Memorial University of Newfoundland is to produce physicians who will return to rural areas that are currently underserviced. Research shows that the strongest indicator of practice in a rural area is a rural background, and thus it is important that rural students apply to medical school. We investigated what high school students believe to be preventing them from pursuing medical education.
Methods: Between September 2013 and June 2014, we administered a paper survey to high school students in Newfoundland and Labrador, New Brunswick and Prince Edward Island.
Results: A total of 665 participants completed the survey. We found that fewer rural students (75.6%) than urban students (98.6%) believed that they could gain admission to medical school ($p < 0.01$) and that medicine was promoted as a career choice in fewer rural schools (55.7%) than urban schools (69.7%). Also, 55.4% of urban students, but only 44.4% of rural students, believed that rural students were disadvantaged when applying to medical school.
Conclusion: In our study, rural students believed they were less likely to be accepted into medical school than urban students, and fewer rural students felt that medicine was promoted as a potential career choice. Our results may be explained by a lack of role models or perhaps by financial barriers, although further research is needed.

Introduction : Un des grands objectifs de la Faculté de médecine de l'Université Memorial de Terre-Neuve est de former des médecins qui retourneront exercer dans les zones rurales qui sont actuellement mal desservies. Des études ont démontré que le facteur le plus fortement associé au choix de la pratique en milieu rural est le fait d'y avoir habité; il est donc important que des jeunes ruraux entrent en faculté de médecine. Nous avons demandé à des élèves de niveau secondaire ce qui pourrait les empêcher de poursuivre des études en médecine.
Méthodes : Entre septembre 2013 et juin 2014, nous avons invité des élèves de Terre-Neuve-et-Labrador, du Nouveau-Brunswick et de l'Île-du-Prince-Édouard à répondre à un sondage papier.
Résultats : Le sondage a été réalisé auprès de 665 répondants. Les élèves en milieu rural (75,6 %) sont moins nombreux que les élèves en milieu urbain (98,6 %) à croire en leurs chances d'être admis en médecine ($p < 0,01$). De plus, la promotion de la profession médicale à l'école serait moins répandue en milieu rural (55,7 %) qu'en milieu urbain (69,7 %). Finalement, 55,4 % des élèves en milieu urbain et seulement 44,4 % des élèves en milieu rural croient que le milieu représente un frein à l'admission en médecine.
Conclusion : En résumé, les élèves du milieu rural croient que les citadins sont plus susceptibles d'être admis en médecine, et ils sont moins nombreux à dire que leur école les a encouragés à faire carrière dans ce domaine. Nos résultats pourraient s'expliquer par un manque de modèles ou des contraintes financières; il faudra approfondir la recherche à ce sujet.

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INTRODUCTION

In Newfoundland and Labrador, a very sparsely populated province, there is an increasing demand for physicians of all specialties to return to rural areas and provide medical care. With 42% of Canada's population living in rural areas and only 13.4% of Canada's doctors practising rurally, there is a growing demand for physicians to expand from the major health care hubs to reach underserviced rural populations.[1] Despite recent increases in the number of physicians practising in rural locations in Canada,[2] many rural and isolated communities in the province of Newfoundland and Labrador remain underserviced[1,3] owing to an inadequate supply of practitioners. A major goal of the Faculty of Medicine at the Memorial University of Newfoundland is to produce physicians who will return to rural areas of Newfoundland and Labrador, and to rural Canada in general. Research shows that the strongest indicator of practice in a rural area is a rural background.[4,5] Thus, it is important that there be a sizeable portion of applicants with a rural background. The overall aim is that these students will eventually return to practise in rural and remote communities.[4,6–10] Medical schools focused on rural retention want to increase enrolment of rural applicants,[5,11] yet it appears that rural students are still not pursuing a career in medicine.

Scrutiny of the procedure for application to medical school has sparked a belief that the process followed by admission committees is biased in favour of urban students. However, research suggests that no partiality exists in the application procedure and that the problem lies in fewer rural students applying.[12] Studies have been conducted with medical students and residents in an effort to ascertain what they feel are barriers to the pursuit of a career in medicine. Specifically, it has been found that rural students are older, come from families with lower socioeconomic status, and experience more stress over debt and financial matters.[13] It has also been found among high school students in southwestern Ontario that the factors preventing respondents from applying were competitiveness, low grades and affordability.[14] Other researchers speculate that the limited representation of rural students in medical school applications in Ontario could be related to the lack of role models in rural areas, as well as financial barriers.[15] Data are lacking to confirm these speculations in Ontario, and a lack of evidence exists to explain why a similar trend of misrepresentation of rural candidates is occurring in other provinces, such as Newfoundland and Labrador.

