

ORIGINAL RESEARCH

Recruiting and retaining rural students: evidence from a faculty of dentistry in South Africa

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ABSTRACT

Introduction: There is a shortage internationally of adequately trained health professionals to service rural areas. Health professionals are more likely to practice in communities that are like the one in which they grew up. The WHO therefore suggests targeted university admission policies to facilitate the enrolment of students from rural areas. In South Africa, rural students have special needs with regard to university access and throughput because they come from the most economically disadvantaged communities and often are the first in their families to attend university. This descriptive study, the first in South Africa with a cohort of dentistry students, draws on data from undergraduates at a single faculty of dentistry in South Africa. It investigates the factors affecting rural students' access to university, their academic success, as well as their employment intentions.

Methods: A self-administered questionnaire was completed by 304 (70%) of the total number of 435 undergraduate dental students. Closed questions elicited information regarding students' year of study, academic performance, source and adequacy of funding, family history of university attendance, and area of origin. Responses were analyzed using MS Excel and Epi Info™. Qualitative data were used to support quantitative findings. Open-ended questionnaire questions, including employment intentions, and three focus group interviews generated examples to illustrate and elaborate the quantitative findings.

Results: Only 7% ($n=22$) of the cohort ($n=304$) were from rural areas. Rural students relied on assistance from those with university experience to apply and register, for course information and funding opportunities. Most rural students were funded by provincial bursaries (41%; $n=9$) and National Student Financial Scheme (NSFAS) funding (18%; $n=4$). Forty-four percent ($n=4$) of the rural students with provincial bursaries and 100% ($n=4$) of the rural students with NSFAS funding reported not having enough money for food. All NSFAS-funded rural students ($n=4$) reported not having enough money to buy the prescribed and recommended texts. Fifty percent ($n=2$) of the rural students with NSFAS funding had failed at least one academic year. Rural



students were least likely to have family members who had attended university. Rural students were three times more likely than other students to want to work in rural areas.

Conclusion: Only a minority of dentistry students came from rural areas, and rural schools did not adequately prepare these students academically for university. Rural students also lacked immediate access to people with insight into the academic and socio-cultural aspects of higher education, including the process of independent learning. Despite financial and academic challenges, rural students had a significantly stronger commitment to rural employment than students from cities and towns. It is recommended that rural students should receive academic, financial, and mentoring support both before and during their studies.

Key words: access, equity, oral health care, retention, rural students, undergraduate education.

Introduction

One of the most urgent healthcare challenges internationally is ensuring that people living in rural areas have access to appropriate and equitable health care¹. This access is impeded by a shortage of adequately trained healthcare professionals². Evidence suggests that graduate health professionals practice in communities similar to those in which they grew up, and therefore that students who grow up in rural areas are more likely to return to these communities on graduation³⁻⁸. In order to ensure an adequate rural healthcare workforce, the WHO thus suggests targeted university admission policies to enrol students from rural areas². These students, however, have special needs with regard to university access and throughput^{9,10}. They may need financial assistance during their studies because rural families are among those most impoverished^{2,9,10}. They may also need academic and social support in the transition to university^{2,11,12}.

The current study, the first in South Africa with a cohort of dentistry students, was based on these assumptions about the relationship between area of origin and later employment, and the potential need for financial and academic support. The study set out to create a profile at a single faculty of dentistry in South Africa of the undergraduate dental students with regard to their area of origin, economic and academic challenges, and employment intentions. The case study profile was used to investigate the extent to which rural students in South Africa could be recruited for and retained in dental degree programs.

Methods

This was a descriptive study conducted in 2009 at a single faculty of dentistry. After obtaining ethics approval from the respective university's research ethics committee, a self-administered anonymous questionnaire was voluntarily completed by 319 (73.3%) of the total number of 435 undergraduate dental students. The questionnaire was piloted on one of the year groups, and no changes were needed. The same researcher designed and administered the tools and interpreted the data, so as to ensure validity and reliability. The questionnaire consisted of closed questions eliciting information on students' year of study, academic failure, source of funding (family; loan; National Student Financial Aid Scheme [NSFAS]; bursary), number of family members who have attended university, and area of origin (city; town; rural). Further closed questions, with a 'true/ false' option, elicited information on the adequacy of students' funds for food and textbooks.

Quantitative data from the questionnaires was captured in MS Excel and analyzed using pivot tables. Further analysis was performed using Epi Info v3.4.3 (<http://wwwn.cdc.gov/epiinfo/>). Associations between variables were investigated by subjecting the frequencies to the χ^2 test and calculating the relative risk. For all the statistical tests, the results were considered statistically significant at $p < 0.05$.

