Author/s:
Lopez Silva, CP;Singh, A;Calache, H;Derbi, HA;Borromeo, GL

Title:
Association between disability status and dental attendance in Australia—A population-based study

Date:
2021-02-01

Citation:
Lopez Silva, C. P., Singh, A., Calache, H., Derbi, H. A. & Borromeo, G. L. (2021). Association between disability status and dental attendance in Australia—A population-based study. Community Dentistry and Oral Epidemiology, 49 (1), pp.33-39. https://doi.org/10.1111/cdoe.12571.

MR. ANKUR SINGH (Orcid ID : 0000-0003-1336-6493)

Article type : Original Manuscript

Association between disability status and dental attendance in Australia – A population-based study

Claudia Patricia Lopez Silva,[1] Ankur Singh,[1,2] Hanny Calache,[1,3] Hajer A Derbi,[1] Gelsomina L Borromeo[1]

1. Melbourne Dental School, University of Melbourne, Melbourne, Victoria, Australia
2. Centre for Health Equity, Melbourne School of Population and Global Health, University of Melbourne, Melbourne, Victoria, Australia
3. Centre for Population Health Research, Deakin University, Melbourne, Victoria, Australia

Corresponding author:

Dr Ankur Singh

Centre for Health Equity

Melbourne School Population and Global Health

Level 3, 207, Bouverie Street

The University of Melbourne, Victoria 3010 Australia
T: +61 3 8344 9256 M: +61 475 085 306 E: ankur.singh@unimelb.edu.au

AUTHOR CONTRIBUTION

Dr Lopez Silva contributed to acquisition of data, analysis and interpretation of data, drafting the article, critical revision of the article and final approval of the version to be published.

Dr Singh contributed to conception and design of the work, oversaw analysis and interpretation of data, drafting the article, critical revision of the article and final approval of the version to be published.

Dr Calache contributed to conception and design of the work, interpretation of results, critical revision of the article and final approval of the version to be published.

Dr Derbi contributed to interpretation of data, critical revision of the article and final approval of the version to be published.

Dr Borromeo contributed to conception and design of the work, acquisition of data, analysis and interpretation of data, drafting the article, critical revision of the article and final approval of the version to be published.

ABSTRACT

Aims: Disability is a key social determinant of health. The objective of this study was to test the association between disability status and irregular dental attendance among the Australian population, and to examine if the observed association varied among adolescents.

Methods: Data on 17,501 participants from The Household, Income and Labour Dynamics in Australia (HILDA) was analyzed. The main outcome examined was irregular dental attendance (two or more years since last dental visit) with disability as the primary exposure. Multivariable logistic regression models were fitted to test the associations between disability and dental attendance pattern. Models were adjusted for age, gender, country of birth, region of residence, education and income. Analysis was repeated among adolescents (15-24-year-old) to examine for variations in observed association.

Results: One in four participants reported having a disability. Unadjusted model showed that the odds for irregular dental attendance was 1.40 times greater (95%; CI, 1.30-1.51) in those with disability than those without disability. After adjusting for all covariates, participants with disability had 1.20 times higher odds (95%; CI 1.10-1.30) of irregular dental attendance than those without disability. Irregular dental attendance was 1.40 times greater (95%; CI 1.10 -1.80) in those with disability aged 15-24 years than their non-disabled counterparts.

Conclusions: Australian individuals with disability are more likely to have irregular dental attendance than those without.

INTRODUCTION

Irregular dental attendance patterns are associated with poor oral health outcomes of self-rated oral health, experience of dental pain, caries in permanent teeth, periodontal disease and edentulism – conditions ranked prominently in the top 50 causes of disabilities [1]. Poor oral health outcomes can be more pronounced among individuals with disabilities than non-disabled counterparts as maintaining regular and preventive dental attendance can be challenging [2,3]. Barriers include age, access to services and financial constraints that often preclude to life-long and ongoing dental care [2,3].