We investigated what high school students, from both rural and urban areas, believe to be preventing them from pursuing medical education in Newfoundland and Labrador. We looked at whether rural students have a perception that they are less likely to be admitted and therefore do not consider medicine as a potential career. We believe that students in this province are in a unique situation in that the spike in tuition fees that deterred students in Ontario[16] may not have affected Memorial University, where tuition rates are among the lowest in the country.[17] Knowledge of the barriers that prevent students from applying to medical school is paramount in addressing the issue of recruitment of more applicants from rural areas. Overcoming these barriers could subsequently lead to an increased number of rural physicians for a predominantly rural province.

METHODS

Participants

We targeted high school students living in Newfoundland and Labrador, New Brunswick and Prince Edward Island who were interested in postsecondary education. Rather than calculating a sample size, we used a convenience sample of students from schools in these provinces to obtain a large and representative sample.

Participants were included if they were in high school, indicated interest in postsecondary training and were attending a school in a community where first-year medical students were completing a clinical placement. Additional participants were recruited through a health care career-development program called MedQUEST at Memorial University in St. John's, NL.

Survey design and content

Between September 2013 and June 2014, medical students administered a paper survey consisting of closed-ended, rank-based questions and open-ended opinion questions based on consultation with content experts in the field. Before completing the survey, high school students received a 1-hour presentation about Memorial University and its Faculty of Medicine from medical students attending a clinical placement in their community.

The survey consisted of 17 questions that focused on key areas, including exposure to medicine,

ideas regarding admission, perceived barriers to attending medical school for all students and perceived barriers that may be specific to rural students. The rank-based questions used an ordinal scale of 1 to 10, where responses of 1 to 5 were interpreted as disagreement and responses of 6 to 10 were interpreted as agreement. Participants were asked to provide only their school district and birthdate to remain anonymous.

Data management and analysis

Quantitative data were entered into SPSS, version 22. Personal identifiers were removed during data input, and all electronic data were stored on a password-protected computer. Paper copies of the survey were stored in a locked room in a faculty member's office. Missing survey data (unanswered questions) were not imputed and remained empty.

Appropriate statistical calculations were computed, including frequency analysis and χ^2 tests (95% confidence interval) to determine differences and trends, respectively. Open-ended questions were collected and stored for later analysis.

This study was initiated as a quality-improvement project and therefore did not require ethics approval from the health research ethics board.

RESULTS

Participant characteristics

A total of 665 participants completed the survey. The mean age of respondents was 16.83 (standard deviation 0.89) years. Of the participants, 5.4% were 15 years of age, 32.2% were 16, 37.6% were 17, 23.7% were 18, 1.0% were 19 and 0.2% were 20.

More participants resided in a rural area (88.0%, n = 585) than in an urban area (12.0%, n = 80). A geographic breakdown revealed that most students sampled resided in central Newfoundland (29%, n = 190) followed by western Newfoundland (22.1%, n = 147), the Avalon Peninsula (15.0%, n = 100), other Atlantic Canadian provinces (13.8%, n = 92), eastern Newfoundland (12.6%, n = 84) and Labrador (6.6%, n = 44).

Exposure to medicine as a career

Overall, 62.4% of students had attended a presentation on medicine in the past, whereas 37.6% had not. Students who had attended a presentation in the past were more likely to come from a rural community (92.0%) than an urban community (8.0%) ($p < 0.01$). Rural students (64.8%) were more likely than urban students (43.4%) to have previously attended a presentation on medicine ($p < 0.01$).

As a cohort, 57.3% of students believed that medicine was promoted at their school as a career choice. Investigation into the differences between rural and urban samples revealed that 69.7% of urban students believed medicine was promoted at their school, whereas 55.7% of rural students believed that it was promoted at their school ($p < 0.05$).

Beliefs about a career in medicine

Significant differences existed between rural and urban students in their perception of gaining admission to medical school. Overall, 78.2% of all students surveyed felt they could be accepted. Fewer rural students (75.6%) than urban students (98.6%) believed that they could gain admission to medical school ($p < 0.01$). Interestingly, 55.4% of urban students, but only 44.4% of rural students, believed that rural students were disadvantaged when applying to medical school.

Beliefs on working in rural medicine

As an entire group, 41.2% of students were interested in a career in rural medicine. However, differences existed between the rural and urban groups; 43.0% of rural students were interested in a career in rural medicine but only 27.0% of urban students were interested in rural medicine ($p < 0.01$) (Table 1).

Financial worries and role models

Although this was not addressed in the survey, students alluded to financial worries being a barrier in the open-ended questions.

The survey also indicated that role models were lacking for the promotion of rural medicine.

