

# DMFT Index among Institutionalized Elderly

## SUMMARY

**Introduction.** Poor oral health among elderly is most common dental problem nowadays, especially among the institutionalized persons.

**Aim.** To detect DMFT index among the institutionalized elderly.

**Material and Method.** Oral examination was made to make adequate evaluation. A total number of 70 subjects were evaluated. DMFT index has been detected only with dental mirror and probe, without using additional instruments and methods.

**Results.** Average value of DMFT index in our survey was  $24.84 \pm 4.56$  (with Confidence interval from 23.77 to 25.89). M-component was dominant -  $21.56 \pm 7.79$  (with Confidence interval from 15.74 to 23.38). D-component indicated by carious teeth and persistent roots had value  $2.60 \pm 3.54$  (with Confidence interval from 1.77 to 3.42). Mean value of teeth with definitive fillings (F-component of DMFT index) was  $0.34 \pm 1.42$  (with Confidence interval from 0.33 to 1.01).

**Conclusion.** DMFT index among the institutionalized elderly had one of the biggest values in the literature. M-component was dominant and indicator of the absence of many teeth. Therefore it is of great importance to prepare adequate protocol for oral health care among the institutionalized elderly.

**Keywords:** Gerodontology; Institutionalized Elderly; DMFT Index

**M. Petrovski<sup>1</sup>, K. Ivanovski<sup>2</sup>, A. Minovska<sup>1</sup>**

<sup>1</sup>University "Gotse Delchev"  
Faculty of Medical Sciences, studies of dental  
medicin, Shtip, FYROM

<sup>2</sup>University "St. Kiril and Methodius"  
Faculty of Dentistry  
Department of Oral Pathology and Periodontology  
Skopje, FYROM

**ORIGINAL PAPER (OP)**

**Balk J Dent Med, 2015; 19:21-25**

## Introduction

Oral health is an integral part of the overall health and includes the health of the oral cavity or the health of teeth themselves, periodontal tissues, oral mucosa, the salivary glands and surrounding structures<sup>13</sup>. Poor oral health among the elderly is most common dental problem nowadays, especially among the institutionalized elderly. Edentulism may indicate an increased risk for numerous problems concerning general health.

The impaired general health of these people have an impact on their oral health, i.e. on the dental status, the presence of caries, periodontal health, oral hygiene, toothless, limited oral functions, problems associated with wearing dentures, total or partial presence of malignant and benign conditions and tumors, xerostomia, and other oral conditions that can cause pain or discomfort in the orofacial region. Also, oral health in turn, is

conditioned by many factors such as dental caries and its complications, un-extracted untreated dental roots, different diseases of the oral mucosa and numerous oral infections, precancerous conditions and benign and malignant tumors, pain in the temporo-mandibular joint, and partial or a total toothless as well. Loss of teeth can affect chewing efficiency, the choice of food and, of course, the nutritional status in the elderly<sup>17</sup>. The oral health of the institutionalized elderly can be influenced by numerous other factors such as: multi-morbidity, depending on the maintenance of oral hygiene, limited skills and movements and use of numerous medications.

Krasta et al<sup>15</sup> noted that in recent decades among retirees in developed countries, the number of remaining teeth is increased, while the number of untreated teeth affected by caries in developed countries over the last 20 years has declined.

Interaction of highly prevalent xerostomia and inability to maintain satisfactory oral hygiene among institutionalized elderly leads to increased occurrence of dental plaque. Because of its presence the elderly have increased risk for caries and periodontitis. Therefore, special knowledge and manual dexterity are needed to allow proper oral health care among the elderly.

Recurrent caries around inadequate or old fillings and cervical caries or cavities on the root of the teeth are the most common types of caries in adults<sup>29,30</sup>. Root caries is a specific type of caries, which is characterized by the presence of hard-tissue lesion of one or more teeth in the area of the tooth root (the part of the tooth that is protected and covered with cement). Due to the process of apical migration of epithelial attachment and gingival recession, the primary place of occurrence of dental hard-tissue demineralization is the cervical region and the subsequent decomposition of cementum. In the cementum, demineralization affects quite large area and rapidly evolves, due to its histological and mineralogical structure. The process occurs in 2 ways: by direct decomposition of the dental cementum of the lesion and peeling between dentin and cement due to bacterial penetration<sup>18</sup>.

