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Impact of COVID-19 on the provision of paediatric dental care: analysis of the Australian Child Dental Benefits Schedule

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Data availability statement:

The data that support the findings of this study are available from Medicare Australia at http://medicarestatistics.humanservices.gov.au/statistics/mbs_group.jsp

Abstract

Objectives:

Oral health is essential to maintaining good overall health and access to dental care is necessary for the early detection, prevention, and control of oral diseases. The COVID-19 pandemic has seen a significant disruption in the provision of dental services globally. The aim of this study was to investigate the impact of COVID-19 on dental services provided in Australia through the Child Dental Benefits Schedule.

Methods:

This study was a retrospective analysis of Medicare data on utilisation of the Child Dental Benefits Schedule obtained from the Australian Government. Data was analysed for the period February to September 2020, with the number of services provided per month across five categories (diagnostic, preventive, restorative, endodontic and oral surgery) compared with the monthly average for 2019 (95% CI) and the same month for 2019. Total services by month were reported for 2017, 2018 and 2019 to compare the yearly trend with 2020. Differences in services provision by State/Territory were also described.

Results:

Over the period of March to September, there were 881,454 fewer dental services provided in 2020 than 2019, with the largest decline seen in April. There was a greater decline in preventive and diagnostic services, and a smaller decline in endodontic and oral surgery services. A second wave of COVID-19 in Victoria saw 198,609 fewer dental services provided in that state from July to September 2020 than 2019. Dental service provision had still not returned to normal levels across Australia by September 2020.

Conclusion:

The COVID-19 pandemic has had a significant impact on the provision of dental services to children from lower socioeconomic backgrounds who already experience higher levels of dental disease and disadvantage in accessing dental care. Although the restriction of dental services was deemed necessary in order to minimise the risk of transmission of COVID-19 in the dental setting, the impact of these restrictions on oral health will be long lasting. Given

the chronic and progressive nature of dental disease, the deferral of necessary dental care is likely to contribute to poorer oral health and long-term problems for many Australians.

Introduction

The COVID-19 pandemic is having an unprecedented impact on society, the economy, and the dental care sector. The first Australian case of COVID-19 was identified in on 25 January 2020 in a returned traveller from Wuhan, China.[1] Since then 27,807 cases have been confirmed up to 21 November 2020, with 73 per cent of cases occurring in Victoria and 16 per cent in New South Wales, the two most populous states in Australia (Figure 1). The federal and state governments introduced a range of measures, commencing 23 March 2020, to reduce virus spread and prevent community transmissions.

Against this backdrop, the dental profession experienced critical shortages of facemasks as international supply decreased and other health services increased their utilisation of masks. In March the Australian Dental Association (ADA) developed policies and guidelines for the management of risk of COVID-19 in dental practices.[2] This included advice on screening patients and appropriate infection control and personnel protective equipment (PPE). The ADA took the initiative of developing a treatment and triage framework to provide the profession staged guidance in the event of possible escalation of COVID-19 within the community. On 23 March, the ADA recommended that dental practices implement ADA Level 2 dental restrictions to minimise the risk of transmission in the dental setting, and on 25 March the Australian Health Protection Principal Committee (AHPPC), comprising the chief health officers from all states and territories, recommended that all dental practices implement ADA level 3 restrictions. The ADA Level 3 restrictions state that all routine examinations and treatments should be deferred and dental treatments that generate aerosols should only be undertaken in very limited and defined cases. During the last two weeks of March Australia was experiencing around 300-400 cases per day and a range of community restrictions were imposed, including a ban on overseas travel, social distancing requirements including a maximum of one person per four square metres indoors and restaurants and cafes closed except for take-away service. By the end of April Australia was only experiencing between 10 and 20 cases per day and this continued until the middle of June, when case numbers began to increase up to 81 daily cases by the end of June.

