ORIGINAL RESEARCH

'The word that comes to mind is polymath': medical students' perceptions of rural postgraduate careers

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ABSTRACT:

Introduction: Physician shortages in rural and remote areas challenge accessibility and delivery of care to rural and remote communities, including within Scotland. Medical education is a reform priority to establish a sustainable medical workforce. Although there is evidence to support aspects of medical education that enhance the likelihood of practising rurally, the mechanism by which these educational initiatives work is not clearly understood. This study aimed to examine medical students' perceptions of rural and remote practice, how these perceptions motivate their interest to practise rurally, and what aspects of education are thought to influence these perceptions.
Methods: This cross-sectional study utilised semistructured interviews with 10 University of St Andrews medical students enrolled in undergraduate or graduate-entry medical education programs. Feldman and Ng's theoretical framework was deductively applied. Interviews informed additional subthemes,

which were integrated into the original framework. The final framework helped examine medical students' perceptions of rural medicine and mechanisms that shape these perceptions.

Results: Structural (countrywide) themes included geographical barriers affecting patients and physicians. Organisational themes included perceptions of inequitable allocation of resources between urban and rural areas, as well as limited staff and support in rural practices. Occupational themes included the perception of rural clinical generalists. Personal life themes included the perception of community in rural areas. Mechanisms shaping medical students' perceptions most profoundly were their experiences (educational, personal experience or working).

Conclusion: Medical students' perceptions align with other professionals' reasons for staying in a particular job. Perceptions regarding rural careers included challenges due to geographical proximity to patients, resource allocation in rural areas, and the potential to subspecialise as a general rural practitioner. Identified mechanisms, which shape perceptions, can be addressed and strengthened by educators, policy-makers and governments to optimise medical education that promotes rural recruitment and retention.

FULL ARTICLE:

Introduction

Access to healthcare services is a major rural health issue globally[1], with medical resources, including staff, frequently concentrated in urban areas[1,2]. Healthcare provider shortages in rural and remote areas have resulted[2-4] and the WHO estimates a global health worker gap of 18 million by 2030[5]. Specifically, lack of access to health services affects rural and remote Scotland, where 29% of the population resides[6,7]. Recruiting enough healthcare workers with skills required for rural practice proves challenging[7], with general practitioner shortages noted, alongside an ageing GP workforce and retention difficulties[8]. Targeting rural recruitment issues through medical education, multiple studies show three factors that strongly predict a medical student's intention to practise rurally: (1) a rural background, (2) positive undergraduate rural clinical rotations, and (3) targeted rural training at undergraduate and postgraduate levels[9-13]. Medical educational curricula that include rural health issues also create student interest in working rurally[9-11,13]. Medical education involving immersion in rural communities guided by good role models and curricula that integrate rural content promotes rural recruitment of recent graduates[14,15].

Medical schools have a social accountability to their communities[16]. Canadian research demonstrates that rurally oriented undergraduate programs grounded in social accountability have positive impacts on recruiting and retaining rural practitioners[17-19]. While some evidence base confirms that curricula components encourage rurally oriented medical students, their mechanism of action is not entirely clear. One possibility is that they alter medical students' existing perceptions of rural practice; however, little current research explores this.

The University of St Andrews has two medical programs: a BSc Medicine and a graduate-entry MBChB (ScotGEM). The BSc program is an integrated, systems-based three-year BSc Honours degree, with graduates transferring to partner schools to complete their primary medical qualification. The BSc program delivers the scientific basis of medicine via lectures, guided studies or small-group workshops, alongside clinical skills teaching and short placements within primary and secondary care. The ScotGEM program was commissioned to address Scotland's rural generalist workforce crisis[20]. The program, Scotland's first graduate-entry medicine course, runs in partnership with the Universities of Dundee and the Highlands and Islands, and NHS Scotland[21]. It employs high-quality mentorship and role modelling, and a 40-week immersive longitudinal integrated clerkship (often in rural locations) to achieve its aims. This curricula contrast provides a unique opportunity to explore rural practice perceptions in medical students exposed to different programs. This pilot study examines the perceptions of University of St Andrews' medical students about rural and remote practice and how these perceptions influence their interest in future rural practice.