Open-ended questions on the questionnaire elicited responses on transition to university and where participants intended



working after graduating. These qualitative questions collected illustrative examples related to specific quantitative questions.

Fifteen of the respondents did not disclose their home location, and because this was such an important variable, these 15 questionnaires were excluded from further analysis, resulting in a final sample size of 304 (70% of the students).

Three focus group interviews were conducted after the questionnaires had been analyzed in order to find out how students accessed information about university prior to registration and how they experienced the transition to university. The interview cohort was a tutorial group, taught by the first author, comprising 20 students from the total 80 first year dentistry students. Written consent to participate in the focus groups was obtained from each student beforehand. This form indicated how the researcher would ensure confidentiality, and also required that the student participants sign an assurance of confidentiality outside the interview context. Participation in the focus groups was voluntary and the students were free to withdraw at any time. All focus group interviews were conducted by the first author after class in the tutorial room. A semi-structured interview protocol consisted of three questions:

1. 'What was it like coming to university?'
2. 'What is it like to be a student at our university?'
3. 'What does being a dentist mean to you?'

Each interview was audiorecorded and transcribed by the first author. Each focus group included 4–7 students ($n=15$), and each interview was only for the students from a particular origin (city; town; or rural). Qualitative data from the interviews was used specifically to elaborate on quantitative findings. Issues identified in the literature as significant to recruitment and retention were used to analyze the interview data.

Results

When asked 'Where did you grow up?', students could select from the categories 'city', 'town' or 'rural'. The majority of the students ($n=189$; 62%) were from cities, 31% ($n=93$) were from towns, but only 7% ($n=22$) were from rural areas.

Knowledge about university

Data from the rural student interviews indicated how they accessed information about university prior to registration. Students had relied on others who had experienced university to help them apply and register:

And then I go and work at a place. And I talked to those who are working there and they said, no you can study at university without money. You can get a bursary.

My brother was studying here so I found out from him.

The application form, my friend who is studying here, got for me.

The data also indicated the knowledge about university access that rural students lacked:

I didn't know about bursaries, something like that so that you can go to university, that can help something.

Sandile, he is from here and his school brought him last year for a career exhibition at the university. But my school had nothing like that.

I want to expose the youth in my community to other careers. They know about the doctor, but I want to expose them to ja, you can do this, and then you can become a dentist and a hygienist.



Funding

The source of funding for all 304 respondents is given (Fig1). Only 6 (27%) of the rural respondents were funded by their families, as opposed to 130 (69%) of the city respondents and 57 (61%) of the town respondents. Eighteen percent ($n=4$) of the rural students were funded by NSFAS loans (state-funded but disbursed by individual higher education institutions⁹) which are available to students once they are registered. The largest number of rural students (41%; $n=9$) was funded by bursaries from provincial departments of health or education. These bursaries required that graduates return to their area of origin to practice as dentists. Data from open-ended questions in the questionnaire indicated that not all rural students had access to provincial bursaries: 'The Province does not want to grant us bursaries'.

Of the total cohort ($n=304$), 52% ($n=22$) of the students with NSFAS funding and 41% ($n=14$) of those with bursaries indicated they did not always have enough money for food. Only 15% ($n=29$) of the total number of students funded by families recorded going without food. The proportion was similar for rural students specifically, with 100% ($n=4$) of the students with NSFAS funding, 44% ($n=4$) of the students with bursaries, and 33% ($n=6$) of the students funded by families indicating that they did not have enough money for food. Students from rural areas were nearly one-and-a-half times more likely to go without food than students from urban areas (relative risk [RR]=1.46, $p=0.013$).

All ($n=4$) of the rural students with NSFAS funding, 33% ($n=3$) of the rural students funded by bursaries, and 17% ($n=1$) for rural students funded by their families reported not having enough money to buy all textbooks, pay for class readers, and print recommended readings. However, these results must be interpreted with caution in view of the small number of rural students.

Academic success

Data related to academic success is indicated (Fig2). The failure rate of students (failed at least one academic year) was

higher for rural students, irrespective of their source of funding. Half of the rural students ($n=2$) with NSFAS funding repeated at least one academic year. Seventeen percent ($n=1$) of those funded by families and 11% ($n=1$) of those funded by a provincial bursary had also failed at least once. No rural students with a bank loan had failed a year. However, these differences are not statistically significant and should be interpreted with caution due to the small numbers.

