

# Dental status in nursing home residents with domiciliary dental care in Sweden

P Andersson<sup>1</sup>, S Renvert<sup>1,2,3</sup>, P Sjogren<sup>4</sup> and M Zimmerman<sup>4,5</sup>

<sup>1</sup>School of Health and Society, Kristianstad University Kristianstad 291 88, Sweden; <sup>2</sup>Blekinge Institute of Technology, Karlskrona, Sweden; <sup>3</sup>School of Dental Sciences - Trinity College, Dublin; <sup>4</sup>Oral Care AB, Box 10047, Stockholm 12126, Sweden, Department of Dental Medicine - Karolinska Institutet, Stockholm, Sweden

**Objective:** To describe the dental health status of elderly people in nursing homes receiving domiciliary dental care. **Design:** Case note review. **Clinical settings:** Nursing homes in 8 Swedish counties. **Participants:** Care dependent elderly people ( $\geq 65$  years). **Methods:** Clinical data, including the number of remaining natural teeth, missing and decayed teeth (manifest dental caries) and root remnants, recorded by dentists according to standard practices. Medical and dental risk assessments were performed. **Results:** Data were available for 20,664 patients. Most were women (69.1%), with a mean age of 87.1 years (SD 7.42, range 65-109). The mean age for men was 83.5 years (SD 8.12, range 65-105). Two or more medical conditions were present in most of the population. A total of 16,210 individuals had existing teeth of whom 10,974 (67.7%) had manifest caries. The mean number of teeth with caries was 5.0 (SD 5.93) corresponding to 22.8% of existing teeth. One in four individuals were considered to have a very high risk in at least one professional dental risk assessment category. **Conclusions:** Care dependent elderly in nursing homes have very poor oral health. There is a need to focus on the oral health-related quality of life for this group of frail elderly during their final period of life.

**Key words:** dental status; domiciliary care; elderly; geriatric dentistry; nursing homes; Sweden

## Introduction

Over the past decades, the lifespan in Western societies has steadily increased. The population of elderly people in Sweden and worldwide is increasing both in number and life expectancy (Christensen *et al.*, 2012). At present, despite high age, the vast majority of the elderly retain some natural teeth relatively intact, often in combination with fixed prosthetic tooth replacements (Douglass and Glassman, 2013). It is very positive that the older people retain more teeth and that fewer are edentulous. Maintaining good oral health during old age poses a challenge for the dental profession (British Dental Association, 2003). Due to co-morbidity, hospitalization, and polypharmacy, many older people become care dependent in their late years. Among those frail and medically compromised elderly, there is a considerable risk of rapid deterioration of their oral health (Terekakis *et al.*, 2011). Dry mouth (hyposalivation) is a common side effect of many medications (Johnell and Klarin, 2007), thus increasing the risk of dental caries substantially, especially in combination with a frequent intake of refined carbohydrates (Westergren *et al.*, 2009).

Recent studies have reported poor oral health among care-dependent older people in nursing homes (Hopcraft *et al.*, 2012; Silva *et al.*, 2014; Sjogren *et al.*, 2016a). Despite professionally evaluated need of daily assistance with oral hygiene procedures among nursing home residents, oral health care is often neglected by the nursing staff (Forsell *et al.*, 2009). Poor oral health among

care-dependent elderly people has a negative impact on nutritional status, general health status and health-related quality of life (Kandelman *et al.*, 2008; Moynihan and Petersen, 2004). Professionally oral hygiene interventions have been shown to reduce gingival bleeding, improve oral hygiene (Sjogren *et al.*, 2016a) and may reduce mortality from health-care associated pneumonia among elderly people in hospitals and nursing homes (Sjogren *et al.*, 2016b).

In Sweden, several defined groups (including nursing home resident elderly) in need of extensive care are entitled to an annual oral health assessment (screening) free of charge. They are also entitled to essential dental care at a fixed fee corresponding to the fee at outpatient primary care clinics, with a yearly maximum patient cost of approx. EUR 118 (USD 130) (data from 2015). In 2013, individuals  $\geq 65$  years in Sweden comprised 19.5% of the total population (National Board of Health and Welfare, 2015), of whom 8% were entitled to essential dental care. Many (40%) of those entitled received care (Swedish Agency for Health and Care Services Analysis, 2015).

