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ABSTRACT

Background: Patient attendance rates at Soweto dental clinics increased during the year after the implementation of free primary oral health care in 1995.[4]
Objective: This study was performed to examine if the attendance rates continued to increase between April 1995 and March 2002.
Materials and methods: Monthly clinic records were used to record casual (pain and sepsis treatment) and booked patient attendance (restorative, prosthetic and orthodontic treatment) and number of dental operators in the nine primary health care clinics and one hospital clinic in Soweto. Data were analysed with SAS and Prism software.
Results: Total patient attendances in the primary health care clinics significantly increased from 6,161 in 1995 to 10,519 in 2002 ($P<0.05$) due to an increase in casual patients Booked patients decreased and patients treated per operator increased. In the hospital clinic the casual patient attendances decreased but booked patients significantly increased ($P<0.005$).
Conclusions: Patient attendance rates increased between 1995 and 2002 with an increase in dental operator workload.

INTRODUCTION

The introduction of free primary health care for children under six years of age and pregnant women in South Africa was the first major health policy implemented after the 1994 election. Two years later, on 1 April 1996 (the beginning of the state financial year), the free primary health care policy was extended to all ages and to include primary oral health care, a policy that has been supported by others in Africa and elsewhere.[1,2]

The only published study to analyse the effect of the primary health care policy on medical attendance rates is that of Wilkinson *et al.*[3] who examined attendance patterns at a rural hospital in KwaZulu-Natal before and after the introduction of free health care for pregnant women and children aged under six years. They showed a substantial increase in attendances after implementation of the policy. A similar study, but for primary oral health care, was conducted by Bhayat and Cleaton-Jones.[4] They examined attendance at nine 'free' (primary health care) dental clinics and one 'pay' (hospital clinic) in Soweto, and found that attendance rates increased by 46 per cent in the 'free' (primary health care) clinics after the implementation of free primary oral health care.

The aim of this study was to investigate attendance patterns over an eight-year period, between 1995 and 2002, in the same ten dental clinics in Soweto initially studied over two years.[4]

MATERIALS AND METHODS

Ethical approval to undertake this study was obtained from the Committee for Research on Human Subjects (Medical) of the University of the Witwatersrand (clearance M970306).

The clinics studied are situated in the Soweto region. These clinics provide services to the whole of Soweto which is 10 kilometres south-west of central Johannesburg extending over an area of 87 square kilometres, with a population estimated at around 1,5 to 2 million people, 44 per cent of whom are younger than 18 years of age.[5] Estimates of income and living cost in the mid-1990s were: average income R100/month, average rent for a two-roomed house R40/month and average living cost R145/month. The socio-economic spread is from poor to wealthy and there are about 400 000 homeless people.[5,6]

Bhayat and Cleaton-Jones chose ten clinics for their research study. These ten clinics were chosen because they treated the most patients in the Soweto region. At the time Bhayat and Cleaton-Jones sub-divided the ten clinics into nine free clinics and one pay clinic. We have determined that this terminology is no longer appropriate and hence the nione 'free' clinics have been re-named primary health care clinics for this study. The services offered here are at no cost to the patient. The clinics that fall into this category are Chiawelo, Diepkloof, Lilian Ngoyi, Meadowlands, Mofolo, Orlando, Pimville, Tladi and Zola.

The single 'pay' clinic, situated within the boundaries of Chris Hani–Baragwanath Hospital has been re-named the hospital clinic for this study. This clinic is separated from the primary health care clinics because the treatment is limited to hospital patients only (in-patients and out-patients receiving treatment for chronic diseases). The treatment offered at the hospital clinic is identical to that of the primary health care clinics. The patients are required to pay a nominal hospital fee in the department in which they are receiving their chronic treatment and are not required to pay again at the hospital clinic. Furthermore, individuals who are not hospital in- or out-patients are refused treatment at the hospital clinic and are encouraged to attend the primary health care clinics. The hospital clinic thus does not provide a service to the general community. However, in order to justify employing a full-time dentist there, schoolchildren are brought in for screening and treatment. In addition, the clinic also treats a proportion of the staff currently employed at Baragwanath Hospital.