Following advocacy from the ADA, the AHPPC recommended moving back to ADA Level 2 dental restrictions effective 26 April 2020 in light of the decreasing number of COVID-19 cases across Australia. Level 2 dental restrictions still had a focus on deferring aerosol generating procedures or using rubber dam to mitigate aerosol generation. On 11 May 2020 the AHPPC recommended moving to ADA Level 1 dental restrictions, allowing for the complete range of treatment using standard precautions for people who do not meet the epidemiological or clinical risk factors for COVID-19. Through May and June the number of COVID-19 cases remained relatively low, but began to increase in Victoria from the middle of June, with up to 700 new cases per day by the end of July.[1] The Australian Dental Association Victorian Branch recommended that their members in metropolitan Melbourne and surrounding areas with high numbers of COVID-19 cases practice at Level 2 dental restrictions from 15 July 2020. On 6 Aug 2020 the Victorian government, as part of their Stage 4 restrictions, mandated that dentists in metropolitan Melbourne only provide urgent dental treatment. These restrictions remained in place until 28 Sept 2020, when dentists were able to resume non-urgent care. During this period of increased restrictions in Victoria, dental practitioners across the rest of Australia remained at ADA Level 1 dental restrictions.

Dental caries is one of the most prevalent health conditions affecting Australian children, with nearly one in three children experiencing caries in the deciduous dentition by the age of 5-6 years, and nearly 40 per cent in the permanent dentition by the age of 12-14 year.[3] Dental conditions are the leading cause of preventable hospitalisation for Australian children, with more than 26,000 children hospitalised each year.[4] There are significant disparities in oral health for disadvantaged children in Australia.[3] Twenty per cent of children aged 5-10 years had over 80 per cent of the total population burden of dental caries experience in the primary dentition and 17 per cent of children aged 11-14 years had almost 80 per cent of the overall dental caries experience in the permanent dentition. Although 81 per cent of Australian children are reported to have visited the dentist in the past 12 months, 21 per cent have an irregular visiting pattern. Dental visiting behaviour is strongly linked measures of inequity including parental education, income and indigenous status. Recognising that there are significant social disparities in oral health, the Australian government provides a safety net for dental care through the Child Dental Benefits Schedule (CDBS).

The CDBS is funded by the Australian Government provides up to $1000 of dental care over 2 years for children aged 2-17 years from low income families.[5] Private dentists can opt to participate in the scheme, and they are paid on a fee-for-service basis according to a schedule of fees. They may charge a co-payment, but more than 95 per cent of services are provided without any additional patient contribution. Some services, such as orthodontic dental work, cosmetic dental work or dental services provided in a hospital, are not covered by the scheme. Approximately 3 million Australian children are eligible to access dental services in either the public or private sector through the CDBS, and it has been previously reported that only around 20 per cent of those eligible children access the scheme.[6] Nonetheless, it is an important scheme to provide necessary dental care to vulnerable children.

Restrictions on dental services and measures to limit community movement have combined to reduce access to necessary dental care during the COVID-19 pandemic. Delaying or deferring routine diagnostic and preventive care may contribute to an increased burden of disease across the population, and this will likely be more apparent for vulnerable population groups. The aim of this study was to investigate the impact of COVID-19 on dental services provided through the Child Dental Benefits Schedule (CDBS).

Methods

This study was a retrospective analysis of Medicare data on utilisation of the Child Dental Benefits Schedule (CDBS). Data was obtained from Medicare Australia website for the period Jan 2017 to September 2020.[7] The data is publicly available, and so no ethics approval was required. The project was conducted through the eviDent Foundation which facilitates dental practice-based research.

CDBS data is grouped into eight categories - diagnostic services, preventive services, periodontic services, oral surgery, endodontic services, restorative services, prosthodontics services and general services. Individual item code data was also available. There is a

variable pattern of services provided across the year, with a greater number of services provided in April, July and October, broadly corresponding to school holiday periods. Therefore the average number of services provided per month and 95% confidence intervals was calculated for each category of service using 2019 data to take into account these monthly variations. The number of services provided each month from February to June 2020 was compared with the 2019 monthly average, and to the same month in 2019 to determine the percentage change in services provided. If the number of services was outside the 95% confidence interval for the 2019 monthly average, then that difference was considered statistically significant ($p<0.05$). As periodontic (0.06%), prosthodontic (0.02%) and general services (0.72%) were relatively minor contributors to overall services, they were not analysed as separate categories, but their data is included in total services. Total services by month were reported for 2017, 2018 and 2019 to compare the yearly trend with 2020. Data was analysed using Microsoft Excel.

