

Longitudinal register study of attendance frequencies in public and private dental services in Finland

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Objective: The Public Dental Service (PDS) in Finland was recently opened to all adults. According to annual statistics, 75% of children and 51% of adults made dental attendances in 2008. This study aimed to survey the frequency of dental attendance across three years and compared attendance frequencies between age groups and treatment sectors. **Methods:** Data from municipal databases and the reimbursement register of the Social Insurance Institution were collected on all who had attended the PDS (733,000) or the private sector (473,000) in 2008 and they were retrospectively followed from 2008 to 2006. **Results:** Most children had attended the PDS in each year (57.4%) or in two of the three years (32.2%). Most working aged (57.3%) and elderly (69.1%) were annual attenders in the private sector. In addition, 27.1% of the former and 19.8% of the latter had attended in two of the three years. Attending in one year only was unusual. In the PDS, adult annual attendance was uncommon (31.9%), and adult attenders were fairly evenly distributed over the three categories, attending in one, two or all three years. **Conclusions:** Annual or biannual attendances seemed to be the norm among children in the PDS and adults in the private sector. Adults in the PDS showed irregular attendance patterns probably partly due to scarcity of resources for recall patients in the PDS.

Key words: health services research, longitudinal register study, frequency of dental visits, public, private, comparison, equity

Introduction

Dental caries and periodontal diseases can affect all ages, from small children to old people. For a lay person, recognising these diseases is difficult and thus, unlike general health care, all people from young children to the elderly are advised to make regular visits to a dentist (or alternatively, in some countries, to a dental hygienist). Use of dental services depends on several factors: perceived treatment need, financial and practical resources, ease of access, costs and cultural traditions. As in many other countries, equal access to health care and use of services according to needs have long been key elements in Finnish health policy. Several elements in the historical development of the dental care provision system have not contributed to equity, and income-related inequalities in the use of dental services were common among adults in the mid-1990s (Nguyen and Häkkinen, 2004).

Although income- and education-related inequalities in dental utilisation exist in most European countries, their magnitude varies, showing that influencing them is possible (Listl, 2012). Achieving equitable universal oral health care coverage is generally thought to require provision of accessible and affordable services for all population groups. In the European Union member states, much emphasis has been put on educating an adequate dental workforce to respond to demands and reduce financial barriers, in some countries through national health insurances, in others through public care provision systems like the Public Dental Service (PDS) in the Nordic countries. Such services have the responsibility

to offer free of charge or subsidised care for vulnerable groups (Widström and Eaton, 2004).

An obstacle to monitoring dental attendance has been the scarcity of relevant data. Adults' use of dental services has traditionally been monitored by questionnaire studies. Thus, according to a nationally representative study in 2000, 55% of the Finnish adults claimed to have made a dental visit during the previous 12 months and 69% during the previous two years (Suominen-Taipale *et al.*, 2008). Statistical information on children's dental attendances has been available annually since the 1970s and on adults since 2003. According to national statistics, 75% of the youngsters (<18 years) attended the PDS in 2008 and 1% private dentists. Correspondingly, 26.0% of adults attended the PDS (SOTKA, 2013) and 24.5% received reimbursed basic care in private practice (Kela, 2013). These conventional estimates have been interpreted to show that children's and adolescents' oral health care works satisfactorily and that adults' dental care consumption is evenly distributed between the public and private sectors but generally too low. In this study, we use these beliefs as our working hypothesis. A longitudinal study from Scotland showed that although the annual attendance rates were around 50%, in fact 80% of the population had used dental services during a six year period (Tilley *et al.*, 2005). In Finland, it has not previously been possible to gather longitudinal data earlier.

The Public Dental Service (PDS) in Finland, financed by taxation and patient fees and run by local municipalities, was established in the early 1970s. During the first ten years, it catered almost entirely for children

and youngsters (free of charge). Since the 1980s, young adults, age group by age group, were successively given access to the subsidised services of the PDS. Some special needs groups also became eligible. At the same time, basic care in the private sector started to be reimbursed from the National Sickness Insurance (SII; financed by taxation and employees) for the same younger adult age groups. The older adults were expected to use private services or clinical dental technicians (denturists) and to pay all costs themselves. High levels of edentulousness, (25% of all adults and 64% of 65+ year-olds.), in the late 1970s (Nyman, 1983), made this unequal care provision and reimbursement system acceptable. In 2002, a major Dental Care Reform abolished the age restrictions and adults older than 46 years (about 40% of the adult population) were given access to the PDS. Reimbursement of care (except prosthetics) provided by private dentists was also extended to older age groups. The reform resulted in long waiting lists for the PDS, partly because of increased demands and because their dental workforce had not been increased (Niiranen *et al.*, 2008). The introduction of Care Guarantee legislation in 2005, stipulated further that emergency dental services should be offered immediately or within three days and examinations and care within six months in the public sector.

