



# The Open Public Health Journal

Content list available at: [www.benthamopen.com/TOPHJ/](http://www.benthamopen.com/TOPHJ/)

DOI: 10.2174/1874944501811010044



## RESEARCH ARTICLE

# What Motivated Students to Choose a Career in Health Sciences? A Comparison of Rural and Urban-Origin Students in Three South African Universities

L.H. Mabuza\* and B. Ntuli

Department of Family Medicine and Primary Health Care, Sefako Makgatho Health Sciences University, Pretoria, South Africa

Received: November 11, 2017

Revised: January 30, 2018

Accepted: February 5, 2018

### Abstract:

#### Background:

Globally, there is a lower ratio of healthcare worker to population in rural compared to urban areas. Scholars are motivated by a number of factors to choose a career in health sciences. Determining these factors among rural and urban-origin students could inform recruitment and retention strategies to redress this imbalance.

#### Objectives:

To determine and compare motivating factors for a career in health sciences among Rural-Origin (ROS) and Urban-Origin Students (UOS) at three South African universities.

#### Methods:

Three institutions (former University of Limpopo (Medunsa Campus), now Sefako Makgatho Health Sciences University (SMU), University of KwaZulu-Natal (UKZN) and University of Cape Town (UCT) participated in the study 2011. Health science students completed a self-administered questionnaire. The SAS® (version 9.2) for Microsoft statistical software was used for analysis. Statistical significance was set at  $p \leq 0.05$ .

#### Results:

A total of 1633 health sciences students participated in the study. Parents (505; 30.9%) and personal exposure (484; 29.6%) were the main motivating factors for both ROS and UOS, with significantly more UOS than ROS motivated by these factors ( $p < 0.001$ ). The contribution of role models (93; 5.7%), friends (77; 4.7%), high school teachers (77; 4.7%), mentors (36; 2.2%) and university lecturers (18; 1.1%) was minimal, with no significant difference between UOS and ROS ( $p > 0.05$ ).

#### Conclusion:

There is need for the health care sector to support students' families and encourage students' personal exposure to health care facilities and personnel in order to motivate them towards a career in health sciences.

**Keywords:** Rural-origin students, Urban-origin students, Motivating factors, Career, Health sciences, South Africa.

## 1. INTRODUCTION

The report of the World Health Organisation (WHO) has revealed that about 50% of the world population live in rural and remote areas with most of the health workers living and working in cities [1]. The trend of imbalance in the

\* Address correspondence to this author at the Department of Family Medicine and Primary Health Care, Sefako Makgatho Health Sciences University, Pretoria, South Africa; Tel: 0833250580; Fax: 0125214172; E-mail: [honeymanyosi@gmail.com](mailto:honeymanyosi@gmail.com)

distribution of health workers between the rural and urban areas is more pronounced in developing countries [2] and has also been reported in South Africa where 43.7% of the population live in rural areas with an average of 13 generalists and two specialists per 100 000 people, compared to 30 generalists and 30 specialists for each 100 000 in urban areas [3]. Comprehensive strategies employed by the WHO to address this disproportionate distribution of health workers include refining the ways of student selection as well as creating better working and living conditions in rural areas [1].

A number of studies have indicated various motivating factors for career choices of scholars, including family and friends, care-givers, teachers, peers, experiences with some aspects of the career and the media [4]. The family, particularly parents have been shown to be an important factor in career choice among scholars as the latter consult with their parents or guardians for education and career advice [5, 6]. However, an investigation by Maharaj on parents who were themselves healthcare professionals did not show a strong parental influence on their children's career choice (< 10%) [7].

Maharaj explored a number of factors affecting a scholar in choosing a career in health sciences. Among these, the type of high school attended, the cost of courses being considered and the availability of funding to follow the course and source of information on careers. In this study, the majority of students (56.5%) obtained information from professionals visiting schools, followed by family and career guidance counsellors (52.2% and 50.7%, respectively) [7]. Willcockson and Phelps found that the family contributed a higher percentage (60.0%) as a motivating factor for a career choice [6].

In the study by Edwards and Quinter in Kenya, outcome expectations of a particular career, for example employment security, prestige, career flexibility and opportunities for self-employment were the most influential factors in students' career choices [8]. A study by Drapper and Louw at the University of Cape Town, outlined medical students' expectations of the medical career, the high ranking being job satisfaction, mental and intellectual stimulation, source of fulfilment and future success [9]. Expectations have been found to direct or motivate an individual towards the desired goal [10]. Willcockson and Phelps found that students were also influenced by the internet for a career choice as a large proportion of them reported to have obtained career guidance information from this source [6]. Another motivating factor found to play a role in career choice was ambition for altruism [11], and past experience with a professional from the career field chosen [12].

Mentoring, defined as "A learning partnership between a more experienced and a less experienced individual [13]"; and a "relationship that becomes more impactful over time [14]" has been shown to have an effect in scholar career choice [15, 16]. However, although its popularity is growing fast in South Africa, the idea of formal mentoring is fairly new in the country [17].