According to Alian et al<sup>2</sup>, high prevalence of coronary dental caries and root caries can be seen in the old population worldwide and advanced dental caries and periodontal disease are considered to be the most important reason for extraction of teeth. Factors that are taken as reasons for the increased risk of caries in the elderly population include attacking factors ("attack factors"), such as dental plaque, the presence of specific microorganisms and nutritional factors and defensive factors ("defense factors"), such as: protective role of saliva and fluoride use.

Unsatisfactory oral health and hygiene among the institutionalized elderly are verified by Rihset al<sup>25</sup>, demonstrated by the high percentage of lost teeth, dental caries and a high incidence of total edentulism.

According to Wyatt et al<sup>35</sup>, about 80% of institutionalized elderly had more than 1 carious lesion, approximately half of them had coronary caries and about 70% had root caries. On average, according to this survey come 3.8 caries teeth of a patient despite the higher number of extracted teeth. The residents of long-time care facilities had presented significantly more carious lesions localized in dental crowns.

In a study published by Gati and Vieira<sup>9</sup>, performed among individuals older than 75 years (mean age 85 years), they found that in almost all (or 97%) of subjects caries was presented, while  $\frac{2}{3}$  of individuals who participated in a survey had root caries, out of which 20% were untreated. According to this research, coronary active root caries was more common in men and in people who consume tobacco in the form of cigarettes or cigars.

Elderly patients' carriers of partial dentures are facing with another significant dental problem: caries in the area of the tooth neck because the retentional parts of the partial dentures are in contact with them. Their presence disables adequate level of oral hygiene presented with accumulation of dental plaque on the retentional parts of the partial dentures<sup>10</sup>.

According to Samnienget al<sup>27</sup> in patients with hyposalivation there is a higher number of teeth, caries prevalence and greater expression of periodontitis than in people with normal salivation.

Considering the poor oral health among institutionalized elderly, this research aimed to determine DMFT index among the institutionalized elderly.

## Material and Method

The survey included a total of 70 subjects who were older than 65 years. In this institution for long-term institutionalized, most of the persons were functionally-dependent individuals, dominated with chronic diseases. The research was conducted in the period from April to July 2013, in the department "Mother Teresa", which is within the PHI Gerontology Institute "13<sup>th</sup> November" in Skopje.

When performing this research, all persons being in the terminal stage of the disease were excluded, subjects with dementia and all individuals who have cognitive disorders, patients with naso-gastric tube and patients placed on artificial ventilation were also excluded. All individuals who do not cooperate because of different behavioural disorders, aggression, or do not allow them to perform clinical examination were not included in the studied group as well. From the survey were also excluded people who do not understand the Macedonian language.

In order to make an objective assessment of the situation on the oral health among institutionalized elderly, an oral examination was done. This examination included determination of DMFT-index (originally: D - "Decayed", carious; M - "Missing", extracted; F - "Filling", teeth with definitive filling). The existence of dental caries during the study was revealed only by a dental mirror and probe without using additional instruments and methods.

The data obtained from the clinical examination were statistically processed using special software for statistical processing of data - Statistica 7.1.

## Results

Determining the DMFT index is intended to define the morbidity and mortality of the remaining teeth

among the institutionalized individuals older than 65 years. Besides the general DMFT index, values for all its components were determined too. The mean value found for DMFT index was  $24.84 \pm 4.56$  (Fig. 1).

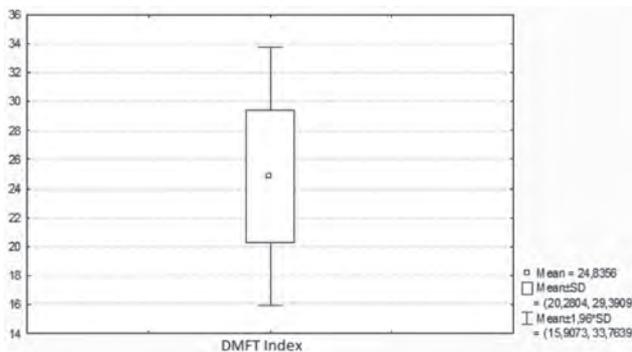


Figure 1. Average value of the DMFT index among examined institutionalized elderly

As it was expected for this population, the number of missing (extracted) teeth (MT) - as an indicator of the huge loss of teeth - was the biggest contributor responsible for the high values of the DMFT index. In particular, higher average number of extracted teeth was found among subjects older than 75 years (*versus* subjects aged 65-74 years). It has to be stressed the fact that elderly subjects where there was no caries observed were predominantly people who have total toothless.

