

The changing demographic profile of dentists and dental specialists in South Africa: 2002–2015

Ahmed Bhayat¹ and Usuf Chikte²

¹Department of Community Dentistry, University of Pretoria, Pretoria, South Africa; ²Department of Interdisciplinary Health Sciences, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa.

Introduction: It is essential to have regular audits of the number of oral health personnel so that planning, delivery of services and training can be addressed. There has not been such an audit in South Africa (SA) for more than 10 years. **Aim:** To determine the demographic profile of dentists and dental specialists (DS) between 2002 and 2015. **Methods:** A retrospective record-based study was used and all dentists and DS registered with the Health Professions Council of South Africa (HPCSA) from 2002 till 2015 were included. Demographic data, including gender, age, race, type of practice and geographical residence were recorded. **Results:** There were 6,125 dentists and 481 DS registered with the HPCSA in 2015. The younger dentists tended to be Black and Asian women while older dentists were mostly White males. The majority of DS with maxillo-facial surgeons (30%), orthodontists (30%) and prosthodontists (17%). The number of dentists increased at around 2% per annum and the majority of the dentists and DS resided in the most metropolitan provinces of SA. Over the 13-year period, the number of female dentists almost doubled and the number of Coloured, Black and Asian/Indian dentists and DS increased sharply. **Conclusion:** The population to dentist ratio was fairly low, with the majority of dentists and DS residing in the three metropolitan provinces of SA. There has been a relatively sharp increase in the number of Coloured, Black and female dentists, which could be a result of increased admission of previously disadvantaged students to dental schools.

Key words: Demographics, trends of dentists and specialists

INTRODUCTION

Health-care systems require adequate numbers of human resources in order to provide quality medical and dental services¹. It is essential to determine the trends and the demographic profile of medical and dental personnel as this helps tertiary training institutions, government and policy makers to address possible imbalances. Trends in human resources are also necessary in addressing disease burdens and this should be used as the determining factor in the training of appropriate health personnel to deal with current and possible future diseases and their complications^{1,2}. Planning for the supply and demand for human resources in health care is often neglected as human resource planning is often determined by health-care expenditures, with resources dictating the outcome¹. This is a problem faced by many countries, including South Africa (SA).

The population of SA has increased from 45.8 million in 2002 to 54 million in 2015; an increase of 18% over the 13-year period. SA consists of an area of approximately 1,220,813 km² and has nine provinces, of which Gauteng, the Western Cape and Kwa-Zulu Natal are the most densely populated and urbanised³. SA has four cadres of oral health personnel: oral hygienists (OH); dental therapists (DT); dentists; and dental specialists (DS). In order for these oral health personnel to practice in SA, they have to register with the Health Professions Council of South Africa (HPCSA) according to the Health Professions Act No. 56 of 1974⁴.

Dental services in SA are delivered through the private and public sectors. The majority of dentists and DS reside in the urbanised provinces of SA and are employed in the private sector, which caters to less than 20% of the population^{5–7}. The remaining 80% of the South African population utilise the public

sector, which offers primary oral health care, including restorations, extractions and the relief of pain and sepsis⁶. SA's oral disease burden is similar to that of most other developing countries, with dental caries being the most prevalent oral disease among young children^{8,9}. Although the dental caries prevalence among 12-year-old children in SA has been decreasing, caries among 6-year-old children seems to be increasing and is currently around 40%^{8,9}. Of this, almost 80% is untreated and many of these children require restorations and possibly extractions⁸. There is also a huge burden of periodontal disease, edentulousness, malocclusions and fluorosis⁸. All of these conditions require extensive human resources and this needs to be considered when planning for the future oral health personnel needs and training.

SA has a notorious history of apartheid, which classified citizens according to their race based on the 1950 Population Registration Act (and subsequent amendments)¹⁰. This Act categorised South Africans into 'White', 'Black', 'Indian' or 'Coloured' depending on the colour of their skin and their ancestral past. This classification system prevented 'Non-Whites' from attending tertiary institutes and as a result there were relatively very few 'Black', 'Coloured' and 'Indian' dentists and specialists who graduated in the apartheid era. However, since 1994, following the democracy of SA, active measures have been put into place to try and address these racial issues, such as increasing the number of 'Non-White' students at both undergraduate and postgraduate levels.