The aim of this study was to study the frequency of dental attendances over a three year period and to compare the attendance frequencies of children and youngsters, working aged and the elderly, and between the PDS and the private sector. Comparisons were also made in relation to the size of the local municipalities managing the PDS units and their geographical locations.

Material and methods

Chief dentists in the PDS were asked to collect the statistical data from their municipal databases. The residents' unique identifiers were used to trace those who had used dental services in 2008 and they were retrospectively followed from 2008 to 2006. Such data were available from 72 PDS units (37%). Data on private dental attendances in the same geographical areas were collected using the reimbursement register of the SII. For private practices only visits to dentists were recorded while the PDS data also included those (mostly youngsters) who

had visited dental hygienists. Patients were grouped by age (<18, 18-64 or 65+ years) and into those who had made dental visits in one, two years or all three years during 2008-2006. The PDS units were further grouped by size: <20,000, 20,000-49,999 and 50,000+ inhabitants and by geographical areas, i.e. the five counties. Chi-square analysis was used for comparisons between groups.

Approval to conduct the study in the PDS was given by one of the Directors of the R&D Centre of Welfare and Health (STAKES), as was customary when register data without sensitive personal information were used to survey service quality, which by law was one of the obligations of the R&D Centre. Thus approval by an Ethical Committee was not necessary. The SII approved the data collection from its register.

Results

Consider first the use of services in 2008. A great majority of the children and youngsters, half of the working age population, and slightly under half of the elderly had one or more dental attendances in 2008. Nearly all youngsters had visited the PDS. Working age attenders were roughly evenly distributed between the treatment sectors but, among the elderly more had visited private sector dentists ($p<0.001$) (Table 1).

Working age adults made up 79.6% of the patients in private practice but only half of the patients (47.5%) in the PDS. In the latter, 43.7% of the patients were children and youngsters and 8.5% 65 years or older. In private practice 19.0% were elderly and 1.4% children.

Turning to the use of services across the three year period, more than half of the children and youngsters had attended the PDS all the three years (57.4%) and 32.2% in two years. Half of the working aged (53.7%) and 69.1% of the elderly were annual attenders in the private sector and made visits every year. About a quarter of the former and a fifth of the latter attended a dentist in two of the three years. Having attended only in one year was the least common option in private care. In the PDS, the attendance pattern was different. The working age attenders were rather evenly distributed over the three categories. Among the elderly, annual visits were more usual (Table 2).

Table 1. Age distribution of the total population in the participating municipal PDS units' uptake areas (n and %) and those persons (n and % of the corresponding age group in the total population) making one or more dental attendances in 2008 by age group and treatment sector

Age in years	Total population in the PDS units' up-take area		Those with dental attendances in 2008		Those having attended the PDS		Those having attended the private sector	
	n	%	n	% of total population	n	% of total population	n	% of total population
0-17	432,831	19.5	326,789	75.5	320,221	74.0	6,568	1.5
18-64	1,410,742	63.7	727,860	51.6	350,732	24.9	377,128	26.7
65+	371,752	16.8	152,207	40.9	62,251	16.7	89,956	24.2
All ages	2,215,325	100.0	1,206,856	54.5	733,204	33.1	473,652	21.4

Table 2. Dental attendance pattern during 2008-2006 of those persons making one or more dental attendances in 2008 by age group and treatment sector

Age group	PDS		Private sector		
	attending in	n	%	n	%
0-17 years		320,221	100	6,568	100
2008 only		33,242	10.4	4,162	63.4
2 of the 3 years		103,048	32.2	1,511	23.0
all 3 years		183,931	57.4	895	13.6
18-64 years		350,732	100	377,128	100
2008 only		113,977	32.5	72,174	19.1
2 of the 3 years		124,737	35.6	102,362	27.1
all 3 years		112,018	31.9	202,592	53.7
65+ years		62,251	100	89,956	100
2008 only		17,958	28.8	9,979	11.1
2 of the 3 years		18,447	29.6	17,830	19.8
all 3 years		25,846	41.5	62,147	69.1

Annual attendances by children and youngsters were more common in the smallest PDS units (<20,000 inhabitants, $p<0.001$), where 69.0% attended each year, than in the largest units (>50,000) where only 51.2% did so. In the medium sized units the corresponding figure was 58.6%. In the private sector, there were no significant differences in this respect (12.5%; 13.5%; 13.8%, small to large).