Although globally, the borders between the urban and rural areas are increasingly becoming diffuse and difficult to identify [18], "urban" basically refers to an industrialised and usually densely populated area [19] while "rural" areas are those outside major urban areas, provincial capitals and towns [20], or the "non-metropolitan areas [21]." Reid and Cakwe brought in the socio-economic aspect in their description and referred to these areas as "rural or underserved [22]." For the purpose of this study, a Rural-Origin Student (ROS) is the student who lived in a rural home and attended a rural high school [23], prior to pursuing a career in a tertiary institution.

In this study, "parents" referred to the members of the family whose gamete resulted in the respondent (as a child), "siblings" were the offspring having one or both parents in common, while "other family members" referred to the extended family members (uncles, aunts, cousins, and others). "Friends" were the respondent's companions who were not family members, *e.g.* school mates. "School teachers" were the students' educators in the various schools they had attended. "Mentors" were senior members in the community who played the role of experienced and trusted adviser to the respondent, *e.g.* the respondent's clergy [24]. "University lecturers" were those academics from various universities who had paid visits to schools and motivated scholars towards a career in health sciences. "Role models" were the qualified health care professionals practicing in the respondent's community or featuring in the public media, *e.g.* the family medical practitioner, nurse, pharmacist, *etc.* "Personal exposure" involved personal experience with the health science team, *e.g.* visiting a health care facility and being attended to by a health team member.

### 1.1. Significance of the Study

A study by De Vries and Reid in 2003 revealed that only 14.4% (138/961) of registered graduates from five South African medical schools were of rural origin. Of these rural origin graduates, 38.4% (53/138) were practising in rural areas, compared to 12.4% (102/823) of urban-origin graduates practicing in rural areas. In this study, overall, only

16.1% (155) of the 961 graduates were practising in rural areas [25]. This underscores the gross deficit of healthcare practitioners in the rural areas of South Africa. Other studies have suggested that recruiting students with a rural background may help alleviate the shortage of healthcare practitioners in rural areas since rural-origin students are more likely to return and practise in their places of origin [26 - 28]. Although a number of studies have investigated factors that motivate students to follow a career particularly in health sciences [7, 29, 30]; at the time of writing this article, there was scarcity of studies that had drawn a comparison between motivating factors for a career in healthcare professions between ROS and their urban counterparts. The authors are of the view that identifying these differences could assist in bridging the gap in the interest of increasing recruitment among ROS.

### **1.2. Ethical Considerations**

The study details were explained to each student, and written informed consent to participate was obtained before the study commenced. Confidentiality of information of the respondents was ensured by removal of all identifiers and keeping data safe and focused strictly for this study. Each participant was informed that s/he could discontinue with the study at any point without any adverse consequences. Ethical approval for the study was granted by the ethics committees of all three participating universities (UL-MREC/M/63/2010: IR, UKZN-HSS/0966/09 and UCT-HREC 353/2011).

## **2. MATERIALS AND METHODOLOGY**

### **2.1. Study Aim and Objectives**

The study aim was to determine the motivating factors for students to choose a career in health sciences at the SMU, UKZN & UCT – comparing the ROS and the UOS in these universities. The objectives were to determine the proportions of ROS and UOS in the three universities, compare the proportions of ROS and UOS in relation to the identified motivating factors in each of the three universities and to compare the combined proportions of ROS and UOS in relation to the identified motivating factors.

### **2.2. Study Design**

This was a cross-sectional study.

### **2.3. Study Setting**

This paper is one of a series of investigations into various aspects of university life and future career aspirations of health science students conducted by the Collaboration for Health Equity through Education and Research (CHEER) collaborators [31]. Three universities volunteered to participate in this study: University of Limpopo (Medunsa Campus) now known as the Sefako Makgatho Health Sciences University (SMU), the University of KwaZulu-Natal (UKZN) and the University of Cape Town (UCT) between August and October 2011. Each participating university traditionally represents a diversity in the proportions of urban and rural-origin students, from mainly urban-origin (UCT), to mainly rural-origin (UL), and an equal proportion of each student group (UKZN).

### **2.4. Study Population and Sampling Strategy**

The classes of the first and final years in a given discipline were visited by the research team in each institution. The number of students per institution is reflected in Table 3 below. The whole class per discipline was requested to participate in each institution. The study was explained to the students, including the reason for the focus on the first and final year students, namely that the larger CHEER study was aiming at gaining information on various aspects of university life and future career aspirations of health science students. A total of 1676 questionnaires were distributed among these students. Those who returned completed questionnaire forms were 1633 (97.4% response rate). Forty three questionnaires were excluded on account of non-completion of the section on the “Motivating factors for a career choice”. Students classified themselves as originating from a rural or an urban area in the question: “Would you classify your home as situated in a rural or urban area?”

