

Socioeconomic inequalities in dental visits among high school students in Chile, years 2013 and 2017

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Objective: To analyze prevalence changes in dental visits and socioeconomic inequalities among high school students in Chile, years 2013 and 2017. **Methods:** Analysis of nationally representative data from 2013 and 2017 waves of the Chilean National Socioeconomic Characterization Survey (CASEN). In a sample of high school students aged 14 to 20 years old (n=12699 in 2013; n=11122 in 2017) we investigated prevalence of dental visits in the last 3 months, by urban-rural residence, sex, type of health insurance, type of school, income level and benefit of dental care at school. For inequality analysis we estimated prevalence ratio of dental visits in the last 3 months according to study variables. **Results:** There was a significant increase in the prevalence of dental visits in the last 3 months and the receipt of dental care at school between years 2013 and 2017. The highest prevalence of dental visits in the last 3 months was found among students living in urban residence, women, with private insurance, in the highest income level, that attended private schools. Inequalities persist but the gap associated with type of residence, health insurance and between the lowest income quintiles decreased over the years. **Conclusions:** The Comprehensive Dental Care for senior year high school students, a public policy that began in 2015 in Chile, could have aided the gap reduction and the increase in visits to the dentist in the last 3 months in this group.

Keywords: Health Services Accessibility, Chile, Adolescent, Dental Health Services, Dental Care, Healthcare Disparities

Introduction

Access to dental care has been associated with improvements in oral health outcomes, as it contributes to improving health and to tackling oral diseases (Reda *et al.*, 2018; Reda *et al.*, 2018; Harris, 2013). Access is a complex and multidimensional construct that involves the opportunity to access dental care when needed, the use of dental services, equity, and outcomes obtained. The most used indicator of access to dental care has been use of services (Harris, 2013), often measured as the proportion of individuals who have visited the dentist in a period of time (frequently the last one or two years). However, measurement of health services utilization, should distinguish between initial and continued use, which indicates access to a higher level of care, for example, in dental treatment. The latter has the greatest interest as a proxy for measuring access (Harris, 2013).

The use of dental services involves factors external to the individual (such as the availability and provision of dental services), and reflects the need and demand for services, that is, internal factors that move the individual to use services. Several determinants dental service utilization have been described: individual determinants (such as sex, age, nationality, among others), social determinants (such as place of residence, educational level, occupation), and economic determinants (Ghanbarzadegan *et al.*, 2021) and a recent systematic review of the world literature on adults (Reda *et al.*, 2018) reports that the lowest use of dental services is found among men, ethnic minorities or immigrants, people living in rural areas, with low socioeconomic and educational level and those without health insurance.

Public policies related to the provision of dental services affect utilization (Ghanbarzadegan *et al.*, 2021). Their importance has been evidenced in European countries where inequalities in the use of dental services are greater in those countries that do not have public coverage for dental care (Palència *et al.*, 2014). However, whilst universal dental coverage reduces the frequency of people who have never visited the dentist, there remain persistent inequalities in dental visits in the population (Galvão and Roncalli, 2021).

The Chilean health system is mixed, characterized by offering the freedom to choose the type of insurance, whether public or private. Since 2005, a major health reform was implemented to reduce socioeconomic gaps in the health system and improve equity in the use of services. To that end, universal dental access was guaranteed via GES (from Spanish Garantías Explícitas en Salud meaning Explicit Health Guarantees) to four prioritized population groups according to age or oral health conditions (emergency dental care, comprehensive dental care for pregnant women and people aged 6 or 60 years old). Between 2004 and 2009, the use of dental services in the adult population increased, especially in the publicly insured population with lower educational and socioeconomic levels (Cornejo-Ovalle *et al.*, 2015). In the same way, in the period 2003 to 2016-17, there is evidence of a reduction in inequality of visits to the dentist in the last 12 months by educational level (Borgeat-Meza *et al.*, 2022). However, there are no national studies of socioeconomic determinants of dental visits among adolescents.

Chilean health goals have focused on preventing and reducing the most common oral problems in children and adolescents, with emphasis on the most vulnerable. Improvements in dental care coverage have been proposed for young people under 20 years of age, with the goal of achieving 50% coverage in this group, which was not achieved in the 2000-2010 decade and was not evaluated in the 2011-2020 decade. During the latter period, two main oral health care policies were implemented to tackle access inequalities in young people. The PAD (from Spanish *Pago Asociado a Diagnóstico* meaning Diagnostic-Related Payment) voucher for dental benefits was introduced in 2013, which benefits young people between 12 and 18 years, facilitating access to some dental services via out-of-pocket payment (Cornejo-Ovalle, 2014). This approach yielded very low utilization rates between 2014-2017 (less than 1%, regardless of insurance type) (Garrido-Urrutia and Cornejo-Ovalle, 2021). However, another policy, the Comprehensive Dental Care for senior year high school students was specifically directed to benefit young people in vulnerable schools from 2015 delivering dental care in primary health centers and using mobile clinics and portable equipment to allow care in areas of difficult access or at school. In addition, the Student Health Program of the JUNAEB (National Board of School Aid and Scholarships) has provided comprehensive dental care, among other benefits, to all primary students (children between 7 and 14 years) of public and subsidized schools since 1991.

