

Clinical academic staffing levels at a South African dental school

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ABSTRACT

Introduction

The inadequacy and skewed distribution of oral health personnel in South Africa are well-documented. Surprisingly, the staffing levels at dental schools have not previously been described.

Aims and objectives

To determine the number of full-time equivalent clinical academic staff working at the dental school of the Sefako Makgatho Health Sciences University for the five-year period 2015 to 2019.

Design

A retrospective cross-sectional descriptive study.

Methods

Data related to the demographic characteristics and employment types of clinical academic staff working at the dental school between January 2015 and December 2019 were acquired from annual reports, payroll records and school calendars and used to calculate full-time equivalents (FTE) by academic ranks and specialties.

Results

Females and Black general dental practitioners at lecturer level constituted the majority of staff. FTE of staff at lecturer level increased sharply between 2016 and 2017 (52.7 FTE vs 65.9 FTE respectively) and have since gradually declined. FTEs of staff at senior lecturer (15.8FTE vs 12.1FTE) and professorial (7.8 FTE vs 5.3FTE) levels have continued to decline. FTEs of staff working in the majority of specialties have decreased while staffing levels in Prosthodontics and Oral & Maxillofacial Surgery have increased.

Conclusion

Staffing levels declined between 2015 and 2019

INTRODUCTION AND BACKGROUND

The inadequacy and skewed distribution of oral health personnel in South Africa are well-documented.¹⁻³ The numbers of oral health personnel fall far short of accepted

international standards.⁴⁻⁶ Traditionally, four methods of calculating health personnel requirements at the national level have been applied: healthcare demands, health-needs approach, personnel to population ratios, and service targets.^{7,8} The Workload Indicators of Staffing Need (WISN) method assists managers at the health facility level to determine how many health workers of a particular type are required to cope with the workload.⁹

The staffing levels in the country's dental schools have surprisingly not previously been described. In fact, very little has been written about the staffing situation in the country's dental schools.¹⁰ A review of staff establishments is under way at Gauteng-based dental schools.¹¹ At present dental schools use student enrolment, among other factors, to determine staffing levels. The Health Professions Council of South Africa (HPCSA) which is a statutory body tasked with guiding the professions does not stipulate specific undergraduate faculty to student ratios. It does however require the schools to have a sufficient number of qualified staff to effectively deliver and evaluate the degree programmes.¹²

A teacher to student ratio is a measure of teacher workload. It is not the same as class size to which it is correlated. The relationship between teacher to student ratio and class size is affected by a variety of factors, including the number of classes for which a teacher is responsible and the number of classes taken by students. The lower the teacher/student ratio, the higher the availability of teacher services to students.¹³ It is considered to be a proxy of quality.¹⁴

Final year dental students' perceptions of the quality of the learning environment at the four dental schools in the country have recently been surveyed.¹⁵ The findings of the study are encouraging. They indicate that overall the students perceived their educational environment to be satisfactory. Their perceptions of lecturers were however concerning. The study found, among other things, that students perceived lecturers to be authoritarian.

A scarcity of full-time clinical faculty members in dental schools has been reported in the United Kingdom (UK) and the United States of America (USA).^{16,17} Academic dentistry in South Africa, unlike in the USA, mainly involves teaching, research, and service responsibilities. In the USA faculty members can be either full-time clinician, clinician scholar or full-time researcher.¹⁸ The Sefako Makgatho University Oral Health Centre (SMU Oral Health Centre), a dental school and a comprehensive care referral hospital, experienced a sharp increase in the number of patients between 2013 and 2018.¹⁹ The impact of high patient load on teaching requirements

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and scholarship is undetermined. A downward trend in peer-reviewed publication output from the dental schools in the country has been reported - independent reviews spanning the periods 1990-1994 and 1990-2005 found a decline in research outputs.^{20,21} Follow-up reviews of more recent outputs are an important issue for future research. Furthermore, a review of the participation of dental researchers at the annual International Association for Dental Research (IADR) conferences spanning the period 1967-2004 found that membership and with it the number of presentations per member has declined since reaching its peak in the 1980's.²²

This study set out to determine the clinical academic staffing levels at the SMU Oral Health Centre in the five-year period 2015 to 2019.