This study is the first in SA to determine the demographic profile of dentists and DS registered with the HPCSA. It provides baseline data regarding the race, gender and distribution of the oral health personnel and can be used in the planning and monitoring of needs and trends among oral health human resources.

The aim of the study was to determine the demographic profile of dentists and DS registered with the HPCSA from 2002 to 2015. This included demographics, geographical distribution and the population to personnel ratio.

METHODS

This was a retrospective record-based review of the HPCSA database from 2002 to 2015. This database contains a list of all registered dentists and DS who had paid their annual fees. The relevant data were collected using a data-collection sheet and included the following variables: category of oral health personnel; category of practice; geographical location; specialty; race; and gender. These data were accessed, collected and analysed by a single operator.

The population to practitioner ratios were calculated by dividing the number of oral health personnel

by the estimated population size of 54,002,000 according to Statistics South Africa³. The ratio of the oral health personnel for each province was calculated in a similar manner.

The data were entered onto a spreadsheet (Microsoft Excel 2013, Redmond, WA, USA) and then analysed using the Statistical Package for the Social Sciences (SPSS version 22.0, IBM Corp., Armonk, NY, USA). Anonymity and confidentiality of all personnel were ensured as no names or personal details were recorded or presented.

RESULTS

There were a total of 6,125 dentists and 481 DS registered with the HPCSA in 2015 (*Table 1*). The majority of specialists were oral and maxillofacial surgeons (30%) and orthodontists (30%) followed by prosthodontists (17%) and periodontists (12%).

There has been a steady increase in both the South African population and the number of dentists over the past 13 years; this has ensured that the population to dentist ratio has remained fairly stable. The number of dentists increased from 4,560 to 6,125, an increase of 34% over the study period (*Figure 1*).

In 2015, most of the dentists resided in the most densely populated and urbanised provinces, namely Gauteng (39%), Western Cape (23%), Kwa-Zulu Natal (14%) and the Eastern Cape (5%). The DS also followed a similar pattern, with 54% in Gauteng, 24% in Western Cape and 9% in Kwa Zulu Natal. The vast majority of dentists (91%) were registered in 'independent practice' while 7% were in the 'public service' categories.

The breakdown of dentists according to age, gender and race for 2015 showed that younger dentists were predominantly female and Black while older dentists were mainly White and male (*Figure 2*).

The changing racial trends among dentists is displayed in *Figure 3*. The greatest increase of dentists occurred among the Coloured population; the number grew from 55 in 2002 to 243 in 2015; an increase of

Table 1 Breakdown of clinical practitioners in 2015 with the practitioner to population ratio based on a population of 54,002,000

Clinical practitioners	n (%)	Practitioner to population ratio
General dental practitioners	6,125 (100)	8,817
Dental specialists		
Maxillofacial and oral surgeons	144 (30)	403,000
Orthodontists	142 (30)	394,175
Prosthodontists	83 (17)	692,333
Periodontists	57 (12)	1,038,500
Community dentists	36 (7)	1,636,424
Oral pathologists	19 (4)	2,700,100
Total specialists	481 (100)	118,947