Among working age patients and those 65+ years old, annual attendance was more common in smaller PDS units than in the big ones ($p<0.001$), indicating greater demand in the bigger units (Figure 1). In the private sector, the share of annual attenders among the working aged was highest in the medium sized municipalities and among the elderly, highest in the large municipalities, possibly related to edentulousness being not so common in towns and cities. All differences between the groups in the private sector were statistically significant ($p<0.001$).

Geographically, the share of annual attenders among children and adolescents varied between 49% in West Finland and 63% in the Mid-North region (Figure 2).

In the two northernmost counties, the proportions of annual attenders among the working aged in the PDS were lower than in the other counties ($p<0.01$) as it was for the elderly, though their difference was greater ($p<0.01$) (Figure 3). The same pattern could also be seen among annual attenders to private practices where the differences between the northernmost two counties and the rest were significant both for working-aged and elderly patients ($p<0.001$).

Discussion

Collecting longitudinal data from the individual municipal PDS databases was found to be demanding. Many municipal merges had occurred preventing data collection and a number of PDS units were not able to do the special programming needed for longitudinal data extraction. The proportions of children (74%) and adults (23%) who had attended the PDS in 2008 in the participating

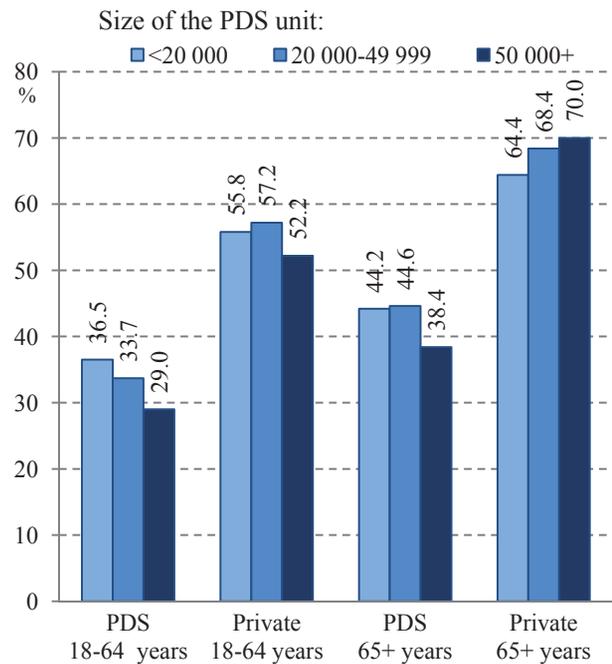


Figure 1. Proportion (%) of the adults who attended in all three years, 2006 to 2008, by age group, treatment sector and size of the municipal PDS unit (number of inhabitants)

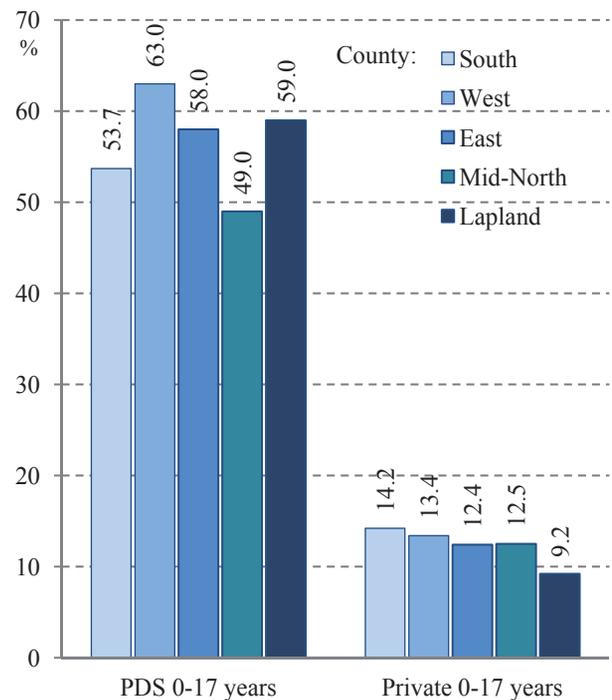


Figure 2. Proportion (%) of the children (0-17 years) who attended in all three years, 2006 to 2008, by treatment sector and geographical area (county)

PDS units were quite close to the national figures for that year, (75%) and (21%) respectively (SOTKA, 2013) and they covered almost half (42% of 5.3 million) of the national population. All data from the private sector were collected centrally by the SII and there were no problems obtaining them. The limitation here was that prosthetic treatments, not reimbursed, were not registered. The