Rural students indicated in the focus group interviews that they felt inadequately prepared for the academic challenges of university:

The level of education that I had from my schooling was not that high. Now I see that many things that was supposed to be done at school, they didn't cover that. I feel like I missed out a lot. Things that we were supposed to do in Life Science, we didn't cover that.

Family experience of university

The proportion of students from each area of origin without family members who had attended university is indicated (Fig3). It shows that 18% ($n=4$) of the rural students had no family members with university experience, as opposed to 12% ($n=22$) of the city students and 11% ($n=10$) of the students from towns.

Data from the focus group interviews indicated what university-experienced parents and siblings knew about access to, and success at, university:

...didn't get my acceptance letter very soon so my Dad called the university to find out.

The university admin didn't know anything about rebates. My father had to go and find out.

I have three siblings at university, and my father went to university and all of his family. And they basically all tell me what I should do and how I should go about doing it.

Before I left home I had all the family friends sitting me down and talking to me and telling me, you are going to university to study, to get your degree. Don't spend your time just loafing and having fun. Have your fun, but at the same time sit down and study.

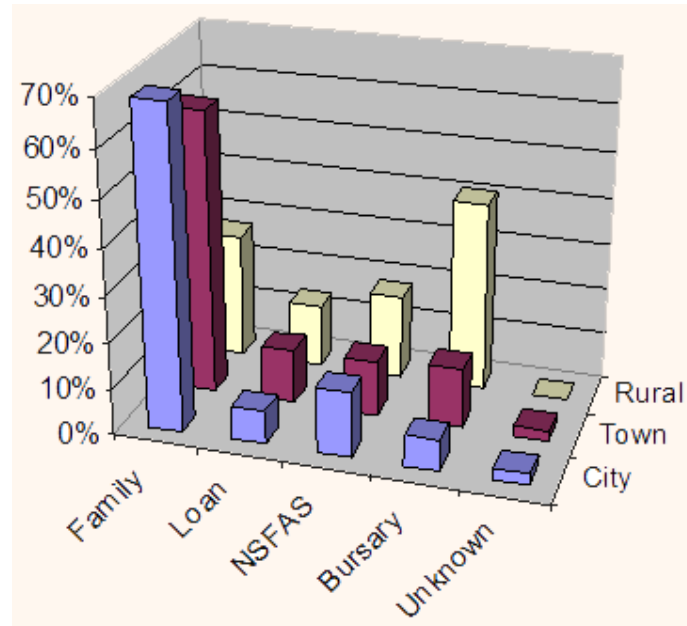


Figure 1: Respondents sources of funding. NSFAS, National Student Financial Scheme.

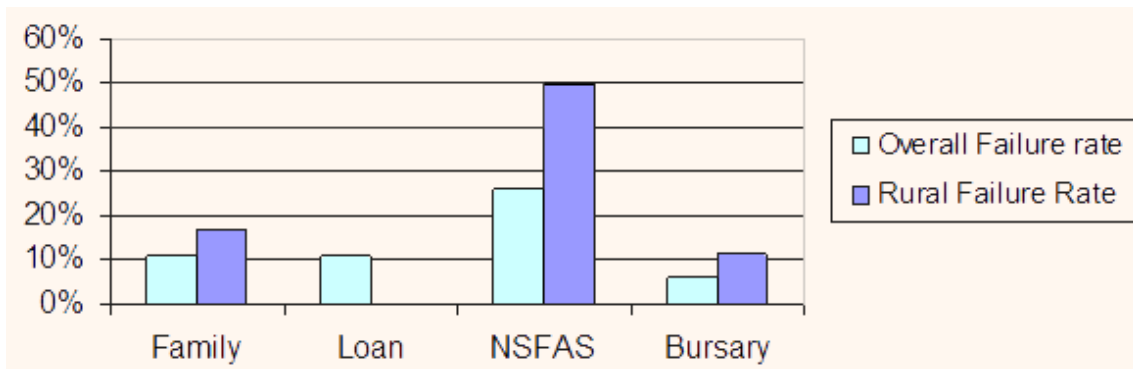


Figure 2: Percentage of students who failed, according to source of funding. NSFAS, National Student Financial Scheme.