The average value of untreated caries teeth (D-component of DMFT-index) among the institutionalized elderly in this study was  $2.60 \pm 3.54$  per person. (Fig. 2). Average value of teeth with definite filling (F-component of DMFT-index) was  $0.34 \pm 1.42$  per person studied. (Fig. 3).

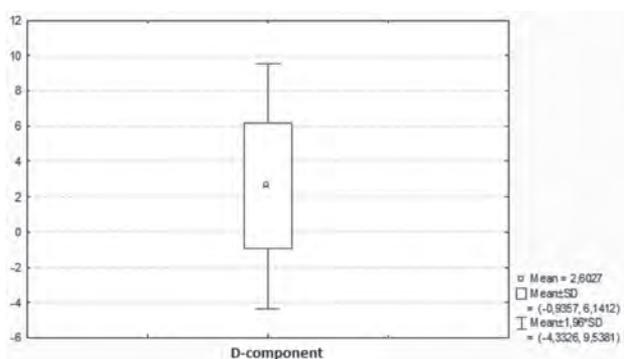


Figure 2. Average value for D-component of the DMFT index among examined institutionalized elderly

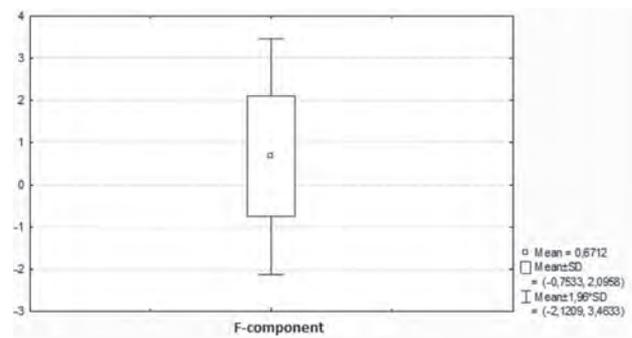


Figure 3. Average value for F-component of the DMFT index among examined institutionalized elderly

The mean value of lost teeth (M-component of DMFT-index) was  $21.56 \pm 7.79$  per person. (Fig. 4).

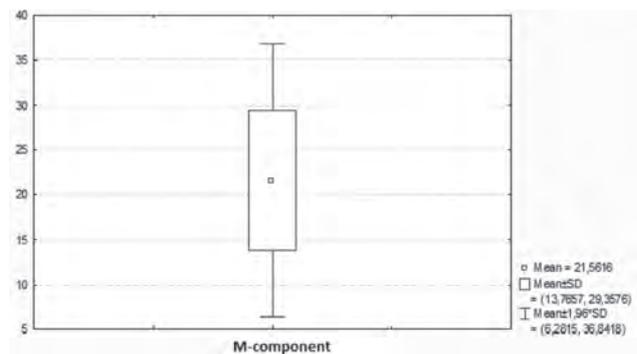


Figure 4. Average value for M-component of the DMFT index among examined institutionalized elderly

The mean value the number that refers to teeth that possess definitive restoration was quite low (20.5%) among subjects.

The mean value for the number of extracted teeth was  $11.64 \pm 4.21$  for each jaw. The number of teeth lost among subjects was higher in the upper than in the lower jaw. It was found that the highest number of missing teeth was in trans-canine region.

## Discussion

DMFT-index is used in order to statistically determine the number of carious, extracted and filled teeth per person and the average value of this index in the tested population. DMFT index is chosen because it is commonly used index for assessment of dental status in population. Primary, DMFT index was developed for

use in childhood and later is adapted for use in the elderly. Some authors believe that DMFT index has low validity for assessment of caries in adults, primarily because it is not able to reveal the true impact of caries on the oral health. This index refers only to the presence of the disease, its consequences and the need for treatment, and it can present high values especially in populations such as ours, where the presence of caries and extracted teeth is really high.

