



Factors that influence Canadian internal medicine residents' choice to pursue a rheumatology career

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Received: 1 June 2018 / Revised: 10 July 2018 / Accepted: 16 July 2018 / Published online: 20 July 2018
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Abstract

In Canada, little is known about residents' self-confidence to diagnose/treat musculoskeletal (MSK) disease and factors affecting pursuit of a rheumatology career. Our study explored these factors. An online survey (descriptive cross-sectional design) was distributed to Canadian postgraduate year (PGY) 1 and 2 internal medicine (IM) residents. Questions probed self-confidence in rheumatology and factors influencing subspecialty career choice. Frequencies were determined and responses compared between PGY-1 and PGY-2 using univariate statistical analyses. Fifty-four IM residents completed the survey. PGY-2 residents were statistically more certain in subspecialty decidedness and had higher levels of self-confidence to diagnose/treat MSK disease and perform a physical exam. "Quality of life" was the most encouraging factor for a rheumatology career choice followed by "job opportunities" and "previous clinical exposure." Although 50% of PGY-1 residents had completed a rheumatology clinical rotation, 76% indicated that increased knowledge would affect rheumatology career choice. Only 38% were interested in novel rheumatology education. No difference in rheumatology exposure, rheumatology clinical rotation completion year, or rheumatology career choice was observed. Our research confirms findings from similar United States (US) and United Kingdom (UK) studies that suggest that increased MSK knowledge positively influences residents' confidence to diagnose/treat MSK disease. Our study differs with Canadian PGY-1 and PGY-2 IM residents by evaluating self-confidence to diagnose/treat MSK disease separately from self-confidence to perform a physical exam. Significant differences between first and second year trainees suggest types/quality of rheumatology experiences (e.g., case complexity, diagnostic problem-solving competency) may affect self-confidence to diagnose/treat MSK disease factors and rheumatology career choice.

Keywords Fellowship/career choice · Internal medicine · Musculoskeletal disease · Resident education · Rheumatology · Self-confidence

Background

In Canada and throughout the world, musculoskeletal (MSK) diseases are some of the most prevalent conditions affecting population health [1, 2]. For the past several years, MSK health has continued to be one of the leading causes of disability and outpatient clinic visits [3, 4]. Between 2006 and 2007, approximately 2.8 million Ontarians (i.e., 23% of Ontario's population) were seen by a physician for MSK-

related disorders, of which 33% were referred to a specialist [4]. From 1995 to 2010, the prevalence of MSK disease in Ontario more than doubled, with an estimated 100,000 people diagnosed with some form of MSK health condition. The burden associated with untreated MSK disease is significant and affects individuals' mobility, ability to work, ability to care for themselves and others, ability to participate in social activities, and their ability to maintain functional independence [1, 5, 6]. In Canada, the socio-economic impact of rheumatoid arthritis alone is estimated at over \$4.4 billion, of which 80% were attributed to loss of income due to unemployment and/or underemployment [7].

Although there has been a slight increase in the number of rheumatology residents training in Canada, like many countries worldwide, Canada is facing a serious shortage of rheumatologists [5, 8–11]. Access to rheumatology care is a significant concern, especially in remote, rural, and indigenous

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communities [12–15]. Canada's rheumatology shortage has been attributed to a: (1) growing demand from new patients (due to aging population, better diagnostics/treatments), (2) fewer practicing rheumatologists due to retirement attrition, and (3) insufficient enrolment in rheumatology programs to meet current and projected needs [9]. According to a recent rheumatology workforce study, there are between 398 and 428 practicing rheumatologists in Canada, one-third of whom will be retiring over the next 10 years [12]. To increase the number of practicing rheumatologists in Canada, it is important to understand factors influencing IM residents' career choice [9, 16].

Previous exposure to a medical subspecialty, procedure-based specialties, the availability of mentors, perceived quality of life, and intellectual stimulation that provides a challenge in diagnosis are key factors that influence career choices among residents [15, 17–20]. As a subspecialty, rheumatology is intellectually challenging. Accurate diagnosis and treatment of MSK disease are complicated due to the extent of differential diagnoses, non-specificity in rheumatological laboratory tests, and radiographic images, in addition to the complex pathophysiology of chronic pain assessment [21, 22]. As a whole, medical students, residents, and practicing physicians are not comfortable diagnosing and treating MSK conditions [23–27]. Given the social and economic burden of MSK diseases on individuals and the Canadian healthcare system, it is important to understand whether lack of self-confidence to diagnose/treat MSK diseases deters residents' choice to pursue a rheumatology career. Thus, we distributed a survey to IM residents to examine: (1) levels of self-confidence to diagnose/treat MSK disease and (2) factors influencing Canadian IM residents' choice to pursue a rheumatology career.