OBJECTIVES OF THE STUDY

To describe the sociodemographic characteristics of clinical academic staff working at the SMU Oral Health Centre during the five-year period 2015 to 2019

To determine the number of full-time equivalent clinical academic staff.

MATERIALS AND METHODS

Study design

This was a retrospective cross-sectional descriptive study in which existing records were reviewed.

Target population

The target population consisted of annual reports, academic staff payroll records and calendars of the SMU Oral Health Centre spanning the five-year period 2015 to 2019.

Study sample

Every available record related to academic staff at SMU Oral Health Centre was studied.

Data collection

Data related to the demographic characteristics and employment types of clinical academic staff was acquired from annual reports and school calendars. Full-Time Equivalents (FTEs) of part-time staff were derived from payroll records.

Data was captured in Microsoft Excel software. It was then transferred to Statistical Package for the Social Sciences (SPSS) version 27 for analysis.

Definition of variables and terms

Population group breakdown of clinical academic staff into African, Indian, Coloured and White was applied according to the Population Registration Act of 1950.²³

Full-time employee refers to any employee who works an average of at least 40 hours per week for more than 120 days in a year.

Part-time employee refers to any employee who works an average of less than 40 hours per week.

Full-Time Equivalents are defined as "the ratio of the total number of hours worked and the average number of hours worked in full-time jobs".²⁴ An FTE of 1.0 is equivalent to a full-time worker, while an FTE of 0.5 signals half of a full work load.

Dental specialist refers to a dentist who has been registered as a specialist in a speciality in dentistry in terms of the regulations under the Health Professions Act 56 of 1974.²⁵ There are six recognised specialities in South Africa. They are Community Dentistry, Maxillo-facial and Oral Surgery, Oral Medicine and Periodontics, Oral and Maxillofacial Pathology, Orthodontics and Prosthodontics.

General dental practitioner refers to a dentist who has been registered with the Health Professions Council for the provision of general dental services

Registrar refers to a dentist undergoing training as a specialist.

Professoriate refers to a body of professors i.e. associate and full professors.

Ethical considerations

Ethical approval for the study was granted by the Ethics Committee of Sefako Makgatho Health Sciences University (SMREC/H/167/2021:IR). Permission to conduct the study was granted by the Chief Executive Officer (CEO) of the SMU Oral Health Centre.

STATISTICAL ANALYSIS/HYPOTHESIS TESTING

Collected data were subjected to univariate and bivariate analysis in Statistical Package for the Social Sciences (SPSS) software. Frequencies, means and proportions were calculated. Chi-squared tests were performed to test the statistical significance of the differences in proportions. The chosen significance level of the tests was a p-value less than 0.05.

RESULTS

Data spanning the five-year period from 2015 to 2019 was extracted from annual reports, payroll records and school calendars and analysed.

Demographic characteristics

Female staff members constituted a majority throughout the study period. The differences in gender proportions were not statistically significant ($p > 0.05$).

Black clinical academic staff constituted a large majority (63.4%). White clinical academic staff constituted the second largest population group between 2015 and 2017, while Indian clinical academic staff constituted the second largest population group between 2018 and 2019. The professoriate comprised an average of 8.2% of clinical academic staff. The number of full-time professors decreased from four in 2015 to two between 2017 and 2019 representing a 50% decline.

The proportion of senior lecturers ranged between 12.7% and 19.2%. Lecturers constituted the bulk of clinical academic staff. A significant increase in the number (62 vs 86) of lecturers occurred between 2016 and 2017. A steady increase in their proportion has since been maintained. Part-time lecturers comprised 31.1% of clinical academic staff in 2019.

Distribution, gender and racial composition of the professoriate

Of the four full-time professors, two worked in Oral Pathology while one worked in Oral Medicine and Periodontics and one in General Dental Practice. Of the

three full-time associate professors, two worked in Oral Medicine and Periodontics and the third in Dental & Maxillofacial Radiology.

Of the four part-time professors, two worked in Restorative Dentistry while one worked in Oral & Maxillofacial Surgery and one in Prosthodontics. All part-time professors were retired. Female representation in the professoriate during the study period ranged between 14.3% and 25%. The racial breakdown during the study period ranged between

75% to 85.7% White and 14.3 to 25% Indian. Blacks and Coloureds were not represented.