### **2.5. Data Collection**

Data collection was led by a CHEER representative at each university. An anonymous, self-administered questionnaire was distributed to all consenting students at each institution. Since the study was focusing at gaining information on various aspects of university life, all first- and final-year students across all disciplines offered at each

health science faculty or medical school were targeted. A qualitative study has already reported on the career aspirations of rural-origin health science students [32], which was followed by the report on curriculum challenges faced by rural-origin health science students at South African medical schools [33]. Regarding, motivating factors which was the focus of this study, the students had to choose from a list of the factors obtained through the qualitative study [32]. They had to indicate to what extent each factor had motivated them: “less motivating”, “motivating” and “highly motivating”.

## 2.6. Data Analysis

Data were entered into an excel spread-sheet at each site, collated and verified by the CHEER representative. The SAS® (version 9.2) for Microsoft statistical software was used for analysis. The results of univariate data analysis were presented as frequencies in tables, bivariate analysis was conducted to determine associations of dependent (motivating factors) and independent variables (baseline characteristics) using the chi-square test. Statistical significance was set at  $p < 0.05$ .

## 3. RESULTS

Table 1 shows that more female than male students participated in the study, they were mostly single with the mean age of around 21 years in all the three universities.

**Table 1. Baseline characteristics (n=1633).**

Marital Status	n	%
Single	1541	94.4
Married	51	3.1
Living together	26	1.6
Divorced	3	0.2
Widowed	2	0.1
Other	10	0.6
<b>Total</b>	<b>1633</b>	<b>100.0</b>
Age (years)	Range	Mean (Mode)
SMU	18 – 58	23.2 (20)
UKZN	18 - 39	21.0 (19)
UCT	18 - 32	20.8 (21)
Sex	Male n(%)	Female n(%)
SMU	330 (44.2)	416 (55.8)
UKZN	142 (29.1)	346 (70.9)
UCT	108 (27.1)	291 (72.9)
<b>Total</b>	<b>580 (35.4)</b>	<b>1053 (64.6)</b>

Table 2 shows that medical students constituted the majority of the health sciences students, followed by the pharmacy students. The rest categories were represented by less than 10% each. Urban origin students constituted 60% of the students.

**Table 2. Rural and urban-origin students according to their course of study (n=1633).**

Course of Study	Rural	%	Urban	%	Total	%
Medicine	230	14.1	417	25.5	647	<b>39.6</b>
Pharmacy	40	2.4	131	8.0	171	<b>10.4</b>
Physiotherapy	51	3.1	104	6.4	155	<b>09.5</b>
Occupational Therapy	49	3.0	106	6.5	155	<b>09.5</b>
Sports Science	9	0.6	56	3.4	65	<b>04.0</b>
Dentistry	35	2.1	24	1.5	59	<b>03.6</b>
Speech language pathology	13	0.8	39	2.4	52	<b>03.2</b>
Dental therapist	25	1.5	25	1.5	50	<b>03.0</b>
Dietetics	24	1.5	14	0.9	38	<b>02.4</b>
Audiology	10	0.6	24	1.5	34	<b>02.1</b>

(Table 2) *contd....*

Course of Study	Rural	%	Urban	%	Total	%
Nursing	9	0.6	9	0.6	18	01.2
Optometry	0	0.0	1	0.1	1	00.1
Not indicated	159	9.7	29	1.8	188	11.5
<b>TOTAL</b>	<b>654</b>	<b>40.0</b>	<b>979</b>	<b>60.0</b>	<b>1633</b>	<b>100.0</b>

Table 3 shows that there were significantly more rural origin students who participated in the study at SMU ( $p < 0.001$ ), while the opposite was true for UCT and UKZN ( $p < 0.001$  in both cases). Overall, there was proportionally more UOS than ROS ( $p < 0.001$ ).

**Table 3. The proportion of rural and urban origin students per university (n=1633).**

Student Origin	SMU	UKZN	UCT	Total
Rural n (%)	462 (61.9)	137 (28.1)	55 (13.8)	654 (40.0)
Urban n (%)	284 (38.1)	351 (71.9)	344 (86.7)	979 (60.0)
Total	746 (100.0)	488 (100.0)	399 (100.0)	1633 (100)
P-values	< 0.001	< 0.001	< 0.001	< 0.001

**Table 4. Comparison of the motivational factors among the combined rural and urban origin students from the three universities (n=1633).**

Motivating Factors	ROS n (%)	UOS n (%)	Total n (%)	P-value
Combined (SMU,UKZN, UCT)				
Parents	168 (10.3)	337 (20.6)	505 (30.9)	< 0.001*
Siblings	62 (3.8)	35 (2.1)	97 (5.9)	0.485
Other family members	51 (3.1)	41 (2.5)	92 (5.6)	0.806
Friends	42 (2.8)	35 (2.1)	77 (4.7)	0.779
Mentors	14 (0.9)	22 (1.3)	36 (2.2)	0.872
High school teachers	44 (2.7)	33 (2.0)	77 (4.7)	0.775
University lecturers	6 (0.4)	12 (0.7)	18 (1.1)	0.905
Role models	45 (2.8)	48 (2.9)	93 (5.7)	0.967
Personal exposure	164 (10.0)	320 (19.6)	484 (29.6)	< 0.001*
Other	58 (3.5)	96 (5.9)	154 (9.4)	0.321
<b>Total</b>	<b>654 (40.3)</b>	<b>979 (59.7)</b>	<b>1633 (100.0)</b>	