Results

In 2019, there was a total of 5,450,996 dental services provided across Australia through the CDBS at an average of 454,250 dental services per month (95% CI 427,052-481,447). There was a significant decrease in total dental services provided from March – May 2020, with only 352,382 services provided in March 2020, 59,290 in April 2020 and 235,792 in May (Table 1). March 2020 saw a 22.4% decrease in the number of total dental services provided compared with the monthly average for 2019, April 2020 saw an 86.9% decrease, May 2020 saw a 48.1% decrease and June 2020 saw a 14.6% decrease, with the pattern of total services provided for March – May 2020 different to that for the past three years (Figure 2). The pattern of services provided from June – September 2020 matched the pattern from the past three years, with a 13.4% increase in services provided in July, a 16.1% decrease in August and a 9.0% decrease in September.

Over the period of March to May, there were 713,159 fewer dental services provided in 2020 than 2019, a 52.4% decrease over the same period in 2019. From June to September there were 168,295 fewer dental services provided in 2020 than 2019, a 9.0% decrease over the same period in 2019.

Diagnostic and preventive services, which comprised 38.3% and 47.5% of all dental services provided in 2019, showed a similar pattern as overall services from March to September 2020. There were 261,311 fewer diagnostic services (50.0% decrease) and 363,147 fewer preventive services (56.8% decrease) provided from March to May 2020 than the same period in 2019. From June to September there was only 45,452 fewer diagnostic services (6.4% decrease) and 105,995 fewer preventive services (11.9% decrease) than the same period in 2019.

Restorative services (11.7% of total services) saw a similar pattern of decline from March to May 2020 as overall services, with 72,005 fewer restorative services (48.8% decrease) provided from March to May 2020 than 2019, with 18,979 fewer restorative services (9.7% decrease) provided from June to September 2020 than 2019.

Endodontic services (0.4%) and oral surgery services (2.8%) comprised only a small proportion of overall services and experienced less of a decline than other types of services. Over the period of March to May, there were 1,869 fewer endodontic services (31.5% decrease) and 12,610 fewer oral surgery services (32.3% decrease) provided in 2020 than 2019, with only 142 few endodontic services (1.9% decrease) and 1,959 more oral surgery services (3.9% increase) from June to September 2020 than 2019.

Most states experienced a similar reduction in dental services through the first wave of the pandemic in Australia, with South Australia and the ACT having the greatest reduction in services in April, whilst the Northern Territory and Western Australia experienced the least reduction (Table 2). Victoria experienced a different pattern in dental services provided from July to September as a result of a second wave of COVID-19 over that period and related restrictions on dental services that were not in place in the other states (Figure 3).

The pattern of decline in dental service provision broadly coincided with the restrictions imposed on Australian dentists, with more severe restrictions in March gradually being eased through April and May across all of Australia, and then restrictions increasing in Victoria only from July through to September.

Discussion

This paper reports on the impacts of COVID-19 on the provision of dental care in terms of the amount of dental treatment provided at a national level, and as such has important policy and practice implications. Restrictions on the provision of routine dental care during the COVID-19 pandemic resulted in a significant reduction in dental services provided to vulnerable children. There were 881,454 fewer dental services (27.3%) provided between March and September across Australia. Most states experienced a similar reduction in dental services through the first wave of the pandemic in Australia, with restrictions on dental practice implemented at the national level limiting dental treatment provided from March through to May. With the lifting of restrictions in May, there was a gradual resumption of dental care from June, with most states reporting similar levels of activity to previous years through to September 2020. The main exception to this was Victoria, where a second wave of COVID-19 commenced in late June and peaked in early August. ADA Level 2 dental restrictions were recommended by the Australian Dental Association Victorian Branch from 15 July, and on 6 August the Victorian government mandated emergency dental care only. These restrictions remained in place until 28 September. Therefore, dental service provision in Victoria had a similar period of disruption from July to September as the first wave from March to May.