The distribution of oral health personnel by categories was: general dental practitioners (53.6%); dental specialists (23%); oral hygienists (3.9); dental therapists (2.3%); dental radiographers (3.5), and registrars (13.3%). A little less than forty percent (39.2%) of the general dental practitioners were employed part-time.

Table 1: Gender distribution of clinical academic staff over the five-year period

Year	Gender		Chi-squared test
	Male n (%)	Female n (%)	
2015	43 (44.3)	54 (55.7)	p = 0.979
2016	41 (43.6)	53 (56.4)	
2017	49 (43.0)	65 (57.0)	
2018	45 (40.9)	65 (59.1)	
2019	43 (41.7)	60 (58.3)	

Table 2: Distribution of clinical academic staff by population groups over the five-year period

Year	Population groups				Total n (%)
	Black n (%)	Indian n (%)	Coloured n (%)	White n (%)	
2015	60 (61.9)	15 (15.5)	1 (1.0)	21 (21.6)	97 (100)
2016	58 (61.7)	15 (16.0)	1 (1.1)	20 (21.3)	94 (100)
2017	73 (64.0)	18 (15.8)	1 (0.9)	22 (16.3)	114 (100)
2018	72 (65.5)	19 (17.3)	1 (0.9)	18 (16.4)	110 (100)
2019	66 (64.1)	18 (17.5)	1 (1.0)	16 (15.5)	103 (100)

Table 3: Types of employment of clinical academic staff by academic ranks over the five-year period

Year	Types of employment									Total n (%)
	Full-time					Part-time				
	Dev Lecturer	Lecturer n (%)	Snr Lecturer n (%)	Assoc. Prof n (%)	Prof n (%)	Lecturer n (%)	Snr Lecturer n (%)	Assoc. Prof n (%)	Prof n (%)	
2015	5 (5.2)	47 (48.5)	15 (15.5)	2 (2.1)	4 (4.1)	17 (17.5)	3 (3.1)	0 (0)	4 (4.1)	97 (100)
2016	4 (4.3)	45 (47.9)	12 (12.8)	3 (3.2)	3 (3.2)	17 (18.1)	6 (6.4)	0 (0)	4 (4.3)	94 (100)
2017	4 (3.5)	52 (45.6)	12 (10.5)	2 (1.8)	2 (1.8)	34 (29.8)	4 (3.5)	0 (0)	4 (3.5)	114 (100)
2018	4 (3.6)	52 (47.3)	13 (11.8)	2 (1.8)	2 (1.8)	32 (29.1)	1 (0.9)	0 (0)	4 (3.6)	110 (100)
2019	3 (2.9)	48 (46.7)	12 (11.7)	2 (1.9)	2 (1.9)	32 (31.1)	1 (1.0)	0 (0)	3 (2.9)	103 (100)

Table 4: Categories of oral health personnel and types of employment over the five-year period

Categories of oral health personnel	Types of employment									
	Full-time					Part-time				
	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)
Dental specialists	15 (20.5)	13 (19.4)	12 (16.7)	16 (21.6)	16 (23.9)	7 (29.2)	10 (37.0)	13 (31.0)	9 (25.0)	8 (22.2)
General dental practitioners	35 (47.9)	32 (47.8)	34 (47.2)	36 (48.6)	32 (47.8)	16 (66.7)	16 (59.3)	28 (66.7)	24 (66.7)	25 (69.4)
Registrars	14 (19.2)	13 (19.4)	17 (23.6)	14 (18.9)	11 (16.4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Oral hygienists	3 (4.1)	3 (4.5)	3 (4.2)	3 (4.1)	3 (4.5)	1 (4.2)	1 (3.7)	1 (2.4)	2 (5.6)	2 (5.6)
Dental therapists	2 (2.7)	2 (3.0)	2 (2.8)	2 (2.7)	2 (3.0)	0 (0)	0 (0)	0 (0)	1 (2.8)	1 (2.8)
Dental radiographers	4 (5.5)	4 (6.0)	4 (5.6)	3 (4.1)	3 (4.5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	73 (100)	67 (100)	72 (100)	74 (100)	67 (100)	24 (100)	27 (100)	42 (100)	36 (100)	36 (100)