Table 4 above demonstrates that the main motivating factors in their order of frequency were parents (505; 30.9%), personal exposure (484; 29.6%) and the combined siblings and other family members (189; 11.5%). Significantly more UOS than ROS indicated that they had been motivated by parents to choose a career in health sciences (337; 20.6%) versus (168; 10.3%),  $p < 0.001$ . Furthermore, significantly more UOS than ROS indicated that they had been motivated by personal exposure (320; 19.6%) versus (164; 10.0%),  $p < 0.001$ . There was no significant difference between these two groups of students regarding the other listed motivating factors,  $p > 0.05$ .

Table 5 below demonstrates the comparison per university between UOS and ROS regarding their motivating factors to choose a career in health sciences. Except for SMU, the trend observed in the combined picture (Table 4) was again demonstrated among the UOS and ROS regarding parents and personal exposure as motivating factors ( $p < 0.001$ ), in both institutions.

**Table 5. Comparison of the motivational factors among rural and urban origin students per university (n=1633).**

Motivating Factors	ROS n (%)	UOS n (%)	Total n (%)	P-value
<b>1. SMU</b>				
Parents	113 (15.1)	78 (10.5)	191 (25.6)	0.179
Siblings	49 (6.6)	19 (2.5)	68 (9.1)	0.253
Other family members	39 (5.2)	18 (2.4)	57 (7.6)	0.436
Friends	35 (4.7)	14 (1.9)	49 (6.6)	0.440
Mentors	11 (1.5)	8 (1.1)	19 (2.6)	0.915

(Table 5) contd....

Motivating Factors	ROS n (%)	UOS n (%)	Total n (%)	P-value
High school teachers	24 (3.2)	14 (1.9)	38 (5.1)	0.721
University lecturers	6 (0.8)	9 (1.2)	15 (2.0)	0.914
Role models	30 (4.0)	18 (2.4)	48 (6.4)	0.658
Personal exposure	113 (15.1)	78 (10.5)	191 (25.6)	0.179
Other	42 (5.6)	28 (3.8)	70 (9.4)	0.616
<b>Total (SMU)</b>	<b>462 (61.9)</b>	<b>284 (38.1)</b>	<b>746 (100.0)</b>	
2. UKZN	ROS n (%)	UOS n (%)	Total n (%)	P-value
Parents	33 (6.8)	120 (24.6)	153 (31.4)	< 0.001*
Siblings	10 (2.0)	10 (2.0)	20 (4.1)	1.000
Other family members	8 (1.6)	12 (2.5)	20 (4.1)	0.843
Friends	6 (1.2)	9 (1.8)	15 (3.1)	0.894
Mentors	2 (0.4)	6 (1.2)	8 (1.6)	0.862
High school teachers	18 (3.7)	12 (2.5)	30 (6.1)	0.790
University lecturers	0 (0.0)	3 (0.6)	3 (0.6)	0.902
Role models	11 (2.3)	13 (2.7)	24 (4.9)	0.930
Personal exposure	38 (7.8)	138 (28.3)	176 (36.1)	< 0.001*
Other	11 (2.3)	28 (5.7)	39 (8.0)	0.447
<b>Total (UKZN)</b>	<b>137 (28.1)</b>	<b>351 (71.9)</b>	<b>488 (100.0)</b>	
3. UCT	ROS n (%)	UOS n (%)	Total n (%)	P-value
Parents	22 (5.5)	139 (34.9)	161 (40.4)	< 0.001*
Siblings	3 (0.8)	6 (1.5)	9 (2.3)	0.892
Other family members	4 (1.0)	11 (2.8)	15 (3.8)	0.723
Friends	1 (0.3)	12 (3.0)	13 (3.3)	0.592
Mentors	1 (0.3)	8 (2.0)	9 (2.3)	0.742
High school teachers	2 (0.5)	7 (1.8)	9 (2.3)	0.802
University lecturers	0 (0.0)	0 (0.0)	0 (0.0)	-
Role models	4 (1.0)	17 (4.3)	21 (5.3)	0.511
Personal exposure	13 (3.3)	104 (26.1)	117 (29.3)	< 0.001*
Other	5 (1.3)	40 (10.0)	45 (11.3)	0.076
<b>Total (UCT)</b>	<b>55 (13.8)</b>	<b>344 (86.2)</b>	<b>399 (100.0)</b>	
<b>GRAND TOTAL</b>	<b>654 (40.3)</b>	<b>979 (59.7)</b>	<b>1633 (100.0)</b>	

ROS: Rural-Origin Students; UOS: Urban-Origin Students; P-value (Fisher Exact)

#### 4. DISCUSSION

The study has demonstrated that overall, the main motivating factors for students to follow a career in health sciences were parents, personal exposure, siblings and other family members. There was a significant difference in proportions between the ROS and UOS in the combined universities regarding parents and personal exposure as motivating factors. Mentors and university lecturers featured the least as motivating factors for both the ROS and UOS, with no significant difference between these students.