Dental care is traditionally provided at stationary dental clinics, but for more than a decade domiciliary dental care has been an alternative (Sjogren *et al.*, 2015). Domiciliary dental care is provided in nursing homes or similar facilities, hospitals and private residences, when it is impossible, impractical, or otherwise difficult for the person to be transported to a stationary clinic (Lundqvist *et al.*, 2015).

To our knowledge, no previous large scale study of the dental health of care-dependent elderly people receiving domiciliary dental care has been published. Such individuals constitute a frail, unique and specific population (British Dental Association, 2003). They experience multi-morbidity and often cognitive impairments (Sjögren *et al.*, 2015). This study was based on data derived from patient charts of the largest provider of domiciliary dental care in Sweden. The aim was to describe the dental health status of elderly people who received domiciliary dental care in nursing homes.

## Methods

Cross sectional data were collected from digital patient charts of routine domiciliary dental care patients registered with the largest private domiciliary dental care provider in Sweden (Oral Care AB). The patients comprised individuals in eight Swedish counties (Blekinge County, Region Halland, Region Skåne, Stockholm County, Sörmland County, Uppsala County, Region Västra Götaland and Östergötland County).

To be included, the individuals had to fulfil the pre-determined inclusion criteria: nursing home resident, care dependent, age  $\geq 65$  and at least one dental appointment during 2015. The data included individuals where a basic oral examination was performed between 1 January 2014 and 31 December 2015.

The dental examinations were conducted at the nursing home with the patient sitting in a chair or lying in the bed in their own room (Sjögren *et al.*, 2015) using additional light sources. Experienced, certified dentists or dental hygienists employed by the caregiver (Oral Care) performed all assessments with standard dental instruments according to practices applicable to general dental care. Intraoral radiographs were taken when clinical signs of pathology were present or suspected. The caregiver conducted monthly quality assessments of patient charts to standardize the examinations between clinicians.

Medical conditions were recorded in four major categories from patients' medical files: a) cardiovascular diseases, b) high blood pressure, c) diabetes or d) mental health conditions (including dementia). Information on anticoagulation medication as well as the individual need for premedication was obtained from the responsible registered nurse and/or from the patients' health declarations. Through the National Pharmaceutical register, information on individual medications was retrieved and recorded.

The clinical data included the number of remaining natural teeth, missing and decayed teeth (manifest dental caries) and root remnants. A tooth was recorded as decayed when caries extended into dentine on clinical diagnosis or intraoral radiographs ( $\geq d3$ ). Both crown and root surface caries were recorded. Root remnants were recorded separately. Third molars were excluded from the analyses.

Individual dental risk assessments were graded from 1 to 4 (score: 1 = slight risk, 2 = moderate risk, 3 = high risk, 4 = very high risk) according to a predefined matrix with four different categories: a) 'general risk' (related to general health and compliance, according to which e.g. individuals with hyposalivation, or difficulties in treatment compliance received a higher risk score),

b) 'technical risk' (related to previous dental constructions, where e.g. a higher score was given to individuals with many large dental restorations or dental prosthetic constructions of dubious quality), c) 'dental caries risk' (e.g. a higher score on several new cavities), and/or d) 'periodontitis risk' (e.g. a higher score for severe loss of attachment, mobility, and bleeding on probing).

The study was conducted in line with the Helsinki Declaration and approved by The Regional Ethical Review Board Lund (Dnr 2015/446).

Descriptive data were summarised with mean values, standard deviations (SD) and frequency distributions related to gender and age. The population was divided into three age groups: 65–81, 82–91 and  $\geq 92$  years of age. An assumption of the time as a participating patient in domiciliary dental care was made through calculations using the time between the date when an individual was registered as a patient, including the dates of first and last treatment and/or examination. Multiple regression analyses (ANOVA) were performed with SPSS (Statistical Package of Social Sciences, version 22).

## Results

The sample consisted of 20,664 individuals who received domiciliary dental care. Most were women (69.1%), with a mean age of 87.1 (SD 7.42, range 65 to 109). The mean age of men was 83.5 (SD 8.12, range 65 to 105).

