

## Research

# Factors related to academic success among paramedic students

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## Abstract

### Background

South Africa is one of the few countries to produce emergency care graduates in Africa. However, a large number of these graduates are emigrating from Africa. Although academic success has been studied in various contexts in Africa, none have looked into the Bachelor of Emergency Medical Care (BEMC). Maximising academic success in the BEMC might ensure a sustainable skilled workforce in an area which has a shortage of skilled personnel.

### Aims

This study aimed to describe the socio-demographic variables of current South African BEMC students. We also aimed to describe whether any associations exist between socio-demographic variables, various racial groupings and repeating a year during the course of study.

### Methods

A cross-sectional descriptive survey was conducted among students enrolled for the BEMC in 2016. Continuous and categorical variables were analysed using descriptive statistics. The Fisher's exact test and Pearson chi-square test were used to test associations between the survey variables and repeating a year.

### Results

A total of 176 participants responded to the survey. Having a pre-existing emergency care qualification was associated with not repeating a year on the BEMC ( $p=0.02$ ). The statistical difference between race and not repeating a year in the BEMC was not significant ( $p=0.07$ ). However, when the black-African and minority cohort are grouped together, it is significant ( $p=0.05$ ).

### Conclusion

A number of socio-demographics were described in this study. Students with pre-existing emergency care qualifications were least likely to repeat a year.

### Keywords:

academic success; paramedic education; student success

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## Introduction

South African student enrolments in public higher education have increased from 425,000 in 1994 to 985,212 in 2015; 54% of these enrolments were women (1). This was followed by an increase in the proportion of black-African student enrolments at South African public higher education from 43% in 1998 to 69% in 2015. Despite these increases, black-African students' undergraduate success rate has remained lower than the average success rate in public higher education, the only racial group to do so (1). While some studies have examined factors associated with academic success (2-5), none have studied this phenomenon in the undergraduate qualification for paramedics in South Africa: the Bachelor of Emergency Medical Care (BEMC). Understanding whether the same success rates apply in this cohort as elsewhere may similarly provide a starting point to improve student success.

The BEMC degree commenced in 2011 and is currently offered at four public higher education institutions in South Africa: the Cape Peninsula University of Technology, Durban University of Technology, Nelson Mandela Metropolitan University and University of Johannesburg (6). The BEMC graduates are able to register as emergency care practitioners with the Health Professions Council of South Africa Professional Board for Emergency Care on completion. This qualification is currently the highest registration category with the professional board for emergency care. Little is known about the academic success of this cohort. Maximising academic success should be a priority for all higher education institutions to ensure a sustainable, skilled, workforce.

This study did not investigate attrition, instead, it aimed to describe the socio-demographic variables of current South African BEMC students. We also aimed to describe whether any associations exist between socio-demographic variables, various racial groupings and the need to repeat a year during the course of study.

## Methods

An anonymous survey was conducted during 2016 which included students enrolled for the BEMC. We aimed to include all students enrolled for the degree from all four South African higher education institutions listed above. The survey was conducted using the e-survey client Survey Monkey (San Mateo, California). After gatekeeper permission was granted by each of the four institutions, an electronic survey link was disseminated to the entire BEMC student body by their respective head of departments. Information about the study was provided as the first page of the survey and students had the ability to start or exit the survey. The e-survey client was set to provide an anonymous data collection. Data was

collected over a period of 6 months. A total of three reminders were sent to the participants to optimise the response rate. Given an estimated response rate of between 30 and 50% of approximately 400 students, we expected a sample of between 120 and 200 participants. Before data collection, the survey instrument was piloted by ten BEMC graduates who completed the BEMC degree in 2015. They provided feedback on the clarity, relevance, layout and design of the questions which we used to derive the final survey instrument.

