

Oral health and hospitalization in Western Australian children

Marc Tennant,* Deepa Namjoshi,* Desiree Silva,† Jim Codde‡

Abstract

Over the past 20 years, the prevalence of dental disease in Western Australian children has diminished. The causes of this significant improvement in health are associated with better care models, water fluoridation and changes in lifestyle. In this study, the authors examine the reasons for hospitalization for oral health conditions in Western Australia for the calendar year 1995 using the Health Department of WA database. A total of 3,754 episodes of care (4,395 bed days) was recorded for dental conditions. Dental caries resulted in the fifth and sixth highest number of episodes of hospitalization in preschool (1-4 years) and primary-school age (5-12 years) children respectively. Abnormal tooth eruption resulted in the highest number of episodes of hospitalization in high-school age (13-17 years) children. From the age-stratified rates of hospitalization (per 1000), non-Aboriginal children were more than twice as likely to enter hospital for dental related conditions. The primary cause of this is the 15 times higher rate of hospitalization for high-school age non-Aboriginal children which clearly reflects the greater use of services for impacted third molars by the metropolitan non-Aboriginal community. Examination of the distribution by health service region revealed the hospitalization rate was significantly less than the state average for the Kimberley, Pilbara, Northern Goldfields and Wanneroo regions. These data reflect the paucity of oral health care available to residents of these regions, particularly the north-west, and does not reflect a diminished burden of disease. Similarly, the rate of hospitalization for Aboriginal children reflects population and service delivery differences particularly in regional and remote WA. These data highlight the need to develop new strategies in oral health care to target 'at risk' groups in the community, particularly new parents of young children. The preventive measures associated with good oral health in children are clearly aligned with those for good general health

and can be integrated into existing health messages.

Key words: Hospitalization, dental disease, caries, prevalence.

(Received for publication January 1999. Revised June 1999. Accepted June 1999.)

Introduction

The hospitalization of children is a significant cost burden to the state and causes significant social concern within the community. In 1995, Western Australia (WA) recorded a total of 68,000 episodes of hospitalization for children under 18 years of age, with basic hospital costs estimated at approximately \$111 million.¹ This costing does not include the loss of productivity often associated with the disruption of managing a family with a hospitalized child.

Over the past 20 years, the prevalence of dental disease in children has diminished.² The causes of this reduction have been attributed to changes in habits, particularly diet and oral hygiene, as well as public health measures such as fluoride supplementation and interventional procedures. In WA, over 85 per cent of school age children (under 15 years old) undergo routine dental care through the government dental health program. This school dental service provides free prevention, screening and treatment for WA schoolchildren. In addition, 85 per cent of the population lives in areas that are subject to water fluoridation, an acknowledged public health measure for the reduction of dental caries.³

With the significant improvements in dental health, it is assumed that dental disease would no longer be responsible for significant hospitalization rates. However, in WA, oral health conditions are still responsible for a large number of hospital episodes and are a significant cost to the state. This study analysed the causes and rates of hospitalization for oral health conditions in WA by Aboriginality and principal place of residence.

Methods

Study population

*School of Oral Health Sciences, The University of Western Australia.

†TVW Telethon Institute of Child Health Research, The University of Western Australia.

‡Health Information Centre, Health Department of Western Australia.

Table 1. Summary of episodes and rates of hospitalization for oral health conditions in WA in 1995

	Non-Aboriginal		Aboriginal		Total	
	Episodes	Rate*	Episodes	Rate*	Episodes	Rate*
Male	1598	7.0	44	3.9	1642	6.9
Female	2069	9.6	43	4.0	2112	9.4
Total	3667	8.3	87	3.9	3754	8.1

*Episodes per 1,000 children.

In 1995, in WA, there were approximately 460,000 children under the age of 18 years – 25 per cent of the total population. Seventy per cent of these children lived in metropolitan Perth, while 22,000 (5 per cent) were of Aboriginal descent.

Recording procedure and statistical analysis

Principal diagnosis, classified using the International Classification of Disease (ICD) system, was obtained from every patient aged 0-17 years discharged from every private and public hospital in WA for the calendar year 1995. All principal diagnoses of oral health conditions (ICD codes 5200-5299) were analysed in this study. For analysis, the data were grouped into four age cohorts: 0-1 year (infants), 2-4 years (preschool), 5-12 years (primary school) and 13-17 years (high school). Primary place of residency at the time of hospitalization and Aboriginality were also analysed. Residency was grouped into rural and metropolitan as well as one of the 32 health service regions as defined by the Health Department of WA.