##### 4.1. Parental Motivation

This study showed that, in comparison with other factors, parents were a significant motivating factor for students to choose a career in health sciences when the three universities were combined, (as well as in UKZN and UCT when considered individually), with a significantly higher proportion among UOS. In a study conducted among 124 high school pupils in Houston (USA), Willcockson and Phelps also confirmed that the family ranked the highest in terms of influencing the career choice of an individual [6]. Furthermore, parental attitude to science was also shown to have a positive influence on primary and secondary school children to aspire for a career in science in the UK [34]. Unlike in this study, the USA and UK studies did not differentiate between ROS and their urban counterpart. In his dissertation, Clutter highlighted the effects of parental influence on the carrier choices of their children, emphasising that the decision impacts not only on the student, but the family system as a whole [30]. The parental influence was also demonstrated by Olaosebikan and Olusakin in the career choices of adolescents at secondary school level in Nigeria [35].

A study by Maharaj, investigating factors affecting the career choice of selected first year health-care students

(physiotherapy, chiropractic, medicine and occupational therapy) in KwaZulu-Natal, demonstrated a similar trend whereby parents were a major factor influencing career choice (68.1%) followed by the significant other people (42%) [7]. This study showed that parents (in terms of absolute numbers) were the most consistent motivational factor in the three participating universities. However, there was scarcity of studies comparing parental influence on the choice of a career in health sciences between rural and urban origin students.

#### **4.2. Personal Exposure**

In this study, personal exposure was one of the major motivating factors for a student to choose to pursue a career in a health science course. As explained in the study background above, personal exposure entailed an event or events in which the individual had a personal experience with the health care environment and the health care personnel in action. Studies in other fields have shown that among the extrinsic factors responsible for a career choice in that field was the exposure of the scholar in that field [36, 37]. Past experience with career activities and working in hospital were shown to play a major motivational role in individuals' decision to follow a career in nursing in Hong Kong [29]. The study by Maharaj showed that previous past experience with a professional from a chosen career field (comparable to personal exposure in this study) had a relatively strong influence (46.4%) among the students' career choices [7]. The proportion in the study by Maharaj was slightly higher than that in this study (25.1% in ROS and 32.7% in UOS). However, Maharaj did not compare rural and urban origin students, which comparison (in this study) showed that personal exposure significantly motivated more urban than rural origin students for a career choice in health sciences [7].

#### **4.3. Siblings and other Family Members**

It has been shown that the relationship among siblings can be supportive or antagonistic in various aspects of life [38]. A study conducted in the USA on the career choices of children and the influence of their parents and siblings, indicated that up to 15% of 2.37 million same gender siblings shared a similar occupation through the influence among themselves [39]. This study showed a low combined proportion of students (5.9%) who were motivated by their siblings for a career in health sciences. This could be explained by the relatively low sample size in this study. There were no comparable studies found in literature in this regard.

#### **4.4. Friends and Teachers**

Although studies have shown a significant role of friends in influencing students towards a career in health sciences [40, 41]; in this study the proportion of students who had been motivated by friends was low for both the ROS and their counterpart. In the late 1990s, lack of information about careers and entry requirements by institutions of higher learning were identified as factors adversely affecting student career choices in the rural and remote areas of Australia [42]. The authors of this article are of the view that such information should be provided by the school teachers through career guidance. In support of this view, it has been shown that visiting professionals from various fields have a positive influence for a career choice among scholars [43]. Research conducted by Alexander, et al in South Africa indicated that teachers, like parents play a significant role in the motivation of scholars towards a career choice [37].

#### **4.5. Mentors, University Lectures and Role Models**

The effectiveness of mentorship as a motivation strategy for a career choice has been demonstrated [15, 16]. The combined picture of the three universities showed that a low proportion of students (rural and urban origin) were motivated by mentors in their choice of a career in health sciences. This could mean that there was poor awareness on mentorship among high school students. In 1989, the Teachers and High School Students (TAHSS) Program was founded in Boston, Massachusetts (USA) to expose interested high school students of varied backgrounds to health care and related professions, providing mentorship support in their academic and personal development. This program has been shown to yield positive results by giving the necessary motivation and direction to the students [44]. A study conducted by Wolhuter et al. in South Africa showed that role models ranked very low (8th of the 12 listed factors) as a motivating factor for a career choice in the field of education [45]. The conducted study also demonstrated a low proportion of students who were motivated by role models for a career in health sciences. Again, there was scarcity of literature on role models as motivators for a career in the field of health sciences.