Mental health conditions (60.3%) were predominant, followed by high blood pressure (43.3%) and cardiovascular diseases (42.9%). Cardiovascular diseases (48.2% and 40.5% respectively) and anticoagulation medication (43.3% and 34.9%) were more common in men than women (Table 1). A combination of two or more different medical conditions of above mentioned were found in most people (men 54.0% and women 51.7%) and were more frequent (64.9%) in the 82-91y age group than the younger and older groups. Diabetes (19.3%) was more common in the youngest age group (65–81) (Table 1). Two or more conditions were present in 47.4% of those aged 65-81, in 56.4% of 82-91 year olds, and in 50.2% of those aged  $\geq 92$  years.

Multiple regression analyses and ANOVA demonstrated a significant relation between the number of missing and/or decayed teeth (DMT) and the presence of cardiovascular diseases ( $p < 0.001$ ), diabetes ( $p < 0.001$ ), gender ( $p < 0.001$ ) and age ( $p < 0.001$ ).

The mean time as a patient was 1.5 (SD 1.29) years, with small variations across the gender and age groups (Table 2).

Professional dental risk assessment data were available for 73.5% to 73.6% of the individuals across the four risk categories. The numbers at high or very high risk were 9,864 (65.0%) for general health, 8,420 (55.3%) for technical risk, 4,898 (32.3%) for caries and 5,071 (33.3%) for periodontitis (Table 2). One in four individuals were at very high risk in at least one category.

A total of 4,454 (21.5%) individuals were edentulous. Edentulousness occurred in 18.2% in the youngest age group and in 26.4% in the oldest age group. Among dentate individuals ( $n=16,210$ ), 21.3% had 20 teeth or more. Almost all dentate individuals (99.5%) had missing teeth. Two thirds ( $n=10,974$ , 67.7 %) had caries, with a mean of 5.0 (SD 5.93) decayed teeth, corresponding to 22.8% of all teeth. The mean DMT index was 19.1 (SD 9.74) (Table 3).

**Table 1.** Gender and Age Distribution in Relation to Medical History among Older Adults in Domiciliary Dental Care (n=20,664, percentages within parentheses)

	Gender		Age groups			Total n= 20,664
	Women	Men	65–81 years	82–91 years	≥92 years	
	n= 14,278	n= 6,386	n= 5,353	n= 9,823	n= 5,488	
Cardiovascular diseases	5,779 (40.5)	3,080 (48.2)	1,775 (33.2)	4,412 (44.9)	2,672 (48.7)	8,859 (42.9)
High blood pressure	6,319 (44.3)	2,638 (41.3)	2,107 (39.4)	4,431 (45.1)	2,419 (44.1)	8,957 (43.3)
Diabetes	1,811 (12.7)	1,215 (19.0)	1,034 (19.3)	1,508 (15.3)	484 ( 8.8)	3,026 (14.6)
Psychiatric conditions	8,828 (61.8)	3,626 (56.8)	3,240 (60.5)	6,378 (64.9)	2,836 (51.7)	12,454 (60.3)
Anticoagulation medication	4,980 (34.9)	2,767 (43.3)	1,767 (33.0)	3,968 (40.4)	2,012 (36.7)	7,747 (37.5)

**Table 2.** Years as Patient in Domiciliary Dental Care, Proportion of Dental Examinations Performed by Dentist, and Risk Assessment Variables, in Relation to Gender and Age Groups (n=20,664)