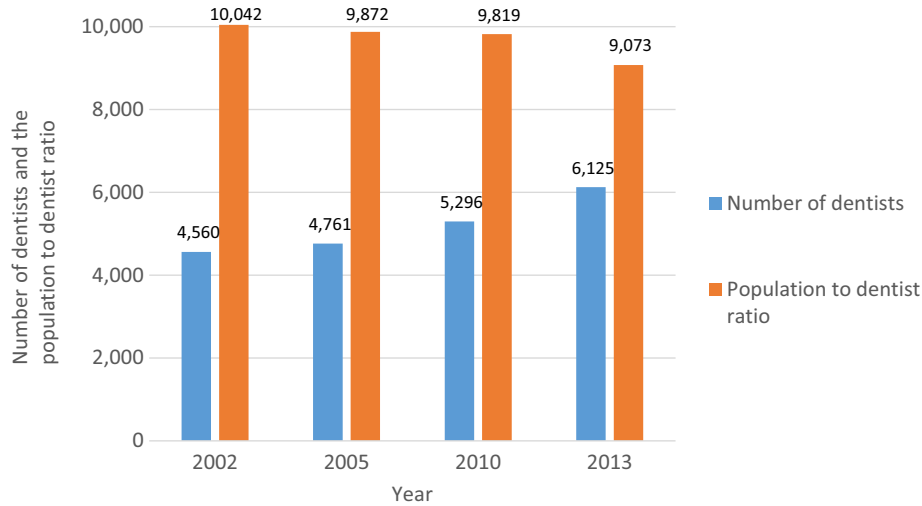


Figure 1. Total number of dentists and the population to dentist ratio: 2002 to 2015.

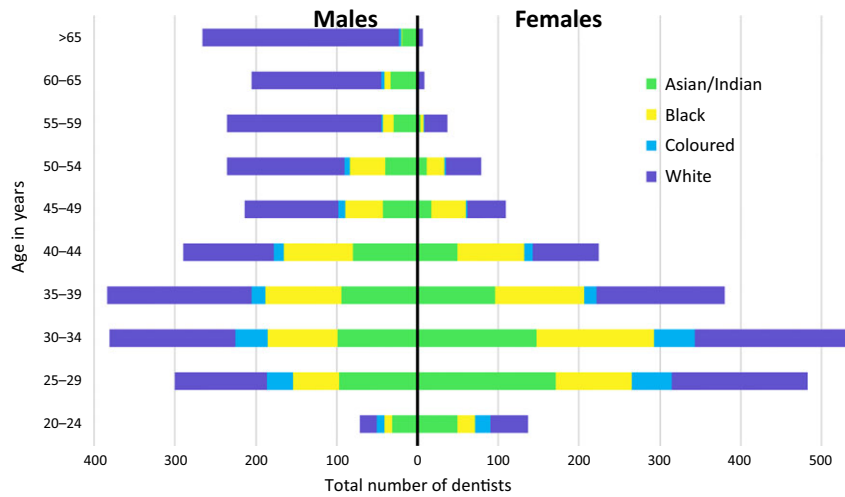


Figure 2. Age, gender and race of dentists in 2015 (n = 6,125).

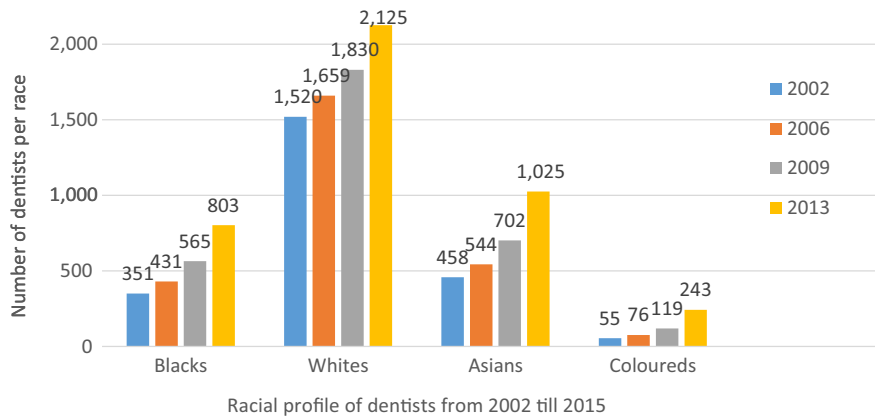


Figure 3. Racial distribution of dentists from 2002 (n = 2,384) to 2015 (n = 4,611).

341%. This was followed by Black people (129%), Asian people (124%) and White people (40%). Not all dentists disclosed their racial profile on the HPCSA database and, as a result, the number of respondents is lower than the total number of registered dentists.

The number of female dentists increased from 25% (1,148) of the total dentist population in 2002 to 37% (2,270) in 2015, which meant that the number of female dentists almost doubled over the study period. This was in contrast to the number of male

dentists who increased from 3,532 to 3,855; an overall increase of only 8%.

