

# Current Status and Trends in Oral Health in Community-dwelling Older Adults: A Global Perspective

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**Purpose:** To record the available current national and regional data on the oral health of community-dwelling (living in their own homes, not institutionalised) older people globally and discuss the future trends considering existing dangers and opportunities.

**Materials and Methods:** A literature search on tooth loss, dental decay and periodontal disease in the elderly was performed using available databases and electronic sources.

**Results:** The findings revealed that the updated national data are scarce in many parts of the world, particularly in Africa, Asia and South America, and direct comparisons are not always possible due to methodological variations. The available information may indicate that dental disease in older adults worldwide is more prevalent compared to younger age groups, with significant variation between countries and regions. Tooth loss is currently more common in the developed countries, while dental decay and periodontal disease are more widespread globally. There are important threats for further deterioration of the oral status among older adults in many developed and less developed areas due to existing sociodemographic and economic risk factors.

**Conclusion:** National studies should be undertaken to record the specific oral problems of the elderly in each area. It is also necessary to develop gerodontology study programmes globally at the undergraduate, postgraduate and continuing education levels which will enhance dentists' knowledge, skills and attitudes towards oral care in the older population, and will promote opportunities for further research and development of relevant policies.

**Key words:** dental caries, elderly, oral health, periodontal disease, tooth loss

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Human populations are aging worldwide. The mean global life expectancy at birth has increased from 64 years in 1990 to 68 years in 2009 (WHO, Global Health Observatory Data Repository). The proportion of the population over 60 years of age was 11% in 2009, ranging from 5% in Africa to 22% in Europe, but within the next 40 years it will almost double in most areas of the world (United Nations, 2009). The World Health Organisation, based on the available data, identified the increased prevalence of oral disease in older adults and stressed the need for population-orientated oral health-promotion programmes (Petersen et al, 2010). In order to establish such policies, current

data representative of the local older population are necessary. National studies on the oral health of the local populations, including the elderly, have been recently published for many countries, such as Canada (Ministry of Health of Canada, 2010), the USA (Dye et al, 2007), New Zealand (Haisman et al, 2010), the UK (Adult Dental Health Survey 2009, 2011), China (Hu et al, 2011), Pakistan (Khan, 2004), Hungary (Madléna et al, 2008), Germany (Micheelis and Schiffner, 2006), Australia (Slade et al, 2007) and Finland (Suominen-Taipale et al, 2008), but the information available in the dental literature is limited for many regions of the world.

The aim of this study was to investigate the available information on the current global oral health status in community-dwelling (living in their own homes, not institutionalised) older adults recorded by national and regional surveys and to discuss the future trends taking various existing threats and opportunities into consideration.

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## MATERIALS AND METHODS

A literature search on the oral health of elderly people was performed up to January 2012 using PubMed, the Country/Area Profile Project database (WHO Headquarters Geneva and WHO Collaborating Centre), the Periodontal country profiles database and an extensive Google search on any published national survey data on the oral health of the community-dwelling elderly. Data on tooth loss, periodontal disease and dental decay were recorded. Only reports on the oral health status in community-dwelling elderly were included, as the oral health in the homebound and those living in long-term care settings presents different characteristics. Only when national surveys were not available were subnational and regional data included. A hand search on references in articles and electronic material was also performed. The original search included data gathered after 2000 published in the English language. Only when data recorded after 2000 were not available were previous data included. No further statistical analysis was performed