References to the four higher education institutions were anonymised before analysis of the data. Age was the only continuous variable included in the study. Categorical variables included, race, gender, previous emergency care qualification and type of secondary school attended. Race was described as white, black-African and a cohort of other minority groups; mixed-race, Indian and Asian groups were pooled for analysis due to their relative size compared to the bigger white and black-African groups. Data were imported onto Microsoft Excel® (Microsoft Corporation, Redmond, WA) for analysis. Continuous and categorical variables were described using basic descriptive statistics. A Fisher's exact test was used to test associations between the various survey variables and the three racial groupings. Pearson's chi-square test was used to test associations between repeating a year and the following categorical variables: emergency care qualifications before enrolment on the degree (Table 1), racial groupings and type of secondary school attended. These associations were also graphically expressed and crude odds ratios were provided. For the graphical description, prior qualifications were expressed as present or not, and race was expressed in terms of the three groupings already described. Statistical significance was considered as a p-value less than 0.05 and the 95% confidence interval (95% CI) were provided as a measure of precision for the crude odds ratios.

## Ethics

Approval to conduct the study was granted by the University of Cape Town Human Research Ethics Committee (HREC Ref: 815/2015) and individual institutions.

## Results

A total of 176 participants (43%) from an available sample of 408 students responded to the survey. Participation and response rates are described in Figure 1. The mean age of participants was 26 years (standard deviation=7), with the majority (n=83, 47%) of participants between 20 and 24 years of age. Ninety-seven (55%) were male and racial distribution was white 94 (53%), black-African 54 (31%), and the minority cohort 28 (16%). The minority cohort was mixed-race 17 (10%), Indian 10 (6%) and Asian 1 (0.6%).

Figure 2 describes the proportion of the cohort that repeated a year on the BEMC degree for the variables: emergency care qualifications before enrolment on the degree, race and type of secondary school attended. There were 101 participants with emergency care qualifications before enrolling for the four-year EMC program. Of these, 39 (39%) were qualified as basic ambulance assistants (4-5 week course), 27 (27%) as ambulance emergency assistants (12-14 week course),

21 (21%) as emergency care technicians (2-year program), and 9 (9%) as critical care assistants (9-10 month course), while 4 (4%) had the National Diploma of Emergency Medical Care (3-year program). Of these, 23 (22%) of the participants never practised using their qualification before enrolling for the BEMC. Having a prior emergency care qualification was strongly associated with not repeating a year on the BEMC ( $p=0.02$ ). The odds of a student with a pre-existing emergency

Table 2. Socio-demographics of participants with row two as the denominator

Variable	All	White	Black-African	Minority cohort*	p-value**
n	176	94	54	28	-
Mean age ( $\pm$ SD)	26 ( $\pm$ 7)	26 ( $\pm$ 7)	26 ( $\pm$ 7)	27 ( $\pm$ 7)	-
Male	97 (55%)	48 (51%)	34 (63%)	15 (54%)	0.39
I have repeated a year in my BEMC studies	34 (19%)	22 (23%)	9 (17%)	3 (11%)	0.28
English is my main language	81 (46%)	49 (52%)	21 (39%)	11 (39%)	0.21
I have a prior emergency care qualification	101 (57%)	52 (55%)	37 (69%)	12 (43%)	0.07
I have a part-time job	52 (30%)	26 (28%)	19 (35%)	7 (25%)	0.54
I worked between school and studying BEMC	117 (67%)	65 (69%)	37 (69%)	15 (54%)	0.29
School prepared me for the BEMC	70 (40%)	33 (35%)	24 (44%)	13 (46%)	0.40
I have a quiet area at the place where I live to study undisturbed	132 (75%)	77 (82%)	35 (65%)	20 (71%)	0.06
I have access to a computer for studying where I live	161 (92%)	90 (96%)	45 (83%)	26 (93%)	0.03
I have internet access where I live?	123 (70%)	78 (83%)	26 (48%)	19 (68%)	<0.001
I am the first person to attend university in my family	63 (36%)	27 (29%)	23 (43%)	13 (46%)	0.11
I own a car	119 (68%)	85 (90%)	16 (30%)	18 (64%)	<0.001
I or a member of my family fund my studies	96 (55%)	58 (62%)	25 (46%)	13 (46%)	0.12

