Hospitalisation for the surgical removal of impacted teeth: Has Australia followed international trends?

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RESEARCH

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Abstract

Background
The aim of the study was to undertake a six-year analysis from 1999/00 to 2004/05, of the demographic characteristics of hospitalisations for the surgical removal of impacted teeth in Western Australia under general anaesthesia.

Method
Data for the current analysis was obtained from the Western Australian Hospital Morbidity Data System (HMDS). Gender, age, indigenous status, place of residence, type of hospital admitted, insurance status, and Diagnostic Related Group (DRG) cost estimates for the procedure were analysed.

Results
A total of 37.6% of all oral health-related hospitalisations in Western Australia over the six years were for the removal of impacted teeth. Admitted patients were predominantly females (58.8%) and very few Indigenous people were hospitalised (0.2%). The average age of patients was 21.4 years (sd=9.9). Metropolitan patients were hospitalised 1.5 times more than rural patients for this condition. The majority of patients were hospitalised at a private metropolitan hospital and were insured. The total cost of hospitalisation for this condition contributes to 27% of all the oral health condition-related hospitalisation costs.

Conclusion
This study suggests that the hospital-based removal of impacted teeth in Western Australia is associated with factors such as indigenous status, age, gender and private hospital access along with insurance status raising interesting questions over the equity of provision of this service.

Key Words
Impacted teeth, third molars, indigenous, Australia

What this study adds:
1. This is the first study that has investigated surgical extractions of impacted teeth in Australia.
2. Various factors, including socioeconomic status, accessibility to private hospitals and insurance status, seem to influence patients undergoing surgical extraction of impacted teeth in Western Australia.

Background
Over the past decade there has been a significant evidence-based policy shift in addressing the extraction of impacted teeth (in particular third molar teeth) in a number of countries, particularly led by the United Kingdom. This application of evidence through the National Institute for Health and Clinical Excellence (NICE) programme has seen a significant decrease in the extraction of third molars.[1] In Australia, healthcare policy often looks towards international best practice outcomes for its development.

Of all Australian states, Western Australia in particular faces significant challenges in delivering healthcare services to its inhabitants due to its vast expanse and sparsely distributed population. In addition to this, the increasing demands (ageing population) being placed on the hospital system make it important that all disciplines examine their impact.

Oral health conditions are responsible for a large number of hospital admissions in Western Australia and represent a significant cost to the community. A recent study which analysed hospitalisations for oral conditions in Western

Australia confirmed that most of these hospitalisations were for the removal of impacted teeth.[2]

Tooth impaction is a well-known dental anomaly and occurs at the population level with a frequency of approximately 20%.[3] The vast majority of impacted teeth are the mandibular and maxillary third molars.[4-8] Such impacted teeth become a source of pain for many people and affect their quality of life; which may be an indicator for their removal. Removal of impacted teeth is performed under general anaesthesia and is a day-stay procedure that has an an impact on limited theatre resources.

The aim of the study was to analyse the demographic trends in hospitalisation for the removal of impacted/embedded teeth in Western Australia over a six-year period that coincided with the period of international policy shift.

Method

Data for analysis was obtained from the Western Australian HMDS for six financial years, from 1999/2000 to 2004/2005. The principal diagnosis, classified by the International Classification of Disease (ICD-10AM) system,[9] was obtained for every patient diagnosed with the condition 'Impacted/Embedded teeth' and discharged from any private and public hospital in Western Australia during the study period.

All principal diagnoses of oral health conditions (ICD-10 codes: K01.0 and K01.1 for impacted/embedded teeth) were analysed in this study. Gender, age, indigenous status, place of residency, type of hospital admitted to, insurance status, and DRG cost estimates for the procedure were analysed. All country hospitals were classified as public/non-private hospitals for data analysis. The DRG cost estimates were reported in Australian dollars. It is noted that an extremely small number of cases would be completed under local anaesthesia in dental practices and therefore would not be collected in the data sample. However, as these are a very minor number they do not impact on the overall results.[10]

Population data was derived from 2001 census data collected by the Australian Bureau of Statistics. This census sample was chosen as it is nearest to the time frame of the dataset. Age-specific and age-standardised rates were calculated using the Health Statistics Calculator, a software package developed by the Western Australian Department of Health. Rates were used to compare subgroups within the Western Australian population. All statistical analysis was undertaken using the SPSS (version 15) package. Significant differences between rates were based on non-overlapping 95% confidence intervals (p≤0.05).

