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ORIGINAL ARTICLE

Socio-Demographic Factors Influencing Noncompletion of Dental Treatment Among Children in Public Oral Health Care Service

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ABSTRACT

Background: Oral health outcomes are closely linked to the completion of necessary dental treatment.

Hypothesis or Aim: This study seeks to determine the socio-demographic characteristics of children and adolescents and the clinical factors contributing to the noncompletion of necessary dental treatments within a 12-month period at Monash Health Dental Services in Melbourne, Victoria.

Design: Data were collected from seven public health dental sites, capturing all patients younger than 18 years who visited Monash Health Dental Services within a 12-month period.

Results: Of the 7160 children who attended the dental clinics, 24.2% did not complete dental treatment. The majority (79.4%) were between 5 and 17 years of age, with each additional year of age increasing the probability of having an incomplete course of care (CoC). Participants receiving 'Preventive' CoCs were less likely to have incomplete treatments, while Aboriginal and Torres Strait Islander peoples, those who spoke languages other than English or Dari and patients needing interpreters were more likely to have incomplete treatments. Attendees of the different dental clinics had differing odds of noncompletion. The model explained 11.3% of the variance in predicting noncompletion.

Conclusion: This analysis underscored the complex interplay between socio-demographic, enabling factors and clinical circumstances that contribute to incomplete CoCs.

1 | Introduction

Regular dental visits are essential for the early detection and treatment of oral conditions, as well as for promoting oral health and providing education on proper oral hygiene practices [1]. Although it is important to recognise the significant oral health disparities that exist among different population groups, a key factor contributing to the lack of regular oral healthcare is financial barriers. In addition to these financial challenges, additional obstacles to regular oral health care, particularly for children, include language and cultural differences, systemic inequalities, limited oral health literacy and a lack of awareness regarding the importance of primary dentition [2–6]. The health and financial consequences of inadequate access to oral healthcare have been widely documented [7].

Summary

- Why this paper is important to paediatric dentists?
- Present analysis underscores the complex interplay between socio-demographics, enabling factors and clinical circumstances that contribute to the incomplete CoC at public dental settings.
- Present findings would indicate that predictors of noncompliance also vary according to age and other socio-demographic characteristics (e.g., language spoken at home).
- Present findings suggest that variables linked to oral healthcare service utilisation may not necessarily be associated with compliance. While access to care is an important aspect, our contention is that although utilisation and access are significant, it is essential to investigate noncompliance as a distinct issue requiring dedicated attention.

Access to healthcare remains a major issue in many countries [8], and when it comes to oral healthcare services, it is not only about availability and utilisation but also about adherence to treatment, which is particularly crucial for public patients. A course of care (CoC) begins with the patient's initial visit, during which a comprehensive examination is typically conducted. This visit often takes place following an offer of care from the waitlist, recall list, after prioritising care for those with urgent access needs. The course of care is deemed complete after the final treatment visit, at which point the patient is offered no further appointments, as all planned care from the examination has been fulfilled. Should there be a need for additional care beyond the original treatment plan later (e.g., the provision of dentures), this would be classified as a new course of care. Therefore, the completion of the CoC as prescribed by an oral health professional plays a central role in determining the outcome of dental treatment, such as tooth preservation, management of recurrent pain and overall quality of life [9].

Incompletion and noncompliance with dental treatment result in significant costs and impact individuals, the healthcare system and society [7]. From the perspective of an oral health provider, noncompliance affects practice operations and productivity. This noncompliance means an unnecessary number of broken appointments and late cancellations resulting in the progression of disease and treatment in emergency rooms, and so on [10]. Individuals who do not finish their treatment courses often belong to specific patient groups (e.g., high caries groups) [11, 12]. Thus, having information about patient profiles can help assess compliance levels and develop strategies to improve attendance and clinical outcomes. Investigating the use of public oral healthcare services can also shed light on underrepresented population groups, often from socially disadvantaged backgrounds.

