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ORAL HEALTH SERVICE SYSTEMS IN GAUTENG PROVINCE, SOUTH AFRICA
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ABSTRACT

Objectives: **To describe the provision of restorative care and dental operators' opinion about their conditions of service in a South African provincial oral health service system.**
Design: **Assessment of oral health service over a four-month period.**
Setting: **Gauteng Province, South Africa.**
Subjects: **Dental operators in public oral health service.**
Interventions: **Operator interview, collection of treatment statistics, calculation of the mean score of restoration-extraction ratio per operator.**
Main outcome measures: **Number and type of restorations and tooth extractions rendered, daily patient load, perceived occupational stress level and opinion about main reasons for operator stress.**
Results: **A total of 88,705 patients had been treated. The mean number of patients treated daily was 26 (SD = 8.4). Operators extracted 39,242 teeth and placed 2,992 restorations. The main type of dental treatment was extraction. The mean score of the restoration-extraction ratio per operator was 0.09 in the primary, and 0.07 in the permanent dentition. The mean level of stress was 4.9 (SD = 1.9). The majority of operators regarded patients' high dental anxiety as the main reason for stress, followed by high patient load. The mean level of stress increased with the increase in number of patients treated per day ($r = 0.44$, $p = 0.004$) and also with the increase in the number of tooth extractions performed per day ($r = 0.41$, $p = 0.008$).**
Conclusions: **Restorative dental care in this public oral health service is limited, tooth extraction being the predominant treatment provided. High patient load and high patient levels of dental anxiety determine this situation, according to the operators. The health authority should introduce appropriate solutions in order to address the prevailing situation adequately.**

INTRODUCTION

The South African Department of Health conducted a national oral health survey in 1988/89. It covered only urban areas in the country's nine provinces. The authors observed, amongst others, the need for restorative treatment in the ratio of two restorations to one extraction (1). Ten years later a report showed that restorative care in the public oral health services was provided in a ratio of one restoration to nine extractions, only (2).

Using the 2001-census data, the dental operator to persons ratio in South Africa was in the order of 1 to 95,727 in 2001 (3). Each dental operator in the public oral health services rendered, on average, 4,400 oral treatment procedures per year

(2). These services were provided in 490 full-time and 322 part-time operating dental surgeries. An additional 131 surgeries were not utilised, owing to the unavailability of dental operators. Gugushe (2) reported that 75% of full-time operating surgeries were situated in urban, and only 25% in rural areas and that 55% of part-time operating surgeries were situated in urban, and 45% in rural areas. Of the unutilised surgeries, 66% were situated in urban areas and 34% in rural areas. These data show the difficulties the oral health authorities face in rendering oral health care to South Africans.

Conceptually, the public oral health services have been described as palliative and demand-driven, and lacking a structured budget and functional or operational concepts (2); for example, the implementation of organised school dental programmes is mainly hindered by lack of funds (2). The provision of public oral care is further compromised by a critical shortage of oral health personnel in urban areas and the mal-distribution of appropriate personnel (4,5). It is no wonder that pain relief, provision of anti-sepsis and tooth extractions constitute the main focus of oral care delivery, with limited attention being given to restorative dental care (2). It is obvious that any attempt to increase the restorative components requires an in-depth understanding of factors that drive the current manner of rendering oral care. This paper describes the provision of restorative care and dental operators' opinions about their conditions of service in a provincial public oral health service system.

MATERIALS AND METHODS

Selection procedure: Ethical clearance for this study was obtained from the Ethics Committee for Research on Human Subjects (medical) of the University of the Witwatersrand, Johannesburg, South Africa, under protocol number M00/07/13. The study was carried out in Gauteng Province, situated in the North-East of the country. The province consists of five administrative regions. In 2001 the public oral health services employed 68 dentists and 22 dental therapists. The selection criteria for participating in the study required given consent of the operator and given permission of the regional health authority. Two of the five regional health authorities did not respond to the invitation to participate in the study. In one region only a restricted number of dental operators (n = 9) were given permission by the health authorities to participate. The number of dental operators in the two fully participating regions was 33, bringing the total number of participating dental operators to 42. None of the eligible dental operators refused to participate.

Evaluation: Information concerning the number of all restored and extracted teeth per dentition were collected, per operator, from the dental clinic records, over a four-month period from April to August 2001. A trained field worker, using a structured and piloted questionnaire, interviewed the operators. Questions included operator estimates regarding the number and type of restorations and tooth extractions rendered daily, daily patient loads, perceived levels of occupational stress and operator opinions about main causes of stress. Stress levels were rated on a scale ranging from 1 = 'no stress' to 10 = 'intense stress', as suggested by Brand and Chalmers (6).

Statistical analysis: Data were entered in a data file. SPSS-12 software was used by an oral biostatistician (MvtH) to analyse the data. Statistical significance was set at $\alpha = 0.05$. Two mean restoration-extraction scores were calculated. The first was based on the actual data collected from the treatment records and the second was based on the numbers of restorations and extractions as estimated by the operators. The Pearson correlation test was applied to correlate both scores.

Spearman's rank correlation test was used to correlate perceived stress levels with daily patient loads.