#### **4.6. Strength and Weaknesses**

The combined sample size obtained from the three universities was large to validate the results (power of the study). However, since it was voluntary, those who did not consent may have introduced selection bias in the study.

## **CONCLUSION**

The study has demonstrated the important role of the family and student's personal exposure to the health environment in motivating both the rural and urban-origin students for a career in health sciences. Mentors and university lecturers featuring as the least motivating factors for both the ROS and UOS reveals an untapped source of motivation for a career choice among student interested in following a career in health sciences.

## **RECOMMENDATIONS**

Personal exposure entailed being under the care of a health care personnel (as a scholar) as a result of ill-health or while escorting an important other to a health care facility. It is therefore recommended that health care professionals should bring the exposure to scholars at their various schools through annual career motivation days.

Since parents formed the largest motivating factor in career motivation for their children, especially the UOS, this resource should be supported through invitations during career guidance conducted on open days in schools and institutions of higher learning. This could empower them to become even more effective career motivators.

Personal exposure of students to a health environment and health care personnel should be ensured in various schools.

Further studies should be conducted to explore the reasons underlying the difference between the ROS and UOS regarding the motivating factors towards their choice in following a career in health sciences.

## **AUTHORS CONTRIBUTIONS**

L.H.M. drafted the manuscript. B.N. provided intellectual input and reviewed the draft manuscript. Both authors approved the final manuscript and agreed to submission to the Open Public Health Journal for publication.

## **ETHICS APPROVAL AND CONSENT TO PARTICIPATE**

Ethical approval for the study was granted by the ethics committees of all three participating universities (UL-MREC/M/63/2010: IR, UKZN-HSS/0966/09 and UCT-HREC 353/2011).

## **HUMAN AND ANIMAL RIGHTS**

No animals were used for studies that are based of this research. All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2008.

## **CONSENT FOR PUBLICATION**

The study details were explained to each student, and written informed consent to participate was obtained before the study commenced.

## **CONFLICT OF INTEREST STATEMENT**

The authors declare no conflict of interest, financial or otherwise.

## **ACKNOWLEDGEMENTS**

The authors would like to thank Atlantic Philanthropies for the funding the Collaboration for Health Equity through Education and Research (CHEER) under the umbrella of which this study was conducted. A special word of gratitude to the students in the three universities who were respondents in this study, and Prof HS Schoeman who assisted with the data analysis.

## **REFERENCES**

- [1] World Health Organisation. Increasing access to health workers in remote and rural areas through improved retention 2010. Available from: [http://www.searo.who.int/nepal/mediacentre/2010\\_increasing\\_access\\_to\\_health\\_workers\\_in\\_remote\\_and\\_rural\\_areas.pdf](http://www.searo.who.int/nepal/mediacentre/2010_increasing_access_to_health_workers_in_remote_and_rural_areas.pdf)
- [2] Geyman JP, Norris TE, Hart LG, Eds. Textbook of Rural Medicine. New York: McGraw-Hill 2001; pp. 3-4.
- [3] Rural Health Advocacy Project. Fact Sheet Rural Health 2013. Available from: <https://www.health-e.org.za/wp-content/uploads/2014/02/Updated-Rural-Fact-Sheet-27-Nov-2013.pdf>