Variables	Gender		Age groups			Total n=20,664
	Women	Men	65–81 years	82–91 years	≥92 years	
	n=14,278	n= 6,386	n=5,353	n=9,823	n=5,488	
Years as patient, mean (SD)	1.5(1.31)	1.3 (1.24)	1.3(1.24)	1.5(1.27)	1.6(1.35)	1.5(1.29)
Dental examination by a dentist, n (%)	11,948 (83.7)	5,493 (86.0)	4,675 (87.3)	8,269 (84.2)	4,497 (81.9)	17,441 (84.4)
<i>Risk assessment variables, n (%)</i>						
<i>General health risk<sup>1</sup></i>						
No risk	54 (0.5)	35 (0.7)	15 (0.4)	51 (0.7)	23 (0.5)	89 (0.6)
Slight or moderate risk	3,536 (33.6)	1,693 (36.2)	1,210 (31.6)	2,537 (35.4)	1,482 (35.4)	5,229 (34.4)
High or very high risk	6,919 (65.8)	2,945 (63.0)	2,606 (68.0)	4,573 (63.9)	2,685 (64.1)	9,864 (65.0)
<i>Technical risk<sup>2</sup></i>						
No risk	187 (1.8)	89 (1.9)	68 (1.8)	137 (1.9)	71 (1.7)	276 (1.8)
Slight or moderate risk	4,443 (42.2)	2,077 (44.4)	1,544 (40.1)	3,109 (43.3)	1,867 (44.5)	6,520 (42.8)
High or very high risk	5,907 (56.0)	2,515 (53.7)	2,234 (58.1)	3,926 (54.7)	2,260 (53.8)	8,420 (55.3)
<i>Dental caries risk<sup>3</sup></i>						
No risk	1,728 (16.4)	841 (18.0)	650 (17.0)	1,196 (16.7)	723 (17.3)	2,569 (16.9)
Slight or moderate risk	5,353 (50.9)	2,357 (50.5)	1,783 (46.5)	3,725 (52.0)	2,202 (52.6)	7,710 (50.8)
High or very high risk	3,431 (32.6)	1,467 (31.4)	1,399 (36.5)	2,238 (31.3)	1,261 (30.1)	4,898 (32.3)
<i>Periodontitis risk<sup>4</sup></i>						
No risk	1,081 (10.2)	482 (10.3)	370 (9.6)	760 (10.6)	433 (10.3)	1,563 (10.3)
Slight or moderate risk	5,947 (56.4)	2,636 (56.4)	2,086 (54.3)	4,081 (56.9)	2,416 (57.5)	8,583 (56.4)
High or very high risk	3,514 (33.3)	1,557 (33.3)	1,384 (36.0)	2,334 (32.5)	1,353 (32.2)	5,071 (33.3)

Risk assessment data not available in: 1 n= 5,482 (26.5), 2 n= 5,448 (26.4), 3 n= 5,487 (26.5), 4 n= 5,447 (26.4)

**Table 3.** Dental Status in Relation to Gender and Age Groups (n=20,664)

Variables	Gender		Age groups			Total n=20,664
	Women	Men	65–81 years	82–91 years	≥92 years	
	n=14,278	n=6,386	n=5,353	n=9,823	n=5,488	
Existing teeth, n (%)	11,174 (78.3 )	5,036 (78.9 )	4,379 (81.8 )	7,794 (79.3 )	4,037 (73.6 )	16,210 (78.5 )
mean (SD)	14.5 ( 6.40)	15.5 ( 6.53)	16.8 ( 6.48)	14.6 ( 6.25)	13.1 ( 6.24)	14.8 ( 6.45)
Missing 1-27 teeth, n (%)	11,128 (99.6 )	5,008 (99.4 )	4,335 (99.0 )	7,774 (99.7 )	4,027 (99.7 )	16,136 (99.5 )
mean (SD)	13.5 ( 6.36)	12.6 ( 6.48)	11.3 ( 6.41)	13.4 ( 6.22)	15.0 ( 6.20)	13.2 ( 6.41)
Decayed teeth, n (%)	7,381 (66.0 )	3,593 (71.3 )	2,652 (60.6 )	5,353 (68.7 )	2,971 (73.6 )	10,974 (67.7 )
mean (SD)	4.8 ( 5.92)	5.3 ( 5.93)	4.6 ( 5.47)	4.8 ( 5.67)	5.6 ( 6.68)	5.0 ( 5.93)
DMT n (%)	14,249 (99.8 )	6,374 (99.8 )	5,330 (99.6 )	9,814 (99.9 )	5,479 (99.8 )	20,623 (99.8 )
mean (SD)	19.2 ( 9.66)	18.8 ( 9.91)	16.6 ( 9.89)	19.0 ( 9.38)	21.5 ( 9.65)	19.1 ( 9.74)
Root remnants, n (%)	6,088 (42.6 )	3,056 (47.8 )	2,185 (40.8 )	4,324 (44.0 )	2,635 (48.0 )	9,144 (44.2 )
mean (SD)	3.4 ( 3.13)	3.7 ( 3.63)	3.6 ( 3.63)	3.4 ( 3.18)	3.5 ( 3.24)	3.5 ( 3.31)

## Discussion

This cross sectional study describes the dental status, based on patient charts of more than 20,000 care-dependent elderly people who received domiciliary dental care. To our knowledge, this is the first large-scale assessment of such a population. Almost all participants lived in nursing homes and comprised the vast majority of the elderly who received domiciliary dental care in eight Swedish counties, including the three largest cities. The data can be considered representative for care-dependent elderly people in Sweden and demonstrate poor dental health with a remarkably high prevalence of dental caries. The vast majority of individuals were considered at high or very high risk of deterioration of their oral health status. These findings are supported by medical history data, with the vast majority of medically compromised individuals having two or more co-existing medical conditions.