Methods

This pilot study deductively applied Feldman and Ng's 'Careers: mobility, embeddedness, and success' framework to the data[22]. The framework assesses factors that motivate and encourage workers to change careers or occupations. Findings were assimilated into six perspectives influencing career mobility to explore the usefulness of the framework's application to this novel context (see Table 1).

Sample

The sample included 10 participants from University of St Andrews BSc and ScotGEM medical education programs, recruited through online advertisements and snowballing. The recruitment strategy aimed to enhance variation in rural and remote practice intention, geographical backgrounds, gender and career interests. Researchers assumed that the type of student who studied at the University of St Andrews was a preselected group. Sufficient homogeneity of perceptions related to practising rurally was expected to be reached with this sample size.

Data collection and analysis

Semistructured interviews with participants took place between June and July 2020; they explored themes around geographical and familial history, perceptions of practising rurally, lifestyle preferences, education, and future career intentions. Pre-interview, participants provided a diary response, informing the researcher's initial questions. The researcher audio recorded and transcribed all interviews, then generated codes within Feldman and Ng's

theoretical framework[22]. These were discussed among the research team to finalise them. The different research perspectives (development practice, medical education and rural primary care) in the research team created a robust and reflexive process. Transcripts were coded using NVivo v12 (QSR International, 1999, https://qsrinternational.com/nvivo/nvivo-products).

Ethics approval

The Graduate School of Interdisciplinary Studies Ethics Committee at the University of St Andrews approved the research protocol (GS14941).

Results

For information on participants' courses and intention to practise rurally, see Table 2. Interviews informed several key perceptions among medical students regarding rural practice within the Feldman and Ng framework, detailed in Table 1. An additional conceptual theme was generated to highlight the perceived mechanisms through which educational experiences informed these perspectives[22].

Structural/organisational perspective

Participants noted that rural patients' geographical isolation impedes convenient access to urban-located specialised or secondary care. This was especially concerning for doctors in areas with older patients and limited public transport (ScotGEM6 (1)). Supporting quotes for all subthemes are detailed in Table 3.

Participants perceived limited resource provisions, including technology, in rural health care, deterring some from rural practice. Others perceived that rural physicians took on more roles. One participant mentioned the use of virtual consultation platforms as an alternative to increase rural areas' connectivity to urban hubs (ScotGEM4 (1)). All participants perceived that rural settings have fewer staff than urban locations, leaving rural physicians without additional support to check their work. This lack of support meant rural clinicians had greater responsibility (Occupational perspective theme), which was positively viewed by some (BSc4 (1)).

Occupational perspective

Participants perceived the urgent need for more rural generalist clinicians, and many were excited by the role's versatility (ScotGEM4 (2)). Most students defined urban-style, secondary care specialists as having more depth of focus in a specific aspect of medicine, making them impractical members of the rural health workforce (BSc2). Most ScotGEM participants understood that rural generalists could subspecialise in an area of interest. Perceptions concluded that generalists could explore parts of medicine in depth, while providing broadly needed general services in rural communities (ScotGEM3). Educational experience, including exposure to generalist tutors, informed these views.

The uncertainty of 'not knowing what will come through the door next' and learning a wider array of skills as a generalist was favourably perceived by some participants. This adaptation to handle uncertainty was perceived as a learned behaviour,

established during GP placements through the hidden curriculum (subconsciuosly transmitted information such as attitudes and beliefs), and reinforced by positive role modelling (ScotGEM6 (2)). In addition, working in isolation, with the particular expectation to respond to any undifferentiated emergency presentation, is perceived as a rural generalist's responsibility (ScotGEM2).

Working group perspective

Most participants commented that a rural medical practice is unable to perform additional tasks because of limited staff, a smaller physician-to-patient ratio, and the increased time required to deliver services in rural areas. Some participants stressed the importance of social support within the workplace (BSc3). Some participants perceived a more relaxed medical hierarchy in rural settings, meaning teamworking was easier. While some perceived urban hospitals as a natural environment for teamwork, others perceived urban hospitals as competitive workplaces, constrained by the hierarchy of medicine (ScotGEM1 (1)).

Personal life/personality perspective

Some participants perceived that rural communities observed their physician's everyday life, while city living allowed physicians to remain anonymous to the population. Others maintained perceptions that rural areas promote 'tight-knit communities', wherein residents care for each other (ScotGEM4 (3)).