- [4] Dodge EA, Welderufael M. Factors that Influence career choice in South African township high school students 2014. Master's Theses and Capstone Projects, Paper 7. Available from: <http://scholar.dominican.edu/cgi/viewcontent.cgi?article=1005&context=masters-theses>
- [5] Conference Board of Canada Connecting students to tomorrow's ICT jobs and careers 2009. Available from: [http://70.33.247.10/~ccictt/wpcontent/uploads/2010/11/Connecting\\_Students\\_to\\_ICT\\_Careers\\_Report.pdf](http://70.33.247.10/~ccictt/wpcontent/uploads/2010/11/Connecting_Students_to_ICT_Careers_Report.pdf)
- [6] Willcockson IU, Phelps CL. Recruiting future neuroscientists: What asking the recruits can teach us. *Neuroscientist* 2004; 10(6): 594-7. [<http://dx.doi.org/10.1177/1073858404269059>] [PMID: 15534043]
- [7] Maharaj SA. An investigation of the factors affecting the career choice of selected health-care students (physiotherapy, chiropractic, medicine and occupational therapy) in KwaZulu-Natal Dissertation for a Master's Degree in Technology: Chiropractic at the Durban University of Technology 2008. Available from: [http://ir.dut.ac.za/bitstream/handle/10321/501/Maharaj\\_2008.pdf](http://ir.dut.ac.za/bitstream/handle/10321/501/Maharaj_2008.pdf)
- [8] Edwards K, Quinter M. Factors influencing students career choices among secondary school students in Kisumu Municipality, Kenya. *JETERAPS* 2011; 2(2): 81-7.
- [9] Draper C, Louw G. What is medicine and what is a doctor? Medical students' perceptions and expectations of their academic and professional career. *Med Teach* 2007; 29(5): e100-7. [<http://dx.doi.org/10.1080/01421590701481359>] [PMID: 17885961]
- [10] Hattie J, Timperley H. The power of feedback. *Rev Educ Res* 2007; 77(1): 81-112. [<http://dx.doi.org/10.3102/003465430298487>]
- [11] Gaşiorowski J, Rudowicz E, Safranow K. Motivation towards medical career choice and future career plans of Polish medical students. *Adv Health Sci Educ Theory Pract* 2015; 20(3): 709-25. [<http://dx.doi.org/10.1007/s10459-014-9560-2>] [PMID: 25352498]
- [12] Ososki A, White J, Morago S, Van Sickle J. Factors affecting science undergraduates choice of teaching as a career A case study at Humboldt State University Humboldt State University, California Available from: [http://www.academia.edu/9139978/Factors\\_Affecting\\_Science\\_Undergraduates\\_Choice\\_of\\_Teaching\\_as\\_a\\_Career\\_A\\_Case\\_Study\\_at\\_Humboldt\\_State\\_University2](http://www.academia.edu/9139978/Factors_Affecting_Science_Undergraduates_Choice_of_Teaching_as_a_Career_A_Case_Study_at_Humboldt_State_University2)
- [13] Garvey B, Alred G. An introduction to the symposium on mentoring: Issues and prospects. *Br J Guid Coun* 2003; 31: 1-9. [<http://dx.doi.org/10.1080/0306988031000086125>]
- [14] Grossman JB, Rhodes JE. The test of time: Predictors and effects of duration in youth mentoring relationships. *Am J Community Psychol* 2002; 30(2): 199-219. [<http://dx.doi.org/10.1023/A:1014680827552>] [PMID: 12002243]
- [15] Selwa LM. Lessons in mentoring. *Exp Neurol* 2003; 184(Suppl. 1): S42-7. [[http://dx.doi.org/10.1016/S0014-4886\(03\)00356-X](http://dx.doi.org/10.1016/S0014-4886(03)00356-X)] [PMID: 14597325]
- [16] Bhagia J, Tinsley JA. The mentoring partnership. *Mayo Clin Proc* 2000; 75(5): 535-7. [[http://dx.doi.org/10.1016/S0025-6196\(11\)64225-0](http://dx.doi.org/10.1016/S0025-6196(11)64225-0)] [PMID: 10807085]
- [17] Msila V. The struggle to improve school: Voices of South African teacher mentors. *Educ Manage Adm Leadersh* 2016; 44(6): 1-6. [<http://dx.doi.org/10.1177/1741143215595416>]
- [18] Monte-Mór RL. What is urban in the contemporary world? *Cad Saude Publica* 2005; 21(3): 942-8. [<http://dx.doi.org/10.1590/S0102-311X2005000300030>] [PMID: 15868054]
- [19] Zlotnik H. Assessing past trends and future urbanisation prospects: The limitation of available data Paper presented at the conference New Forms of Urbanisation: Conceptualising and Measuring Human Settlement in the Twenty-First Century IUSSP Working Group on Urbanisation, Rockefeller Foundation Study and Conference Centre, Bellagio, Italy 2002. Available from: <http://archive.iussp.org/Activities/wgc-urb/urb-abstracts02.php>
- [20] Tumbo JM, Couper ID, Hugo JF. Rural-origin health science students at South African universities. *S Afr Med J* 2009; 99(1): 54-6. [PMID: 19374088]
- [21] Rai M. Operational definitions of urban, rural and urban agglomeration for monitoring human settlements scores. Proceedings, 25th Conference on Regional and Urban Statistics and Research.
- [22] Reid SJ, Cakwe M. The contribution of South African curricula to prepare health professionals for working in rural or under-served areas in South Africa: A peer review evaluation. *S Afr Med J* 2011; 101(1): 34-8. [<http://dx.doi.org/10.7196/SAMJ.4526>] [PMID: 21626979]
- [23] Diab P, Flack PS, Mabuza LH, Moolman H. Curriculum challenges faced by rural-origin health science students at South African medical schools. *AJHP* 2015; 7(1): 51-4.
- [24] Merriam Webster Dictionary Available: <https://www.merriam-webster.com/dictionary/parent>
- [25] de Vries E, Reid S. Do South African medical students of rural origin return to rural practice? *S Afr Med J* 2003; 93(10): 789-93. [PMID: 14652974]
- [26] Magnus JH, Tollan A. Rural doctor recruitment: Does medical education in rural districts recruit doctors to rural areas? *Med Educ* 1993; 27(3): 250-3. [<http://dx.doi.org/10.1111/j.1365-2923.1993.tb00264.x>] [PMID: 8336575]
- [27] Peach HG, Bath NE. Comparison of rural and non-rural students undertaking a voluntary rural placement in the early years of a medical