The CBDS only represents a proportion of the total dental care delivered in both the public and private dental sectors, so some caution should be exercised when interpreting the outcomes. It is also not possible to determine how this reduction in service provision will impact on oral health for patients. Nonetheless, given the nature of restrictions that were imposed on dental practice, it is likely that this pattern is reflected more broadly in the care delivered to all patients. Schwendicke et al (2020) modelled the impact of COVID-19 on dental practices in Germany and showed that mitigation strategies would result in reduced utilisation of all services, with the most severe impacts seen for prevention (-80 per cent).[10] Ren et al (2020) reported a reduction in patient visits of approximately 85 per cent in April to the urgent dental care clinic at the University of Rochester Eastman Institute for Oral Health.[11] This is consistent with the reduction in services seen in the present study. It is

likely that this study reflects the broader impact of COVID-19 on the provision of dental care to the whole Australian community. Guo et al (2020) reported 38 per cent fewer emergency patients at a hospital providing emergency dental care in Beijing, China over a 10 day period in February 2020.[12] They expected an increase in patients seeking emergency dental care since routine dental care was not available, but concluded that the reduction in patient visits was related to government recommendations to limit movement and patient fears of the epidemic. It is also important to consider how the economic impacts of the pandemic may impact on the provision of dental care. An analysis by Choi et al (2020) suggests that an increase in unemployment will result in a substantial decrease in dental insurance coverage and increased pressure on state based Medicaid programs.(13) The impact of COVID-19 on dental care globally will be dependent on the nature and duration of restrictions that countries have adopted during the pandemic and the response of patients to concerns about the pandemic.

Research has focussed on how dental care delivery has changed as a response to COVID-19, with many countries adopting various restrictions or precautions to minimise the risk of transmission in the dental setting.[8, 9] This includes the adoption of transmission based precautions with enhanced infection control protocols (N95 respirator masks, environmental cleaning and room resting) and limiting aerosol-generating procedures as examples. It is also likely that some patients may actively avoid dental visits through concerns about transmission of the virus in the dental practice setting, independent of restrictions that may be imposed on dental practice. The net effect of these practice changes and patient attitudes has been to reduce the amount of dental care provided. This paper is interested in the impact that this is likely to have on the oral health of patients. In Australia, the imposition of restrictions on dental treatment from March 2020 had the effect of reducing access to necessary dental care, and this study has shown that there was a reduction of more than 52 per cent in the number of dental services provided between March and May 2020 for children utilising the Child Dental Benefits Schedule. A second wave of COVID-19 cases in Victorian from June to September 2020 resulted in 49 per cent decrease in services provided in that state as the rest of the country gradually returned to their usual pattern of dental service provision.

There were more than 75,000 fewer restorative services provided from March to June 2020 than the same period in 2019. Given the progressive nature of dental caries, particularly in the deciduous dentition, it is possible that the deferral of treatment in some of these cases would lead to a poorer outcome, for example endodontic treatment or extraction, depending on the severity of disease the extent to which treatment is deferred. Although there was also a large decline in endodontic and oral surgery services over March to June 2020, it was less than that observed for diagnostic, preventive and restorative services. This is consistent with a focus on only treating urgent and emergency cases. It may, however, also reflect that different treatment decisions were made to reduce aerosol generating procedures that would lead to a worse oral health outcome for patients, favouring extraction over restoration. The significant reduction in preventive services is also concerning given the importance of establishing good preventive behaviours early in children. Although diagnostic, preventive and restorative services were around 10 per cent lower from June to September in 2020 than 2019, there was 1,959 more extraction services, an increase of 3.9 per cent over the same period in 2019. This increase may reflect the expected catch-up of extractions that were deferred during March - May or indicate the possibility of deterioration of dental problems leading to more extractions during this period.

Even during the pandemic, dental conditions that would normally be described as 'routine' may need escalating, for example mild to moderate orofacial pain where a dentist may advise analgesia as an interim measure until an appointment can be made to provide a more definitive solution.[14] With restrictions placed on dental services for extended periods of time and uncertainty for their duration, there is increased likelihood of progressive and prolonged suffering, greater increasing severity of symptoms and poorer outcomes for patients.