The oral healthcare team is responsible for assessing patient compliance and providing the necessary knowledge to patients. Therefore, it is important for oral health providers to identify the causes behind the discontinuation of dental treatments, ensuring that oral healthcare needs are fulfilled, and any barriers are effectively addressed. Identifying factors associated with noncompletion of dental CoC among children can also help to elucidate the specific oral health services needed and assess if current services meet the needs of public dental service beneficiaries in the Australian state of Victoria. This information is crucial for developing effective oral health education initiatives and overcoming barriers to the success of oral healthcare treatments, particularly in suggesting obstacles that may prevent or obstruct the completion of dental treatment.

This study seeks to initiate this understanding by investigating the socio-demographic and clinic characteristics and type of CoC of children and adolescents who have not completed necessary dental treatments within a 12-month period at Monash Health Dental Services in Melbourne, Victoria. These efforts align with the goals of public health dentistry, which emphasises accessibility and equitable oral health outcomes, especially for vulnerable populations [13].

2 | Data Source and Methods

The research involved a secondary analysis of information sourced from patients under 18 years of age accessing Monash Health Dental Services (MHDS) services over a 12-month period; between November 2022 and October 2023. MHDS is the largest public health dental provider in south-east Melbourne, Victoria, focusing on priority population groups such as Aboriginal and Torres Strait Islander peoples, children, youth, homeless individuals, pregnant women, refugees, asylum seekers and those in need of specialised healthcare like mental health services. These groups experience higher rates of oral health problems and face numerous barriers when accessing and completing dental care.

The data used for this study encompassed patients for whom information, including their course of care category, was completely documented at the time of implementation. Information was gathered from seven clinics utilising the Titanium electronic database, capturing all patients within the specified data collection timeframe. Ethical approval for this study was obtained from Monash Health HREC (Human Research Ethics Committee). The preparation of this manuscript adhered to the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) recommendations [14].

De-identified data were provided, including:

1. Course of care (CoC). The codes to identify the course of care category were as follows:
   a. 'Open CoC without future appointment' or 'Closed CoC with reason that treatment was not completed' and
   b. 'Closed CoC with reason that treatment was completed'.

Open courses of care with a future appointment, indicating that the patient is still under care, were excluded from this analysis. Emergency CoCs were excluded from this analysis.

Socio-demographic characteristics.

a. Age was measured at the time of the examination. For part of the analysis, age was regrouped based on the limits of the Primary versus Transitional/Permanent dentition, into two groups: 'younger than 5 years' and '5 to 17 years of age'.

b. Sex.

c. Health care card type: Australia offers various types of concession and health care cards, each with distinct eligibility criteria and benefits. The health care card grants access to public healthcare services and allows for more affordable medication. Health care cards were categorised as 'Pensioner Card', 'Health Card' or 'Non-card Holder'.

d. Aboriginal Status Aboriginal/Torres Strait Islander status, coded as Yes/No.

e. Asylum Seeker to indicate whether the patient is a person seeking asylum, coded as Yes/No.

f. Patient preferred language, coded as 'English', 'Other than English, but not Dari' and 'Dari'.

g. Need for interpreter, coded as Yes/No.

Clinical data included:

a. Distance to the dental clinic was coded as: 'Close' if they were in the postcode the same as, or contiguous to, the clinic and 'Not close'.

b. Type of course of care: Service item code according to the Australian Dental Association item code and descriptor [15]. Codes were recoded as: 'Examination procedures' (e.g., dental examinations, radiography); 'Preventive' and 'Other' (e.g., endodontics, exodontia/surgery, restorative).

c. The clinic where patients were provided services included the following dental clinics: 'Thomas St'; 'Berwick'; 'Kingston'; 'Cranbourne'; David St'; 'Pakenham' and 'Springvale'.