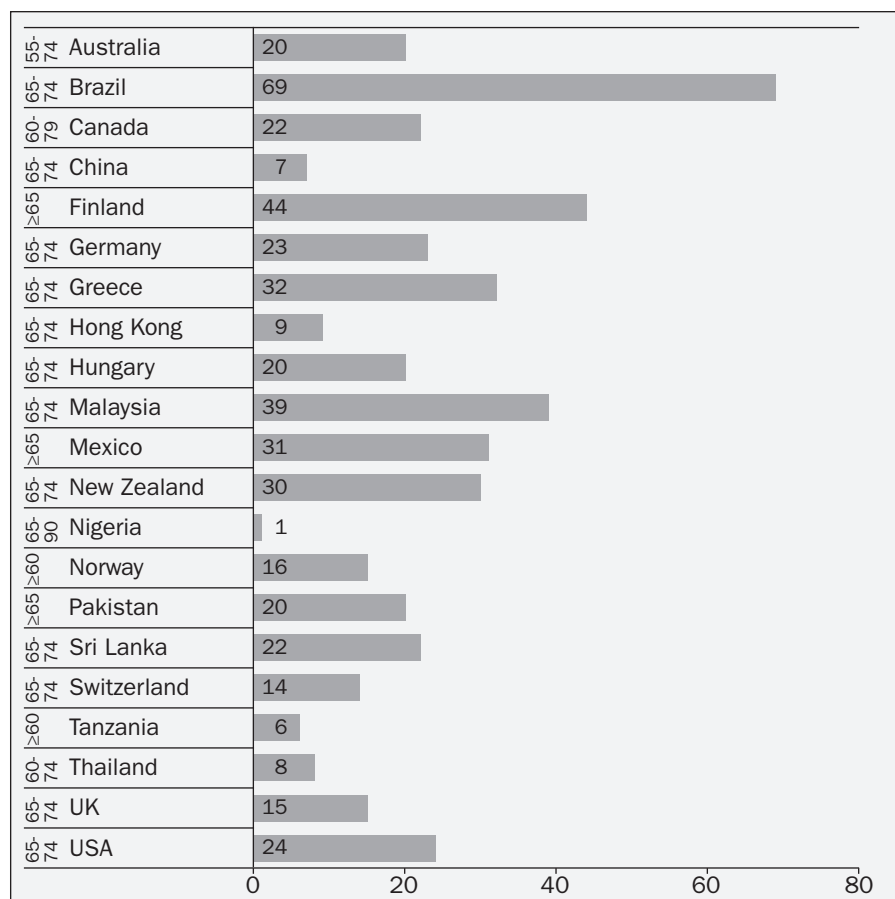
and the data are presented as obtained from the original sources.

## RESULTS

### Tooth loss

Three indicators for tooth loss will be discussed: complete edentulism (Fig 1), suboptimal dentition (less than 21 natural teeth), the mean number of remaining natural teeth and complete dentition (28–32 teeth) (Table 1).

The rate of complete tooth loss varies between different countries and regions (Fig 1) (Department of Health, Hong Kong, 2001; Khan, 2004; Sarita et al, 2004; Taiwo and Omokhodion, 2006; Dye et al, 2007; Slade et al, 2007; Holst, 2008; Madléna et al, 2008; Suominen-Taipale et al, 2008; Zitzmann et al, 2008; Rihs et al, 2009; Haisman et al, 2010; Ministry of Health of Canada, 2010; Adult Dental Health Survey 2009, 2011; Hu et al, 2011; Mamai-Homata et al, 2012, WHO Oral Health Country /



**Fig 1** The rate of edentulism (%) in older persons in selected countries.

Area Profile Project) but direct comparisons are not possible due to variation in the methodology applied. In some studies, the data were regional (e.g. Brazil, Tanzania, Nigeria) and the study was conducted before 2000 (Brazil, Nigeria, Tanzania). Edentulousness is common in many countries in Europe, America, and Oceania but is rare in Africa and in many Asian countries. The rate of edentulism can also differ between regions in the same country (Shah et al, 2007). Living in rural areas (Slade et al, 2007; Norderyd et al, 2011) or having lower income (Dye et al, 2007) are important predictors of tooth loss. In all studies, the rate of edentulism significantly increases in the oldest elderly (Suominen-Taipale et al, 2008; Adult Dental Health Survey 2009, 2011; WHO Oral Health Country/Area Profile Project).

National and subnational surveys have shown that a significant proportion of the dentate elderly have fewer than 20 natural teeth (Table 1) (Slade et al, 2007; Rihs et al, 2009; Vyšniauskaite, 2009; Haisman et al, 2010; Ministry of Health of Canada 2010; Adult Dental Health Survey 2009, 2011; Norderyd et al, 2011; Mamai-Homata et al, 2012). The range varies from 28.6% in Australians aged 55–74 years (Slade et al, 2007) to 81.9% in older Brazilians in Sao Paulo (Rihs et al, 2009). In the Guangdong Province of China, half of those aged 65–74 years in 1997 had 20 or more teeth not indicated for extraction (Lin et al, 2001). Complete dentitions were not frequent in older people (Department of Health Hong Kong, 2001; Sarita et al, 2004; Ministry of Health of Canada, 2010) (Table 1). However, a study conducted in 690 older