Table 5: Proportions of non-specialist oral health personnel who held a Master's degree over the five-year period

Categories of non-specialist personnel	Year				
	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)
General dental practitioners	(19/51) 37.3	(15/48) 31.3	(17/62) 27.4	(17/60) 28.3	(17/57) 29.8
Dental therapists	(1/2) 50	(1/2) 50	(1/2) 50	(1/3) 33.3	(1/3) 33.3
Oral hygienists	0	0	0	0	0
Registrars	(3/14) 21.4	(3/13) 23.1	(2/17) 11.8	(2/14) 14.3	(1/11) 9.1

Table 6: Types of employment of clinical academic staff by specialities over the five-year period

Specialities	Types of employment									
	Full-time					Part-time				
	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)
Orthodontics	9 (12.3)	8 (11.9)	9 (12.5)	7 (9.6)	7 (10.4)	2 (8.3)	2 (7.4)	3 (7.1)	3 (8.1)	3 (8.3)
Oral Medicine and Periodontics	7 (9.6)	7 (10.4)	7 (9.7)	8 (11.0)	6 (9.0)	1 (4.2)	1 (3.7)	5 (11.9)	6 (16.2)	5 (13.9)
Prosthodontics	6 (8.2)	5 (7.5)	7 (9.7)	10 (13.7)	10 (14.9)	8 (33.3)	11 (40.7)	10 (23.8)	5 (13.5)	5 (13.9)
Community Dentistry	11 (15.1)	8 (11.9)	10 (13.9)	11 (15.1)	10 (14.9)	2 (8.3)	2 (7.4)	2 (4.8)	3 (8.1)	3 (8.3)
Oral Pathology	6 (8.2)	6 (9.0)	5 (6.9)	4 (5.5)	3 (4.5)	0	0 (0)	0 (0)	0 (0)	0 (0)
Oral & Maxillofacial Surgery	10 (13.7)	9 (13.4)	11 (15.3)	11 (15.1)	11 (16.4)	2 (8.3)	2 (7.4)	11 (26.2)	10 (27.0)	10 (27.8)
General Dental Practice	9 (12.3)	8 (11.9)	8 (11.1)	8 (11.0)	7 (10.4)	2 (8.3)	2 (7.4)	4 (9.5)	3 (8.1)	3 (8.3)
Dental & Maxillofacial Radiology	7 (9.6)	7 (10.4)	6 (8.3)	5 (6.8)	5 (7.5)	2 (8.3)	2 (7.4)	2 (4.8)	2 (5.4)	2 (5.6)
Restorative Dentistry	7 (9.6)	8 (11.9)	8 (11.1)	8 (11.0)	7 (10.4)	5 (20.8)	5 (18.5)	5 (11.9)	5 (13.5)	5 (13.9)
Oral Microbiology	1 (1.4)	1 (1.5)	1 (1.4)	1 (1.4)	1 (1.5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total n (%)	73 (100)	67 (100)	72 (100)	73 (100)	67 (100)	24 (100)	27 (100)	42 (100)	37 (100)	36 (100)

The proportion of general dental practitioners who held a Master's degree ranged between 27.4% and 37.3%. A significant proportion, ranging from 9.1% to 23.1%, of registrars held a Master's degree.

A little more than two-thirds (68%) of the clinical academic staff were employed full-time. Full-time staff in most specialties were in the low to mid-teen percentage. The specialty of Oral Pathology experienced a steady decline in the number of full-time staff from 2016. The specialty of Prosthodontics employed four out of ten part-time staff in 2016. A significant increase (7.4% vs 26.2%) in the proportion of part-time clinical academic staff occurred between 2016 and 2017 in the specialty of Oral & Maxillofacial Surgery. A steady increase has since been maintained.

The FTE of clinical academics at lecturer level increased sharply between 2016 and 2017 and have since gradually declined.