Methods

To examine factors that influence Canadian IM residents' choice to pursue a rheumatology career and level of confidence in assessment/diagnosis/treatment, a 15-question survey was designed. Seven questions pertained to demographic information (i.e., post-graduate year, gender, residency training location, subspecialty decidedness, exposure to rheumatology, completion of first clinical rotation in rheumatology, and consideration of a rheumatology fellowship/career) while eight questions related to factors that influence residents' career choice and their self-confidence in rheumatology practice including: (1) extent to which residents are confident diagnosing/treating rheumatic disease and performing a physical exam, (2) decidedness on a subspecialty selection, (3) factors that encourage and prevent choosing a rheumatology career, (4) whether more knowledge would affect rheumatology career choice, and (5) interest in novel rheumatology education. The study was approved by the Hamilton Integrated Research Ethics Board (a jointly instituted board of St.

Joseph's Healthcare Hamilton, Hamilton Health Sciences and McMaster University's Faculty of Health Sciences).

The survey was launched through [SurveyMonkey.com](https://www.surveymonkey.com), a secure on-line, privacy protected (under the European Union-United States Privacy Shield Framework) software service. In the fall of 2016, Canadian program directors of all 13 English language IM Residency Programs received an email asking them to distribute the link to the online survey to IM residents. Four program directors forwarded the survey link. Participation was voluntary and anonymous, and informed consent was obtained upon survey commencement. Responses were received over 3 months. Frequencies of responses were summarized and categorical responses between PGY-1 and PGY-2 residents were compared. Likert response data were collapsed into condensed sets and univariate statistical analysis was performed using the Chi-square test for independence with a significant value set at $p < 0.05$.

Results

Of 54 respondents, 21 were PGY-1 and 33 residents were PGY-2, of which 67 and 33%, respectively, were female (Table 1). Most residents received their residency training in Ontario (66%), followed by Alberta (23%) and British

Table 1 Demographic characteristics of study participants

Characteristic	PGY-1 ($n = 21$)	PGY-2 ($n = 33$)
Female	67%	33%
Location of residency training		
Ontario	57%	52%
Alberta	29%	12%
British Columbia	–	9%
Other	14%	27%
Decidedness on a subspecialty ($p = 0.05$)		
Undecided	14%	0
Somewhat decided	10%	9%
Decided	29%	15%
Very decided	47%	76%
Exposure to rheumatology		
None/little	52%	39%
Some/a lot	48%	61%
Completion of first clinical rotation in rheumatology		
PGY-1	50%	59%
PGY-2	–	25%
No experience during residency	50%	16%
Consideration of a rheumatology fellowship/career		
Strongly disagree/disagree	52%	36%
Strongly agree/agree	48%	64%

Columbia (9%). Exposure to rheumatology as “some/a lot” was identified by 48 and 61% of PGY-1 and PGY-2 residents, respectively, with 50 and 59% having completed their first clinical rotation in rheumatology during PGY-1. Significant differences in subspecialty decidedness revealed that 48 and 76% of PGY-1 and PGY-2 residents were “very decided” and 48 and 64% of PGY-1 and PGY-2 residents had ever considered a career in rheumatology. Self-confidence to practice rheumatology (i.e., diagnose/treat rheumatic disease and perform a physical exam) was statistically different between PGY-1 and PGY-2 (Fig. 1). Self-confidence to diagnose/treat rheumatic disease was 35% for PGY-1 and 65% for PGY-2 and self-confidence to perform a physical exam was 45 and 72% for PGY-1 and PGY-2, respectively. This is relevant considering that there was no difference between residents’ exposure to rheumatology or completion year of their first clinical rheumatology rotation.