**Table 1 Tooth status in the older adults in selected countries**

Country	Year of study	Age (years)	% of dentate with less than 21 teeth	Mean number of teeth present	% with complete dentition
Australia	2004–2006	55–74 ≥75	28.6 55.1		
Brazil, Sao Paulo	1998	65–69 70–74	81.9 (all ages)	12.1 9.7	
Canada	2007–2009	60–79	42.2	19.4	8.6 (28 teeth)
Finland	2000–1	65–74 ≥75 >65		16.3 13.4 15.4	
Greece	2005	65–74	66.4	15.2	
Hong Kong	2001	65–74		17.0	1.9 (32 teeth)
Lithuania	1999–2001	≥60	75	16.2	
New Zealand	2009	65–74 ≥75	45.1 46.0	19.7 18.1	
Nigeria, Ibadan	1998–99	65–90		27.5	48
Norway	1996–99	67–99	51	17.2	
Spain, Valencia	2006	65–74		14.9	
Sri Lanka, Colombo District	2007 (year of publication)	≥60		13.4	
Tanzania, Coastal zone	1998–2000	≥60		19.9	13
UK	2009	65–74 75–84 ≥85	39 60 74	20.9 17.1 14.0	21 (27–31 teeth) 8 4
USA	1999–2004	65–74 ≥75		19.3 18.4	

Data from Spain, Brazil, Sri Lanka, Nigeria and Tanzania are subnational.

adults in Ibadan, Nigeria in 1998/9 revealed that 48% of the older participants had no missing teeth (Taiwo and Omokhodion, 2006).

The mean number of remaining natural teeth in older populations is usually fewer than 20 and significantly decreases with increasing age (Table 1) (Department of Health, Hong Kong, 2001; Sarita et al, 2004; Taiwo and Omokhodion, 2006; Dye et al, 2007; Kularatne and Ekanayake, 2007; Suominen-Taipale et al, 2008; Rihs et al, 2009; Vyšniauskaite, 2009; Eustaquio et al, 2010; Ministry of Health of Canada, 2010; Adult Dental Health Survey 2009, 2011; Haisman et al, 2010; Norderyd et al, 2011; Mamai-Homata et al, 2012). The variance recorded is high: 9.7 in Sao Paulo, Brazil (Rihs et al, 2009) but 27.5 in Ibadan, Nigeria (Taiwo and Omokhodion, 2006). As previously mentioned, it is difficult to make comparisons because of variation in the methodology applied.

However, the presence of natural teeth is not an indication of adequate oral dentition when tooth remnants are also included. In many African studies not limited to the elderly, a large number of teeth should have been extracted but remain in the mouth because no dental care is available (Baelum and Sheutz, 2002). A study conducted in 1998–1990 in two Tanzanian regions showed that extractions were needed in 33.6% of those aged 55 years and older in Mbeya and in 53.3% of those living in Tanga (Mosha et al, 1994). In southern China, residents of urban and rural areas had similar numbers of missing teeth, but more teeth needed extraction in the rural adults because of poor access to dental care (Lin et al, 2001).

### **Trends in tooth loss**

In many countries, particularly the developed ones, there was a trend toward reduction in complete edentulism in the recent years (Dye et al, 2007; Holst 2008; Hugoson et al, 2008; Madléna et al, 2008; Adult Dental Health Survey 2009, 2011; Hu et al, 2011; Mamai-Homata et al, 2012). For example, in Norway, complete tooth loss decreased from 52.9% in 1975 to 16.4% in 2002 for those over 60 years of age (Holst 2008). The number of persons with functional dentitions also presents a tendency to increase in some developed countries (Slade et al, 2007; Holst, 2008; Haisman et al, 2010). In the less developed countries, the tendencies for partial or complete tooth loss are not clear. In the rural areas of mainland China in the early years of the

21st century, there were still traditionally trained dental providers who extracted severely decayed or mobile teeth instead of providing restorative care (Lin et al, 2001). In Africa, the access to dental care is limited and teeth are often left untreated or are extracted to relieve pain (Petersen, 2004). In Tanzania, the increased presence of emergency dental care in rural health centers and other strategic places is expected to increase the rate of extracted teeth (Mosha et al, 1994). If emergency dental care is more frequently provided in these areas, tooth loss is expected to increase. The low dentist:patient ratio and the financial barriers in many less developed areas preclude the retention of restorable teeth for the near future.