RESULTS

Background information regarding the participating dental operators and the treatment provided over the four-month period (Table 1). Forty-two percent of the operators were female. During the four-month period, a total of 88,705 patients were treated. The mean number of patients treated daily per operator was 26 (SD = 8.4). Treatment included scaling and polishing, minor surgical procedures, root extractions, application of fissure sealant, topical fluoride applications, tooth extractions and restorations. Operators extracted 39,242 teeth and placed 2,992 restorations in both primary and

permanent teeth. The actual restoration-extraction score was only slightly higher in primary (0.09), than in permanent teeth (0.07) (Table 2). Furthermore, Table 2 shows that dental operators overestimated the number of restorative treatments placed by them ($r = 0.80$, $p = 0.0001$).

Table 1

Background information on dental operators interviewed and the invasive treatment rendered by type of dentition over a four-month period (n = 42)

			Mean	P_{10}	P_{50}	P_{90}
Age (years)			37.7	25	39	50
Patient load (number/day)			26.4	19	25	40
Years since graduation			12.1	1	12	24
Years in current post			6.9	0	4	12
Rendered treatment (4 months period)	Tooth extractions	Primary dentition	167	32	153	339
		Permanent dentition	767	280	767	1426
	Amalgam restorations	Primary dentition	1.7	0	0	3
		Permanent dentition	22.4	0	10	57
	"White" restorations*	Primary dentition	13.0	0	4	32
		Permanent dentition	34.2	2	19	108

* Includes: composite resin, resin-modified and conventional glass-ionomer restorations

Table 2

Actual and estimated number (N) of restorations and extractions rendered by provincial dental operators in primary and permanent dentitions during a four-month period (n = 42)

		Actual			Estimated by operator
		Primary	Permanent	Combined dentitions Mean per operator per day	Combined dentitions Mean per operator per day
Tooth extractions (N)		7,019	32,223	12.0 (SD = 7)	23 (SD = 12)
Restorations (N)		614	2,378	0.8 (SD = 1)	5 (SD = 4)
Restoration/ Extraction Ratio	Mean	0.09	0.07	0.08*	0.30*

* Spearman's rank test: ($r = 0.08$, $p = 0.0001$)

Table 3

Operators' opinions on factors determining their perceived levels of stress whilst working in the public oral health service (n = 41)

Identified main reasons for stress	Dental operators	(%)
High patient anxiety	23	56.1
High patient load	11	26.8
Inadequate dental facilities	3	7.3
Insufficient dental assistance	2	4.9
No response	2	4.9

The mean level of stress reported was 4.9 (SD=1.9). More units of treatment were performed in permanent, than primary dentitions. Tooth extraction was by far the main type of treatment provided, whereas "white" fillings were the predominantly rendered restorative treatment. The majority of operators regarded patients' dental anxiety as the main reason for their own perceived stress levels, followed by patient load, inadequate dental facilities and insufficient dental assistance (Table 3). The mean level of stress increased with the increase in number of patients treated per day ($r = 0.44$, $p = 0.004$) and also with the increase in the number of tooth extractions performed per day ($r = 0.41$, $p = 0.008$). There was a statistically significant correlation between the number of patients treated per day and the number of tooth extractions performed per day ($r = 0.60$, $p = 0.0001$). No gender and regional effect was observed for the dependent variables under study ($p>0.05$).

DISCUSSION

Why the regional health authorities did not respond to the request for participation into the study is unclear. They were contacted by telephone but even this did not evoke a response. The outcomes of the present study are, therefore, not representative of the entire Gauteng Province.

The conditions that hinder implementation of structured restorative oral care in South Africa appear to be comparable to those reported for other developing countries (7-9). A general lack of resources seems to be the main reason for the insufficient number of dental operators in the services and for not adjusting the services into an oral care delivery system that responds adequately to treatment needs and demands as advocated by Songpaisan (10). The current situation at the provincial public oral health service results in a high daily patient load with the main focus on relief of pain. This factor, together with the operators' perceptions of high levels of patients' dental anxiety, contributed to the perceived stress experienced amongst the group of dental personnel interviewed in the present study. This finding is in line with the main sources of operator stress reported in literature (11).

The observed low number of restorations in the public oral health service is alarming. It calls for action from the health administration authorities at the highest level. More emphasis should be placed on oral health education and promotion at local and national levels, using all available means of mass media. Concepts like the Basic Package of Oral Care (BPOC), that emphasises oral hygiene and fluoride deposition through tooth cleaning with affordable fluoridated toothpaste, should be vigorously advocated. Only through proper implementation of caries prevention and oral health promotion activities may the dental operator be enabled to free treatment time for restoration of tooth cavities and, thus, to prolong tooth life and increase the quality of life of the patient.

It is concluded that restorative dental care in public oral health services of Gauteng Province in South Africa is limited and that extraction is the predominant treatment provided. Under these prevailing circumstances, premature tooth loss is high and the goals originally set by the Department of Health can, therefore, not be met (1,12). Dental operators work under a fairly high level of stress that they perceive to be aggravated by a high daily patient load and patients' levels of dental anxiety. Appropriate solutions are needed in order to address the prevailing situation.

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