Delayed dental treatment can also have significant impacts beyond deterioration of oral health. Waiting for or delaying care can lead to a degree of pain and suffering, lost productivity and missed time at school or work (for parents and carers) and a reduction in quality of life. There are also potential economic costs associated with deferred dental treatment, either through lost productivity as a consequence of disease or an increased cost

burden of a more significant treatment intervention if the oral health condition deteriorates. In the case of the CDBS this cost burden is predominantly borne by the state, but more broadly the impact of delayed dental care will impose a financial burden on the individual.

Quinonez and Vujicic (2020) argue that the COVID-19 pandemic has potentially redefined what constitutes necessary dental care, in so much as regulatory intervention in many countries has restricted dental care to emergency and urgent care only.[15] As a consequence, much of dentistry was deferred because it was determined to be non-urgent. Indeed, the World Health Organisation has recently recommended that routine non-essential oral health care – which usually includes oral health check-ups, dental cleanings and preventive care – be delayed until there has been sufficient reduction in COVID-19 transmission rates from community transmission to cluster cases or according to official recommendations at national, sub-national or local level.[16] This has important policy implications for the dental profession, and it is important to understand the health impacts of delaying dental care that is deemed to be non-urgent. This study has shown the scale of dental treatment that has been deferred as a result of COVID-19 related dental restrictions in Australia. If funding models for dental care narrow their focus only to the treatment areas that were deemed to be urgent, then this is likely to further increase oral health inequities.

There is a need for further research to investigate the reduction in dental care across all population groups, and the longer term impact of delayed care on oral health and well-being.

Conclusion

The COVID-19 pandemic has had a significant impact on the provision of dental services in Australia, and it is likely that this has also occurred across the world. The restriction of dental services was deemed necessary in order to minimise the risk of transmission of SARS-Cov-2 in the dental setting to either patients or dental staff in the context of an unknown risk. The impact of these restrictions on oral health will be long lasting.

Dental care for children from lower socioeconomic backgrounds who already experience higher levels of dental disease and disadvantage in accessing dental was significantly disrupted. In three months from March to May 2020 there was a 52 per cent decrease in the number of dental services provided to vulnerable Australian children, and this pattern was replicated from July to September during the second wave in Victoria. Given the chronic and progressive nature of dental disease, delayed dental care as a result of the COVID-19 pandemic is likely to have a significant impact on oral health.

Author Contributions

M Hopcraft and G Farmer contributed to conception and data analysis, drafted and critically revised the manuscript. Both authors gave final approval and agree to be accountable for all aspects of the work. The authors received no financial support and declare no potential conflicts of interest with respect to the authorship and/or publication of this article.

Conflict of Interest Statement

M Hopcraft is the Chief Executive Officer of the Australian Dental Association Victorian Branch.

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Table 1. CDBS dental services provided per month by category for Australia (February -June 2020).