3 | Analysis

The analysis first presents descriptive details regarding the sample's demographic and clinical characteristics. To explore how socio-demographic and clinical variables relate to the probability of having incomplete dental treatment in this group of patients, a stepwise logistic regression analysis (LRA) was conducted. This analysis aimed to explore the likelihood of an under 18-year-old patient to be in the incomplete dental treatment group, using sociodemographic (i.e., age, sex, type of health card, etc.) and clinical predictors (i.e., type of CoC, etc.). The final model comprised predictor variables with a p value below 0.05. The stepwise selection method was utilised to craft the final model. Stepwise variable selection is a method in which independent variables (predictors) are incorporated through iterative processes; variables are added or removed from the model to optimise its performance and ensure that only the relevant predictors are retained. Cases with missing values were excluded using case-wise deletion. IBM-SPSS Statistics (Version 29.0) facilitated data manipulation, checking for assumptions under multivariate methods and overall analysis.

4 | Results

During the specified period, a total of 8763 children received treatment at the dental clinics of Monash Health. Out of them, 725 children were excluded due to receiving emergency care, and an additional 878 children were excluded due to having ongoing CoC with scheduled future appointments. Consequently, the remaining sample consisted of 7160 children. Of them, 5736 (80.1%) were from 5 to 17 years of age, and 1424 (19.9%) were younger than 5 years. On average, the sample was 9.0 (SD 4.2) years of age. Overall, there was a similar proportion of males (49.8%) and females (50.2%). The majority (67.6%) were born in Australia. Another 14.5% nominated Afghanistan as their country of birth. The remaining children (17.9%) nominated one of 69 different countries as their place of birth, but none, except for Pakistan, reached 2.6% of the total cases. A total of 101 children (1.4%) reported having Indigenous heritage. According to the language spoken at home, 69.5% reported English as the language spoken at home. Patients nominated 63 different languages spoken at home, including English. The most frequently reported languages other than English were Dari (13.1%), and to a lesser extent, Hazaraghi (3.0%) and Pashto (2.4%). Nonetheless, only 8.9% ($n = 636$) indicated the need for an interpreter. Nine hundred and fifteen children reported refugee status (12.8%).

Of the total sample, the majority were non–health care cardholders (59.1%), another 27.6% held a health care card, and 13.3% were children of pensioner concession cardholders. Most of the sample lived near the clinics (95.2%). The largest proportion of oral healthcare services provided was oral examinations (53.9%), followed by preventive services (29.2%). The remaining 17.0% were restorative services.

About one quarter of the sample (24.2%; $n = 1733$) did not complete their required CoC of dental treatment. The bivariate analysis indicated that compliance rates varied significantly across several variables. By age, children 5–17 years old had lower rates of compliance compared to those under 5 years (73.2% vs. 86.1%; $p < 0.001$). Those who spoke English at home or spoke languages other than English, but not Dari at home (76.0% and 79.6% respectively), had higher rates of compliance compared to those who reported speaking Dari at home (76.0%, 79.6% and 68.1% respectively; $p < 0.001$). In the same way, compliance was higher among those who did not need an interpreter (76.7%) compared to those who did (66.9%; $p < 0.01$) (See Table 1). Aboriginal and Torres Strait Islander peoples had lower compliance (54.4%) compared to non-First Nations peoples (76.1%; $p < 0.001$). No significant differences were found between sex.

To better explore the probability of not completing the required CoC, a logistic regression analysis was conducted using 10 predictors including: four predisposing variables (age, sex, distance to the health clinic and type of health card), four enabling and needs variables (refugee status, language spoken at home, aboriginality and need for interpreter) and

TABLE 1 | Univariate associations between predisposing, enabling and clinical variables and noncompliance of course of care in oral health care.