Persistent social inequalities in oral health outcomes, including irregular dental attendance, is well established using several measures of social disadvantage (low income, low education, area deprivation, gender and ethnicity) [4-6]. Research on disability and oral health shows that individuals with disabilities have worse oral health outcomes across different stages in life [7-16]. However, pathways through which this relationship occurs is not well understood. Disability is often viewed as an end-point in the disease spectrum, despite of a growing consensus now that it is a form of social disadvantage and discrimination, which can be addressed effectively with necessary policy and environmental action. Irregular dental attendance can contribute significantly to the relationship between disability and poor oral health outcomes but the research on disability and dental attendance at a national level is sparse, particularly in Australia. An association between disability and irregular dental attendance at a population level would imply a lack of adjustments in existing policy framework to address disability-related inequalities in oral health.

Age plays a crucial role in the association between disability and irregular dental attendance. Often, dental services are equipped for paediatric patients with special needs. Consequently,

with increasing age, individuals with disability are likely to be excluded from the benefits of regular and preventative dental care. In Australia, recent evidence from a population-based survey outlined the barriers in the transition process, from the perspective of both paediatric and Special Needs Dentists (SND) which included age, maturity, level of independence and financial constraints [17]. However, there is relatively little data in relation to transition care for adolescents and young adults with disabilities [7,18]. Adolescence is a tipping point as the lack of an inclusive dental system can establish long-term continuing trends of irregular dental attendance among individuals with disability. Pradhan, Slade, Spencer [2] found that an irregular dental visit pattern was higher among care recipients with disabilities in younger adults (25–34 years) than older (35–44 years). However, adolescence is overlooked in this literature.

The objectives of the current study were twofold. First, to determine the association between disability status and dental attendance in the Australian population. Second, to examine if this association varied among adolescents.

METHODS

Study population and sampling

To address the aim of the study, longitudinal, nationally representative data was obtained from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. HILDA is a longitudinal nationally representative study of Australian households and collects information regarding economic and personal wellbeing, labour market dynamics and family life of over 17,000 Australians annually since 2001 [19]. A detailed description of the methodology used in HILDA has been published elsewhere [19].

A total of 17,501 participants were included in the current study. A population-based cross-sectional design was used to examine the association between disability and irregular dental attendance.

Data collection

This study acquired data from Wave 13 (2013) collected via computer-assisted personal interviewing for addressing the objectives of the study as it was most recent at the conceptualisation of the study. The Continuing Person Questionnaire was administered to

every member who had been interviewed in a previous wave. A New Person Questionnaire which is collected every year from wave 2, was conducted for individuals new to the survey. These questionnaires are used by HILDA to collect information about a range of life domains including social, demographic, health, and economic characteristics. The Household Form was used to collect basic information about aspects of health care utilization by children aged under 15 [19].

Outcome

The main outcome examined in this study was dental attendance. Those individuals aged 15 years and over were asked 'how long has it been since you last saw a dentist?'. For each child in the household aged under 15, an adult member of the household was asked 'how long has it been since [name] last saw a dentist?' For the purpose of the analysis, responses were dichotomised into 2 groups, less than two years (regular) and 2 or more years (irregular). Based on the literature, visiting the dentist regularly (within 2 years) for the purpose of a routine check-up has been considered a regular pattern of dental attendance [3,20]. This definition closely resembles our classification taking into account how the HILDA data was collected and generated.

Exposure

The primary exposure was "disability" which was ascertained by the question "do you have any long-term health condition, impairment or disability that restricts you in your everyday activities, and has lasted, or is likely to last, for six months or more". HILDA has defined disability based on the International Classification of Functioning, Disability and Health (ICF) framework [21]. The ICF defined disability as an umbrella term for impairments, activity limitations and participation restrictions [22]. This variable was dichotomised into two categories, yes and no, indicating whether an individual had a disability which could be linked to dental attendance.

Covariates

Sociodemographic variables included age, gender, country of birth and region of residence. Indicators of socioeconomic position included information related to educational attainment of the respondents and household weekly earnings. Age was converted to categorical variables for statistical analysis and collapsed into six categories: 24-year-old or less, 25 to 34, 35 to 44, 45 to 54, 55 to 64, and 65 years and above. Country of birth was classified as Australia, main English-speaking country and non-English-speaking country. The Australian

Standard Geographical Classification (ASGC) was used and included “major city”, “inner regional”, “outer regional” “remote” and “very remote”. Education was categorised into two categories (high school or less and more than high school) based on highest education level achieved by the participant. Family income status was evaluated based on weekly earnings information and categorised into tertiles.