It is interesting to note that both diabetes and cardiovascular diseases seem to be related to dental status. However, medical history data in this study are blunt variables and that most individuals had a poor medical condition.

Major investments in dental care and prevention are most likely the reason why the present elderly population have most of their natural teeth in function late in life. Among home-living elderly, 82.6% between 60 to 93 years is reported to be dentate (Renvert *et al.*, 2013). This result corresponds with the present study although this group of elderly was dependent and medically compromised. However, the mean number of teeth was lower in the present study (14.8) compared with elderly living in private apartments, with a mean of 18.3 teeth. The number of teeth has been shown to be associated with chewing disability (Singh and Brennan, 2012), and it has been reported that at least 20 teeth are required for an acceptable chewing ability (Ueno *et al.*, 2008). The present study showed that a large proportion of the elderly had less than 20 teeth, possibly leading to problems with eating. At least 50% of 65-year-olds and older should have  $\geq 20$  teeth already in year 2000, according to a goal by WHO (1982). It is unacceptable that so few individuals in the present group have reached this goal.

The caries frequency has been reported to be high in the elderly living in nursing homes. For this group, Christensen *et al.* (2012) and Hopcraft *et al.* (2012) reported caries in 57% and 70%, respectively, and Silva *et al.* (2014) reported coronal caries in 67.9% and root caries in 77.4% of elderly people. Dental caries and root remnants were also frequent findings in the present study, implying an increased risk of oral infections and pain. Furthermore, the individuals represented a patient group with special needs and remained dental care patients during a relatively short time period. Thus, the purpose of dental treatment during this time should be to reduce pain, suffering and facilitate eating. It is therefore important to maintain regular, professional, oral care for elderly people, especially those dependent on care from others (Afshar *et al.*, 2015). Comprehensive dental treatment is often difficult to perform and must instead focus on prophylactic procedures and fluoride treatment.

This study describes a very frail group of elderly people with multiple medical problems and polypharmacy and urgent need of professional dental care, based on evidence-based practice (Terezakis *et al.*, 2011). Dental care provided at stationary dental clinics could be very difficult for the elderly in nursing homes (Lundqvist *et al.*, 2015). Ageing leads to increased morbidity and costs for both health care and dental care, which are therefore expected to increase substantially over the next 15-25 years, since elderly will constitute a larger proportion of the population in the future (British Dental Association, 2003, Norderyd *et al.*, 2015).

Interventions with extended focus on intensive, professional, preventive, domiciliary dental care must be strongly emphasized in this high-risk population of care dependent elderly. These interventions are necessary to avoid pain and infections and to reduce suffering and oral health associated mortality as well as substantially increased difficulties and costs of providing essential dental care to frail individuals late in life.

In conclusion, care-dependent elderly people in nursing homes have a very poor oral health status. There is a need to focus on the oral health-related quality of life for this group of frail elderly during their final period of life.