Results

There were a total of 47,411 patients hospitalised in Western Australia for the oral condition 'Impacted/embedded teeth' during the six-year period 1999/2000 to 2004/2005. This accounted for 37.6% of all hospitalisations for oral health conditions in Western Australia, followed by 15% for dental caries and the rest include pulp and peri-apical diseases, sinusitis, dento-facial anomalies, jaw fractures and others. More females (58.8%) were hospitalised compared to males (41.2%) and very few Indigenous people were hospitalised (0.2%) as shown in Table 1. The average age of the hospitalised patients was 21.4 years (SD=9.9). The numbers of patients undergoing this procedure increased over the study period from 328 per 100,000 in 1999/00 to about 445 per 100,000 in 2004/05 (Table 1).

		N (%)	ASRs †	CI (95%)
Gender	Male	19,514 (41.2%)	323.6	319.0–328.1
	Female	27,897 (58.8%)	478.9	473.3–484.6
Indigenous Status	Indigenous	84 (0.2%)	16.9	13.3–20.5
	Non-Indigenous	47,327 (99.8%)	415.8	412.1–419.6
Patient residence	Rural dweller	7,538 (15.9%)	287.9	281.4–294.4
	Metro dweller	39,754 (83.8%)	428.9	424.6–433.1
Financial Year of Separation	1999/00	6,347 (13.4%)	328.2	320.0–336.2
	2000/01	6,568 (13.9%)	336.9	328.7–345.0
	2001/02	8,121 (17.1%)	414.5	405.5–423.5
	2002/03	8,627 (18.2%)	433.4	424.2–442.5
	2003/04	8,731 (18.4%)	435.2	426.1–444.3
	2004/05	9,017 (19.0%)	444.8	435. –454.0

†Age standardised rates per 100.000

Table 1: Basic demographics of patients hospitalised for the removal of impacted teeth in Western Australia from 1999/00 to 2004/05

Age group distribution

The majority of patients were aged between 15–24 years, this population accounted for almost 60.8% of the total admissions, with the least number of patients being

hospitalised after the age of 50 years (2.8%) as shown in Figure 1. Female patients aged 15–19 years had the highest rate of hospitalisation with almost 2,495 per 100,000 females (Table 2). Females aged 20–24 years were almost 1.8 times more likely to be hospitalised than males of the same age.

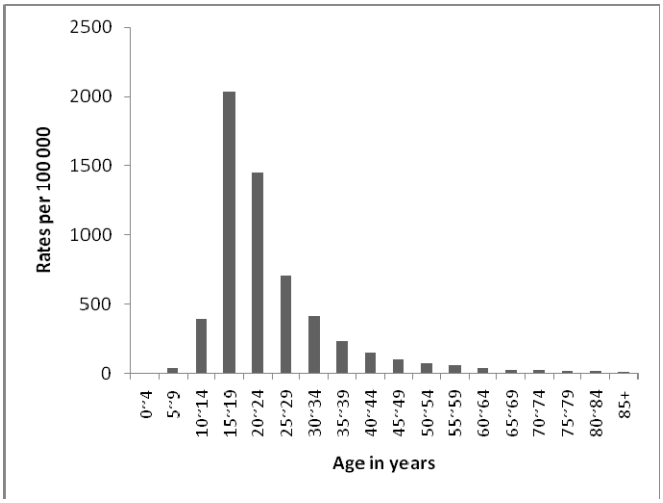

Figure 1: Comparison of age standardised rates across different age-groups for patients hospitalised for removal of impacted teeth in Western Australia from 1999/00 to 2004/05