Statistical methods

Multiple logistic regressions models were fitted to examine the unadjusted and adjusted associations between disability and dental attendance pattern. The dependent variable (irregular dental attendance) was measured on a dichotomous scale. Model 1 reported the unadjusted association. Model 2 was adjusted for age, gender and country of birth. Model 3 additionally adjusted for socioeconomic factors (education level and weekly earnings). Finally, Model 4 was adjusted for all variables considered in previous models and region of residence.

A separate logistic regression model was fitted for those 15 to 24 years of age. This analysis informed the extent to which the association between dental attendance and disability differed among the adolescent population compared to the overall Australian population. This model was also adjusted for all confounding factors. All analyses were performed on Stata v15.

RESULTS

A total of 17,501 participants were included in the analysis. Nearly one in four (23.9%) Australians suffered with a disability. Among the total participants, 18.6% were in the age group of 15-24 years old. The mean age was 44 years and sample had more females than males. The majority of participants were born in Australia (78.1%) with most (63.0%) residing in major cities. Educational attainment varied markedly by disability status. In addition, almost one third of the participants had visited the dentist in less than 2 years while the remaining reported as irregular (Table 1). Prevalence of dental attendance pattern showed that in addition to disability status, prevalence of irregular dental visiting varied by age, gender, country of birth, region of residence, educational attainment and financial situation (Table 2).

The unadjusted model from logistic regression indicated that irregular dental attendance was 1.40 times greater in those with a disability than in those without (95%; CI, 1.30-1.51). After

adjusting for participants' age, gender and country of birth, the odds remained the same (OR: 1.40, 95%; CI, 1.29-1.52). The inclusion of education and weekly income in model 3 attenuated the association as the odds of irregular dental attendance was 1.20 times higher in those with disabilities than in those without (95%; CI, 1.10-1.30). After adjusting for all potential confounding factors (model 4), participants with disability still had 1.20 (95%; CI, 1.10-1.30) times higher odds of irregular dental attendance in comparison with those without (Table 3).

Irregular dental attendance was 1.40 times greater in those individuals with disabilities aged 24 years and below than in those without disabilities after adjusting for all potential confounding factors (95%; CI 1.10 -1.80) (Table 3).

DISCUSSION

Findings show that individuals with disabilities were more likely to have irregular dental attendance than those without disabilities. This association was stronger among those aged between 15 and 24 years**.** The importance of regular dental attendance for individuals with disabilities cannot be undermined. Irregular dental attendance of individuals with disabilities would most likely result in poor oral health outcomes as these individuals age [4,23,24].

To our knowledge, this is the first study that has assessed the association between disability status and dental attendance using data from a nationwide survey which allowed geographic representation within Australia. The current study also adjusted for theoretically consistent potential confounding factors. Including both individuals with and without disabilities, it has provided us with the evidence of stark inequality in dental attendance by disability status. In addition, the large sample size allowed for testing this association within those 24 years and below.

The impact of different forms of disability (e.g. intellectual, medical, physical or psychiatric conditions) on dental attendance could not be examined. This was due to the lack of information on different forms of disability in HILDA. However, HILDA is most applied dataset for disability and health status in Australia. It cannot be overlooked that the use of self-reported data within HILDA, for both disability and dental visits, was not validated with clinical outcomes data leading to potential introduction of dependent measurement error [25].

In addition, the study was only able to capture one dimension of dental attendance (frequency). It has been suggested that the use of a composite indicator to reflect an individual's usual dental attendance behaviour would be beneficial [4,23]. Standards used to determine dental attendance patterns should include frequency of dental visiting, reason for dental visiting and whether the patient attends a regular dental professional [4,23]. Having a composite indicator would have provided a clearer picture about the dental attendance behaviours of the analysed population since it could have accounted for an 'intermediate' category to reflect the mixed pattern of dental attendance, such as for those individuals who frequently visited the dentist for the purpose of a dental problem (e.g. pain) and who did not have a usual dental care provider [4].