	Diagnostic	Preventive	Restorative	Endodontic	Oral Surgery	Total Services
2019 Monthly Average	173,783	215,576	48,414	1,888	12,689	454,250
95% CI	(163,826 - 183,739)	(200,886 - 230,265)	(46,123 - 50,705)	(1,813 - 1,963)	(12,182 - 13,196)	(427,052 - 481,447)
Feb-20	164,190	192,584*	46,685	1,884	12,017*	419,338*
Mar-20	134,776*	161,377*	41,162*	1,714*	11,580*	352,382*
Apr-20	28,423*	15,282*	8,940*	900*	5,009*	59,290*
May-20	98,295*	99,348*	25,573*	1,444*	9,785*	235,792*
Jun-20	154,584*	178,485*	38,524*	1,825	12,674	387,899*
Jul-20	198,801*	245,584*	51,775*	2,062*	14,804*	515,120*
Aug-20	150,657*	172,354*	41,999*	1,775*	12,453	381,244*
Sept-20	163,035*	189,517*	44,329*	1,827	12,811	413,552*
Change from 2019 monthly average						
Feb	-5.5%	-10.7%	-3.6%	-0.2%	-5.3%	-7.7%
Mar	-22.4%	-25.1%	-15.0%	-9.2%	-8.7%	-22.4%
Apr	-83.6%	-92.9%	-81.5%	-52.3%	-60.5%	-86.9%
May	-43.4%	-53.9%	-47.2%	-23.5%	-22.9%	-48.1%
Jun	-11.0%	-17.2%	-20.4%	-3.3%	-0.1%	-14.6%
Jul	14.4%	13.9%	6.9%	9.2%	16.7%	13.4%
Aug	-13.3%	-20.0%	-13.3%	-6.0%	-1.9%	-16.1%
Sept	-6.2%	-12.1%	-8.4%	-3.2%	1.0%	-9.0%
Change from same month 2019						
Feb	4.5%	5.0%	1.8%	-5.6%	-2.7%	4.1%
Mar	-19.7%	-20.4%	-14.9%	-15.2%	-11.3%	-19.2%
Apr	-84.2%	-93.2%	-81.6%	-51.9%	-60.6%	-87.4%
May	-43.8%	-53.2%	-49.7%	-29.0%	-26.0%	-48.2%
Jun	0.5%	-6.8%	-10.3%	-0.6%	12.0%	-3.8%
Jul	-9.1%	-12.6%	-10.6%	1.6%	0.9%	-10.6%
Aug	-12.1%	-18.6%	-13.8%	-12.1%	-3.0%	-15.0%
Sept	-3.3%	-8.7%	-3.7%	4.6%	7.1%	-5.5%

* p<0.05

Table 2. Change in total services by State/Territory

	NSW	VIC	QLD	SA	WA	TAS	ACT	NT	Total
					Comparison to 2019 monthly average				
Feb-20	-9.3%	-13.9%	-1.8%	-5.7%	-1.6%	-8.1%	-8.3%	47.1%	-7.7%
Mar-20	-25.1%	-26.8%	-21.2%	-18.3%	-8.6%	-12.0%	-23.9%	43.0%	-22.4%
Apr-20	-86.0%	-88.4%	-88.2%	-92.0%	-74.4%	-86.5%	-90.2%	-52.7%	-86.9%
May-20	-47.0%	-48.9%	-49.7%	-47.4%	-42.0%	-69.5%	-17.0%	-17.2%	-48.1%
Jun-20	-14.8%	-19.1%	-9.8%	-9.0%	-18.7%	-35.0%	50.9%	-30.3%	-14.6%
Jul-20	31.7%	-6.7%	15.6%	-4.7%	23.8%	-0.6%	138.8%	-43.7%	13.4%
Aug-20	3.1%	-66.2%	-5.3%	15.8%	10.2%	1.6%	28.8%	-54.7%	-16.1%
Sept-20	7.9%	-59.7%	13.7%	8.8%	-0.3%	0.5%	88.7%	-9.7%	-9.0%
					Comparison to same month 2019				
Feb-20	1.9%	5.5%	5.5%	1.8%	3.3%	2.6%	-2.0%	95.9%	4.1%
Mar-20	-23.3%	-18.9%	-19.9%	-23.3%	2.3%	-2.7%	-11.1%	24.4%	-19.2%
Apr-20	-86.4%	-89.3%	-88.4%	-91.7%	-74.4%	-84.9%	-91.0%	-69.0%	-87.4%
May-20	-45.9%	-48.2%	-47.6%	-55.7%	-40.0%	-74.0%	-11.2%	-39.0%	-48.2%
Jun-20	-3.5%	-5.5%	0.6%	-4.6%	-6.2%	-31.7%	58.3%	-36.5%	-3.8%
Jul-20	2.2%	-28.6%	-5.6%	-22.1%	-0.8%	-22.4%	70.1%	-37.7%	-10.6%
Aug-20	5.9%	-65.7%	-2.5%	8.6%	10.3%	-7.2%	22.3%	-33.2%	-15.0%
Sept-20	16.3%	-60.1%	13.0%	12.6%	26.9%	-0.5%	113.4%	94.9%	-5.5%

Figure 1. New daily confirmed COVID-19 cases in Victoria and Australia with dental restrictions, 2020

Figure 2. Total CDBS services provided by month from 2017-2020

Figure 3. Total CDBS services provided by month by State from 2017-2020