Age group	Males		Females		Total	
	Episodes	Rates†	Episodes	Rates†	Episodes	Rates†
0~4	12	3.1	10	2.7	22	2.9
5~9	154	37.2	146	37.3	300	37.2
10~14	1296	301.2	1987	486	3283	391.2
15~19	6896	1598.2	10222	2494.8	17118	2034.9
20~24	4325	1045.6	7377	1871	11702	1448.4
25~29	2418	579.2	3410	838	5828	707
30~34	1696	387.2	1930	445.1	3626	416
35~39	986	222.4	1041	234.3	2027	228.4
40~44	659	147.2	647	143.7	1306	145.4
45~49	436	104.1	417	99.2	853	101.6
50~54	260	66.6	285	75.4	545	70.9
55~59	155	49.5	187	63.5	342	56.3
60~64	91	38	88	37.9	179	38
65~69	50	26.4	54	28	104	27.2
70~74	37	23.4	36	21.1	73	22.2
75~79	26	22.2	28	19.4	54	20.7
80~84	12	18.3	18	17.8	30	18
85+	5	11.6	14	14.6	19	13.7

†Rates per 100,000

Table 2: Age group population rates of patients hospitalised for the removal of impacted teeth in Western Australia from 1999/00 to 2004/05 according to gender

Geographical distribution

Metropolitan patients were hospitalised almost 1.5 times more often than rural patients. The majority of the rural patients were hospitalised in a rural hospital (60.9%) with 37.5% travelling to a metropolitan hospital for hospitalisation and there is a small percentage which is unclassified. Metropolitan patients were mainly hospitalised in private hospitals (95.9%).

Hospital type and insurance status

Most of the patients were hospitalised at a metropolitan private hospital (86.6%) while just 13.4% of hospitalisations were at a public hospital (Table 3). Around 74.9% of all patients were insured, out of which almost 92.1% were treated in a private metropolitan hospital. A negligible percentage of Indigenous people were insured when compared to the 75% insured status among non-Indigenous people.

Costs

The estimated DRG costs for the removal of impacted/embedded teeth for the six years investigated were in excess of $65 million, contributing to almost 27% of the total costs for oral health-related conditions during that period. The average estimated cost per patient was $A1 388 (SD=231.9). The cost ranged from $A1 301 to $A12 141 with almost 96% of patients having an estimated cost of $A1 301. The average cost per year increased over the six-year period from $A1 323 in 1999/00 to $A1 488 in 2004/05.

		Private Hospital†	Public hospital‡
Patient demographics (N) %	All	41,072 (86.6%)	6,339 (13.4%)
	Male	17,016 (87.2%)	2,498 (12.8%)
	Female	24,056 (86.2%)	3,841 (13.8%)
	Indigenous	54 (64.2%)	30 (35.8%)
	Non-Indigenous	41,018 (86.7%)	6,309 (13.3%)
	Rural dweller	2,828 (37.5%)	4,710 (62.5%)
	Metro dweller	38,126 (95.9%)	1,628 (4.1%)
Length of stay		1.0 day	1.01 day
Same day separation (N)		35,888	5,990
Estimated costs (Mean)		$1,389.25	$1,426.9

Insurance status (N)		32,710	2,808
%	Insured	(92.09%)	(7.1%)
		8,362	3,531
	Uninsured	(70.3%)	(29.7%)

†includes only private metropolitan hospitals
‡ includes all public and country hospitals

Table 3: Demographics of patients hospitalised for the removal of impacted teeth in Western Australia from 1999/00 to 2004/05 based on hospital type

Indigenous status

Only 84 Indigenous people under the age of 35 years were hospitalised over the six years, while non-Indigenous people were hospitalised through all age groups. There were only three Indigenous people 35 years and older hospitalised for the removal of impacted teeth compared to 5,529 non-Indigenous people. The overall hospitalisation rate of the Indigenous and non-Indigenous people was 16.9 and 415.8 per 100,000 people respectively (Table 1).

Length of stay

The average length of stay in hospital was 1.0 day (SD=0.3). There was no major difference in the length of stay for gender or indigenous status or hospital type. A total of 99.8% of patients were admitted and discharged on the same day.

Discussion

This study shows that most of the hospitalisations for the removal of impacted teeth occurred at private hospitals, more females were hospitalised than males, patients were mostly between the ages of 15 and 24 years and very few Indigenous people were hospitalised. The DRG costs attributed to this procedure were in excess of $65 million over the six-year period.

The results of the study indicate that the removal of impacted teeth in hospital is largely associated with factors such as indigenous status, age and private hospital access along with insurance status. The extraction of third molars is predominantly undertaken in the private sector. Oral healthcare in the private sector is not managed through policy directives. Practitioners are independent to practice as they see the needs of their patients. The changing rates of procedures over time is often a factor of changing trends in clinician beliefs as well as changing health insurance levels in the community; no specific reason for change is evident. The highly privatised healthcare provision in oral health makes a contrast to the more managed approach in general health through the influences of Medicare and state and federal policy.