Curricula changes cannot explicitly address the personality perspective, but admission policies can. Some students stressed the importance of flexibility and adaptability in rural doctors' handling uncertain environments and cases (ScotGEM6 (3)). Medical students referenced the need to be confident and 'sure in yourself' regarding competence and knowledge in rural areas, given the lack of support workers and the increased clinical uncertainty synonymous with working in rural or remote locations. Some students mentioned how the variety of rural medicine is aligned with their personality (BSc1 (1)).

Experience mechanism

The authors developed a mechanism theme to explain the process by which participants viewed how certain experiences shaped their perceptions. For both BSc and ScotGEM participants, education was influential in shaping perceptions of rural medicine.

The BSc undergraduate program provided clinical consolidation blocks to students, exposing them to rural medicine. BSc participants viewed these summer placements positively, some specific rural locations being highly sought after (BSc1 (2)). Clinical consolidation blocks and placements throughout the year appeared to be the only rural medicine exposure for BSc students. Participants did not reference dedicated rural content within teaching. Consequently, specific knowledge of rural healthcare issues and rural medicine was not viewed as 'core'. Implicitly, future rural practice was not expected in the program (BSc4 (2)).

Conversely, all ScotGEM participants had significant exposure to rural medicine education through lectures, small-group teaching with a dedicated clinical generalist, and rural clinical placements

(ScotGEM6 (4)). Students perceived that this generalist education provided practical training and knowledge (ScotGEM1 (2)), along with a realistic view of what rural practice entailed. Participants perceived that the consistency of small-group, immersive learning allowed them to build a relevant foundation in clinical, consultation and procedural skills, while providing exposure to positive rural, generalist role models (ScotGEM5).

Table 1: Feldman and Ng's six perspectives of career mobility and embeddedness[22] and resulting subthemes

Feldman and Ng's perspectives	Subthemes
Structural perspective: social and legal factors affecting labour market, mobility affected by quantity and quality of available jobs	Geography
Organisational perspective: organisational staffing, compensation policies, socialisation networks	Resources, support
Occupational perspective: social networks and human capital investment, salary, labour demand	Generalists, specialists, uncertainty, responsibility
Work group perspective: value of social relations and connections within organisations	Support, teamwork
Personal life perspective: time demands, work–life conflict; non-work factors affect productivity and decision-making	Community
Personality perspective: impact of personal characteristics of the individual, career interests, attachment styles	Adaptability, variety

Table 2: Intention to practise rurally by course of study of participants

St Andrews' medical program	Intention to practise rurally	
	Yes	No
BSc	2	2
ScotGEM	5	1