The number of DS increased from 380 in 2002 to 481 in 2015, an overall increase of 27%. The largest increase was among the Coloured DS who increased by more than 500%; however, there were only two specialists in 2002 and this increased to 13 in 2015, which was still the lowest number of specialists among the different racial categories. The number of Black DS increased by 400%, Asian/Indian DS by 186% and White DS by 48% (Figure 4). It must be noted that throughout the study period, not all DS disclosed their race and as a result were excluded from the analysis.

DISCUSSION

In 2015, there were 6,125 dentists and 481 DS registered with the HPCSA, and the number of dentists increased by about 2% on an annual basis. The 2015 dentist to population ratio was almost 1:8,900, which is low relative to that of other developed countries in Africa¹¹. According to the World Health Organization (WHO), the dentist to population ratio is approximately 1:150,000 in Africa compared with approximately 1:2,000 in developed countries¹¹. This could be as a result of developing countries having a higher birth rate, which results in an increased population growth compared with the more developed countries¹². In addition, developing countries, especially those with low levels of education, often have few health personnel because of a shortage of tertiary institutions and an increased trend of migration to developed countries¹².

In SA, as in many other developing countries, health professionals often migrate to developed countries for financial security, education options for their children, health services, personal safety and other lifestyle factors¹³. Almost 25% of South African medical health-care workers have migrated over the past 10 years and this has placed a huge burden on the already limited health-care workforce^{13,14}. Many dentists and DS who have migrated from SA may opt to

continue being registered with the HPCSA and, as a result, the actual number of practicing oral health personnel could be much lower than the numbers currently reported. Coupled with this fact, not all registered dentists are directly involved in the delivery of oral health services as some are employed at teaching institutions, in public administrative roles, in fields outside dentistry and may be close to retirement, which could reduce their service delivery output. These factors could result in a reduction of the number of practicing dentists in SA and, as a result, the current dentist to population ratio could be an overestimate of the actual number of dentists practicing in SA. Consequently, the South African dentist to population ratio might actually be more similar to that of the other developing African countries.

In SA, between 70% and 80% of the dentists are employed in the private sector and this caters for approximately 20% of the South African population^{5-7,15,16}. The remaining dentists are employed in the public sector and they provide services to 80% of the South African population. Dentists prefer working in the private sector as there are limited posts available in the public sector, the private sector is financially more lucrative, they have the freedom to be independent and offer a range of dental services and they have the flexibility to work according to their own time schedules¹⁷. Some of the reasons why medical personnel are not retained in the public sector include lack of finances, lack of employment opportunities, poor working environment and non-existent career prospects¹⁴. If the South African government wants to attract and retain dentists and DS in the public sector, they need to create more posts and try to address some of these issues.

The DS to population ratio was considerably lower compared with that of other developing countries. This could be a result of the small number of dental schools and output of DS compared with other developing countries. The number of DS increased by 27%, with an increase of more than 500% among the Coloured population over the time period of the study. It must be noted that although the percentage increase was more than 500%; the number of Coloured DS increased from 2 (2002) to 13 (2015) and this was still the lowest number of DS in any of the racial groups. So, although there was a marked increase in Coloured DS, they still represented the lowest proportion, according to race, in 2015. The increase among Coloured, Black and Asian DS could be attributed to the active recruitment and selection of dentists from previously disadvantaged communities. The majority of DS were maxillofacial and oral surgeons and orthodontists. There is a huge demand for maxillofacial and oral surgeons in SA as there is a high prevalence of trauma caused by violence, motor vehicle accidents and physical abuse¹⁸. The government should recruit and employ maxillofacial