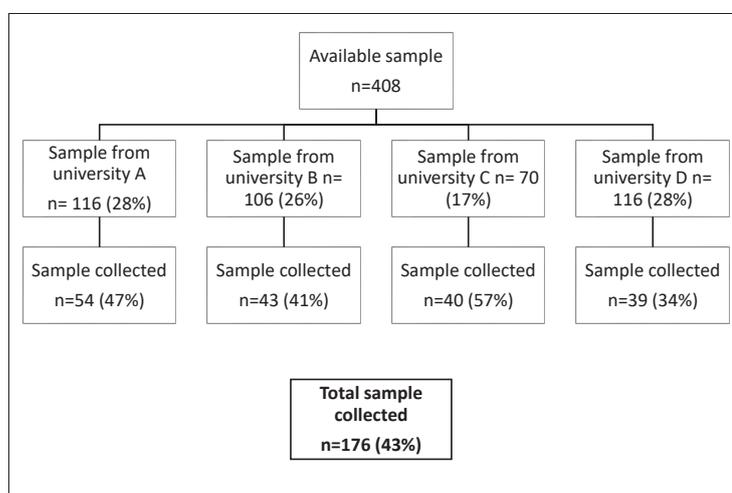


Figure 1. The available number of participants and response rate

care qualification not repeating a year were 2.4 (95% CI=1.2-5.1) times the odds of a student without a pre-existing emergency care qualification not repeating a year. The statistical difference between race and not repeating a year in the BEMC was not significant ( $p=0.07$ ). However, when the black and minority cohort are grouped together, it is significant ( $p=0.05$ ). That is, the odds of a non-white student not repeating a year on the program were 2.1 (95% CI=1.0-4.5) times better compared to a white student not repeating a year. Students who were schooled in township or rural schools repeated a year on the course on fewer occasions ( $n=7$ , 18%) compared to students who had studied at private schools ( $n=12$ , 32%) and former model C (former whites-only government schools) schools ( $n=19$ ; 50%). There was however no statistical difference between the type of secondary school and academic success ( $p=0.30$ ).

## Discussion

This study showed that not repeating a year during the BEMC was significantly associated with two important variables: having a prior emergency care qualification and not being a white student. Although the latter finding may appear odd at first, a closer look at the rest of results offer an explanation. Table 2 describes a number of significant differences between the various racial groups against a number of socio-demographic variables. Black-African students were the least likely (and significantly so) of any of the other groupings to have access to a car, a computer or the internet at home. They were also less likely than any of the other groups to have access to a quiet area to study undisturbed, and (alongside the minority cohort) to have a member of their family fund their studies. Despite these barriers, black-African students were less likely to repeat a year than their white counterparts as depicted in Figure 2. A possible explanation is that the sample

only included students registered on the BEMC program; anyone who had failed a year and not returned the following year to repeat it would have been excluded from analysis.

White students were proportionally more likely to report access to a car, or have a member of their family fund their studies, and the least likely to be a first-generation higher learning student compared to any of the other groupings. These findings, along with more access to a computer and the internet at home suggests that they may have access to more capital than other racial groupings. This access to more capital and resources provides them an added advantage to other students from previously disadvantaged backgrounds.

Another possible explanation would be the late blooming hypothesis that suggests the marks of African students from historically disadvantaged schools gradually improve as they progress in their studies despite coming from a disadvantaged background. The rationale behind the hypothesis is that the academic performance of African students gradually draws level with that of students from historically advantaged white schools as they adjust to university life, acquire a better understanding of the academic and discipline specific discourse, make use of academic support services and develop better study methods. The finding that students from township, or rural schools were less likely to repeat a year compared to students from former model C schools or private schools can likely be similarly explained. They eventually adapted to the university culture and 'cracked the code of academic literacy' in higher education (7).