The FTE of clinical academics at senior lecturer level have continued to decline (12.1), representing a FTE change of -23.4% since 2015, when senior lecture FTE was 15.8. The FTE of clinical academics at professorial level have continued to decline (5.3 FTE), representing a FTE change of -32.1% since 2015, when professorial FTE was 7.8.

The FTE of clinical academics have steadily declined from a high of 89.1FTE in 2017 to a low of 81.4FTE in 2019. This represents an 8.6% decrease in staffing since 2017.

FTEs of clinical academics working in the majority of specialties have decreased while staffing levels in Prosthodontics and Oral & Maxillofacial Surgery have increased. Staffing levels in Oral Pathology declined substantially (3 FTE) in 2019, representing a FTE change of -50% since 2015 when the FTE was 6.

DISCUSSION

This study set out to calculate the FTEs of clinical academic staff at the SMU Oral Health Centre for the five-year period 2015 to 2019.

Sociodemographic characteristics

The results of this study show that females and Black general dental practitioners at lecturer level constituted the majority (Tables 1, 2 and 3). This finding is supported by previous research which found a sharp increase in the number of female and Black dentists between 2002 and 2015.²¹

The results of this study indicate that a little less than forty percent (39.2%) of the general dental practitioners were employed part-time (Table 4). This finding was not

Table 7: FTEs of clinical academic staff by academic ranks over the five-year period

Year	Academic ranks					Total n (%)
	Developmental n (%)	Lecturer n (%)	Snr Lecturer. n (%)	Assoc. Prof n (%)	Prof n (%)	
2015	5 (6.0)	54.5 (65.6)	15.8 (19.0)	2 (2.7)	5.8 (7.0)	83.1 (100)
2016	4 (5.1)	52.7 (67.0)	14.2 (18.0)	3 (3.8)	4.8 (6.1)	78.7 (100)
2017	4 (4.5)	65.9 (74.0)	13.5 (15.2)	2 (2.2)	3.8 (4.3)	89.1 (100)
2018	4 (4.6)	64.6 (73.8)	13.1 (15.0)	2 (2.3)	3.8 (4.3)	87.5 (100)
2019	3 (3.7)	61.1 (75.1)	12.1 (14.9)	2 (2.5)	3.3 (4.1)	81.4 (100)

Table 8: FTEs of clinical academic staff by specialities over the five-year period

Specialties	Year				
	2015 n (%)	2016 n (%)	2017 n (%)	2018 n (%)	2019 n (%)
Orthodontics	9.4 (11.3)	8.4 (10.7)	9.8 (11.0)	7.8 (8.9)	7.8 (9.6)
Periodontics	7.1 (8.5)	7.1 (9.0)	7.8 (8.8)	9.1 (10.4)	7.1 (8.7)
Prosthodontics	9.6 (11.6)	10.1 (12.8)	11.9 (13.4)	12.3 (14.1)	12.3 (15.1)
Community Dentistry	12 (14.4)	9 (11.4)	11 (12.3)	12.5 (14.3)	11.5 (14.1)
Oral Pathology	6 (7.2)	6 (7.6)	5 (5.6)	4 (4.6)	3 (3.7)
Oral & Maxillofacial Surgery	10.9 (13.1)	9.9 (12.6)	15.5 (17.4)	15.3 (17.5)	15.3 (18.8)
General Dental Practice	10 (12.0)	9 (11.4)	10 (11.2)	9.5 (10.9)	8.5 (10.4)
Dental & Maxillofacial Radiology	8 (9.6)	8 (10.2)	7 (7.9)	6 (6.9)	6 (7.4)
Restorative Dentistry	9.3 (11.2)	10.3 (13.1)	10.3 (11.6)	10.1 (11.5)	9.1 (11.2)
Oral Microbiology	1 (1.2)	1 (1.3)	1 (1.1)	1 (1.1)	1 (1.2)
Total n (%)	83.1 (100)	78.7 (100)	89.1 (100)	87.5 (100)	81.4 (100)

unexpected for the reason that between 70% and 80% of the dentists are employed in the private sector.²¹ A previous unrepresentative study (41.25% response rate) reported that more than two-thirds (68%) of full-time academic dentists employed at the dental schools in South Africa came from private practice.¹²

It is interesting to note that a large majority (more than two-thirds) of the general dental practitioners did not hold a Master's degree (Table 5). This result contrasts sharply with that from a previous unrepresentative study (41.25% response rate) which found that the majority of full-time academic dentists had completed a Master's degree.¹² It may be explained by the fact that general dental practitioners are not required to possess a Master's degree as a condition of employment. It is however concerning that few general dentists make good use of opportunities to develop themselves.