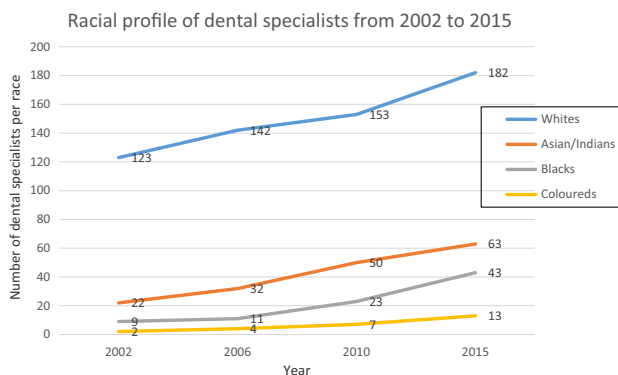


Figure 4. Total number of dental specialists (DS) and their racial trends between 2002 and 2015.

and oral surgeons in the public sector to assist with this high demand for services.

The prevalence of severe and handicapping malocclusion was reported to be approximately 16% among 12-year-old subjects and this could be the reason for the high demand for orthodontic services¹⁹. However, orthodontic treatment is often costly and many people cannot afford these services. Therefore, the government should examine ways in which it could attract and retain orthodontists to work in the public sector. This could provide much-needed orthodontic services to the poor and underserved communities.

One way to retain DS in the public sector could be to introduce a compulsory community service (CCS) programme, similar to that for dentists and other health professionals. This would ensure a continuous stream of DS and increase the number of specialised human resources which, in turn, could reduce the disease burden requiring specialised dental services. However, the government must first allocate appropriate posts and have facilities that have all the necessary equipment and human resources in place before the introduction of this type of programme. This would then ensure that this community service initiative is sustainable, effective and beneficial for underserved and needy communities.

The majority of dentists (92%) were registered in the 'independent practice' category, which indicated that they had full registration and were allowed to practice independently either in the public or the private sector. The remaining dentists were restricted to working either in the public sector or under supervision only. This could be a result of them having a foreign qualification or that they were carrying out their year-long compulsory community service programme.

Most of the dentists and DS resided in the Gauteng, Western Cape and Kwa-Zulu Natal provinces. These are the most densely populated and urbanised provinces in SA and attract most of the professionals as a result of their economic activity, educational facilities and development structures. The Kwa-Zulu Natal province had the highest population to dentist ratio of 12,891, followed by Gauteng and the Western Cape at 5,627 and 4,536, respectively. In addition, all of the dental schools that train dentists and DS are located in Gauteng and the Western Cape and this could be a reason for the dentists preferring to reside in these provinces once they complete their studies.

There has been a sharp increase in the number of Coloured and Black dentists over the past 10 years, which could be attributed to the increased intake of Coloured and Black dental students²⁰. This could be a result of an active recruitment drive to increase the number of Black and Coloured people into the dental profession. However, it must be noted that there were very few Black and Coloured dentists in 2002 and, as a result, the increase in percentage seems high, yet the

actual numbers are still low compared with other race groups. The demographic profile of the oral health personnel should mirror the demographics of the country but because of the previous apartheid era, Black people, Coloured people and Asian people did not have as much access to tertiary institutions as did White people. As a result, the number of oral health personnel was skewed in favour of the White minority. However, since then, there has been an increase in the number of admissions and subsequent graduations from tertiary institutions of previously disadvantaged races. The number of female graduates has also increased and this is an international trend as more women want to pursue a career in the oral health field compared with men²¹.

RECOMMENDATIONS

The HPCSA should ensure that all relevant details of the applicants are captured correctly. The database should also be expanded to include information regarding those who have emigrated, the type of sector in which applicants are currently employed (e.g. private, academic, public, military etc.) and the status of all registered health professionals (e.g. unable to practice as a result of old age or disability or other causes).

This additional information will help with the future planning and provide a more comprehensive profile of oral health personnel in SA.

CONCLUSIONS

Dentists and DS increased at a rate of about 2% per annum and this ensured that the dentist to population ratio remained fairly low compared with that of other developing countries. The majority of dentists and DS resided in the three main metropolitan provinces of SA and there has been a relatively sharp increase in the number of Coloured, Black and female dentists over the last decade, as a result of the increased admission of previously disadvantaged students.

Acknowledgements

The authors would like to thank the following organisations and individuals: HPCSA, Stellenbosch University, Ziyaad Parker, Dawne Johnson and Adele Kruger. No funding was received for this research project.