Age-specific rates were calculated by dividing the number of cases in a particular age group by the population of that age group. Direct age standardization used the Australian 1991 estimated resident population as the standard to control for differences in the age structure of various populations. This allowed comparisons between groups of different size and age compositions.

All statistical analysis was undertaken using the SPSS version 6.1.3 package (SPSS Inc, Chicago, US).

Results

In 1995, a total of 3,754 hospital episodes (4,395 bed days) were attributed to oral health conditions among WA children. Of these, 0.6 per cent of episodes were attributed to infants, 22.3 per cent to preschool children, 25.7 per cent to primary school children and 51.5 per cent to high school children.

Gender and Aboriginality

Of the 3754 hospital episodes, approximately 44 per cent were males and 98 per cent were of non-Aboriginal descent (Table 1). Most interestingly,

Table 2. Distribution of episodes and rate of hospitalization for Aboriginal and non-Aboriginal children by age group

Age groups (years)	Non-Aboriginal		Aboriginal		IRR†
	Episodes	Rate*	Episodes	Rate*	
0-1	17	0.8	5	2.7	0.3
1-4	795	8.3	44	7.4	1.1
5-12	930	4.6	33	3.5	1.3
13-17	1928	15.8	5	1.0	15.8
Total	3670	8.3	87	4.0	2.1

*Episodes per 1,000 children.

†Rate of non-Aboriginal child hospitalization for oral health conditions compared with Aboriginal children.

there were almost 30 per cent more episodes of hospitalizations for female children than males in the non-Aboriginal population. This compared with the male:female ratio of the 0-19 year old population being reported at 0.95 per cent and may relate to variances in ideal health outcomes (in particular cosmetics) between males and females.

Age and Aboriginality

Overall, compared with an Aboriginal child, a non-Aboriginal child was twice as likely to be hospitalized for an oral condition (Table 2). However, compared with a non-Aboriginal infant, an Aboriginal infant was three times more likely to be hospitalized for an oral condition. There was a distinct contrast in the rate of hospitalization for an oral condition among Aboriginal and non-Aboriginal high school children. Non-Aboriginal high school children were nearly 16 times more likely to be hospitalized for an oral cavity condition compared with Aboriginal children of the same age group.

Residency

There was little difference in the rates of hospitalization for oral conditions when comparing metropolitan and rural hospitalizations in any of the age groups analysed (Table 3). Analysis of the 32 health service regions revealed the Kimberley,

Table 3. Age-stratified episodes and rates of hospitalization by place of residence

Age groups (years)	Rural		Metropolitan		IRR†
	Episodes	Rate*	Episodes	Rate*	
0-1	7	1.0	15	0.9	1.1
1-4	310	9.7	527	7.6	1.3
5-12	290	4.4	673	4.7	0.9
13-17	496	14.6	1436	15.4	0.9
Total	1103	8.0	2651	8.2	1.0

*Episodes per 1,000 children.

†Rate of non-Aboriginal child hospitalization for oral health conditions compared with Aboriginal children.