In patients with disability, attending the dentist can be a significant issue as they may experience problems accessing dental care [2]. One study of Australian adults showed that those with developmental disabilities had regular dental visits but significant undetected dental disorders requiring specialist treatment [26]. Other studies have revealed that those with disabilities living in the community had a lower dental attendance rate compared to those living in residential facilities [3,27,28]. This could be attributed to a formal arrangement between institutions and public dental services that aimed at ensuring residents received regular dental visits such as six-monthly recalls [2]. Unfortunately, for those living in the community, parents and carers may potentially be unaware of dental services available placing individuals with disabilities at a higher risk of adopting an irregular pattern of dental attendance [2].

Irregular dental attendance by disability status was also shown to be higher within the adolescent population sub-group. Paediatric dentists have traditionally provided oral care to adults with disability due to a lack of suitable qualified specialists specifically trained to manage the complex needs of this cohort [7,29]. These groups presented with a high prevalence of irregular dental visiting potentially related to a lack of information regarding possible dental health services available for young adults [2,30].

Considering data was from 2013, it is important to highlight that policies regarding access to dental care for people with disability has not changed in Australia. Specifically, none for those transitioning from paediatric to adult dental care. The oral healthcare system remains unsustainable, unaffordable, inequitable and non-tailored to the healthcare needs of people with disability. Consequently, resulting in negative impact on continuity of care[17,31]. The

Commonwealth Government has a key role in planning dental health services for people with disability due the current funding arrangements shared between federal and states and territory governments [32]. The recently introduced Child Dental Benefits Schedule (CDBS) increases access to dental care among children and adolescents in Australia through a comprehensive list of services: examinations, dental radiographs, cleaning, fissure sealing, restorations, root canals treatment and dental extractions. However, this scheme is restricted to those below 17 years of age excluding adolescents with disability who are about to transition to dental care services for adults [33]. Given the complex interplay between determinants of transitioning including developmental readiness, health status of the individual and the capabilities of the adult healthcare provider[34], an eligibility cut off of 17 years is inappropriate for people with disability[35,36,37,38].

With the development of Special Needs Dentistry as a specialty, the oral management of disabled individuals and in particular of those at the complex end of the disability spectrum should be provided by specialists in this area. However, a shortage of suitably qualified specialists in the workforce, and the concentration of specialists in major metropolitan cities persists [17,39]. Yet, in some situations, continuity of care is lost due to lack of appropriate transition pathways [17,29]. An integrative team could help tackling the lack of resources and perhaps help the reduction of health expenditure. Provision of preventive care for individuals with disabilities must be prioritised to achieve containment of the spiraling cost of complex dental treatment [39,40]. The skills, knowledge and training of other oral health professional including dentists, dental hygienists and oral health therapists could be utilized to share the dental care of individuals with disabilities directly or following specialist advice [39].

Discontinuity of oral care may relate to the change in structural support in this post-adolescent age group [2]. A study confirms that policies and medical services are more readily available for disabled individuals in school age groups [41]. Systematic oral health promotion programs for individuals with disabilities are lacking. Therefore, when individuals reach adulthood, they tended to have poor oral health status. However, the problems regarding oral care are associated with underestimation of the treatment needs of those with disabilities [41]. Clearly if disabled adolescents continue to experience issues related to access to dental care, this would in turn feed into poorer oral health and dental attendance in later life, perpetuating the association between disability and poor dental attendance.

Further research is needed to explore other factors that can impact on dental attendance including reasons for attendance, type of disability and health insurance coverage. This study builds the platform for taking advantage of the longitudinal nature of the HILDA study, to examine causal relationships between transitioning to adulthood and decreased dental attendance among those with disabilities in order to develop a more oriented, affordable, effective way of ensuring regular dental care. It also positions disability as a key form of social disadvantage for oral health that needs to be addressed by implementation of equitable policies.

CONCLUSION

Dental attendance patterns are poor in those individuals with disabilities, and this appears to originate in the adolescence period. This stage in life could be the key for establishing regular dental attendance patterns to enable continuity of dental care from paediatric to adult-oriented systems.