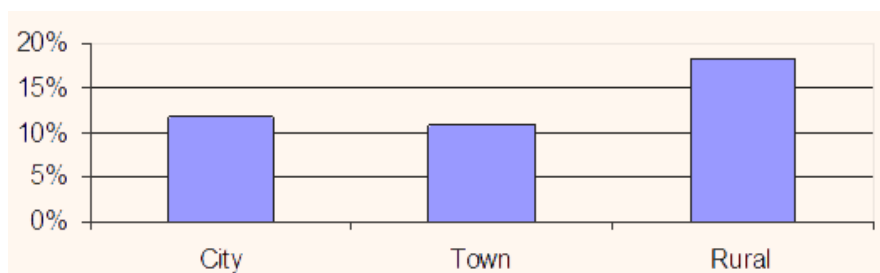


Figure 3: Percentage of students with no family at university.



Employment preferences

Rural students were nearly three times more likely to want to work in rural areas than city or town students (RR=2.89, $p=0.00006$). Seventy-seven percent ($n=11$) of the rural students expressed a desire to work in rural areas, as opposed to 31% ($n=57$) from cities and 43% ($n=37$) from towns. However, 11 students were unsure of where they would be working and were therefore not included in this analysis. Responses to open-ended questions on the questionnaire indicated the reasons why rural students planned for rural employment. These reasons highlighted service to community of origin and providing healthcare in under-resourced communities:

It is my goal to go back and make a change in my community.

I want to give back to my community. There aren't a lot of dentists back home.

[I want to] return service that I received while growing up.

Three students indicated that they were returning to rural areas because of provincial bursaries and not necessarily because of personal desire: 'Because my sponsor wants me to do so'.

Discussion

Area of origin

Findings from the study revealed that only a minority of students ($n=22$; 7%) from those who responded to the questionnaire ($n=304$) came from rural areas. Given that 59% of South Africans live in rural areas¹³, this proportion of potential rural dental graduates is clearly inadequate.

Two factors might influence this low percentage of rural students. First, access to university depends on knowing what options for professional development exist at which specific

universities, and how to apply and register for specific degrees. Prospective students thus need 'insider' information before they can even consider attending university^{9,14}. They need to know what careers are available in the health sciences. They need to know what high school subjects are required for particular degrees, and when and how to apply. Without this information they cannot register for the degree of their choice. The focus group data indicates that rural students do not automatically have access to this kind of information, and that this shortcoming had a negative effect on the high school subjects that students selected, on the study programs for which they registered, and on their knowledge of when and how to apply and register.

Second, access to finances influences whether rural students are able to attend university and whether they are able to remain in higher education^{2,9,10}. Few rural students ($n=6$, 27%) were funded by their families. High fees for dentistry and costs of accommodation, food and textbooks place a financial burden on rural families, and may inhibit poorer students from considering dentistry. Alternative sources of funding do not necessarily solve the problem because provincial government bursaries are limited in number and so provide access for only a few students. Economically challenged students are reluctant to take out bank loans because they are fearful of the implicit debt^{9,10,15}. Relative to more wealthy students, debt repayment represents a much higher percentage of family income for poorer students and is therefore less attractive¹⁵.

The NSFAS is particularly problematic because it can only be accessed once students are registered at the university. If students apply on arrival at the university they may be unable to access financial aid for the first semester or even for the first year of study⁹. Thus these students need access to 'bridging' finance for travel to university, registration, initial fees, and accommodation and living expenses. Such costs must be covered by families, and an inability to access this interim funding may prevent rural students from accessing university⁹.



Funding

Finances play a role in students' academic performance and success⁹. The data indicated that rural students were more likely than other students to experience hunger during their studies, particularly those students with NSFAS and bursary funding. Hunger has a potentially negative effective on academic performance⁹. Further, almost three-quarters of the rural students could not afford access to the prerequisite learning materials (textbooks, readers, recommended readings) which has a further negative effective on academic performance.

The allocation of NSFAS and bursary funding may contribute to these financial constraints. Not all provincial bursaries pay for all costs associated with higher education. Thus students may experience hunger even while having funds for all prescribed and recommended texts. The distribution of NSFAS funding is also problematic⁹. Institutions are likely to give students less than the full amount needed in order to spread the support as widely as possible⁹. This means affected students are often only covered for the costs of tuition and have to fund all other costs themselves⁹. This restriction is inevitably problematic because NSFAS students are among the most economically disadvantaged students⁹.

Academic success

Rural background has an influence on student academic success⁹. Rural students were among those with the highest risk of academic failure⁹. The data indicated that rural students were more likely to have repeated an academic year than students from towns and cities, but this was not statistically significant. The quality of rural schooling in South Africa plays a significant role in this failure⁹. Data from the focus group interviews indicated that the rural schooling system failed to prepare these students for the academic challenges of university, particularly in those subjects like life science, that are foundational to the health sciences^{9,10}. The legacy of apartheid education for African children continues to have an effect in rural schools, with limited access to libraries, science and computer laboratories, and adequately trained

teachers^{9,10}. Thus rural students arrive at university less well prepared for the higher education learning context⁹.