Variable	N¥	Compliance (%)	Noncompliance (%)
Sex			
Male	3513	75.4	24.6
Female	3545	76.2	23.8
Age group		***	
Less than 5 years	1424	86.1	13.9
5–17 years	5736	73.2	26.8
Language spoken at home		***	
English	4972	76.0	24.0
Other than English and Dari	1366	79.6	20.4
Dari	797	68.1	31.9
Card type		***	
Pensioner card	944	62.9	37.1
Health care card	1967	67.5	32.5
Noncard holder	4225	82.6	17.4
Clinic		***	
Berwick	212	96.2	3.8
Thomas St	1111	79.3	20.7
Cranbourne	1485	67.3	32.7
David St	1422	74.0	26.0
Pakenham	1031	69.3	30.7
Springvale	1874	83.1	16.9
Course of Care		***	
Examination procedures (e.g., exam, Rx)	3844	70.6	29.4
Preventive (e.g., sealants, fluoride application)	2080	86.9	13.1
Other procedures (e.g., Exodontia, restorative)	1211	73.2	26.8
Refugee status		**	
Yes	898	72.2	27.8
No	6237	76.3	23.7
Australia-born		**	
Yes	4837	76.8	23.2
No	2298	73.8	26.2
Interpreter		***	
Yes	636	66.9	33.1
No	6507	76.7	23.1
Aboriginality		***	
Yes	101	54.4	43.6
No	7034	76.1	23.9

Note: ¥ Figures may not add due to missing values; ***$p < 0.001$; **$p < 0.01$.

two clinical variables (service item code and clinic attended). A test of the final model with all six statistically significant variables against the constant-only model was statistically reliable [$\chi^2(13) = 554.772$; $p < 0.001$], indicating that these predictors reliably distinguished between completing and not completing a dental CoC.

After controlling for all the variables present in the model, those participants who were provided 'Preventive' services were less likely to have incomplete treatment compared to the other CoC (e.g., endodontics, exodontia/surgery, restorative) or dental examination groups (OR = 0.48; 95% CI: 0.41–0.56). Those who spoke neither English nor Dari at home were less likely to have incomplete CoCs, compared to patients who spoke English at home (OR = 0.75; 95% CI: 0.63–0.89). On the other hand, Aboriginality increased the odds of being in the noncompletion group (OR = 1.90; 95% CI: 1.25–2.89). By age, each additional year of age increased the chances of having an incomplete CoC (OR = 1.04; 95% CI: 1.03–1.06). Additionally, individuals who requested an interpreter were more likely to be in the noncompletion group (OR = 1.56; 95% CI: 1.26–1.93). In the same manner, when compared to those who attended the Thomas St clinic, those who attended the Cranbourne or Pakenham clinic were more likely to be in the noncompletion group (OR = 1.23; 95% CI: 1.05–1.43; and OR = 1.19; 95% CI: 1.00–1.41 respectively). On the other hand, those who attended the Berwick or Springvale clinics were less likely to be in the incomplete CoC group (OR = 0.12; 95% CI: 0.10–0.44; and OR = 0.68; 95% CI: 0.58–0.79 respectively) than those who attended the Thomas St clinic (See Table 2).

In the final multivariate model, there was no difference associated with noncompletion of required treatment by: sex, country of birth, refugee status or proximity to the clinic. The variance for the ability to predict a noncompletion CoC case, using the full model, was 11.3% (Nagelkerke $^2r = 0.113$).

5 | Discussion

The study aimed to examine the completion rates of required dental treatment among patients 17 years or younger ($n = 7160$) attending Monash Health Dental Services. Findings indicate approximately one quarter (24.2%) of these patients have not completed their necessary dental CoC. Through logistic regression analysis, several significant independent variables were identified as associated with completion of dental

TABLE 2 | Regression coefficient, odds ratios and 95% confidence interval for odds ratios for the factors associated with noncompliance of course of care in oral health.