Of all factors influencing residents’ decision to pursue a specific subspecialty of medicine (Fig. 2), “interest in field” was the most frequent response (71% in PGY-1 and 79% in PGY-2), followed by “lifestyle” (10% in PGY-1 and 12% in PGY-2). When asked what factors encouraged their decision to choose a rheumatology career (Fig. 3), residents ranked “quality of life” as the highest (48% in PGY-1 and 36% in PGY-2). This was followed by “job opportunities” (14% in PGY-1 and 24% in PGY-2), “previous clinical exposure” (14% in PGY-1), and “outpatient based clinical practice” (12% in PGY-2). Factors that discouraged their decision to choose rheumatology (Fig. 3) were “outpatient based clinical practice” (24% in PGY-1 and 24% in PGY-2) followed by “interest in another field” (24% in PGY-1 and 15% in PGY-2), “previous clinical exposure to subspecialty” (10% in PGY-1 and 12% in PGY-2), and “opportunities for procedures” (10% in PGY-1 and 6% in PGY-2). When asked if increased knowledge would affect rheumatology career choice (Fig. 4), statistical difference was observed with 76% of PGY-1 residents having responded positively. However, only 38% of

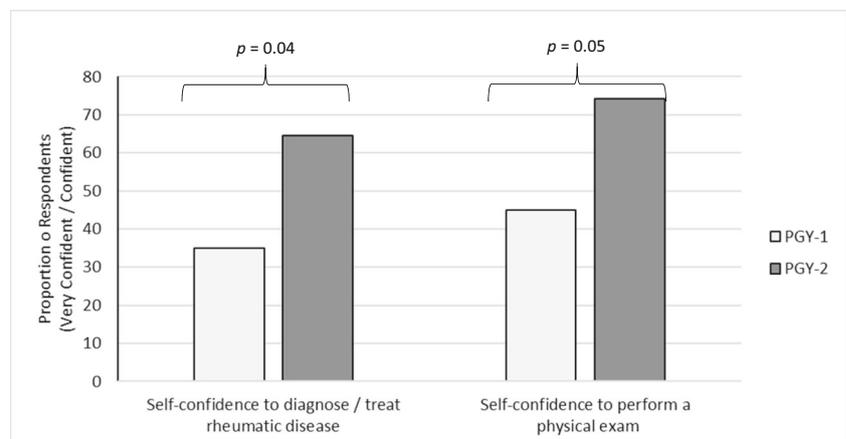
PGY-1 residents indicated that they were interested in novel rheumatology education.

Discussion

With current and projected MSK patient care needs, Canada’s healthcare system is facing a precarious situation, as fewer Canadian residents are choosing non-procedure-based rheumatology careers. Compounding this issue, many medical students, residents, and practicing physicians lack the self-confidence to accurately diagnose and effectively treat MSK disease [9, 16, 23–26]. To address these concerns, there is an urgent need to develop residents’ skills to diagnose/treat MSK disease and encourage them into rheumatology practice. Accordingly, we asked Canadian IM residents about their self-confidence to diagnose/treat MSK disease and perform a physical exam, and factors that influenced their choice to pursue a rheumatology career. We compared responses between residents in their first and second year of postgraduate training.

Both PGY-1 and PGY-2 residents indicated that “interest in field” was the biggest factor influencing career choice. This was consistent with similar studies performed in the US. In three separate American studies that explored the needs of resident trainees during elective subspecialty rotation, Hale et al. (2016), Horn et al. (2008), and Ofoma et al. (2011) found that subspecialty electives play a key role in resident career development and interest in subspecialty choices [17, 18, 28]. Similar studies pointed to two additional considerations: (1) the importance of prior exposure to rheumatology practice through rotations, especially if exposure was done during the first year of IM residency, and (2) the need to provide residents with greater information about rheumatology as a field of practice [18, 24–27]. In our study, 76% of PGY-1 residents agreed that increased knowledge in rheumatology would influence their career choice; yet, only 38% indicated interest in novel rheumatology education. This suggests that

Fig. 1 Residents’ self-confidence to diagnose/treat rheumatic disease and perform a physical exam