Staffing levels

The results of this baseline study indicate that SMU Oral Health Centre experienced a net decline of 1.9 FTE between 2015 and 2019 i.e. FTE of clinical academics rose from a base of 83.1 FTE in 2015 to a high of 89.1 FTE in 2017 and then decreased to 81.4 FTE in 2019. This represents an 2.3% decrease in staffing since 2015. Comparable local studies were not found – staffing levels in the country's other dental schools have not previously been described. Considering the difference in the size of the economies between South Africa and the United Kingdom (UK), it is interesting to note that an average

of 33.7 full-time equivalent (FTE) clinical academics were employed at 18 dental schools across the UK in 2017 - the aggregate FTE was 607.3.²⁸ A summary and discussion of the results by academic ranks and specialities follows.

Lecturer

The current study found that the FTE of clinical academics at lecturer level increased sharply between 2016 and 2017 (Table 7). The observed increase could be attributed to the substantial increase in the number of part-time lecturers (Table 3). This curious finding may be related to the 2016 HPCSA accreditation visit - the HPCSA require the schools to have a sufficient number of qualified staff to effectively deliver and evaluate the degree programmes.¹²

The results of this study indicate paradoxically that while the FTE of clinical academics at lecture level declined gradually from 2017, their proportion among clinical academics increased steadily (Tables 3 and 7). This rather contradictory result is due to the decline in the numbers of part-time clinical academics at senior lecturer level and full-time professors between 2017 and 2019 owing to resignations.

Senior lecturer

The results of this study indicate that the proportion of senior lecturers ranged between 12.7% and 19.2%. and that their FTE has continued to decline (12.1), representing a FTE change of -23.4% since 2015 when

senior lecture FTE was 15.8 (Table 7). This finding when considered together with the continued decline in the number of full-time professors implies that the number of research active clinical academics has decreased. This is reflected in the decreased research outputs of affected specialties.

Professoriate

The most interesting finding was that the professoriate comprised an average of 8.2% of clinical academic staff (Table 3). This result reflects the national downward trend.²⁶

Another important finding was that the FTE of clinical academics at professorial level has continued to decline (5.3 FTE), representing a FTE change of -32.1% since 2015 when professorial FTE was 7.8 FTE (Table 7). This rather disappointing finding may be explained by the decrease in the number of full-time professors from four in 2015 to two between 2017 and 2019, representing a 50% decline (Table 3). These findings suggest that experienced senior clinical academic staff were replaced with lower ranking, less educated and less experienced staff members.

The results of this study indicate that females were underrepresented while Blacks and Coloureds were not represented. The findings of the current study do not support the previous research which found a changing demography of academic staff at South African universities.²⁷ In this study, Black and Coloured academics do not represent their national population representation. This is the legacy of the apartheid past.

It is interesting to note that the specialties of Oral Medicine and Periodontics and Oral Pathology were overrepresented in the professoriate. This finding is mirrored in the contribution of these specialties to the research output of the school.

Specialties

The results of this study indicate that while the FTEs of clinical academics working in the majority of specialties have decreased, more so in the specialty of Oral Pathology, staffing levels in Prosthodontics and Oral & Maxillofacial Surgery have increased (Tables 6 and 8). These results are contrary to those reported in a survey of dental schools in the United Kingdom, which found that staffing levels in most specialties increased while the FTE of those working in Oral & Maxillofacial Surgery declined.²⁸ Differences in patients' profile may account for this discrepancy. Another possible explanation for the increased staffing levels in Prosthodontics and Oral & Maxillofacial Surgery at SMU Oral Health Centre is that the prevalence of interpersonal violence in South Africa is high.^{29,30}

Limitations of the study

The age distribution of clinical academic staff could not be described as data was not available.

CONCLUSION

Staffing levels declined between 2015 and 2019.

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