### **Dental caries**

As many older people retain natural teeth, dental decay remains common, because of the various age-related risk factors which are not easily controlled (diet, cleaning habits, compromised general medical condition, lack of preventive measures). Dental decay in the elderly is particularly common in Europe, America and the Eastern Mediterranean (including countries in Asia and Africa such as Jordan, Egypt, Morocco, Sudan, Pakistan, Afghanistan, Yemen, United Arab Emirates, etc) WHO Regions (Petersen et al, 2010). Untreated coronal caries in older adults was recorded in many surveys: in 35% of those aged 75–84 years in the UK (Adult Dental Health Survey 2009, 2011), in 16% of those aged 60–79 years in Canada (Ministry of Health of Canada, 2010), in 31% of those aged 60 years and over in southern Vietnam (Nguyen et al, 2010) and 51.6% to 95.1% of the elderly in various states in India (Shah et al, 2007). Untreated root caries was recorded in 29.3% of those older than 75 years in New Zealand (Haisman et al, 2010) and in 21.5% of those aged 65–74 in Hong Kong (Department of Health, Hong Kong, 2001). The reported root caries experience in older people in China ranged from 43.9% in Hubei Province (Du et al, 2009) to 57% in Beijing and Shanghai (Hu et al, 2011). Forty-four percent of the older adults in the southwest of Mexico City had experienced root caries (Sánchez-García et al, 2007), while its prevalence in the Colombo district of Sri Lanka was 89.7% (Kularatne and Ekanayake, 2007).

The DMFT index (mean number of decayed, missing due to decay or filled teeth) has been applied in many surveys and has shown that decay experi-



ence varies between different countries (Table 2) (Department of Health, Hong Kong, 2001; Khan, 2004; Dye et al, 2007; Shah et al, 2007; Slade et al, 2007; Madléna et al, 2008; Haisman et al, 2010; Ministry of Health of Canada, 2010; WHO Oral Health Country/Area Profile Project). The analysis of the DMFT index reveals that missing teeth in the elderly are frequent in all areas. Filled teeth were common in many developed countries (Canada, Australia, New Zealand, Japan, USA, many European countries), but rare in the less developed ones. In China, 78.9%–91.7% of carious teeth in middle-aged and older people have been left untreated (Hu et al, 2011). Fillings are also rare in Africa where carious teeth are often extracted even if they could be conservatively treated, due to lim-

ited access to care (Baelum and Sheutz, 2002; Sarita et al, 2004).

### Trends for dental decay

There is no clear tendency for the future global prevalence of dental decay in the older population. In many developed countries, decay prevalence has decreased during the past 25 years. In the USA, the prevalence of dental caries in seniors remained unchanged but untreated decay decreased between 1988–1994 and 1999–2004 (Dye et al, 2007). In Canada in a 38-year period (comparing 1970–72 and 2007–2009), the prevalence of coronal caries for those aged 60 years and over has increased from 91% or 92% to 100%, but the severity has

**Table 2 The DMFT index in older adults in selected countries**

Authors/ country	Age	Years	DMFT	DT	MT	FT
Australia	65–74 ≥75	2004–2006	23.3 24.3	0.4 0.4	12.0 14.1	10.9 9.8
Austria	65–74	2000	23.3	0.3	18.1	5.0
Brazil	65–74	2002–2003	27.8	1.2	25.8	0.7
Canada	60–79	2007–2009	15.7	0.4	5.6	9.8
Denmark	65–74	2000–2001	24.8	0.8	12.0	12.0
Gambia	≥65	1995	8.8	3.2	5.6	0.0
Germany	65–74	2005	22.1	0.3	14.1	7.7
Hong Kong	65–74	2001	17.6	1.3	15.1	1.2
Hungary	65–74	2003–2004	21.9	2.0	18.9	1.0
India	65–74	2005	2.9–15.5			
Japan	65–69 70–74	2005	20.8 22.6	1.1 1.0	10.1 13.1	9.6 8.5
Mexico	≥65	2008	18.9	5.8	11.0	2.0
New Zealand	65–74 ≥75	2009	24.2 24.8	0.6 0.5	12.1 13.7	11.5 10.6
Pakistan	≥65	2003	17.7	4.4	12.9	0.4
Spain	65–74	2005	16.8	1.4	13.8	1.6
Sri Lanka	65–74	2002–2003	17.1	1.8	15.2	0.1
Tanzania	≥50	2004	3.7	1.6	2.1	0.0
Thailand	60–74	2000–2001	14.4	2.1	12.2	0.1
Turkey	65–74	2004–2005	25.8	1.0	24.6	0.2
USA	65–74 ≥75	1999–2004	17.7 18.3	0.4 0.5	8.3 9.4	9.0 8.4