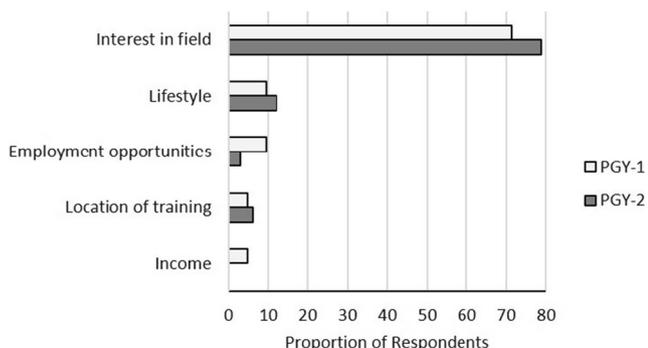


Fig. 2 Factors that influence residents' decision to pursue a specific subspecialty of medicine

resident interest in rheumatology education may be less linked to the types of instructional strategies used, rather than the level of engagement residents experience with rheumatology patients during their clinical rotations. Katz et al. showed that both the frequency and complexity of different exposures to rheumatology practice increased academic and clinical performance (as measured by MSK objective standardized clinical exams and diagnostic accuracy) as well as resident self-confidence to diagnose/treat MSK disease [23]. In our study, neither residents' prior exposure to rheumatology nor the year

in which they completed their first rheumatology clinical rotation influenced interest in subspecialty selection or decision to pursue a rheumatology career.

Consistent with previous research examining residents' confidence to diagnose/treat MSK disease and factors that influence their choice to pursue a rheumatology career, our results showed that resident self-confidence to diagnose/treat MSK disease increased with training and interest in rheumatology subspecialty selection [9, 19, 23–30]. In the US, Button and Bruel (2007) and DiGiovanni et al. (2012) showed that increased MSK knowledge had a positive influence on residents' clinical confidence to treat MSK disease [29, 30]. In the UK, Nadesalingam et al. (2016) found that residents' confidence and competency to treat MSK disease were proportionately related to their level of training and exposure to MSK medicine throughout resident training [27]. Different in our study, however, is that Canadian IM residents rated their self-confidence to diagnose/treat MSK disease separately from their confidence in their ability to perform a physical exam. Given that these two measures of self-confidence were significantly different between PGY-1 and PGY-2, it suggests that further research examining this relationship is needed. Also of interest was that lower levels of confidence in performing a physical examination and in diagnosing/

Fig. 3 Factors that encourage (a) and prevent (b) residents' choice in a rheumatology fellowship/career

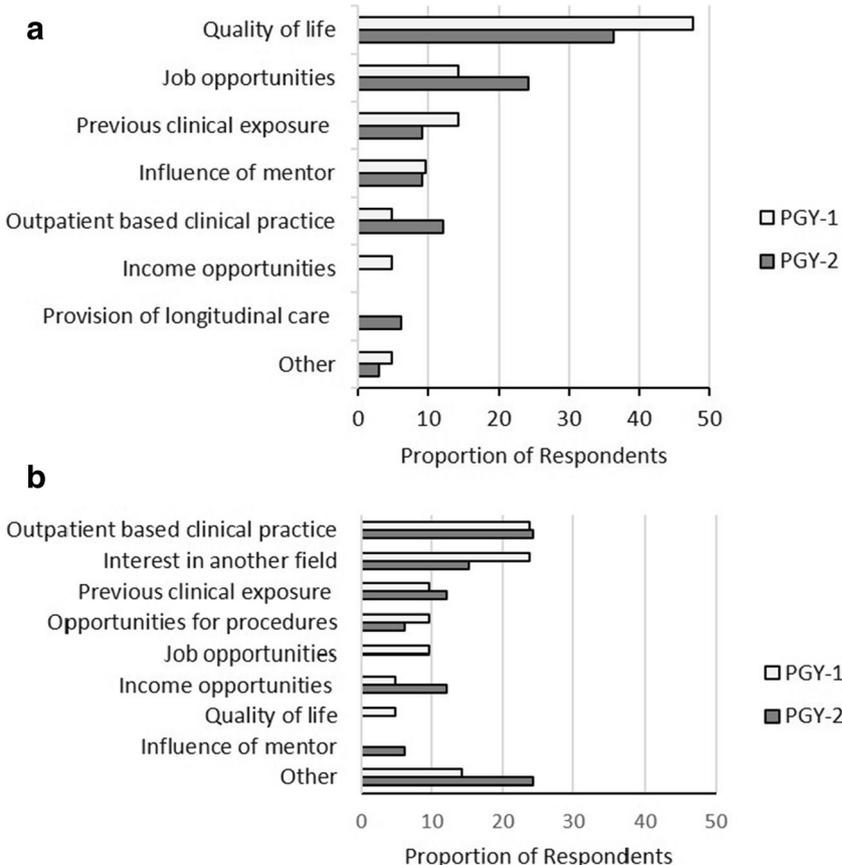
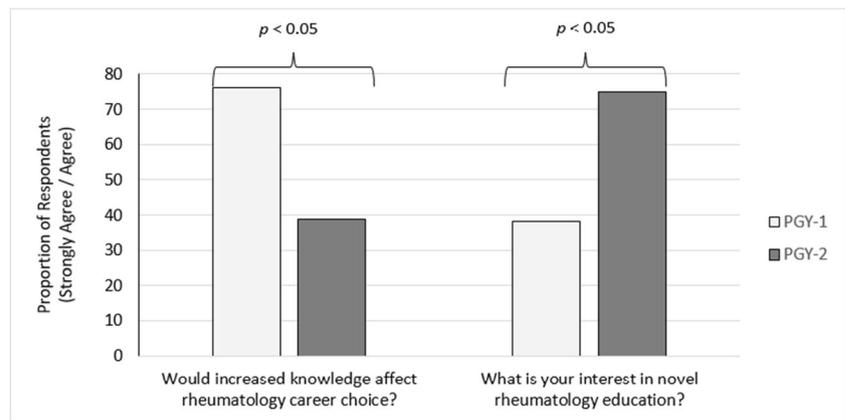