Table 3: Supporting quotes for themes and subthemes

Feldman and Ng's perspective/experience mechanism	Subtheme	Supporting quote
Structural perspective	Geography	But you're also dodging the fact that you don't want to put them in a car for three hours for something that they don't need to do. It's trying to get that judgement right … do they need to go somewhere or do they not, which I think is hard because it takes a long time to get. (ScotGEM6 (1))
Organisational perspective	Resources	The fact these consultations with specialists can now be performed back on the island means the patient's happier because they get … to scoot into the local doctors. But also, the primary care providers can join in that meeting as well … They can see the whole thing as it's happening. (ScotGEM4 (1))
	Support	I think in a rural practice, it's more like you could be the only doctor or one of the only doctors for miles. So, the patients will rely on you a lot. (BSc4 (1))
Occupational perspective	Generalists	The word that comes to mind is polymath. It is the idea that you have a clinician that's able to do … well not do everything. But at least understand what needs to be done. (ScotGEM4 (2))
	Specialists	In urban medicine … I think people become very specialised, to the point where they aren't able to do other parts of the body, really, and other systems. (BSc2) If you're in a proper rural practice … I imagine that a lot of people there will take on some specialty to make things a bit more interesting … I think a lot of the time it's from a desire to kind of spice up the job a bit … (ScotGEM3)
	Uncertainty	I've been taught by GPs who are completely comfortable with being uncertain about what they're doing. And that's a hard thing for students to grasp. It's hard for me to grasp as well. I think I'll probably find that hard. (ScotGEM6 (2))
	Responsibility	You're the doctor and you're the only one there that can help. So, there might be a perception of having even more responsibility than you would expect … (ScotGEM2)
Work group perspective	Support	I think in general terms, that sort of camaraderie between colleagues would appeal to me. I don't think I would do very well in a setting where I felt I wasn't also a level of friends with my colleagues. I think I'd be more anxious if I felt more alone, and I wouldn't perform as well. So, it's just more work for me. (BSc3)
	Teamwork	I have worked in a city hospital before and it's just too busy. Everyone's harassed … stressed … there's just too much of a hierarchy there. Too much of, 'This isn't my job. That's your job'. (ScotGEM1 (1))
Personal life perspective	Community	There's lots of positives as well. Like … everyone knows everyone. It means that you can support each other if bad things are happening like global pandemics. (ScotGEM4 (3))
Personality perspective	Adaptability	I like to push myself and I think there's an element of … putting yourself outside your comfort zone, which I quite enjoy … (ScotGEM6 (3))
	Variety	I think that doing the same thing day in and day out would not suit my personality. (BSc1 (1))
Experience mechanism	Experience	We ranked [placement locations] and then it was done by our grades. The islands are quite popular, so it was more competitive to get the islands. Then some of the hospital ones are quite popular, the surgical ones. We get preference if we wanted to be rural or more urban. (BSc1 (2)) We spend one day a week in a GP practice. You get to see patients, and quite quickly become a part of the practice team. You get to see the GP every week and the patients in that kind of setting, because most of the practices are really quite rural. You get a sense of what it's like. And you see the issues that they have, whether it's staff or recruitment or, you know, resources. You get a sense of all that. (ScotGEM6 (4))
	Knowledge	But in terms of lectures, we haven't had anything about what to expect on rural medicine. And I think … they're assuming if we were going to practise medicine, it would be in an urban area. I think that's more where it's directed. (BSc4 (2)) Each week is centred around a different case. So, it will be a different virtual patient each week that is based on one of our GP mentor's actual patients, and they're all in a rural setting. It gives you an idea of the process that's involved and the different, you know, how you would diagnose the patient and … what other organisations are involved and all that. It gives you a good idea of what being a GP in a rural practice is like. (ScotGEM1 (2))
	Role model	We get speakers from remote and rural areas. And there's a lot of really good professors, like one guy in Dumfries, down there. He's very passionate about remote and rural practice.

		And they're definitely giving us as much exposure as possible in the first two years. (ScotGEM5)

Discussion

Social accountability

Social accountability is defined as 'an approach … in which citizens participate directly or indirectly in demanding accountability from service providers and public officials[23]'. Medical schools are obligated to directly address priority health concerns within their local communities[16] and to deliver high-calibre education and medical graduates attuned to societal needs[24]. Mandated by social accountability, community-oriented medical education requires authentic partnerships between health services, academic institutions and local knowledge[25]. This principle should be at the core of medical undergraduate curricula, particularly in low- and middle-income countries with more pronounced health inequalities.

Examining medical students' perceptions of rural practice through Feldman and Ng's career mobility and embeddedness framework[22] allowed the authors to view these perceptions from perspectives that lend themselves to educational intervention, providing guidance on how medical schools can deliver their social accountability mandate.

Structural/organisational perspective

The WHO Global Observatory for eHealth series identifies telemedicine as a tool to increase the accessibility of medical care and enhance health service provision by providing clinical support irrespective of geographical barriers, thereby improving health outcomes[26]. The structural perspective highlighted the impact of geographical isolation on rural practice, perceived to be exacerbated by the limited allocation of medical resourses and reduced access to virtual technology in rural areas. Professional and social isolation due to rural location is unattractive and deters health workers from working rurally[27].

Increased virtual technology utilisation is reducing patient and practitioner isolation in rural areas. Prior to the COVID-19 pandemic, all Scottish Health Boards (regions) were tasked with expanding NearMe, a virtual consulting platform designed to increase healthcare access connectivity for patients and physicians in rural areas[28]. In 2019, 9000 NearMe consultations were conducted across Scotland. Since the COVID-19 response in March 2020, up to 17 000 virtual NearMe consultations occurred per week in Scotland[29].

Only one medical student referenced virtual technology, and its alleviation of patient/physician isolation in rural settings. Educational experience in a rural clinic shaped their knowledge of NearMe. Medical students' minimal knowledge of virtual consulting platforms is concerning, because increased virtual connectivity to urban medical hubs for networking, collaboration and continuing professional development may challenge the views of isolation in rural practice[30]. Medical education can challenge the common perception of rural isolation through experience

mechanisms that emphasise the use of virtual technologies for a variety of uses.