Conflict of interest

None.

Ethical statement

This research was conducted in full accordance with the World Medical Association Declaration of

Helsinki. It has been approved by the University of Stellenbosch Medical Ethical committee. All data were strictly anonymous as no names were recorded from the database. All data were confidential.

REFERENCES

1. Bloor K, Maynard A, Hall J *et al.* *Planning Human Resources in Health Care: Towards an Economic Approach: An International Comparative Review*. Ottawa: Canadian Health Services Research Foundation; 2003.
2. Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century – the approach of the WHO Global Oral Health Programme. *Community Dent Oral Epidemiol* 2003 31(s1): 3–24.
3. Statistics South Africa. *Census 2011: Census in Brief (PDF)*. Pretoria: Statistics South Africa; 2012. ISBN 9780621413885.
4. The Health Care Professions Council of South Africa. Guidelines for good practice in the health care professions. Booklet 9. Available from: <http://www.hpcs.co.za>. Pretoria, May 2008. Accessed 1 July 2016.
5. Council for Medical Schemes. Annual report of the registrar of medical schemes 2014/15. P29. Pretoria: Council for Medical Schemes; 2015.
6. Bhayat A, Cleaton-Jones P. Dental clinic attendance in Soweto, South Africa, before and after the introduction of free primary dental health services. *Community Dent Oral Epidemiol* 2003 31: 105–110.
7. Kroon J, Prince E, Denicker GA. Trends in treatment performed in the Phelophepa Dental Clinic: 1995–2000. *SADJ* 2001 56: 462–466.
8. Van Wyk PJ, Van Wyk C. Oral health in South Africa. *Int Dent J* 2004 54: 373–377.
9. Department of Health. Report: National Children's Oral Health Survey. South Africa; 2003. p. 1–18.
10. Seekings J. The continuing salience of race: discrimination and diversity in South Africa. *J Contemp Afr Stud* 2008 26: 1–25.
11. World Health Organization. Global Health Observatory data repository. Available from: <http://apps.who.int/gho/data/node.main.A1444>. Accessed 5 July 2016.
12. Haub C, Gribble J, Jacobsen L. *World Population Data Sheet 2011*. Washington: Population Reference Bureau; 2011.
13. Padarath A, Chamberlain C, McCoy D *et al.* *Health Personnel in Southern Africa: Confronting Maldistribution and Brain Drain*. Durban: Health Systems Trust; 2003.
14. Strachan B, Zabow T, Van Der Spuy ZM. More doctors and dentists are needed in South Africa. *S Afr Med J* 2011 101: 523–528.
15. McIntyre D. Private sector involvement in funding and providing health services in South Africa: implications for equity and access to health care. EQUINET discussion paper 84. July 2010.
16. White JG. Interacting forces influencing private dental practice in South Africa: implications for dental education. *SADJ* 2008 63: 80–85.
17. Andersen LB. What determines the behaviour and performance of health professionals? Public service motivation, professional norms and/or economic incentives. *Int Rev Admin Sci* 2009 75: 79–97.
18. Desai J, Lownie JF, Cleaton-Jones P. Prospective audit of mandibular fractures at the Charlotte Maxeke Johannesburg Academic Hospital. *S Afr J Surg* 2010 48: 122–126.
19. Van Wyk PJ, Drummond RJ. Orthodontic status and treatment need of 12-year-old children in South Africa using the Dental Aesthetic Index. *SADJ* 2005 60: 334–336.
20. Lalloo R, McMillan W, Gugushe TS *et al.* Gender and race distribution of dental graduates (1985–2004) and first year dental students (2000–2005) in South Africa. *SADJ* 2005 60: 206–209.
21. Brown LJ, Lazar V. Trends in the dental health work force. *J Am Dent Assoc* 1999 30: 1743–1749.

Correspondence to:
Ahmed Bhayat,
Department of Community Dentistry,
School of Dentistry,
University of Pretoria,
Pretoria,
South Africa
Email: ahmed.bhayat@up.ac.za