The data source for the study was the monthly clinic records at Soweto, which lists the total patient attendances per day per clinic, the numbers of casual patients (treated for pain and sepsis), the numbers of booked adults and children (who have restorations, dentures, scaling and polishing, endodontics and orthodontic treatments), the numbers of operators (dentists, dental therapists and oral hygienists) per day per clinic, and the numbers of patients treated during overtime period. The following were used in the study (the period was 1 April 1995 to 31 March 2002):

- Total patient attendance = total booked patient + casual patient attendance
- Total booked patient attendance = booked adults + booked children
- Total casual patients
- Patient index = the number of patients per operator
- Booked to casual patient (bc) ratio.

Pre-school and primary school children seen during school screening programmes at some clinics were casual patients for the screening visit. Some returned as booked patients. The numbers of patients treated during overtime have been recorded only from 1998 and, as a result, could not be evaluated as a separate group for the entire study period.

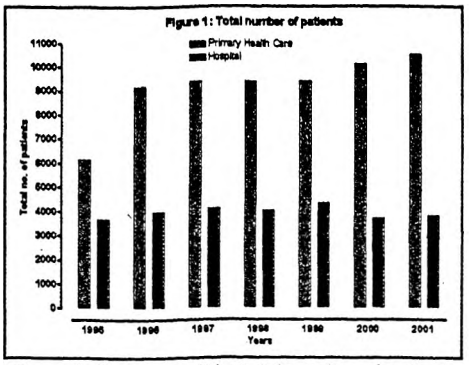


Figure 1: Bar chart of the total number of patients.

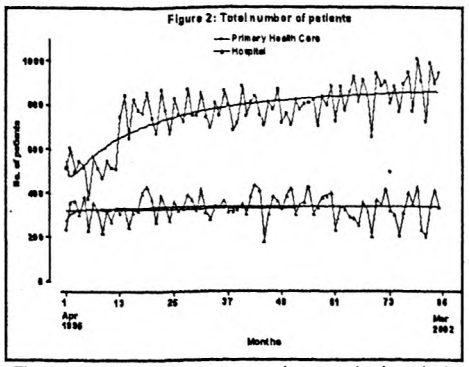


Figure 2: Non-linear regression analysis of the total number of patients.

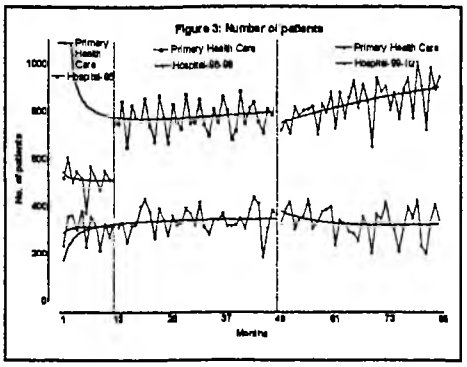


Figure 3: Non-linear regression analysis of the total number of patients; separated into the three periods.

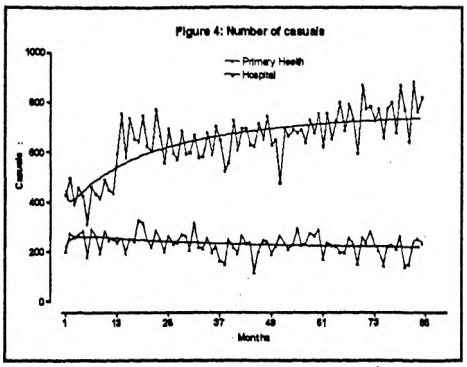


Figure 4: Non-linear regression analysis of the numbers of casual patients.

SAS for Windows (Version 8.02, SAS Institute Inc, Cary NC, USA) was used for a general linear models analysis with total patient attendances, numbers of casual patients, total numbers of booked patients, numbers of overtime patients, patient index and bc ratio as the dependent variables. Clinic, year and month were the independent variables. The data were plotted with Prism (Version 3.02, Graph Pad Software, San Diego, CA, USA). The same software was used to fit non-linear regression lines on the plots, to calculate 95 per cent confidence intervals and to do linear regression analyses. A P ?0.05 was considered to be statistically significant.