In this context, this research compares socioeconomic inequalities in the use of dental services in high school students in Chile, before and after the implementation of public policies to improve dental access in this population.

Methods

We conducted cross-sectional secondary analysis of nationally representative data from the 2013 and 2017 waves of the Chilean National Socioeconomic Characterization Survey (CASEN). CASEN is a survey of the Ministry of Social Development of a representative sample of the urban-rural Chilean population, to describe demography, education, housing, health, work, and income to evaluate the impact of social policy. It has been carried out since 1990 every two or three years, with the 2017 survey being the last one before the COVID pandemic. Details of the survey methods and databases are publicly available at the website of the Ministry of Social Development in Chile and can be requested from the corresponding author.

The 2013 and 2017 waves were selected as they took place before and after two public oral health policies implemented to improve access to dental care for adolescents under 20 years of age. These policies were the PAD voucher for dental care that facilitated access to some dental services via out-of-pocket payment for people between 12 and 18 years old, and the Comprehensive Dental Care for senior year high school students from vulnerable groups (Cornejo-Ovalle, 2014; Garrido-Urrutia and Cornejo-Ovalle, 2021).

We sampled participants aged 14 to 20 years old, that were in high school at the time, obtaining a final sample of 12699 and 11122 in the 2013 and 2017 surveys respectively. We investigated prevalence of dental visits

in the last three months, by urban-rural residence, sex, type of health insurance, type of school, socioeconomic quintile, and if they received dental care at school in the last year as a benefit. These variables were measured in the same way in both surveys and defined according to the CASEN method. The CASEN questions allowed us to measure continued care utilization as regular treatment visits, including emergency visits, but excluding dental examination or control visits. This is important, since in Chile, many private dental services offer a first exam visit free of charge for all people, independent of their health insurance.

Chi-square tests were used to test differences in the prevalence of dental visits in the last three months in 2013 and 2017, according to the studied variables. The prevalence ratio of dental visits in the last 3 months was estimated to identify inequalities in relation to independent variables. STATA 14.0 ® was used. The study was approved by the Ethics Committee in Scientific Research of the University of Antofagasta, on October 18, 2018 (file number:151/2018).

Results

Table 1 describes characteristics of the participants in the 2013 and 2017 CASEN waves, which were broadly similar. More young people experienced the benefit of dental care at school and visited a dentist in the last 3 months of 2017 than 2013.

The proportion of students visiting the dentist in the last 3 months of 2013 and 2017 was higher among those who lived in urban areas, were women, had private health insurance, attended private schools and came from higher income families (Table 2). Proportionately more beneficiaries of School Dental Care had visited the dentist in the last three months in 2017 than 2013. There were also increases in the proportion of students visiting the dentist in the last 3 months among those who lived in urban and rural areas, were men, were aged 16 or over, had public insurance, belonged to the first (lowest) or third quintiles of income level or studied in public schools.

Table 3 compares the adjusted models for the proportion of young people visiting the dentist in the last three months of 2013 and 2017 and shows reduction of inequalities according to the type of residence, in those aged 18-20 years, with private health insurance and the two lower income quintiles.

Discussion

This study analyzed changes in the proportion of high school students making dental visits and socioeconomic inequalities in 2013 and 2017. It is the first study to show that more secondary school students visited the dentist and that inequalities in visiting reduced over this period, when two public oral health policies were implemented.

The two policies were implemented to improve access to dental care for adolescents under 20 years of age. The PAD voucher for dental care in people aged 12-18 years may have facilitated access via out-of-pocket payments (Cornejo-Ovalle, 2014). The Comprehensive Dental Care for senior year high school students focused on improving access for vulnerable hard-to-reach populations. However,

Table 1. Characteristics of the CASEN 2013 and 2017 samples.