	β coefficient	Odds ratio	95% confidence interval
Age	0.04	1.04	1.03–1.06
Language spoken at home English Other than English and Dari Dari	−0.29 0.09	1 0.75 1.09	0.63–0.89 0.90–1.33
Aboriginality (1 = Yes)	0.64	1.90	1.25–2.89
Type of health card			
Noncard holder		1	
Health care card	0.48	1.62	1.42–1.85
Pensioner holder	0.68	1.97	1.67–2.32
Interpreters need (1 = Yes)	0.44	1.56	1.26–1.93
Clinic			
Thomas St		1	
Berwick	−1.55	0.12	0.10–0.44
Cranbourne	0.20	1.23	1.05–1.43
Pakenham	0.17	1.19	1.00–1.41
Springvale	−0.39	0.68	0.58–0.79
Type of course of care (1 = Preventive)	−0.73	0.48	0.41–0.56
Constant	−1.56		

Note: The variance in dental visits accounted for using the full model was 11.3% ($\eta^2 = 0.113$).

treatment. This analysis underscored the complex interplay between socio-demographics, enabling factors and clinical circumstances that contribute to the incomplete CoC at public dental settings. Patients receiving 'Preventive' treatments were less likely to have incomplete CoC compared to the general course of care and examination procedures groups. On the other hand, increasing age and individuals identifying as Aboriginal or Torres Strait Islanders were more likely to have incomplete treatments.

Refugees and ethnic minority populations generally face barriers such as language, cultural differences, systemic inequalities, poor oral health literacy, knowledge about the importance of primary dentitions and so on, which are shown to lead to lower oral healthcare service utilisation, negative oral health beliefs and behaviours [5, 16]. However, present multivariate results demonstrate that refugees did not differ from nonrefugees in completing CoCs when other variables were controlled for (e.g., language spoken at home, need for interpreters, etc.). The effect of language spoken at home on the use of oral healthcare services has been studied extensively [17–19]. Language barriers can significantly impact access to and utilisation of oral healthcare services among individuals who do not speak the dominant language [20, 21]. In the present study, the multivariable model showed a significant association of language with the odds of an incomplete CoC. Those who spoke English or Dari at home were less likely to have incomplete CoCs compared to those who spoke languages other than English or Dari at home. Interestingly, this finding is in contrast to our study using the adult patient base report [22]. These findings require further exploration, highlighting the necessity of collecting specific data to thoroughly investigate these associations, perhaps with qualitative designs.

While it is important for healthcare providers to address language barriers and provide culturally safe services to ensure equitable access to oral healthcare for all individuals, regardless of their language proficiency, the effect of language proficiency as a barrier emphasises the importance of thoroughly understanding its influences within different age and migrant groups. Furthermore, it is important to recognise that cultural factors may affect individuals within cultural or ethnic groups in diverse ways. The implications of acculturation on oral health are significant [21]. Therefore, examining the acculturation experiences is central for ensuring the provision of culturally competent services and programs. This requires not only language proficiency but also cultural sensitivity and cultural awareness [22].

The analysis found that the place of service (i.e., clinic), likely influenced by the area of living, was a significant factor in the multivariate analysis. This finding suggests that there might be inequalities in oral health outcomes operating within specific communities or neighbourhoods, or in the operation of the clinic (e.g., length of waiting list). A study conducted in London revealed a significant variation in life expectancy between different subway stations [23]. These localised differences may be operating here, represented by the clinic attended. Thus, the location of clinics can be a powerful tool to improve people's health outcomes, highlighting the presence of local social inequalities, which can result in varying levels of oral health across different areas, and the need for targeted interventions to address these disparities.

The present study found that as children get older, there is an increase in the likelihood of not completing necessary dental treatment. The importance of oral health and oral health concerns differ at different life stages. Age appears to influence this decision, not only the type of oral healthcare requirement but also the decision to utilise health services and complete CoCs. For example, preschool and school children are still dependent on caregivers for health decisions, while adolescents may take more responsibility for these decisions. Additionally, during adolescence, competing priorities (e.g., studies, sports), peer pressure or the desire to maintain good oral health for social and personal reasons might affect those decisions [24].