ACKNOWLEDGEMENTS

This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the author and should not be attributed to either DSS or the Melbourne Institute.'

REFERENCES

1. GBD. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet.* 2017(10100):1211.

2. Pradhan A, Slade G, Spencer A. Access to dental care among adults with physical and intellectual disabilities: residence factors. Australia: *Australian Dental Association;* 2009:204.
3. Phadraig C MG, Burke E, McCallion P, McGlinchey E, Nunn J, McCarron M. Dental attendance among older adults with intellectual disabilities in Ireland. 2014;34(6):265-272.
4. Ellershaw A. Dental attendance patterns of Australian adults. *Australian Dental Journal.* 2014;59(1):129-134.
5. Hill KB, Chadwick B, Freeman R, O'Sullivan I, Murray JJ. Adult Dental Health Survey 2009: relationships between dental attendance patterns, oral health behaviour and the current barriers to dental care. *British Dental Journal.* 2013;214(1):25-32.
6. Donaldson AN, Everitt B, Newton T, Steele J, Sherriff M, Bower E. The effects of social class and dental attendance on oral health. *Journal of Dental Research.* 2008;87(1):60-64.
7. Cruz S, Neff J, Chi DL. Transitioning from Pediatric to Adult Dental Care for Adolescents with Special Health Care Needs: Adolescent and Parent Perspectives--Part One. *Pediatric Dentistry.* 2015;37(5):442-446.
8. Altun C, Guven G, Akgun OM, Akkurt MD, Basak F, Akbulut E. Oral health status of disabled individuals attending special schools. *European journal of dentistry.* 2010;4(4):361-366.
9. Makkar A, Indushekar KR, Saraf BG, Sardana D, Sheoran N. A cross sectional study to evaluate the oral health status of children with intellectual disabilities in the National Capital Region of India (Delhi-NCR). *Journal of Intellectual Disability Research.* 2019(1):31.
10. Ziegler J, Spivack E. Nutritional and dental issues in patients with intellectual and developmental disabilities. *The Journal of the American Dental Association.* 2018;149(4):317-321.
11. Purohit B, Singh A. Oral health status of 12-year-old children with disabilities and controls in Southern India. 2012;1(3):330-338.
12. Hennequin M, Moysan V, Jourdan D, Dorin M, Nicolas E. Inequalities in oral health for children with disabilities: a French national survey in special schools. *PloS one.* 2008;3(6):e2564-e2564.
13. Anders PL, Davis EL. Oral health of patients with intellectual disabilities: A systematic review. 2010;30(3):110-117.
14. AIHW. Older Australia at a glance. 2018; https://www.aihw.gov.au/reports/older-people/older-australia-at-a-glance/contents/health-functioning/oral-health-disease.
15. Ramsay SE, Whincup PH, Watt RG, et al. Burden of poor oral health in older age: findings from a population-based study of older British men. *BMJ Open.* 2015;5(12).