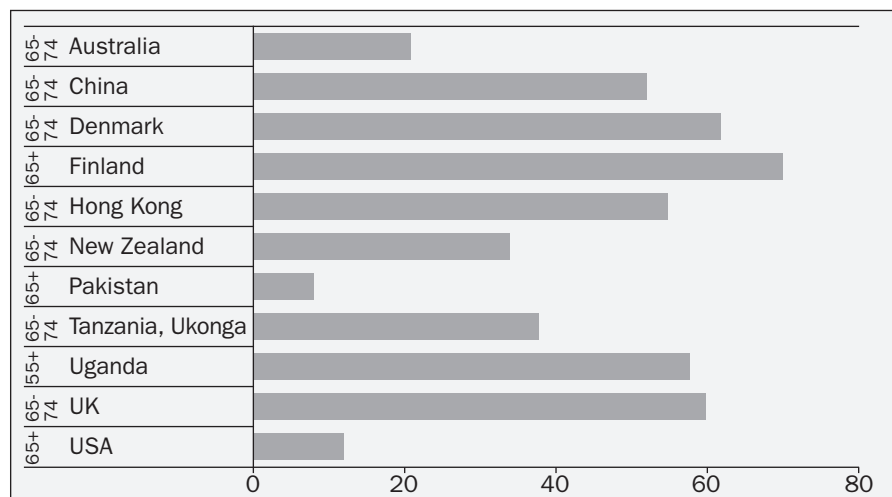
dropped (Ministry of Health of Canada, 2010). A ten-year cross-sectional study (1987–1997) in elderly persons living in Göteborg, Sweden, has shown that 95% of the participants had developed at least one carious lesion in that period (Fure, 2004). In Germany, caries experience has fallen from 1997 to 2005, but root caries prevalence specifically has increased, with 45% of senior citizens having at least one carious or filled root surface (Micheelis and Schiffner, 2006). National surveys in China have shown an increase in caries prevalence in older adults (Hu et al, 2011) (Du et al, 2009). The incidence of dental caries in all age groups is also expected to increase in many African regions, due to dietary changes and inadequate exposure to fluorides (Petersen, 2004). The use of fluoride is uncommon in Africa and tooth cleaning mainly includes chewing sticks or sponges, cotton-plant leaves with ash, use of cloth or fingers, tooth brush, while contradictory results have been reported on the efficacy of some traditional methods compared to toothbrushing (Baelum and Sheutz, 2002).

### Periodontal disease

Various risk factors (poor oral hygiene, tobacco smoking, trauma, general medical condition, etc) accumulating throughout a person's life predispose to increased prevalence of periodontal problems in the elderly. Periodontal disease increases the risk of developing root caries and chewing problems and may lead to tooth loss (Boehm and Scannapieco, 2007). There is increased difficulty in recording and comparing periodontal status in the elderly worldwide because of the lack of current informa-