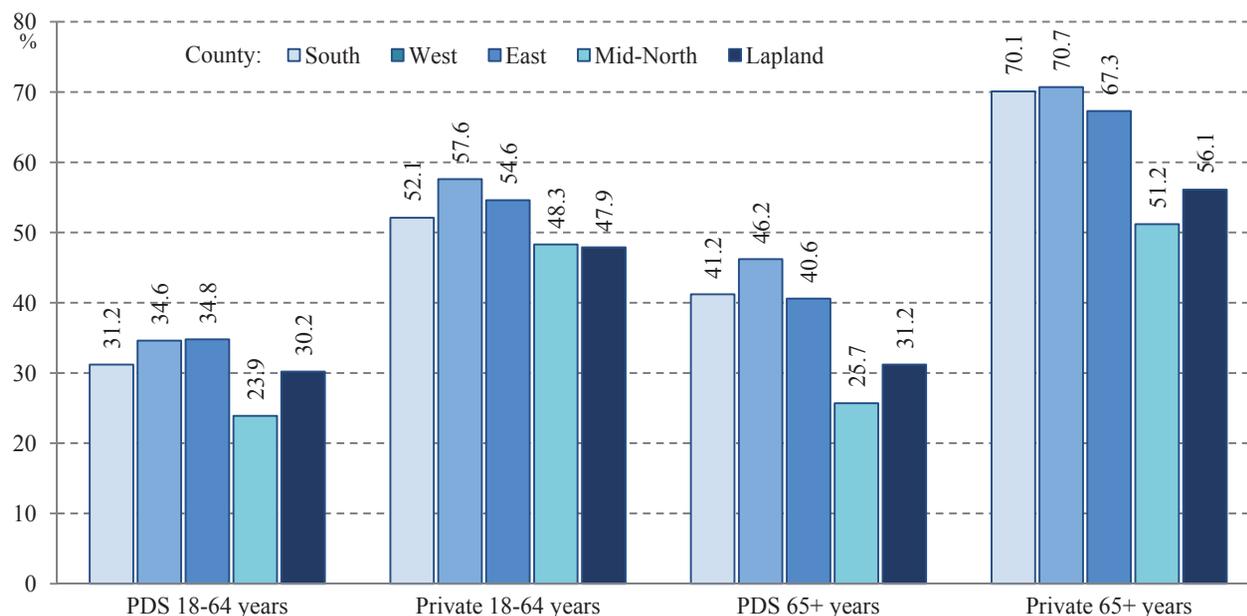


Figure 3. Proportion (%) of the adults who attended in all three years, 2006 to 2008, by age group, treatment sector and geographical area (county)

number of patients who had merely prosthetic treatment without reimbursement for examinations or radiographs can be considered low, especially because full dentures can be provided by independent clinical dental technicians. Due to the separate patient registers it was not possible to check how many individuals had attended both sectors. In the Helsinki metropolitan region, 9% of the adults claim to have used both the PDS and the private sector. It is common for private patients to have emergency treatment in the PDS. More than half of the adults claim not to be able to pay for private dental care (Widström and Seppälä, 2012). With these limitations, our material can be considered to be satisfactorily representative of the Finnish circumstances. Because we had no data on reasons for the attendances or their types, the results need to be interpreted in the light of information from other studies.

The study showed that more of the annual dental attenders (70% attended in all the three years) could be found in the oldest age group, in the private sector and in the biggest municipalities (cities) in Southern and Southwest Finland, closely followed by children and adolescents in the PDS in the smallest municipalities (68%). Most private dentists work in the bigger cities in the south and, on the other hand, the PDS has, for historical reasons, relatively better personnel resources and probably lower demand from adults in the smaller municipalities.

Children's attendance pattern in the PDS and adults' in the private sector were rather similar. For example, more than half of them had attended each year and the next biggest group visited in two of the three years. In the 1970s and 1980s, systematic care and full annual coverage based on a recall system of all children and adolescents was emphasised and about 90% of the 12-year-olds were seen every year. In the 1990s, a best practice guideline was published as children's caries situation had improved. This recommended individual recall

intervals between three months to two years for those under 18 years, depending on oral health status and risk factors (Lahti *et al.*, 2001). The recommended check-up intervals for healthy children were longer than the present NICE guidelines in Britain (NCGCACC, 2004). Today, most children and adolescents have good oral health; the PDS units recall them regularly for examinations and all preventive, all conservative and most specialist care (e.g. orthodontics) are free. Much of the care is provided by dental hygienists to save dentists' resources for more demanding tasks (Suominen-Taipale *et al.*, 2009; Widström and Järvinen, 2011). Attendances to the private sector are unusual, probably due to lack of such tradition and the need to pay for part of the treatments (62.6% in 2008).