- course. *Med Educ* 2000; 34(3): 231-3.  
[<http://dx.doi.org/10.1046/j.1365-2923.2000.00515.x>] [PMID: 10733713]
- [28] Couper ID, Hugo JF, Conradie H, Mfenyana K. Influences on the choice of health professionals to practice in rural areas. *S Afr Med J* 2007; 97(11): 1082-6.  
[PMID: 18250918]
- [29] Law W, Arthur D. What factors influence Hong Kong school students in their choice of a career in nursing? *Int J Nurs Stud* 2003; 40(1): 23-32.  
[[http://dx.doi.org/10.1016/S0020-7489\(02\)00029-9](http://dx.doi.org/10.1016/S0020-7489(02)00029-9)] [PMID: 12550147]
- [30] Clutter C. The effects of parental influence on their children's career choices A report submitted in partial fulfilment of the requirements for the degree Master of Science, School of Family Studies and Human Service College of Human Ecology. Manhattan, Kansas: Kansas State University 2010. Available from: <https://krex.k-state.edu/dspace/bitstream/handle/2097/3951/ChanceClutter2010.pdf?sequence=3>
- [31] University of the Western Cape Collaboration for Health Equity through Education and Research (CHEER) Available from: <https://www.uwc.ac.za/CE/Pages/Cheer.aspx>
- [32] Diab PN, Flack PS, Mabuza LH, Reid SJ. Qualitative exploration of the career aspirations of rural origin health science students in South Africa. *Rural Remote Health* 2012; 12: 2251.  
[PMID: 23157560]
- [33] Diab P, Flack PS, Mabuza LH, Moolman H. Curriculum challenges faced by rural-origin health science students at South African medical schools. *Afr J Health Profess Educ* 2015; 7(1): 51-4.
- [34] De Witt J, Archer L. Who Aspires to a Science Career? A comparison of survey responses from primary and secondary school students. *Int J Sci Educ* 2015; 37(13): 2170-92.  
[<http://dx.doi.org/10.1080/09500693.2015.1071899>]
- [35] Olaosebikan OI, Olusakin A-M. Effects of parental influence on adolescents' career choice in badagry local government area of lagos state, Nigeria. *IOSR-JRME* 2014; 4(4): 44-57.  
[<http://dx.doi.org/10.9790/7388-04434457>]
- [36] Smadu M. So, what makes you want to be a nurse? *Concern* 1996; 25(5): 32-3.  
[PMID: 8954357]
- [37] Alexander PM, Holmner M, Lotriet HH, *et al.* Factors affecting career choices: Comparison between students from computer and other disciplines. *J Sci Educ Technol* 2010; 20(3): 300-15.  
[<http://dx.doi.org/10.1007/s10956-010-9254-3>]
- [38] Kramer L. Supportive sibling relationships in: *Sibling development: J Caspi (Ed); Implications for Mental Health Practitioners*. New York, NY: Springer Publishing Company 2011; pp. 41-54.
- [39] Beall A. Taking over the family business: Children tend to make career choices based on what jobs their parents and siblings have 2016. Available from: <http://www.dailymail.co.uk/sciencetech/article-3504404/Taking-family-business-Children-tend-make-career-choices-based-jobs-parents-siblings-have.htm>
- [40] McHugh SM, Corrigan MA, Sheikh A, Lehane E, Broe P, Hill AD. A study of the factors influencing school-going students considering medical careers. *Surgeon* 2011; 9(4): 191-4.  
[<http://dx.doi.org/10.1016/j.surge.2010.09.005>] [PMID: 21672658]
- [41] Millan LR, Azevedo RS, Rossi E, De Marco OL, Millan MP, de Arruda PC. What is behind a student's choice for becoming a doctor? *Clinics (Sao Paulo)* 2005; 60(2): 143-50.  
[<http://dx.doi.org/10.1590/S1807-59322005000200011>] [PMID: 15880251]
- [42] Young DJ, Fraser BJ, Woolnough BE. Factors affecting student career choice in science: An Australian study of rural and urban schools. *Res Sci Ed* 1997; 27(2): 195-214.
- [43] Career Guidance Section School Development Division, Education Bureau, Australia. Guide on Life Planning Education and Career Guidance for Secondary Schools 2014. Available from: [https://careerguidance.edb.hkedcity.net/edb/export/sites/default/lifeplanning/pdf/about-careers-guidance/CLP-Guide\\_E\\_r3.pdf](https://careerguidance.edb.hkedcity.net/edb/export/sites/default/lifeplanning/pdf/about-careers-guidance/CLP-Guide_E_r3.pdf)
- [44] Tufts University, School of Medicine, Boston (USA). Teachers and High School Students Program (TAHSS) Available from: <http://medicine.tufts.edu/About-Us/Administrative-Offices/Office-of-Multicultural-Affairs/Pipeline-Programs/Teachers-and-High-School-Student-Program>