This index does not take into consideration the reasons for tooth loss - whether the tooth is lost due to caries or periodontal disease, risk for caries occurrence and dental assessment of the need for treatment. As can be noticed, the presence of dental caries among respondents varied greatly.

As it is expected in this population, the number of lost (extracted) teeth (MT) - as an indicator of the huge loss of teeth - was the biggest contributor responsible for the high values of the DMFT index.

The available data indicate a wide distribution of caries and the consequences of its presence around the world, having enormous social significance especially among the institutionalized elderly. D-component of the DMFT index itself comprises: carious teeth, teeth with definitely filling on one area while the other with caries, teeth with definite fillings that have recurrent or secondary caries, teeth with temporary fillings or teeth that have only remaining root.

M-component (number of missing teeth) is the dominant component of the DMFT index, not only in this study but also in numerous other studies concerning the institutionalized elderly. In particular, higher values of extracted teeth were found among respondents older than 75 years (versus respondents aged 65-74 years).

F-component (teeth with definite fillings) has the lowest value in the DMFT index. The low value of F-component may due to the neglect of the respondents for their oral health, irregular check-ups, as well as because the definitive fillings did not last, or their durability was reduced due to other factors.

The value of the DMFT index obtained in this research was  $28.84 \pm 4.71$  (Fig. 1), which is quite high but often seen in the literature. Our results for DMFT index correlate with the data obtained by Simunković et al<sup>29</sup>, Piuvezam and de Lima<sup>23</sup>, Unluer et al<sup>31</sup> as well as data published by Vrbic et al<sup>34</sup>. Lower index values for DMFT index concerning the institutionalized elderly are presented by Ruiz-Medina et al<sup>26</sup>, Philip et al<sup>21</sup>, Zusman et al<sup>36</sup>, Ahluwalia et al<sup>1</sup>, Samson et al<sup>28</sup>, Comfort et al<sup>7</sup>, Lo et al<sup>16</sup>, Bourgeois et al<sup>4</sup>, Vrbic et al<sup>33</sup>. Higher values for DMFT index are quite rare in the literature and observed in Brazil by Rihs et al<sup>25</sup>, Gaiao et al<sup>12</sup>, Van Wyk et al<sup>32</sup>, and Petelin et al<sup>20</sup>.

The determined averaged value for D-component of the DMFT in our study (Fig. 2) coincides with the data presented by Lo et al<sup>16</sup>, Zusman et al<sup>36</sup>, Corneo et al<sup>7</sup>

and Carter et al<sup>5</sup>, unlike King and Kapadia<sup>14</sup>, Esmeriz et al<sup>11</sup>, Rihs et al<sup>25</sup> and Ambjørnsen<sup>3</sup>, who showed a lower representation of carious lesions of the remaining teeth. Greater representation of carious teeth i.e. D-component of the DMFT index in institutionalized elderly noticed Rao et al<sup>24</sup> and Piuvezam and de Lima<sup>22</sup>.

M-component of the DMFT index is the dominant component in most studies and researches, not only among the institutionalized elderly, but among the elderly as a whole population<sup>19</sup>. Results published by King and Kapadia<sup>14</sup> and Esmeriz et al<sup>11</sup> match with the same from this research -  $25.41 \pm 8.03$  (Fig. 4). Lo et al<sup>16</sup>, Zusman et al<sup>36</sup>, Cornejo et al<sup>7</sup>, Ambjørnsen<sup>3</sup> and Chlamers et al<sup>6</sup> in their studies showed lower mean values for M-component of the DMFT index. Unlike them, Rihs et al<sup>25</sup> and Piuvezam and de Lima<sup>22</sup> showed higher values for extracted teeth.