Fig. 4 Increased knowledge affecting rheumatology fellowship/ career choice and interest in novel rheumatology education



treating were seen in PGY1 trainees which appeared to correspond with their lower consideration of rheumatology as a subspecialty, suggesting an association between confidence and career choice. There may be potential, then, that increasing residents' self-confidence may lead to more trainees considering a rheumatology career. To better understand this connection, we suggest that further research investigates how the frequency and complexity of rheumatology patient exposure are linked to resident self-confidence, and how self-confidence is linked to residents' abilities to accurately perform the different elements involved in MSK examination, diagnosis, and treatment (e.g., detailed compilation of patient clinical history, basic rheumatologic skills, ordering and interpreting laboratory tests, and patient care treatment) and choice to pursue a rheumatology career.

Following the completion of our study, we critiqued its merits and limitations. To facilitate participation, our survey was short and succinct (15 questions, average participation response time of approximately 5 min). Questions about participant demographics were kept to a minimum. With respect to questions related to previous rheumatology exposure, further sub-questions related to (1) frequency and duration, (2) depth and breadth of rheumatology patient case loads, and (3) complexity/problem-solving skills required. Another limitation is that we were not able to calculate survey response rate as we did not know the total number of residents enrolled in each of the programs that circulated our questionnaire. Other limitations of this study relate to the survey methodology [31]. Although our survey questions were first reviewed by a select group of faculty and residents from McMaster University, the questions did not undergo validity or reliability testing [32]. Additionally, due to the survey design, we cannot conclusively link the self-report measures of residents' self-confidence to residents' perceived ability or choice to pursue a rheumatology career. These measures may better be assessed through qualitative research (e.g., semi-structured interviewing) whereby researchers and participants could explore the phenomena of self-confidence (i.e., factors influencing self-

confidence) as it relates to clinical confidence and ability to diagnose/treat MSK disease, perform a physical exam, and choice to pursue a rheumatology career.

Conclusions

Our results are consistent with US and UK research examining residents' confidence to diagnose/treat MSK disease and factors influencing choice to pursue a rheumatology career [18, 24–30]. In our study, we found that self-confidence to diagnose/treat and to perform examination was significantly different between PGY-1 and PGY-2 trainees, coinciding with level of decidedness on a rheumatology career. Practical and relevant insight into factors that influence confidence and pursuit of a rheumatology career may be less linked to the instructional strategies or time of completion than the type/quality of rheumatology experiences (e.g., case complexity/diagnostic problem-solving competency).

Compliance with ethical standards

The study was approved by the Hamilton Integrated Research Ethics Board (a jointly instituted board of St. Joseph's Healthcare Hamilton, Hamilton Health Sciences and McMaster University's Faculty of Health Sciences).

Conflict of interest The authors have no financial relationship with The Arthritis Society who funded Dr. Matsos with a career award. The authors confirm they have full control of all primary data and allow the journal to review their data if requested.

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