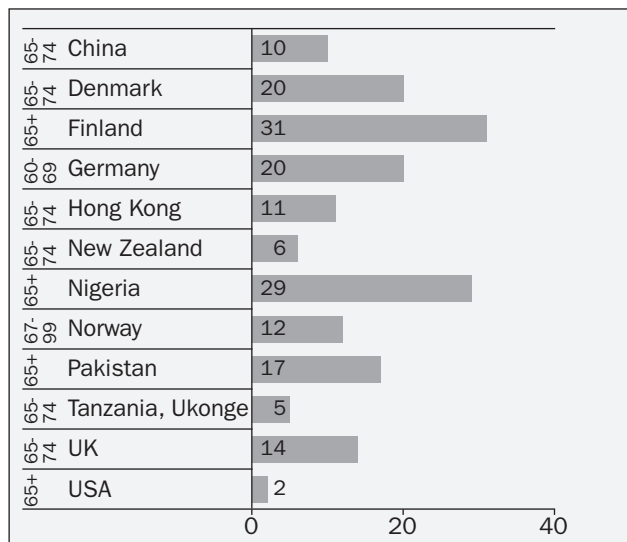
tion and the variation in the methodology applied. However, most studies agree that few elderly people have a healthy periodontium. The increased variability in the prevalence of moderate ( $\geq 4$  mm) and deep pockets ( $\geq 6$  mm) in different countries is presented in Fig 2 (Department of Health, Hong Kong, 2001; Baelum and Sheutz, 2002; Khan, 2004; Krustrup and Petersen, 2006; Dye et al, 2007; Suominen-Taipale et al, 2008; Mumghamba, 2009; Haisman et al, 2010; Adult Dental Health Survey 2009, 2011; Hu et al, 2011) and Fig 3, respectively (Department of Health Hong Kong, 2001; Khan, 2004; Taiwo et al, 2004; Krustrup and Petersen, 2006; Dye et al, 2007; Suominen-Taipale et al, 2008; Holtfreter et al, 2009; Mumghamba, 2009; Haisman et al, 2010; Adult Dental Health Survey 2009, 2011; Corbet and Keung Leung, 2011; Norderyd et al, 2011), but data from Africa are older than those from other regions. The degree of attachment loss also varies between countries and regions. Attachment loss of 4 mm and more was recorded in 96.1% of those aged 60–69 years in the region of Pomerania, Germany (Holtfreter et al, 2009), in 67% of those aged 65–74 years in the UK (Adult Dental Health Survey 2009, 2011), in 91.7% for those aged 65–74 in Hong Kong (Department of Health Hong Kong, 2001) and in 92.7% for those aged 65–74 years in Chile (Gamonal et al, 2010). Studies in Asia have shown that in some areas, attachment loss is more prevalent than periodontal pockets (Corbet and Keung Leung, 2011).

Data on periodontal disease in older adults in Central and Latin America, Asia and Africa published in the English language are rare. Gjermo et al (2002) reported that in Central and South America, moderate periodontitis in the elderly has been reported in



**Fig 2** The prevalence of moderate periodontal pockets (%) in older persons in selected countries, as reported in various studies. Direct comparisons are not always possible due to variations in the methodology applied.

29%–49% of the population and severe periodontitis in 7%–71%. In Africa, data are scarce and not up to date; furthermore, most studies were subnational. A 1987–1988 study in Ukonga, Tanzania, revealed that moderate periodontitis was recorded in 37.9% of those aged 65–74, but severe periodontitis was rare (5.2%) (Mumghamba, 2009) (Figs 2 and 3). However, in the South East Local Government Area of Ibadan, Nigeria, the prevalence of severe periodontitis was 29% in older people (Taiwo et al, 2004).