## References

- Afshar, S., Roderick, P.J., Kowal, P., Dimitrov, B.D. and Hill, A.G. (2015): Multimorbidity and the inequalities of global ageing: a cross-sectional study of 28 countries using the World Health Surveys. *BMC Public Health* **15**, 776.
- British Dental Association. (2003): Oral Healthcare for Older people: 2020 Vision. *Gerodontology* **20**, 60-62.
- Christensen, L.B., Hede, B. and Nielsen, E. (2012): A cross-sectional study of oral health and oral health-related quality of life among frail elderly persons on admission to a special oral health care programme in Copenhagen City, Denmark. *Gerodontology* **29**, e392-e400.
- Douglass, C.W. and Glassman, P. (2013): The oral health of vulnerable older adults and persons with disabilities. *Special Care in Dentistry* **33**, 156-163.
- Forsell, M., Sjögren, P. and Johansson, O. (2009): Need of assistance with daily oral hygiene measures among nursing home staff resident elderly versus the actual assistance received from the staff. *The Open Dentistry Journal* **3**, 241-244.
- Hopcraft, M.S., Morgan, M.V., Satur, J.G. and Wright, F.A. (2012): Edentulism and dental caries in Victorian nursing homes. *Gerodontology* **29**, e512-9.
- Johnell, K. and Klarin, I. (2007): The relationship between number of drugs and potential drug-drug interactions in the elderly: a study of over 600,000 elderly patients from the Swedish Prescribed Drug Register. *Drug Safety* **30**, 911-918.
- Kandelman, D., Petersen, P.E. and Ueda, H. (2008): Oral health, general health, and quality of life in older people. *Special Care in Dentistry* **28**, 224-236.
- Lundqvist, M., Davidson, T., Ordell, S., Sjöström, O., Zimmerman, M. and Sjögren P. (2015): Health economic analyses of domiciliary dental care and care at fixed clinics for elderly nursing home residents in Sweden. *Community Dental Health* **32**, 39-43.
- Moynihán, P. and Petersen, P.E. (2004): Diet, nutrition and the prevention of dental diseases. *Public Health Nutrition* **7**, 201-226.
- Norderyd, O., Koch, G., Papias, A., Kohler, A.A., Helkimo, A.N., Brahm, C.O., Lindmark, U., Lindfors, N., Mattsson, A., Rolander, B., Ullbro, C., Gerdin, E.W. and Frisk, F. (2015): Oral health of individuals aged 3-80 in Jonköping, Sweden, during 40 years (1973-2013): II. Review of clinical and radiographic findings. *Swedish Dental Journal* **39**, 69-86.

- Renvert, S., Persson, R.E. and Persson, R. (2013): Tooth loss and periodontitis in older individuals: Results from the Swedish national study on aging and care. *Journal of Periodontology* **84**, 1134-1144.
- Silva, M., Hopcraft, M. and Morgan, M. (2014): Dental caries in Victorian nursing homes. *Australian Dental Journal* **59**, 321-328.
- Singh, K.A. and Brennan, D.S. (2012): Chewing disability in older adults attributable to tooth loss and other oral conditions. *Gerodontology* **29**, 106-110.
- Sjögren, P., Bäckman, N., Sjöström, O. and Zimmerman, M. (2015): Patient safety in domiciliary dental care for elderly nursing home residents in Sweden. *Community Dental Health* **32**, 216-220.
- Sjögren, P., Girestam, C.C., Skott, P., Marsson, N., Nova, R., Zimmerman, M. and Wårdh, I. (2016a): Professional domiciliary oral care for elderly in nursing homes - A randomized controlled pilot trial. *Health*, **8**, 1112-1119. <http://dx.doi.org/10.4236/health.2016.811116>
- Sjögren, P., Wårdh, I., Zimmerman, M., Almståhl, A. and Wikström, M. (2016b): Oral care and mortality in older adults with pneumonia in hospitals or nursing homes: Systematic review and meta-analysis. *Journal of American Geriatric Society* **64**, 2109-2115.
- Terezakis, E., Needleman, I., Kumar, N., Moles, D. and Agudo, E. (2011): The impact of hospitalization on oral health: a systematic review. *Journal of Clinical Periodontology* **38**, 628-636.
- The National Board of Health and Welfare (2015): Tillståndet och utvecklingen inom hälso- och sjukvård och socialtjänst – Lägesrapport 2015. [The status and development in health and sick care and social services – Medical report 2015]. Socialstyrelsen, Stockholm. Artikelnummer 2015-2-51.
- The Swedish Agency for Health and Care Services Analysis (2015): Tandlösa tandvårdsstöd - En analys av hur tandvårdsstöd fungerar för den äldre befolkningen. [Toothless dental care - An analysis of dental care work for the elderly population]. Stockholm. Rapport 2015:3.
- Ueno, M., Yanagisawa, T., Shinada, K., Ohara, S. and Kawaguchi, Y. (2008): Masticatory ability and functional tooth units in Japanese adults. *Journal of Oral Rehabilitation* **35**, 337-344.
- Westergren, A., Wann-Hansson, C., Börgdal, E.B., Sjölander, J., Strömblad, R., Klevsgård, R., Axelsson, C., Lindholm, C. and Ulander, K. (2009): Malnutrition prevalence and precision in nutritional care differed in relation to hospital volume - a cross-sectional survey. *Nutrition Journal* **8**, 20.
- World Health Organization (WHO) (1982): Global goals for oral health in the year 2000. *International Dental Journal* **32**, 74-77.