The frequent attendance among adults in private practice can be explained mainly by two things: well-off patients motivated to take care of their teeth and dentists motivated to keep their good patients. Attending a private dentist has been and still is more common among adults with higher income and education while those with lower income and education tend to visit a public dentist (since 2003, when it became possible). Also, oral health has improved and edentulousness is less common in this group than in those with a lower status (Nyman, 1987; Suominen-Taipale *et al.*, 2008; Nguyen and Häkkinen, 2004); they have had more teeth to be treated and also had more advanced treatments (e.g. crowns and bridges) rather than removable dentures (Nihtilä and Widström, 2005). Furthermore, regular recalls are widely in use and considered the most important marketing tool in private practice (Widström *et al.*, 2011).

The great difference in adults' attendance patterns between the private and public sectors is of concern. In private practice, most adults attended regularly while those with the PDS are more irregular attenders. Part of the difference can be explained by the recently introduced responsibility (Care Guarantee) for the PDS to organise necessary emergency services for the whole population,

including anyone usually attending private dentists. A survey of the performance of the PDS in 2006 showed that 35% of working aged and 6% of the older patients had made emergency attendances that year (Widström *et al.*, 2008). It is likely that the Dental Care Reform brought new patients to the PDS from adult groups previously unused to regular dental care. The rather low total numbers of elderly treated in the PDS in this study is likely to be related to their edentulousness. In 2000, 44% of those aged 65 years or more had lost all their teeth, compared with only 6% of those aged 30-64 years (Suominen-Taipale *et al.*, 2008). Due to long waiting lists at the PDS and the lack of personnel resources, most PDS units did not offer recall appointments for adults after the Dental Care Reform. Instead, patients were advised to make new appointments after a recommended time period and are then put on the waiting list again (Widström *et al.*, 2010).

In times of diminished resources for health care and increased need and demand for dental care, especially among the elderly, efficient use of the available resources has become crucial. In this situation, utilisation of services on a needs basis and not by routine is important. Our study showed that children and adolescents under 18 years made up about 20% of the population in the study area but almost half (44%) of the patients in the PDS. It is obvious and to be expected that just a few years after the major Dental Care Reform, the PDS had not fully adjusted to its new role as care provider for the whole population. Besides personnel resources, this is also a question of leadership. Being an administrating dentist in the PDS has not been a highly desirable job (Alestalo and Widström, 2011). Leadership demands hard work, particularly after the Dental Care Reform, especially as half of the PDS dentists did not see that the abolition of patient age limits made their clinical work more demanding and complex.

The turnover of patients was great in the PDS and we can roughly estimate that 45%-50% of the working aged population had attended the PDS during the study period. For the private sector, the corresponding proportion in the study area, counted by the SII, was 39%. When taking into consideration that 10% might have used both sectors, it seems possible that 75%-80% of the working aged population had attended a dentist during the three year period. For the oldest age group, we estimate that 30%-35% attended the PDS and the true proportion for the private sector was 35%. These figures indicate that the initial hypothesis of a low attendance pattern among adults was incorrect. Similarly it was obvious that the PDS, in addition to catering for practically all youngsters, also cares for a slightly larger proportion of adults than does the private sector and thus our second hypothesis was also incorrect.

Little can be said about the quality of care provided. Dentists, dentists' associations and commercial companies have been recommending regular and frequent dental check-ups for their patients and for people in general for many years. A Cochrane review found insufficient scientific evidence to draw any conclusions about the beneficial or harmful effects of the recall periods and could give no recommendations (Beirne *et al.*, 2007). Kay reported evidence to suggest that people benefit from an annual checkup, but she also highlights a study indicating

the adequacy of either a 13- or a 120-month interval. She concludes that choices of optimal recall intervals should be made individually (Kay, 1999). Unfortunately, health fund rebate periods, and existing perceptions and practices appear to have a strong influence on recall periods. Many health funds stipulate that they will subsidise an examination every six months or one year, which may indicate acceptable rather than necessary intervals. In Finland, private dentists emphasise annual recalls and the SII reimburses one examination a year. The PDS advises individualised recall intervals, tailored to patient needs in theory, but in practice only recalls those younger than 18 years. Thus generally speaking, the adults who are less in need of treatment and have generally better oral health use services more frequently than those more in need of care and part of the difference can clearly be attributed poor access to care.

Conclusions

Annual or biannual attendances seemed to be the norm among children in the PDS and among adults in the private sector. Adults in the PDS showed irregular attendance patterns probably partly due to scarcity of resources for recall patients in the PDS.

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