However, within the rural cohort, some students were academically more successful than others. The failure rate for rural students with NSFAS funding (50%; $n=2$) was higher than for rural students with provincial bursaries (11%; $n=1$). This difference may be attributed to the fact that provincial bursary students are selected on academic merit and are among the highest achieving rural school students. They have thus already demonstrated higher academic competence while at school than those who have to seek their own funding. However, this finding should be interpreted with caution due to the small numbers involved. The data, nevertheless, indicated that irrespective of area of origin, NSFAS students are more likely to repeat an academic year than students funded from other sources.

Academic preparedness is therefore an important factor in academic achievement at university, with students from rural areas most likely to be under-prepared for higher education⁹. This level of preparedness is, however, also relative to school achievement. However, it is pertinent to consider the extent to which limited access to food and textbooks exacerbates academic disadvantage, and impacts negatively on academic achievement and social integration⁹.

Family experience of university

A higher proportion of rural students did not have any family members who had attended university. Family experience of higher education is a further contributing factor towards students' preparation for higher education¹⁶. This is because family members with experience of university are able to mediate academic and socio-cultural aspects of higher education, such as when and how to apply to university and for funding, and how to behave at university including dealing with the challenge of being an independent learner^{9,14,16}. Rural students are more likely than students from towns and cities to be the first in their families to attend university, and therefore are particularly vulnerable to the disorientation and dislocation associated with transition to university⁹.



Data indicated that rural students from the cohort experienced a variety of information deficits. They lacked, or had limited orientation to the variety of careers in the health sciences. They had little information regarding university application processes and study funding, and they had significant gaps in pre-requisite life science academic content. While the rural students accessed university because of a friend or a sibling, and found information about bursaries from a work colleague, the data indicated that this information was clearly not widely available in rural areas. Lack of access to such pre-requisite information negatively affects the chances of rural students selecting appropriate school subjects for the careers of their choice⁹, meeting university application deadlines, and accessing funding to study⁹. It prevents rural students from registering at university to study for health professions.

Employment preferences

Despite the financial and academic challenges evident from the data, rural students had an almost three-times stronger commitment to rural employment than students from cities and towns. For most of these students this intention was expressed in terms of social responsibility and framed as 'giving back'. The evidence thus suggests that the rural students of this cohort do indeed plan to return and practice in their areas of origin, and confirms previous findings^{3-8,17}.

Conclusion

Data from this profile of undergraduate students at a single faculty of dentistry has been used to highlight the extent to which rural students in South Africa access dental education programs, and the factors that affect both their academic success and their future employment plans. Despite many challenges, the study has confirmed that rural students planned to return to their community of origin, thus providing much needed oral healthcare professionals in rural areas. However, given the small number of rural students, it is recommended that similar studies be conducted at other institutions with a larger number of rural students in order to

confirm the findings. The small number of rural students in the study emphasizes the limited number of African and rural students being recruited for dentistry in South Africa¹⁸ and, therefore, the findings allow a number of recommendations to facilitate the entry and retention of rural students in the healthcare professions.

Recommendations

First, prospective rural students need to be supported into healthcare degree programs. In order to attract rural students to the health professions, information and funding must be made available to these students prior to registration. Community engagement with schools in rural areas has the potential to alert school learners to the variety of health professions that exist. This engagement can further assist high school learners with appropriate school subject choice, as well as assisting them with the various processes required prior to university entry (eg timely initial application as many health sciences programs close applications in August of the preceding year). Prior to registration, prospective students need to know about higher education funding, the various hidden costs (including transport to the university, registration fees and deposits) and various funding opportunities (and their limitations). While universities may not have the capacity to engage with a variety of rural communities, the potential exists to train registered undergraduate students to act as ambassadors for the health professions, and as conduits of information about university access. These students might be paid for delivering these services during their return to their home communities in university vacations. In this way universities may also be able to identify potential health sciences students prior to their university registration and support them with bridging finances and summer school inductions prior to the first academic year.

Second, once in the academic system, health professions students need financial and academic support. Financial support provided through universities and bursary donors should subsidize more than fees alone. To be comprehensive, financial support for rural students must also address hidden



costs, such as living expenses and textbooks. Students who are the first in their family to attend university should be provided with mentoring that mediates their transition to university.

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