Values concerning F-component as a factor indicating the subjective views of subjects to improve their own oral health in most of the published results are around 1. Similar results to those of our research  $0.69 \pm 1.46$  (Fig. 3) published Lo et al<sup>16</sup> and King and Kapadia<sup>14</sup>. Lower representation of teeth with definite fillings among institutionalized elderly published Cornejo et al<sup>7</sup>, unlike Rihs et al<sup>25</sup>, Zusman et al<sup>36</sup>, Esmeriz et al<sup>11</sup> and Ambjørnsen<sup>3</sup>, who indicated higher representation of this component.

## Conclusion

Based on the data and analysis of the results, it may be concluded that there is a presence of large number of extracted teeth and caries among institutionalized elderly, and low representation of teeth with definitive filling. There was a high value of DMFT index, with predominance of M-component.

## References

1. Ahluwalia KP, Cheng B, Josephs PK, Lalla E, Lamster IB. Oral disease experience of older adults seeking oral health services. *Gerodontology*, 2010; 27(2):96-103.
2. Alian AY, McNally ME, Fure S, Birkhed D. Assessment of Caries Risk in Elderly Patients Using the Cariogram Model. *J Can Dent Assoc*, 2006; 72(5):459-463.
3. Ambjørnsen E. Decayed, missing, and filled teeth among elderly people in a Norwegian municipality. *Acta Odontol Scand*, 1986; 44(2):123-130.
4. Bourgeois D, Berger P, Hescot P, Leclercq MH, Doury J. Oral health status in 65-74 years old adults in France, 1995. *Rev Epidemiol Sante Publique*, 1999; 47(1):55-59.