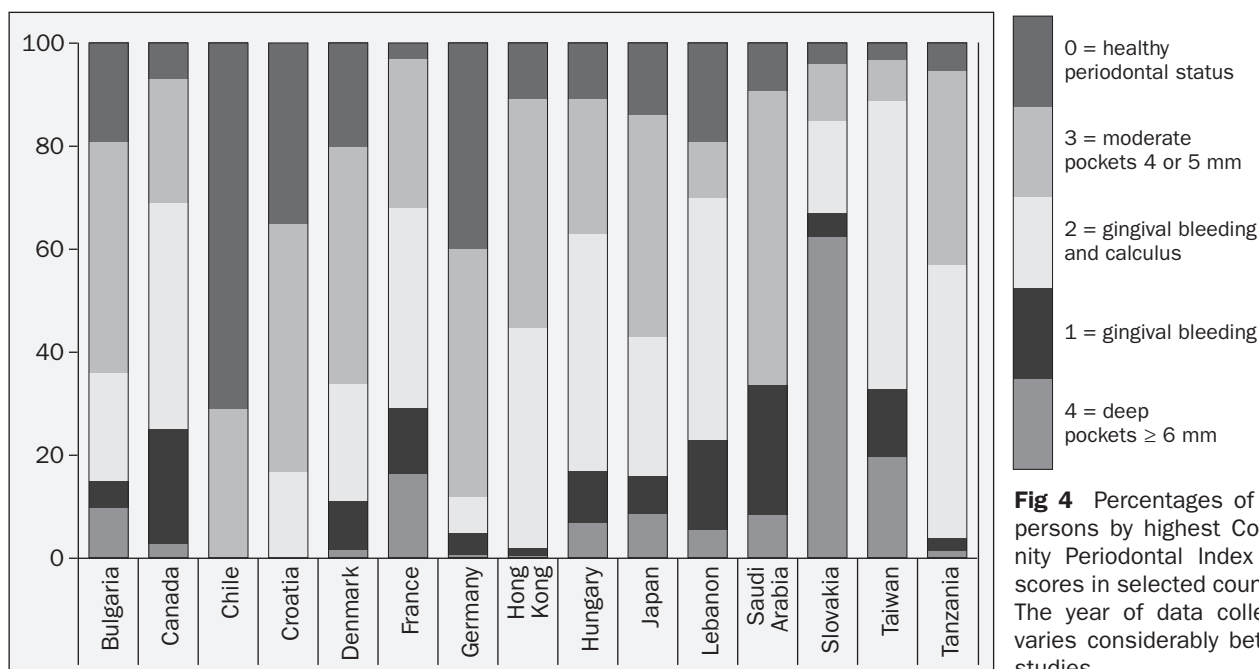


**Fig 3** The prevalence of deep periodontal pockets (%) in older persons in selected countries as reported in various studies. Direct comparisons are not always possible due to variations in the methodology applied.

Using the Community Periodontal Index (CPI) (0 = healthy periodontal status, 1 = gingival bleeding, 2 = gingival bleeding and calculus, 3 = moderate pockets of 4 or 5 mm and 4 = deep pockets of 6 mm or more) increased variation is also recorded between studies, but the data are not always up to date (Fig 4) (Department of Health Hong Kong, 2001; Ministry of Health of Canada, 2010; Petersen et al, 2010; Periodontal Country Profiles).

### Trends for periodontal disease

The prevalence of periodontal disease in older Americans aged 65–74 years decreased from 19.6% in 1998–1999 to 10.2% in 1999–2004 (Dye et al, 2007). The prevalence of severe pocketing did not change between the years 1998 and 2009 in the UK (Adult Dental Health Survey 2009, 2011). Cross-sectional epidemiological studies in Jönköping, Sweden did not show significant change in the prevalence of moderate, severe and advanced periodontitis in the 60- and 70-year-old groups between 1993 and 2003 (Hugoson et al, 2008). However, a non-significant tendency for an increase in the proportion of the periodontally healthy elderly was recorded from 1983 to 2003 (Hugoson et al, 2008). It can be suggested that the retention of severely periodontally affected teeth is one possible reason for the insignificant changes in the prevalence of periodontal disease in the developed countries (Baelum and Sheutz, 2002; Adult



**Fig 4** Percentages of older persons by highest Community Periodontal Index (CPI) scores in selected countries. The year of data collection varies considerably between studies.

Dental Health Survey 2009, 2011). The tendencies for the less developed countries are not clear.

## DISCUSSION

Within the limitations of the present analysis, dental disease is common in the elderly with significant variation between countries and regions. The present study revealed a lack of current high quality data on the oral health in the elderly in many regions of the world. Updated national data are particularly missing from Africa, but also from South and Central America, Asia and some European countries. Subnational studies cannot represent the country's oral status with any certainty. Further, some studies are not published in English (e.g. Brazil, Spain, China) and the findings cannot be easily distributed and discussed. There is also great variation in research methodology, including the age of the participants, the methods of recording and analysis and the year of the investigation. Occasionally, the exact age of the older person could not be recorded. In Nigeria, those who did not know their age estimated it by the installation of the Ibadan King in 1930 (Taiwo and Omokhodion, 2006). The time of the investigation is also very important. Most of the studies presented here were conducted in the first decade of the 21st century (2000–2010), but when recent data were not available, some older data were also discussed, particularly for the African countries (1987–2000). Criticism of some methodological issues regarding the instruments applied in older populations can also be raised. The DMFT index applied in many studies is not a clear indicator of dental decay, as in older populations the reason for tooth loss (DT) in the past is often not clear. A nationwide study in Japan has shown that 42% of all extractions were caused by periodontitis, particularly for those aged 45 years and older (Aida et al, 2006). In Germany, periodontitis was the main reason for extractions for those older than 45 years (Glockmann et al, 2007).