Still, despite this, it is crucial for individuals of all ages, regardless of psychological maturity or any other factor, to prioritise regular dental visits and completion of CoCs to maintain optimal oral health and prevent potential oral health issues. In particular, because, in the present study, some demographic and clinical variables reported in the literature as associated with the use of services [25], did not achieve statistical significance with noncompletion of oral health CoCs. For example, the present analysis showed no statistically significant sex effect. In addition, typically, expenses associated with dental treatment and financial limitations often cause delays in care and may impede individuals from completing necessary treatments [2, 3]. However, the group included in this study receives oral healthcare for free or at a subsidised cost; such barriers are mitigated. In fact, by utilising the type of health card as a surrogate for income level, present findings suggest that income would not be a determining factor in the occurrence of noncompliance with dental treatment. Furthermore, present findings would indicate that predictors of noncompliance vary according to age and other socio-demographic characteristics (e.g., language spoken at home).

Findings from this study underscore the need for additional efforts to explore and understand factors influencing both service usage and adherence to CoCs, prompting further exploration in the realm of healthcare dynamics. Further research is needed to explore and understand the complex interplay between individual, socio-economic, socio-cultural and healthcare system factors influencing service usage and adherence to a CoC. This understanding is essential for designing targeted public health initiatives that address specific obstacles faced by individuals, enhance healthcare accessibility and improve the completion rates of necessary dental treatments. Minimising disparities in oral health outcomes and enhancing the coordination and targeting of services to align with local needs should ensure equitable oral health outcomes, especially for vulnerable populations [7]. Furthermore, this holds even more significance as research has demonstrated that disparities in oral health closely parallel those observed in general health [26] and continue across the entire lifespan [27].

While this information is useful, it only provides initial information; caution must be exercised when interpreting these results. This is a cross-sectional study; therefore, it does not establish causality. Present findings indicate only statistically significant associations and do not imply causal relationships. To explore causality, different study designs must be employed. Furthermore, there are additional limitations in the present study. Findings only reflect the sociodemographic characteristics of those who used Monash Health Dental Services. Therefore, there is no attempt to generalise our findings to the general population under 18 years of age in Melbourne or in the state of Victoria. Further exploration of noncompliance groups for individuals living in remote or rural regions due to geographic variations is warranted. Additionally, there may be different noncompletion rates among those who are able to access private dentistry [28].

Several other factors may contribute to noncompletion of oral healthcare treatments. These factors include dental phobia or anxiety; pain or discomfort from treatments; misunderstanding or lack of information about the severity of their dental issues and the importance of completing treatments; time constraints and practicalities of life; other health conditions; lack of trust in the dentist's skills or communication and so on [12]. Also, information about structural barriers to care, such as lack of transportation to reach oral healthcare services, or the presence of disabilities, was not available. Therefore, these factors were not explored in the present analysis. The use of different research methodologies (i.e., qualitative data) would provide complementary information to understand noncompliance [10], as well as the general oral health experience.

Nonetheless, while our data may have limitations, Monash Health is the largest public healthcare provider in the state of Victoria, as such, we believe that our study represents a substantial sample of children accessing public dental health services. Still, further exploration of noncompliance groups would provide information on how to reach these groups and overcome barriers to oral health care. Inappropriate approaches could inadvertently exacerbate inequalities, following the principle of the 'inverse care law', where those in greatest need may not receive the necessary attention [26, 27].

Understanding these associations can aid in targeted interventions to ensure better completion rates of necessary dental treatments among diverse patient groups within public dental care settings. This includes addressing barriers to access, providing culturally safe care, and tailoring treatment approaches based on individual needs. Present findings suggest that a 'one size fits all' approach may not be effective for addressing oral health inequalities. It is important to further identify optimal indicators that are specific to different levels of intervention and targeted population subgroups. This will help in effectively reducing disparities in oral health outcomes. Healthcare providers can utilise this knowledge to implement strategies that promote patient education, improve communication and enhance the overall patient experience. Such interventions have the potential to improve oral health outcomes and ensure that all patients receive the necessary dental care they require.

Author Contributions

K.I., R.S. and R.M. conceived the idea. K.I. and R.M. collected the data. R.M. analysed the data. K.I. and R.M. led the writing.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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