16. Thomson WM. Epidemiology of oral health conditions in older people. *Gerodontology.* 2014;31:9-16.
17. Borromeo GL, Bramante G, Betar D, Bhikha C, Cai YY, Cajili C. Transitioning of special needs paediatric patients to adult special needs dental services. *Aust Dent J.* 2014;59(3):360-365.
18. Bayarsaikhan Z, Cruz S, Neff J, Chi DL. Transitioning from Pediatric to Adult Dental Care for Adolescents with Special Health Care Needs: Dentist Perspectives--Part Two. *Pediatric Dentistry.* 2015;37(5):447-451.
19. Summerfield M, Bevitt A, Fok K, et al. HILDA User Manual – Release 17. In: Melbourne Institute: Applied Economic and Social Research UoM, ed. Melbourne 2018.
20. Richards W, Ameen J. The impact of attendance patterns on oral health in a general dental practice. *British Dental Journal.* 2003;193(12):697-702.
21. Wilkins R, Lass I. The Household, Income and Labour Dynamics in Australia Survey: Selected Findings from Waves 1 to 16. In: Melbourne Institute: Applied Economic & Social Research UoM, ed2018.
22. WHO. International classification of functioning, disability, and health : ICF. Version 1.0. Geneva : World Health Organization, [2001] ©2001; 2001.
23. Ellershaw A, Spencer A. Dental attendance patterns and oral health status. In: 208. DsarsnCnD, ed. Canberra AIHW; 2011.
24. Ward LM, Cooper SA, Hughes-McCormack L, Macpherson L, Kinnear D. Oral health of adults with intellectual disabilities: a systematic review. *Journal of Intellectual Disability Research.* 2019;63(11):1359-1378.
25. Althubaiti A. Information bias in health research: definition, pitfalls, and adjustment methods. *Journal Of Multidisciplinary Healthcare.* 2016;9:211-217.
26. Scott A, March L, Stokes ML. A survey of oral health in a population of adults with developmental disabilities: Comparison with a national oral health survey of the general population. Australia: *Australian Dental Association*; 1998:257.
27. Tiller S, Wilson KI, Gallagher JE. Oral health status and dental service use of adults with learning disabilities living in residential institutions and in the community. Great Britain: World Dental Press; 2001:167.
28. Ruth IF, Deborah C. Physical and Behavioral Health of Adults with Mental Retardation across Residential Settings. *Public Health Reports (1974-).* 2004(4):401.
29. Nowak AJ, Casamassimo PS, Slayton RL. Facilitating the Transition of Patients With Special Health Care Needs From Pediatric to Adult Oral Health Care. *The Journal of the American Dental Association.* 2010;141:1351-1356.

30. Borromeo GL, Ahmad MS, Buckley S, et al. Perception of Special Needs Dentistry education and practice amongst Australian dental auxiliary students. *European Journal of Dental Education.* 2018;22(3):E321-E326.
31. Schwarz E. Access to oral health care - an Australian perspective. Denmark: Blackwell Publishing Ltd; 2006:225.
32. Council. TCH. Australia's National Oral Health Plan 2015-2024: Healthy Mouths Healthy Lives. Adelaide SA 2015.
33. Australian Goverment. The Child Dental Benefits Schedule. 2017; http://www.health.gov.au/internet/main/publishing.nsf/content/childdental.
34. Viner R. Barriers and good practice in transition from paediatric to adult care. *Journal of the Royal Society of Medicine (Supplement).* 2001;94(40):2-4.
35. Watson R, Parr JR, Joyce C, May C, Le Couteur AS. Models of transitional care for young people with complex health needs: a scoping review. *Child: Care, Health And Development.* 2011;37(6):780-791.
36. Cook K, Langton H. *Cardiothoracic care for children and young people : a multidisciplinary approach.* Chichester, U.K. : Wiley-Blackwell, c2009.; 2009.
37. Williams T, Sherman E, Mah JK, et al. *Measurement of medical self-management and transition readiness among Canadian adolescents with special health care needs.* Vol 32010.
38. Kaufman M. Transition of cognitively delayed adolescent organ transplant recipients to adult care. *Pediatric Transplantation.* 2006;10(4):413-417.
39. Gallagher JE, Fiske J. Special Care Dentistry: a professional challenge. *British Dental Journal.* 2007;202(10):619-629.
40. Australian Goverment. Productivity Commission 2013, Annual Report 2012-13. Canberra: Productivity commission; 2013.
41. Lee J-Y, Lim K-C, Kim S-Y, Paik H-R, Kim Y-J, Jin B-H. Oral health status of the disabled compared with that of the non-disabled in Korea: A propensity score matching analysis. *PLoS ONE.* 2019;14(1).

Table 1: Descriptive characteristics of the sample (n=17,501)

Variables	Total		Disability status	
	n	%	Yes (n)	%
Age group*				
24 or less	3,253	18.6	340	10.5
25-34	3,084	17.6	348	11.3
35-44	2,788	15.9	414	14.9
45-54	2,937	16.8	624	21.3
55-64	2,418	13.8	819	33.9
65 and above	3,021	17.3	1,625	53.9
Gender				
Male	8,296	47.4	1,904	23.0
Female	9,205	52.6	2,266	24.7
Country of birth				
Australia	13,666	78.1	3,144	23.1
Main English-speaking country†	1,661	9.5	485	29.4
non-English speaking country‡	2,168	12.4	540	24.9
Region of residence				
Major city	11,027	63.0	2,375	21.6
Inner Regional Australia	4,232	24.2	1,186	28.1
Outer Regional Australia	1,949	11.1	537	27.6
Remote Australia	237	1.4	62	26.3
Very Remote Australia	51	0.3	9	17.7
Highest education level achieved				
High school or less	7,892	45.1	2,211	28.1
More than high school	9,609	54.9	1,959	20.4