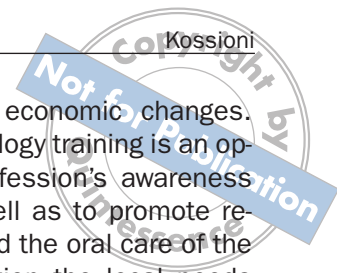
Tooth loss has indubitably decreased in many developed countries in the past decades, mainly due to increased access to restorative and preventive care and to changes in dental treatment options. However, as the proportion of the 'oldest-old' population rapidly increases in many developed countries where edentulism is still very common, and because many dentate older adults are edentulous in one jaw, older persons will continue to suffer from the problems of edentulism in the near future

(Muller et al, 2007). The future trends are not easily identifiable in the less developed countries regarding tooth loss. The increase in the proportion of the elderly with the concomitant accumulation of oral disease, the lack of preventive and restorative oral care options and the potential increase in emergency dental care might lead to an increase in tooth loss in the near future.

Dental decay is a widespread oral disease. Although a decreasing trend was recorded in the past decades in the developed countries, global caries prevalence in the past decade appears to have increased particularly in lower socioeconomic groups, new immigrants and children (Bagramian et al, 2009). In the USA, the significant changes in the composition of the population, with the increase in the proportion of people from minority groups with low income and increased levels of oral disease, will change the country's oral health status profile and the needs for dental care provision in the near future (Albino et al, 2012). Similar changes are also expected in Europe, as the proportion of non-European immigrants with increased financial problems and limited access to care will alter the status and the needs for oral care in many European countries. The DMFT index in Valencia, Spain, in 2006 was 7.5 among Spanish nationals aged 35–44 years compared to 8.6 in the foreigners (Eustaquio et al, 2010). Moreover, the current economic problems in developed countries put the oral health status of the elderly at risk, as socioeconomic factors, health indicators and health service utilisation are interrelated. This is particularly important for dental care in many countries where out-of-pocket payments for dental care are common (Kossioni, 2011). An example of the acute negative effects of financial problems on health status in developed countries can be seen in Greece, where the recent financial crisis had significant effects on the prevalence of key health indicators between 2007 (before the crisis) and 2009 (Kentikelenis et al, 2011). There has been a significant increase in the number of older people reporting that they did not visit a doctor or a dentist despite feeling that it was necessary (Kentikelenis et al, 2011).

Health care providers are not ready to meet the current and future general and oral health needs of the older population (Kossioni, 2011). Oral health is still not integrated into the general health care systems and funding, although it would improve the policies implemented and the access to oral care for older citizens (Petersen et al, 2010; Kossioni, 2011). There is still a lack of dental professionals





adequately trained in gerodontology and a lack of training opportunities at the undergraduate, postgraduate and continuing education levels due to various existing barriers (Ettinger, 2010; Kossioni, 2011). However, significant steps have been made. Gerodontology is included in the curricula of most European dental schools (Kossioni, 2011), while in Japan, one of the most rapidly aging societies, by 2010 it was taught in all dental schools either through specific gerodontology departments or included in the prosthodontic curricula (Kitagawa et al, 2011). In India, where the population is also rapidly aging, the need for geriatric dentistry education to prepare the dentists for the demands of the immediate future has also been consistently stressed (Talwar and Chawla, 2008). Undergraduate curriculum guidelines in gerodontology have been published in the USA (Curriculum Guidelines for Geriatric Dentistry, 1989) and in Europe (Kossioni et al, 2009), and the Association for Dental Education in Europe (ADEE) has included care for the elderly in the necessary competencies for the graduating European dentist (Cowpe et al, 2010). At its General Meeting on November 19, 2010, the Council of the European Dentists (CED) unanimously agreed to recommend to the European Commission that Gerodontology be part of the revised study programme for dental practitioners and include it in the current annex of the Directive 2005/36/EC on the Recognition of Professional Qualifications in Europe. The development of gerodontology programmes worldwide will not only increase the dental professionals' knowledge, skills and attitudes towards the oral problems in the older population, but will also increase the opportunities for further research on the epidemiology and management of oral disease at a local and global level.

## CONCLUSIONS

Considering the limitations of the present study, it can be concluded that there is an increased prevalence of oral disease among older adults worldwide compared to younger age groups. Tooth loss is more common in the developed countries, while dental decay and periodontal disease are more widespread globally.

However, the available data are not always current and comparable and there is an urgent need for further research. A significant threat for the oral health in the older population globally is the reduced access to care, not only in the less developed regions, but also in developed countries that

face sociodemographic and economic changes. The development of gerodontology training is an opportunity to increase the profession's awareness and management skills as well as to promote research in the epidemiology and the oral care of the elderly, taking into consideration the local needs and available resources.

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