Occupational perspective

ScotGEM participants, who were more routinely exposed to generalist clinicians both in the classroom and on placement, referenced role modelling repeatedly. Role models actively influence medical students' career choices by integrating them into clinical settings[31], and passively influence through their passion and excitement for their work[32]. Role modelling in the ScotGEM curricula may have specifically enhanced students' recognition of the ability for generalists to subspecialise in an area of interest, altering their occupational perspective, which can assist in recruitment[33].

BSc undergraduate students were not aware of the ability to develop extended clinical roles as a generalist, making their perception of generalist versus specialist much more rigid and rooted in geographic location. Low generalist representation in medical education might instil this perception. Generalists account for 50% of the UK physician workforce, but only 6% of medical educators[34].

Participants commented that rurality might complicate diagnosis or treatment given geographical isolation and lack of technology, contributing to a rural practitioner's clinical uncertainty. Greenhalgh and colleagues suggest that practitioners must learn to work within complex systems, which are open, dynamically evolving, unpredictable and self-organising[35], the 'grey-scale space' of medical practice[36]. The prominence of uncertainty in primary care is attributed to patients presenting with a wide array of problems, early phases of disease, and comorbidities[37]. Medical curricula should actively address uncertainty to ensure students are not dissuaded by its prominence in rural practice.

Uncertainty affects a physician's anxiety levels and work-related stress and can cause burnout[38,39], yet experienced physicians learn to handle uncertainty[40]. In medical students, uncertainty affects their wellbeing, career choices and attitude towards patients[41,42]. Given the significant uncertainty associated with practice during the COVID-19 pandemic[35], experienced physicians, especially now, must be encouraged to share experiences and methods of overcoming uncertainty with all medical students, but particularly those considering rural practice. Some participants clearly had positive views towards uncertainty and identified curricula mechanisms to help develop this[43].

Personal life perspective

For some participants (often those who originates from rural areas or had immersive, rural educational experiences), the association of rural practice with a greater sense of community was positive, with rural communities perceived as being better equipped to support residents. Other students negatively perceived rural

communities as 'tight-knit' and commented on the anonymity challenges rural clinicians face in their social lives. There is good evidence that codesigned, immersive medical education opportunities, such as that developed by the Northern Ontario School of Medicine's community-engaged education curriculum, results in medical students who are increasingly motivated to undertake rural practice[44].

Strengths and limitations

There is limited qualitative research that explores perceptions of remote and rural practice of medical students (although the current findings align with the limited research that does exist[45]), specifically as it pertains to the intricacies of Scotland's medical education and healthcare system. Moreover, the use of Feldman and Ng's pre-existing framework[22] to explore medical students' perceptions of rural practice is particularly novel, because it has not been applied to students anticipating their future careers.

While a small sample, demographics were well distributed between BSc students (4) and ScotGEM students (6), allowing for examination of both medical education programs and their consequent perspectives. The gender distribution of the sample was representative of the 2018/2019 UK Higher Education student enrolment in medicine and dentistry[46].

Limitations of the study persist. Self-selection of participants may have created unintended bias within the sample[46]. Qualitative research is heavily dependent upon the researcher's experience and personal bias, potentially affecting data collection[47]; however, researchers from heterogenous disciplines were involved in analysis, mitigating this potential impact. The small sample size must be an acknowledged limitation of this study. The research aims were narrow, suggesting a large sample may not be necessary to achieve sufficiency. However, the group of participants held variable yet highly specific characteristics related to the subject. Sufficiency may be enhanced in future research by using a longitudinal or cohort study for a more in-depth comparison and exploration of medical education's effect on future career decisions[48].

Conclusion

Recruitment and retention in rural health care remains a critical global challenge, particularly in low- to middle-income countries[49]. The findings of the study are consistent with the rural medicine education literature. The study adds to that literature through using a theoretical framework to understand the findings. This pilot can be used to inform a larger study that examines the mechanisms identified as potentially influential in medical student perceptions of rural practice, including exposure to telemedicine, GP role modelling, training in overcoming uncertainty, and codesigned medical education programs. Approaching this challenge in a systematic and theory informed way allows policy-makers and governments to fully consider the impact medical education programs make on rural and remote healthcare recruitment and retention.

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