The literature shows that black-African students perform academically poorer to white students; mainly since black-African students trend towards being academically underprepared (2-5,7-9). This finding is commonly put down to

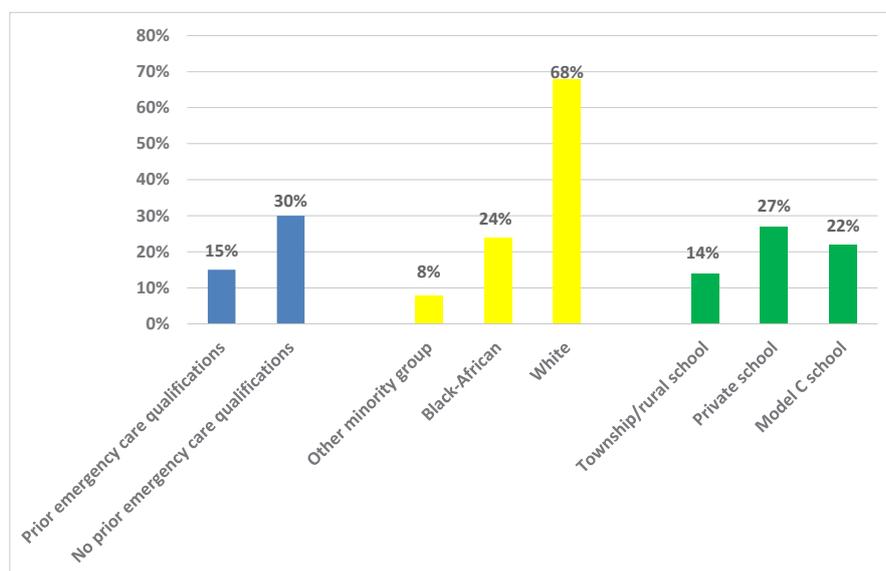


Figure 2. Proportion of cohort that repeated a year on the Bachelor of Emergency Medical Care out of everyone that repeated a year

a poor schooling background as a consequence of the apartheid system and is also referred to as the articulation gap – the knowledge misalignment between school and the first year of attending a higher learning institution (2,8,9). This articulation gap results in the lack of required academic skills to function optimally, resulting in students having to work much harder to achieve academic success, which some do, but not all (10).

Cormier and Whyte found that second degree Bachelor of Nursing students' academic achievement was superior to that of first degree nursing students (11). They also found that second degree students have better clinical assessment attributes in the clinical environment (11). Second degree students tend to put more hours into their academic work than their counterparts, which may have attributed to their academic success (12). Similarly, our study found that having an emergency care qualification in the BEMC is associated with not repeating a year. Our findings are not altogether surprising; studies have found first degree students struggling with the transition from childhood to adulthood while at the same time trying to acquire mastery of knowledge and skills (2,13). In addition, students in medical disciplines struggle with the moral and ethical decisions that they encounter on the clinical platform which would be more challenging if a student is developmentally and intellectually underprepared (12). In contrast, a number of studies also support increased motivation and resiliency for students despite a poor background (3,14). In our study black-African students proportionally had more prior emergency care qualifications but poorer personal circumstances, which according to the literature above may have developed resilience to be successful. However, lack of funding would trump any advantage experience may bring by resulting in a drop-out whether a student was successful or unsuccessful. This particular point provides an even more layered look at the findings.

## Limitations

A key limitation of this study was the sample size. Given an already limited convenience sample and the restrictions in working through the various heads of departments to send reminders, we were unable to achieve a higher response rate. A random sample was considered, but may have produced an even smaller sample. Students may also have been reluctant to participate in a study about academic success and this could have affected the results. Although there are other non-quantifiable factors that contribute to academic success, these were unaccounted for in this study. Despite these limitations there were a number of important findings that corroborated prior research. As this was the first study to explore this topic within this particular cohort, it would have been impossible to control for all limitations. No doubt the findings will go a long way to guide the planning of future research projects. An important strength of the study was that it included students from all institutions that offers the BEMC program in South Africa, thus generalising the findings.

## Conclusion

This study describes a number of socio-demographic variables of BEMC students associated with race and repeating a year during the course of study. Most notably white students were more likely to repeat a year whilst black and other minority students were less likely to do so. Seeing as access to resources were more challenging for the latter two groupings, it is more likely that the findings were merely a reflection of those that had the capital to return to study (whether they were successful or not in the previous year). Surveying the cohort that did not return to the BEMC program and qualitative research is now required to better understand the significance of these findings and uncover some of the factors that enable or restrict academic success. This approach will allow identification of the modifiable factors that inhibits throughput of emergency care students. Addressing these may have a substantial impact on providing more prehospital emergency care provision.

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## Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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