	2013 (n=12699)	2017 (n=11122)
Variables	%	%
Residence		
Urban	82	81.3
Rural	18	18.7
Sex		
Male	50	50.8
Female	50	49.2
Age group*		
14-15 years	30.7	29.6
16-17 years	47.3	47.2
18-20 years	22	23.2
Health insurance*		
Public	84	82.7
Private	10.9	12.3
Other	5.1	5.0
Socioeconomic quintile*		
I	30.8	30.9
II	26.8	28.7
III	19.7	19.1
IV	14.2	12.8
V	8.4	8.5
Type of school*		
Public	48.4	52.2
Subsidized	47.2	41.5
Private	4.4	6.3
Benefit of dental care at school*		
yes	8.2	20.1
no	91.8	79.9
Visited a dentist the last three months*		
yes	9.3	10.6
no	90.7	89.4

* p<0.05, Chi sq.

official reports show that the use of the PAD voucher for dental benefits was scarce in 2014-2017, with less than 1% of the target population using it, regardless of their type of health insurance (Garrido-Urrutia and Cornejo-Ovalle, 2021). Thus, the Comprehensive Dental Care may explain the increase in the proportion of students who received dental care at school as a benefit between 2013 and 2017 (8.16% to 20.05%). The Chilean JUNAEB dental care policy only covers children in primary education aged 7-14 years. In 2013, the highest prevalence of dental visits was among 14–15-year-olds, who could still benefit from JUNAEB. However, with more students aged 16-20 attending in 2017, the difference between age groups disappeared, suggesting that the Comprehensive Dental Care partially met its aim of reducing social inequalities in the use of dental services.

More young people who lived in urban areas, were women, had private health insurance, came from higher income families or attended private schools had visited the dentist in the last three months. This is consistent with systematic reviews of factors associated with dental service use among young people (Curi *et al.*, 2018) and adults (Reda *et al.*, 2018; 2018). The smaller gap in the proportions of young people visiting the dentist in 2017 is explained by the increase in high school students attending.

There was a reduction in access inequalities between rural and urban areas. Living in rural communities decreases use of dental services (Reda *et al.*, 2018; 2018; Curi *et al.*, 2018), often due to restricted geographical access (Guay, 2004). For this reason, innovative and flexible solutions are required for rural communities with difficult geographical access to dental services (Carlisle *et al.*, 2017). This is what the Comprehensive Dental Care seeks for senior year high school students, which was designed to provide dental care closer to populations with difficult access via mobile clinics and portable equipment.

Gender gaps in access also decreased between 2013 and 2017. From 2010 the Comprehensive Oral Health plan for pregnant women (via GES) ensured that young women who were pregnant had access to guaranteed comprehensive dental care, which left a relative lack of cover for young men. Men are often more reluctant to access services and to overcome practical barriers created by incompatible hours of operation, inconvenient location, unpredictable waiting times, hard-to-use reservation systems, and delays between the appointment and the visit to the clinician (Banks and Baker, 2013). Again, the provision of the Comprehensive Dental Care may have reduced these barriers.

Before these health reforms in Chile, the lowest use of dental services occurred among public insured people and people belonging to the lowest income quintiles (Delgado *et al.*, 2013). Although access inequalities according to health insurance status, income and type of school persisted in 2017, the gaps had narrowed. Again these results are compatible with a successful Comprehensive Dental Care for senior year high school students focusing on the vulnerable population, which in Chile is characterized by having public insurance (Castillo-Laborde *et al.*, 2017) and attending public schools (Guthrie *et al.*, 2019).

In contrast to the Comprehensive Dental Care plan, the PAD voucher for dental benefits is a public policy that focuses on improving access to only specific dental benefits. Therefore, it does not favor a comprehensive oral health care model, nor is it aligned with the Health Objective of the Chilean National Health Strategy for 2030, to improve the oral health throughout the life course with an emphasis on equity. In effect, families with a lower income level who want to access free-choice dental care, must bear a greater out-of-pocket expense (copayment) to access care (Cornejo-Ovalle, 2014), adding this to the low utilization reported (Garrido-Urrutia and Cornejo-Ovalle, 2021). Conversely, the Comprehensive Dental Care plan for senior year high school students has greater reach and favors vulnerable groups improving access to care to a population with difficult access. This policy is aligned with literature on interventions focused on distal social determinants (Lorec *et al.*, 2013). That is, interventions

Table 2. Prevalence and absolute changes in proportion of students visiting a dentist the last three months in 2013 and 2017.