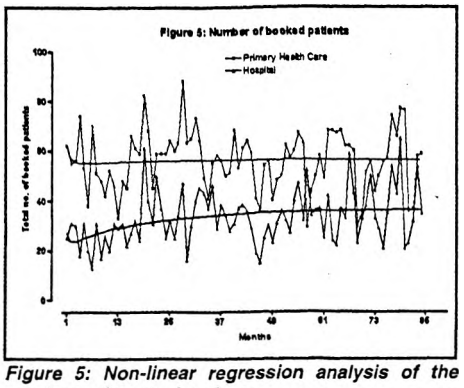


Figure 5: Non-linear regression analysis of the numbers of booked patients.

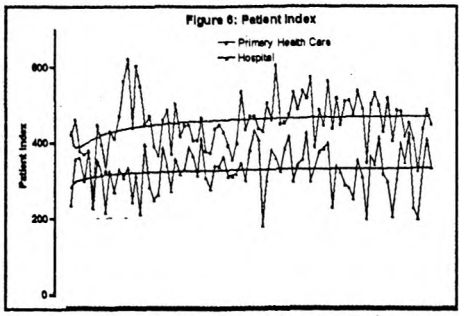


Figure 6: Non-linear regression analysis of the patient index.

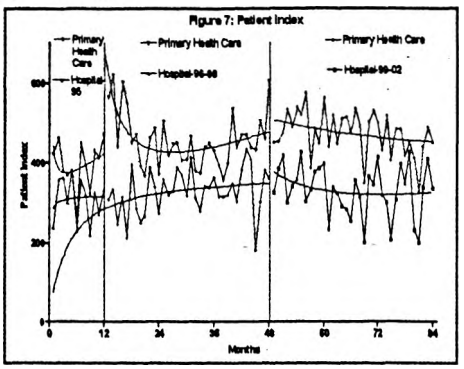


Figure 7: Non-linear regression analysis of the patient index; separated into the three periods.

RESULTS

Total patient attendances in the nine primary health care clinics increased from 6,161 patients in 1995 to 10,519 patients in 2002 (Figure 1), with the greatest increase — from 6,161 to 9,176 — being between 1995 and 1996, the year in which free primary oral health care was introduced. Figure 1 also shows that total patient attendances remained relatively static from 1996 through to 1999. Following 1999, attendances have once again increased. The hospital clinic treats approximately 40 per cent fewer patients per year than the average of the nine primary health care clinics, a rate that remained almost static during the study period.

Figure 2 is a plot of the monthly total patient attendances, from April 1995 to March 2002, for the two types of clinic, which shows a clear cyclic variation in both types. Fitted non-linear regression lines indicate a rising attendance rate trend in the primary health care clinics, which significantly departs from zero (linear regression analysis, P<0.0001). In the hospital clinic, apart from a slight rise at the time of free primary oral health care introduction, the trend remained static.

Closer examination of the total patient attendance data suggested that there might be other trends within the overall trend. By trial and error three periods were identified, namely April 1995 to M arch 1996 — the pre-free primary oral health care period, then April 1996 to March 1999 and April 1999 to March 2002. The data were replotted and are shown in Figure 3. In the primary health care clinics, a static attendance pattern was followed in the next three years by a relatively static trend at a higher absolute attendance rate. From April 1999, however, there has been a continuing increase in patient attendances. At the hospital clinic total attendances were static from April 1995 to March 1999 since when there has been a declining attendance.

The increase in total patient attendances in the primary health care clinics is due mainly to a statistically significant increase (linear regression analysis, P<0.0001) in the numbers of casual patients treated (Figure 4). Booked patient numbers in these clinics have remained relatively static (Figure 5). At the hospital clinic the trend in casual attendances has been downward (Figure 4) accompanied by a significant increase (linear regression analysis, P<0.01) in booked patients (Figure 5). This increase in booked patients is possibly due to a shorter waiting list for restorative treatment, an increased awareness that other treatment options are available and the operators have more time in which to perform restorative treatment. Over the full study period the bc ratio significantly decreased in the primary health care clinics (linear regression analysis, P<0.0001) accompanied by a non-significant increase in bc ratio in the hospital clinic. In addition, the numbers of overtime patients decreased in both the primary

health care clinics and the hospital clinic from 1998 to 2002, the period for which records are available.

The patient index (the number of patients: operator) has shown a similar gradual increase between 1995 and 2002 in both primary health care (linear regression analysis, $P<0.05$) and hospital clinics (Figure 6). When the data were split into the three periods defined above, contrasting trends are clear (Figure 7). These may be called entrenched (before April 1996), attempting to cope with increasing work load (April 1996 to March 1999) and stabilisation to the load (April 1999 to March 2002).