* Age mean and standard deviation: 44.41 (18.96)
† Main English-speaking country (United Kingdom, the United States, Canada, Ireland, New Zealand and South Africa)
‡ Non-English-speaking country (a foreign-born person in any other country)

Weekly earnings[§]				
$-2108.931 to $646.3199 (Tertile 1)	5,835	33.3	2,252	38.7
$646.3839 to $1057.775 (Tertile 2)	5,834	33.3	1,104	18.9
$1057.877 to $15527.64 (Tertile 3)	5,832	33.3	814	14.0
Self-reported disability				
No	13,291	76.1		
Yes	4,170	23.9		
Dental attendance pattern				
Less than 2 years (irregular)	12,584	72.0	2,771	22.1
2 or more years (regular)	4,893	28.0	1,387	28.4

§ Income is imputed in HILDA therefore showing negative values

Table 2: Prevalence of dental attendance pattern of the HILDA population studied according to sample characteristics (n=17,501)**.**

Participants characteristics	Regular dental pattern		Irregular dental pattern	
	Less than 2 years (N)	%	2 years or more (N)	%
Age group				
24 or less	2,423	74.65	823	25.35
25-34	2,157	70.01	924	29.99
35-44	1,953	70.05	835	29.95
45-54	2,188	74.57	746	25.43
55-64	1,830	75.75	586	24.25
65 and above	2,033	67.5	979	32.5
Gender				
Male	5,722	69.08	2,561	30.92
Female	6,862	74.64	2,332	25.36
Country of birth				
Australia	9,777	71.64	3,870	28.36
Main English-speaking country**	1,198	72.21	461	27.79
Non-English-speaking county	1,607	74.23	558	25.77

** Main English-speaking country (United Kingdom, the United States, Canada, Ireland, New Zealand and South Africa

Region of residence				
Major city	8,162	74.09	2,854	25.91
Inner Regional Australia	2,927	69.28	1,298	30.72
Outer Regional Australia	1,297	66.75	646	33.25
Remote Australia	163	68.78	74	31.22
Very Remote Australia	31	60.78	20	39.22

Table 2 (Continued): Prevalence of dental attendance pattern of the HILDA population studied according to sample characteristics.

Participants characteristics	Regular dental pattern		Irregular dental pattern	
	Less than 2 years (N)	%	2 years or more (N)	%
Highest education level achieved				
High school or less	5,334	67.72	2,543	32.28
More than high school	7,250	75.52	2,350	24.48
Weekly earnings	3,728	64.07	2,091	35.93
$-2108.931 to $646.3199 (Tertile 1)	4,174	71.60	1,656	28.40
$646.3839 to $1057.775 (Tertile 2)	4,682	80.34	1,146	19.66
$1057.877 to $15527.64 (Tertile 3)				
Self-reported disability	9,786	73.70	3,493	26.30
No	2,771	66.64	1,387	33.36
Yes				

Table 3: Multivariable logistic regression models for the association between dental attendance and disability (n=17,461)

Disability status	Model 1		Model 2		Model 3		Model 4		Cohort 24 years of age and below (n= 3,235)	
	OR	95% Conf. Interval	OR	95% Conf. Interval	OR	95% Conf. Interval	OR	95% Conf. Interval	OR	95% Conf. Interval
No	1		1		1		1		1	
Yes	1.40	(1.30 - 1.51)	1.40	(1.29 - 1.52)	1.20	(1.10 - 1.30)	1.20	(1.10 - 1.30)	1.41	(1.10 - 1.80)

Model 1: Unadjusted

Model 2: Adjusted for age, sex, country of birth

Model 3: Model 2 + education + income

Model 4: Model 3 + region of residence

24 years of age and below (adjusted for all potential confounding factors)