<i>Variables</i>	<i>2013</i> <i>(N=12699)</i>		<i>2017</i> <i>(N=11122)</i>		<i>Absolute change</i> <i>2013-2017</i>
	<i>% (yes)</i>	<i>(95% CI)</i>	<i>% (yes)</i>	<i>(95% CI)</i>	
Residence					
Urban	9.9	(9.3-10.5)	10.9	(10.2-11.5)	1.0*
Rural	6.5	(5.5-7.6)	9.0	(7.8-10.3)	2.5*
Sex					
Male	7.7	(7.1-8.4)	9.6	(8.9-10.4)	1.9*
Female	10.9	(10.1-11.6)	11.4	(10.6-12.3)	0.5
Age group					
14-15 years	10.4	(9.4-11.4)	10.9	(9.8-12.0)	0.5
16-17 years	9.2	(8.5-10.0)	10.5	(9.7-11.4)	1.3*
18-20 years	7.9	(6.9-9.0)	10.1	(9.0-11.3)	2.2
Health insurance					
Public	8.3	(7.8-8.9)	9.7	(9.1-10.4)	1.4*
Private	16.2	(14.2-18.2)	14.9	(13.1-16.9)	-1.3
Other	10.5	(8.2-13.1)	12.7	(10.0-15.7)	2.2
Socioeconomic quintile					
I	6.6	(5.8-7.4)	8.5	(7.6-9.5)	1.9*
II	8.5	(7.6-9.5)	9.1	(8.1-10.1)	0.6
III	9.0	(7.9-10.2)	11.4	(10.1-12.8)	2.4*
IV	12.2	(10.7-13.8)	12.3	(10.6-14.1)	0.1
V	17.6	(15.4-20.0)	18.2	(15.8-20.8)	0.6
Type of school					
Public	7.2	(6.5-7.8)	9.1	(8.4-9.9)	1.9*
Subsidized	10.6	(9.8-11.3)	11.1	(10.2-12.0)	0.5
Private	18.7	(15.6-22.2)	18.2	(15.4-21.2)	-0.5
Benefit of dental care at school					
yes	11	(9.1-13.0)	13.0	(11.7-14.5)	2.0*
no	9.1	(8.6-9.7)	9.9	(9.3-10.5)	0.8
Total	9.3	(8.8-9.8)	10.5	(9.9-11.1)	1.2*

* p<0.05 (Chi sq. for change between 2013 and 2017).

applied proportionally to the level of disadvantage and that address the problem from a community and structural perspective, instead of one focused on individual behavior changes (Raison and Harris, 2019).

Strengths of this study include the ability to record access as continued care rather than recording a single dental visit. The representativeness of the CASEN samples allows ready generalization to the Chilean population and facilitates repeated analysis to monitor high school students' use of dental services over time. However, the cross-sectional design does not allow causal inference. Furthermore, analysis was restricted to the variables measured in CASEN, preventing analysis of other factors related to utilization of dental care services, including oral healthcare needs (whether normative or perceived). There are inequalities in perceived and expressed dental

needs in the Chilean population (Delgado *et al.*, 2013) and so consideration of these variables would be of value.

In conclusion, dental access inequalities persist. However, gaps in the visiting the dentist among young people had narrowed in 2017, especially in relation to the nature of a family's health insurance, income and place of residence and the gender of the young person. As a public policy, the Comprehensive dental care for senior year high school students may be reducing these gaps as it has greater reach.

Table 3. Proportion of young people visiting the dentist in the last three months in 2013 and 2017.

	2013 ¹	2017 ¹
Variables	Adjusted Prevalence Ratio (95 % CI)	Adjusted Prevalence Ratio (95% CI)
Residence		
Urban	1	1
Rural	0.77 (0.65-0.92)*	0.90 (0.78-1.05)
Sex		
Male	1	1
Female	1.40 (1.26-1.56)*	1.19 (1.07-1.33)*
Age group		
14-15 years	1	1
16-17 years	0.92 (0.82-1.04)	0.97 (0.85-1.10)
18-20 years	0.79 (0.68-0.93)*	0.92 (0.79-1.07)
Health insurance		
Public	1	1
Private	1.26 (1.07-1.49)*	1.07 (0.89-1.28)
Other	1.07 (0.85-1.36)	1.19 (0.95-1.49)
Socioeconomic quintile		
I	1	1
II	1.24 (1.06-1.46)*	1.05 (0.90-1.23)
III	1.27 (1.06-1.51)*	1.32 (1.12-1.55)*
IV	1.59 (1.33-1.91)*	1.37 (1.14-1.65)*
V	1.94 (1.57-2.40)*	1.84 (1.48-2.28)*
Type of school		
Public	1	1
Subsidized	1.31 (1.16-1.47)*	1.17 (1.03-1.30)*
Private	1.65 (1.32-2.05)*	1.53 (1.23-1.90)*
Benefit of dental care at school		
yes	1	1
no	0.69 (0.57-0.83)*	0.64 (0.56-0.73)*

1 Adjusted for residence, sex, age, health insurance, socioeconomic quintile, type of school and benefit of dental care at school; Unweighted data.

* p<0.05 (Prevalence Ratio).

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