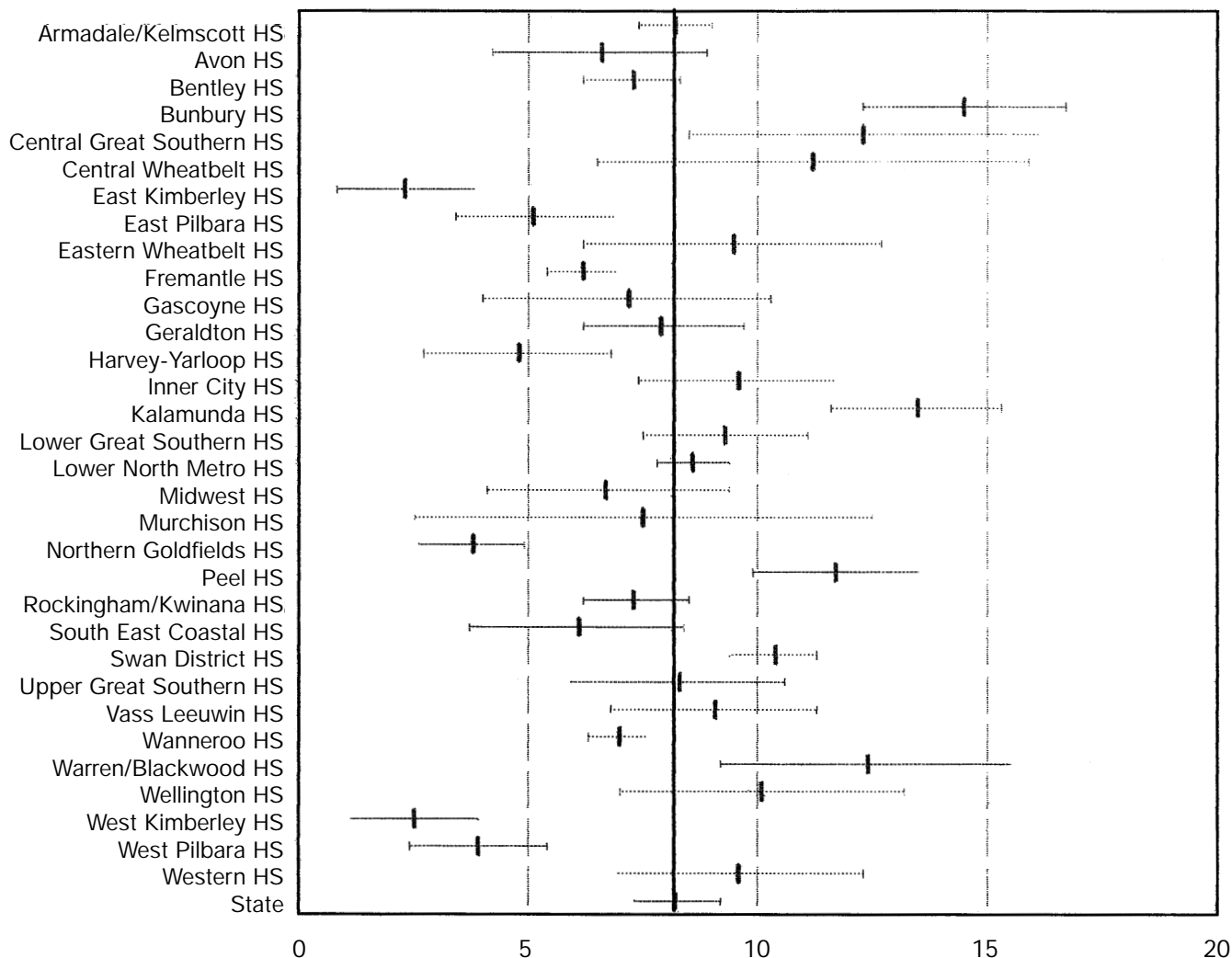


Fig. 1. - Distribution of rates of hospitalization (mean + standard deviation) per health region. Bold vertical line represents the state average.

Pilbara, Harvey-Yarloop, Northern Goldfields and Wanneroo had significantly less episodes of hospitalization for oral health conditions than the State average (Fig. 1).

Principal causes of hospitalization

Dental caries

Dental caries was the primary health condition that required hospitalization in both preschool and primary school children in WA (Fig. 2). Preschool non-Aboriginal children were 1.8 times more likely to be admitted with dental caries compared with preschool Aboriginal children. A rural preschool child was 1.3 times more likely to be admitted with dental caries than a metropolitan preschool child. However, there was no significant difference in the rates of hospitalization of primary school age children by place of residence or Aboriginality.

Abnormal tooth eruption

In high school age children, the principal cause of hospitalization was abnormal tooth eruption (Fig. 3). In 1995, 1,767 hospital admissions for abnormal

tooth eruption in WA high school children were reported. A non-Aboriginal child was 36 times more likely to be admitted with an abnormal tooth eruption than an Aboriginal child. There was little difference between rural and metropolitan hospital admissions.

Discussion

The data presented in this manuscript highlight the variations in service access between different age cohorts and population groups.

Although there was a considerable difference in the rate of hospitalization of Aboriginal and non-Aboriginal infants, the low number of episodes makes it difficult to draw conclusions. However, considering a significant proportion of the Aboriginal population lives in rural and remote locations, the difference may reflect access to services.