DISCUSSION

The purpose of this cross-sectional survey of high school students in Atlantic Canada was to determine whether rural students perceived barriers to applying to medical school and to identify the types of barriers these students felt existed. The underrepresentation of rural applicants at Memorial University is similarly felt across the country, and promotion of rural students may encourage rural practice, which is a desired outcome for most

Canadian provinces. To our knowledge, this is the first study focusing on the barriers specific to rural students in the Atlantic provinces.

Health care promotion at the high school level

Role models and mentors are key elements in individual development throughout many career paths. Having a positive role model can spark interests and influence career choices. It has been proposed that young people who do not grow up having strong relationships with health care professionals lack motivation to follow their path and pursue medicine.[15]

Rural areas in Newfoundland and Labrador, more than anywhere else in Canada, rely on provisionally licensed international medical graduates (IMGs) to service isolated communities. These IMGs often spend less than 5 years in their assigned communities before they emigrate within Canada, often to bigger centres in Ontario.[18] This results in a high turnover of family physicians in rural areas, which means that residents of the area are unable to form positive, lasting doctor–patient relationships.

Results of this study indicate that rural students lacked school administrative personnel or physician community role models who promoted medicine as a career during their high school years. We speculate that this deficit, along with the lack of strong doctor–patient relationships often seen in these areas influence whether rural students decide to apply to medical school.

Expected acceptance

Although rural students lacked personnel who promoted medicine as a career, they did more frequently report that they received information sessions about medical school when compared with their urban counterparts. Despite increased exposure, rural students did not report a subsequent stimulation in interest in pursuing a career in medicine. Although more rural students were reached than urban students, rural students still felt that it was less likely that their application to medical school would be accepted (75.6% of rural students v. 98.6% of urban students). This finding is counterintuitive; the expectation is that high rates of exposure to medical school presentations would lead to higher perception of success on admission. This follows from cognition and learning theory, whereby more exposure and reinforcement make people more comfortable with a process.[19]

Willingness to return

Previous research by Mathews and colleagues[4,5] indicates that coming from a rural community is one of the biggest drivers to eventual return to practise in a rural area; a finding that is also supported by our data. In the 41.2% of total surveyed students who were interested in rural medicine, more rural students than urban students reported willingness to return to a rural area. We believe this can be attributed to the possibility that rural students are more exposed to the need for medical care in their communities and have a more developed understanding of the barriers to rural primary care. Therefore, rural students may have more deep-seated motivations to service these areas. Additionally, it is possible that urban students are unaware of the rural lifestyle and therefore see it as an unknown territory that they are less apt to explore. These data further emphasize the need for rural recruitment efforts to facilitate future service in rural areas of Newfoundland and Labrador and the rest of Canada.

Table 1. Survey results from high school students, by rural or urban residence

	% who agreed			
Variable	Rural	Urban	χ^2 value	*p* value
Attended a presentation on medicine in the past	*n* = 581 64.8	*n* = 76 43.4	12.21	< 0.01
Believed medicine is promoted as a career choice	*n* = 575 55.7	*n* = 76 69.7	4.82	< 0.05
Believed could gain acceptance to medical school	*n* = 569 75.6	*n* = 73 98.6	18.76	< 0.01
Believed rural students are at a disadvantage when applying to medical school	*n* = 579 44.4	*n* = 74 55.4	2.77	> 0.9
Would be interested in a career in rural medicine	*n* = 582 43.0	*n* = 74 27.0	6.29	< 0.05

Limitations

There are limitations associated with this study. We used a convenience sample; medical students on rural rotations completed the presentation and administered the surveys. Therefore, the data have a misrepresentation of rural compared with urban students. Additionally, not all presentations were mandatory for students; consequently, it is possible that the sample population is biased to students already interested in medicine as a future career. Another limitation is that data were not analyzed using specific demographics, such as age and sex.

Financial stress as a direct barrier was not addressed in the quantitative aspect of the survey; however, students alluded to this barrier in the open-ended questions. Our data provide an opportunity for further examination into financial barriers in future analysis. We wish to decipher whether rural students face greater financial stress than their urban counterparts when considering medical school. In future research, this information could enhance our understanding of the types of students who perceive different barriers.

CONCLUSION

One of the most important findings in our data was that rural students believe they are less likely to get into medical school than urban students, and of these students, fewer felt that medicine was promoted as a potential career choice. The limited promotion of medicine during high school may have a greater influence on likelihood for medical school application than previously suggested in the literature. It is therefore our recommendation that medicine be promoted as a career option in rural high schools. Our research identified and confirmed application barriers perceived by high school students. An important area for future research would be to assess whether rural students who apply are obtaining acceptance and to decipher whether the barriers these students report are real or perceived.

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