DISCUSSION

Principal findings

The total number of patients treated in the primary health care clinics increased during the study period due to a rise in the numbers of casual patients, accompanied by a decrease in booked patients. An opposite pattern is observed in the hospital clinic.

Meaning of the study

The rapid increase in total patient attendance from 1995 to 1996 is due to the change in government oral health policy to include access to free primary oral health care for all South Africans at government health services. One would expect this as a natural reaction. What health service planners need to know is whether the trend of increasing attendance, with its accompanying demand for personnel and running expenses, will continue. Research elsewhere has shown that total patient attendances have either decreased or reached a plateau over time.[7] This change may be due to long queues and long waiting periods in order to receive treatment. The problem has not been elucidated in South Africa.

The relatively stable patient load in the hospital clinic, which is situated within the tertiary care Chris Hani–Baragwanath Hospital, is probably influenced by the fact that patient numbers in the hospital have not changed and thus the number of patients treated in the hospital clinic cannot change. As explained earlier, patients who do not need to be at Baragwanath Hospital for other chronic treatment are encouraged rather to attend the primary health care clinics. From the findings in this study it is clear that the primary health care clinics are where attention must be concentrated.

Given the increased patient load several questions arise:

- **Firstly**, if the increase in patient load is due to more casual patients requiring relief of pain and sepsis which, in reality means tooth extraction, and this load decreases the numbers of booked patients having restorative treatment, what will the effect on the dentitions of future generations be? There is a potential for less complete dentitions.
- **Secondly**, will preventive services be curtailed to provide curative services?
- **Thirdly**, what is the effect of the increased workload on staff?
- **Fourthly**, is the increased workload observed at the clinics due to an increased throughput because of increased staff numbers? According to the management at the Soweto clinics, this increase has been influenced by the employment of three additional operators to serve the area and not due to the employment of community service dentists. The reason for this is that the community service dentists were placed in permanent positions that were converted to community service posts, whereas the three additional operators were employed in previously 'frozen' posts. In addition to the three recently employed operators, this study also included oral hygienists as operators. We believe that including oral hygienists as operators does not have a significant impact on the increase in total attendances because only three hygienists serve the clinics studied for this article. Furthermore, the three hygienists are employed as 'session' or part-time operators, performing school screening services in the mornings and working in the clinics in the afternoons. It is perhaps the combination of the three that has resulted in the decrease in the patient index seen in the period 1999 to 2002 (Figure 7).

This study has shown that more patients are being treated by a single operator and the stress placed on the operator is greater. Operators are more likely to tire easily and this involves making errors; errors in judgement as well as operational errors in the form of needle-stick injuries. According to Rossouw,[8] the lack of oral health personnel to render care for the relief of pain, sepsis and basic primary care is the biggest constraint in public oral health. Rossouw[8] believes that more personnel can increase patient throughput (capacity) by three hundred per cent before more facilities are required, but it cannot do so because of a lack of personnel. The shortage of personnel and facilities is due to a shortage of funds: oral health services receive a disproportionately small portion of the Department of Health's health care budget.[9] What this means is that fewer dentists have to maintain an increased workload in ill-equipped clinics. The natural trend would be that the treatment available has shifted from one of prevention and promotion to that of relief of pain and sepsis. This is a continual frustration to the staff at these clinics, and also involves loss of expertise and skills.

The implications of this increase in patient attendances is that more resources and operators will need to be provided in order to cope with the increased workload. A possible solution to the problem would be to include the private sector to share the load with the public sector by way of a National Health System, as has been utilised in the United Kingdom, and suggested by the South African government. The system could include a basic dental package and claims can be made from both the public and private sector. The workload is thus shared, and the goal of prevention and promotion might be achieved.

CONCLUSION

This study correlates with many researchers who have shown a continual increasing trend in patient attendance rates after the removal of a user-fee system. Further research to determine whether the attendance rates continue on this increasing trend is certainly warranted. It would also be interesting to research the changes in utilisation of the services provided; whether there is a shift from treatment offering relief of pain and sepsis to offering preventative and restorative treatment at these clinics.

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