The majority of preschool and primary school children hospitalized for dental caries would be children who have difficulties accessing the existing dental health system, for example those who live in

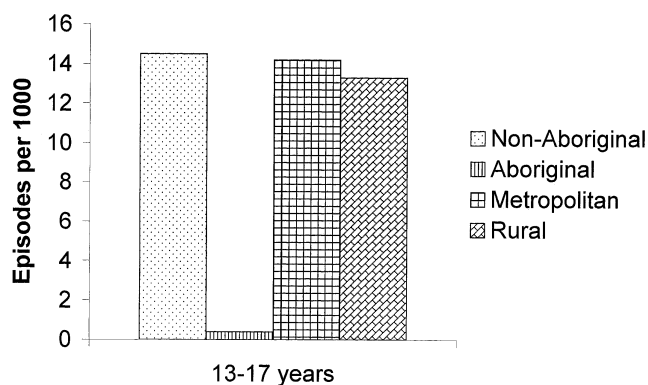


Fig. 2. - Rates of hospitalization (episodes per 1,000) for dental caries.

remote communities in the northwest of WA. This is highlighted by the significantly lower rates of hospitalization for children in the Kimberley and Pilbara regions of WA compared with metropolitan children. In addition, these groups would include children who have not had the oral health advantages of fluoride.

Two other subgroups of young children would also contribute to the results seen for dental caries in preschool and primary school age children. Firstly, the number of children whose exposure to cariogenic substances has been exaggerated as a result of various parental behaviours (for example, nursing bottle caries) would be significant. Second, recently arrived migrant children are often from regions where good nutrition and oral health strategies are lacking.⁴

Impacted third molars were the primary cause of abnormal tooth eruption resulting in hospitalization. Obviously, the massive difference in Aboriginal and non-Aboriginal service utilization for this condition relates to service access and probably not to societal differences in the prevalence of this condition. In addition, although not included in this data set, it is hypothesized that differences in the rates of private health insurance between different community groups would also influence service utilization.

Patient and parent education is one of the key factors in addressing the issues raised. As caries can begin as early as six months of age, with the eruption of the first tooth, effective preventive programs should be instituted early, ideally before tooth eruption begins. As such, there is an important role to be played by paediatricians, general practitioners and child health nurses in preventive oral health care

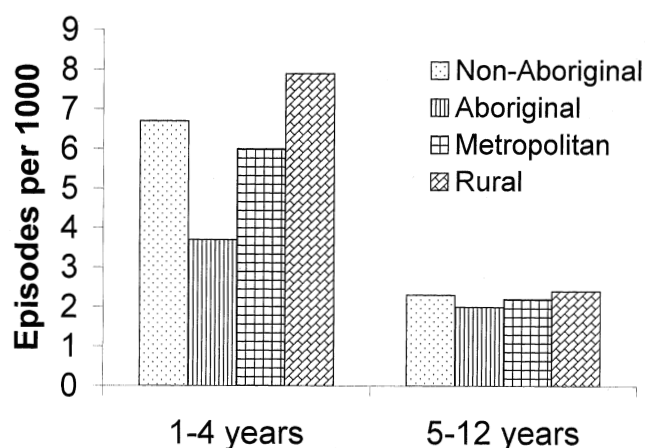


Fig. 3. - Rates of hospitalization (episodes per 1,000) for abnormal tooth eruption.

in infants and preschool children.⁴ These data also highlight the need for public health dental care to be tailored to address the needs of at-risk communities, particularly those who have difficulties in access either through finance or distance from available services.

Acknowledgements

The authors are most grateful to Ms Louise Gill at the Health Information Centre, the Health Department of Western Australia, Dr Carol Bower at the TVW Telethon Institute of Child Health Research and Ms Amy Lau at the School of Oral Health Sciences. In addition, the authors are grateful to the Australian Dental Research Foundation for their financial support.

References

1. Silva DT, Palandri GA, Bower C, *et al.* Child health in Western Australia - an overview. Epidemiology and analytic services. Perth: Health Department of WA and TVW Telethon Institute of Child Health, 1999.
2. Blinkholm AS, Davies RM. Caries prevention. A continued need worldwide. *Int Dent J* 1996;46:119-125
3. Murray JJ, Naylor MN. Fluorides and dental caries. In: Murray JJ, ed. Prevention of oral disease. 3rd edn. Oxford: Oxford University Press, 1995.
4. Kilpatrick N. Oral health for the preschool child. *Med J Aust* 1999;170:6-7.

Address for correspondence/reprints:

Dr Marc Tennant,
School of Oral Health Sciences,
The University of Western Australia,
Nedlands, Western Australia 6907.