Non-Indigenous people are far more likely to be hospitalised for removal of impacted teeth among all age groups. A study of hospitalisations for oral health-related conditions among Western Australian children indicated that a non-Indigenous high school child is 32 times more likely than an Indigenous child to be admitted for an oral health related-condition[11] similar to the results of this study. If geographical access to health services was considered as the reason for this unequal distribution, it is disputed by the fact that Indigenous people in metropolitan areas are also less likely to undergo this procedure than their non-Indigenous counterparts. The Indigenous population in Western Australia constitute just 3.2% of the total population of the state and predominantly live in rural and remote areas and in areas of higher socioeconomic disadvantage.[12] They are also less likely to have private health cover, which plays an important role in the private-driven dental healthcare delivery in Australia, and hence fail to have adequate dental treatment. However, it is important to understand that facial growth, jaw size and tooth size differ among different races and population groups and exhibit definite inheritance patterns.[13] These factors could influence the eruption patterns and impaction status of third molars. A difference in the prevalence of impacted third molars between Indigenous and non-Indigenous Australians has not yet been documented and is an area for future research.

The majority of patients falling in the age group between 15 and 24 reinforces the previously known fact that the removal of impacted teeth is almost exclusive to young adults and usually performed in response to the first symptoms of pericoronitis during the normal process of tooth eruption or for the sake of orthodontic treatment usually commenced at that age. Previous studies have shown, however, that 50% of the third molars classified as impactions are normally-developing teeth most of which will erupt with minimal discomfort if not extracted prematurely.[14] The hospitalisation rates were higher among the metropolitan population than in the rural population. Western Australia is facing a dental workforce shortage in rural and remote areas, especially in terms of dental specialists, which includes oral surgeons.[15] Previous studies have confirmed that even among those eligible for subsidised oral surgery there is an uneven distribution of waiting lists, favouring the metropolitan dwellers,[16] and that access to general dental practitioners, as well as subsequent referral to specialists, is higher in metropolitan areas.[17] This could explain the higher rates of hospitalisations among metropolitan dwellers.

In 2000, UK NICE[2] and in 1999 the Scottish Intercollegiate Guidelines network (SIGN)[18] established guidelines for the removal of third molars which serve as a foundation for clinical practice today. These provide a summary of existing evidence on prophylactic removal of impacted wisdom teeth, in terms of the incidence of surgical complications associated with it, and the morbidity associated with retention. It concluded that there was no reliable research evidence to support the prophylactic removal of pathology-free impacted third molars in young patients. However, the American Association of Oral and Maxillofacial Surgeons did conduct a longitudinal study which indicated that third molar surgery in patients 25 years of age or older is associated with minimal morbidity, a low incidence of post-operative complications and minimal impact on the quality of life.[19] In 2005, the Cochrane Review Group carried out a review on the topic of removal of asymptomatic third molars.[20] They also reached a very similar conclusion that although there were clear indications for third molar removal in the presence of pathology, removal when there is no pathology present, is not indicated. They recommended that the watchful monitoring of asymptomatic third molar teeth may be a more prudent strategy. Despite the guidelines, reviews and risks associated with the extraction of third molars, clinicians still continue to use historical guidance that includes non-pathological teeth for extraction. Some healthcare institution audits have shown that the percentage of patients that have had their third molars removed for non-pathological reasons ranged from 18 to 60%.[20-23]

Under these circumstances, the opportunity exists for Australia to examine these international policy changes in association with the data presented in this research to look towards refining guidelines and policies in keeping with current international evidence bases.

Conclusion

The results of the study indicate that admission to hospital for the removal of impacted teeth in Western Australia is associated with factors such as indigenous status, age, gender and private hospital access along with insurance status. This raises interesting equity questions of the Australian healthcare system and the need towards keeping with current international evidence bases.

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ETHICS APPROVAL

The authors confirm that this work was conducted with adequate safeguards and the appropriate approvals.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

PEER REVIEW

Not commissioned. Externally peer reviewed.