4. Carter G, Lee M, McKelvey V, Sourial A, Halliwell R, Livingston M. Oral health status and oral treatment needs of dependent elderly people in Christchurch. *NZMJ*, 2004; 117(1194):1-10.
5. Chalmers J, Hodge C, Fuss J, Spencer A, Carter K. The Prevalence and Experience of Oral Diseases in Adelaide Nursing Home Residents. *Australian Dental Journal*, 2002; 47:123-130.
6. Comfort AO, King T, Moveni M, Tuisuva J. Dental health of Fiji institutionalized elderly (2003). *Pac Health Dialog*, 2004; 11(1):38-43.
7. Cornejo M, Pérez G, Costa-de Lima K, Casals-Peidro E, Borrell C. Oral Health-Related Quality of Life in institutionalized elderly in Barcelona (Spain). *Med Oral Patol Oral Cir Bucal*, 2013; 18(2):e285-292.
8. Daniel Gati, Alexandre Vieira. Elderly at Greater Risk for Root Caries: A Look at the Multifactorial Risks with Emphasis on Genetics Susceptibility. *Int J Dent*, 2011.
9. Ergün Kunt G, Kökçü D, Ceylan G, Yılmaz N, Umut Güler A. Pulpal blood flow changes in abutment teeth of removable partial dentures. *Bosn J Basic Med Sci*, 2009; 9(4):296-300.
10. Esmeriz CEC, Meneghim MC, Ambrosano GMB. Self-perception of oral health in non-institutionalised elderly of Piracicaba city, Brazil. *Gerodontology*, 2012; 29:e281-e289.
11. Gaiao LR, de Almeida MEL, Filho GB, Leggat P, Heukelbach J. Poor Dental Status and Oral Hygiene Practices in Institutionalized Older People in Northeast Brazil. 2009; doi:10.1155/2009/846081
12. Glažar Irena. Procjena oralnog zdravlja štićenika ustanova za njegu starijih osoba, (Oral health evaluation in the institutionalized elderly). PhD Thesis, Medical Faculty of Rijeka, Croatia. 2010.
13. King T, Kapadia D. Oral health and treatment needs of institutionalised elderly and disadvantaged population of Fiji (1997). *Pacific Health Dialog*, 2003; 10(1):35-40.
14. Krasta I, Vidzis A, Brinkmane A, Cema I. Evaluation of Oral Therapeutical and Surgical Treatment Needs among Retirement Age Population in Different Countries. *Acta Chirurgica Latvianensis*, 2011; 11:125-129.
15. Lo EC, Luo Y, Dyson JE. Oral health status of institutionalised elderly in Hong Kong. *Community Dent Health*, 2004; 21(3):224-226.
16. Mason J, Peare MS, Walls AWG, Parker L, Steele JG. How do factors at different stages of the life course contribute to Oral-health-related quality of life in the middle age for men and women. *J Oral Health*, 2006; 12(2):125-131.
17. Matovska Lj. Cariology. Sigmepres: Skopje, 2011; p 72. (in Macedonian)
18. Milstein L, Rudolph MJ. Oral health status in an institutionalised elderly Jewish population. *SADJ*, 2000; 55(6):302-306.
19. Petelin M, Cotič J, Perkič K, Pavlič A. Oral health of the elderly living in residential homes in Slovenia. *Gerodontology*, 2012; 29:e447-e457.
20. Philip P, Rogers C, Kruger E, Tennant M. Caries experience of institutionalized elderly and its association with dementia and functional status. *Int J Dent Hyg*, 2012; 10(2):122-127.
21. Piuvezam G, de Lima KC. Factors associated with missing teeth in the Brazilian elderly institutionalised population. *Gerodontology*, 2013; 30(2):141-149.
22. Piuvezam G, de Lima KC. Self-perceived oral health status in institutionalized elderly in Brazil. *Arch Gerontol Geriatr*, 2012; 55(1):5-11.
23. Rao A, Sequeira P, Peter S, Rajeev A. Oral health status of the institutionalized elderly in Mangalore, India. *Indian J Dent Res*, 1999; 10(2):55-61.
24. Rihs LB, da Silva DD, da Luz Rosário de Sousa M. Dental caries in an elderly population in Brazil. *J Appl Oral Sci*, 2009; 17(1).
25. Ruiz-Medina P, Bravo M, Gil-Montoya JA, Montero J. Discrimination of functional capacity for oral hygiene in elderly Spanish people by the Barthel General Index. *Community Dent Oral Epidemiol*, 2005; 33(5):363-369.
26. Samnieng P, Ueno M, Shinada K, Zaitso T, Wright FA, Kawaguchi Y. Association of hyposalivation with oral function, nutrition and oral health in community-dwelling elderly. *Thai Community Dent Health*, 2012; 29(1):117-123.
27. Samson H, Strand GV, Haugejorden O. Change in oral health status among the institutionalized Norwegian elderly over a period of 16 years. *Acta Odontol Scand*, 2008; 66(6):368-373.
28. Simunković SK, Boras VV, Pandurić J, Zilić IA. Oral health among institutionalised elderly in Zagreb, Croatia. *Gerodontology*, 2005; 22(4):238-241.
29. Steele JG, Sheiham A, Marcenés W, Fay N, Walls AW. Clinical and behavioural risk indicators for root caries in older people. *Gerodontology*, 2001; 18(2):95-101.
30. Unluer S, Gokalp S, Doğan BG. Oral health status of the elderly in a residential home in Turkey. *Gerodontology*, 2007; 24:22-29.
31. vanWyk GW, Farman AG, Staz J. Tooth survival in institutionalized elderly Cape Coloreds from the Cape Peninsula of South Africa. *Community Dent Oral Epidemiol*, 1977; 5:185-189.
32. Vrbic V, Homan D, Završnik B. Oral health in Slovenia, Yugoslavia. *Community Dent Oral Epidemiol*, 1991; 19(2):72-73.
33. Vrbic V, Vulović M, Rajić Z, Topić B, Tatić E, Malić M, Milić D, Aurer-Kozelj J, Neceva L, Redzepagić S, et al. Oral health in SFR Yugoslavia in 1986. *Community Dent Oral Epidemiol*, 1988; 16(5):286-288.
34. Wyatt CCL. Long-term Care Hospitals. Part II: Dental Caries Status. *J Can Dent Assoc*, 2002; 68(6).
35. Zusman SP, Ponizovsky AM, Dekel D, Masarwa AE, Ramon T, Natapov L, et al. An assessment of the dental health of chronic institutionalized patients with psychiatric disease in Israel. *Spec Care Dentist*, 2010; 30(1):18-22.

Correspondence and request for offprints to:

Mihajlo Petrovski  
 St. "Ivan Turgijev" 10 a  
 1000 Skopje, FYR Macedonia  
 E-mail: m\_5rovski@yahoo.com