ORAL HEALTH STATUS AND SELF RATED HEALTH IN 80-YEAR-OLD COMMUNITY-DWELLING PEOPLE

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ABSTRACT

Oral health is an important discipline of health that can affect functioning of health and have severe consequences. The aim of the study was to examine the oral health of the older people and how oral health is associated with self-rated health. The study was a part of Evergreen Project conducted by the University of Jyväskylä. The participants were 80-year-old persons living in the city of Jyväskylä, People who were living in institutions were excluded from the study sample (N= 262, 74 men, 188 women). The study included clinical measures of oral health such as participant's need for dental care. The data were analyzed by chi square test, t-test and logistic regression analysis. Among men and women significant differences were found in the number of intact teeth, number of decayed teeth and decayed missing filled teeth index (DMFT). There was no association between self-rated health and oral health status (Odds Ratio 2.5, 95% Confidence Interval 0.80-7.5). The results indicate that there was no association between self-rated health and oral health. It explains that dental care at old age could affect not only oral health but also can affect individual senses of general health. Future studies should be carried to investigate and reveal more information on oral health and self-rated health.

Keywords: Self-rated health, older people. oral health, dental care.

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1. INTRODUCTION

Health is multi-dimensional and is affected by interacting social, behavioral and biomedical processes (Sidell, 1995). Health can be assessed e.g. by a doctor or by a person him or herself. Subjective indicators can be understood as those based on a person's feelings and they can be associated with self-rated health, while objective indicators are based on medically defined criteria concerning diseases (Jenkinson, 1994). There is significant association between self-rated health and mortality supporting the validity of self ratings of health (Idler et al, 1997). Poor self-rated health is linked with decline in physical activity, chronic diseases and functional limitation (Loek et al, 1993 & Cockerham et al, 1983).

Poor oral health can affect functioning and have severe consequences. Its problems can lead to discomfort, pain, complications in eating, communication, diseases, decline in social activities and low self esteem (Ritchie et al, 2002 & Raymer et al, 2003). Older people with prosthesis may not be able to take all the diets which are fundamental for the body and if it is not maintained properly there might be harmful consequences (Raymer et al, 2003). Previous studies have shown that poor oral health status is related to lifestyle that increases the risk for cardio vascular diseases (Johansson et al, 1994 & Meurman et al, 2004). Moreover, edentulous people smoked more frequently than their dentate counterparts in a study among middle- aged people in Sweden (Johansson et al, 1994). Chronic obstructive pulmonary disease and aspiration pneumonia are associated with poor oral health (Margret et al, 2001 & Azarpazhooh et al, 2006). Previous studies have shown that regular use of high number of medications increases the risk of hyposalivation and oral diseases in general (Narhi et al, 1992 & Matear et al, 2006). Hence diseases, medications and physical limitations contribute both to poor oral health and also add to poor self-rated health (Benyamini et al, 2004). The principle aim of the present study was to examine the association between oral health status and self-rated health among older people.

2. SELF RATED HEALTH

Self-rated health is the summary of all the information available to an individual about the present health. It comprises information of diseases, observation of functional status, sensations of own body and all of these are evaluated in framework of culture and age. Self-rated health is a tool that is being used commonly for a number of years. People's rating of their health are based on diseases, medications, functional ability and socio economic factors (Benyamini, 2008), but may vary with social and cultural environment. An important factor in this regard is age, as the people age they rate their health better than before because with time they may adapt to their illness and disability (Leinonen et al, 2002). The validity of self rated health is supported by its ability to predict death (Jylhä et al, 2009). The incidence of mortality is twice higher in those individuals with poor self-rated health than those who considered their health as excellent (Peres et al, 2010).

2.1 Assessment of self rated health

Self-rated health can be measured by a single question or by means of scales depending on type of research. According to previous studies there are several ways of measuring self-rated health by a single question and they vary from study to study (Idler & Benyamini, 1997). Self-rated health measured by a single question can be classified as age-comparative, time-comparative and non-comparative self-rated health (Bjorner et al, 2005). The age-comparative way of measuring self-rated health is based on a question where the respondent is asked to compare his or her health to some one else of same age. In time-comparative way the health is assessed by comparing present health to the past. In non-comparative question respondent is asked to rate their health at the moment. The response categories include four or five alternatives e.g. excellent, good, fair, and poor.

Previous studies have shown that in international surveys two-five-point scale versions of self-rated health have been used (Jurges et al, 2008). The answer categories in the first one ranges from 'very good' to 'very poor', and has been recommended by WHO-Europe and the European community health monitoring programme. The second version ranges from 'excellent' to 'poor' and has been followed in the US. There is no

evidence that the WHO version is preferable to the US version as a standard measure of self-rated health. Both versions are equally applicable and represent parallel assessment of health. (Jurges et al, 2008). Previous studies have shown that self-rated health has been recommended for use in comparisons of health status between population groups; as an outcome variable in clinical trials; and as an indicator in risk assessments and clinical practice (Jylhä et al, 2009). The main advantages and limitations for its use arise from the unique nature of the measure: it is comprehensive, inclusive, economical and non-specific. These characteristics allow it to capture dimensions of health that could not be measured by other means. On the other hand the researcher has no control over which aspects of health are emphasized in the individual assessment.

2.2 Factors underlying self rated health

According to previous research, age is a significant predictor of self-rated health but the pattern of association is fairly complex. People over the age of 60 tend to report their health more positively as compared to younger age group. Older people having high educational level tend to rate their health in more positive fashion in this regard (Cockerham et al, 1983). In a 6-year follow-up study respondents in the old-age-group were more likely to rate their health at baseline as good compared to the participants in young-group. Moreover, the proportion of subjects in the good or very good group increased significantly over the follow up period (Dening et al, 1998).

Chronic diseases are associated with self-rated health. Better self-rated health is related to lower number of chronic diseases in both cross sectional and longitudinal studies (Loek et al, 1993, Bryant et al 2000, Cockerham et al, 1983). In a study on older people neurologic diseases and cancer had largest contribution to self- rated health in men while renal diseases, rheumatoid arthritis, and cancer in women. In addition, all these diseases had largest contribution to poor self-rated health (Molarius et al, 2001). Older people with good self-rated health have lower number of chronic diseases and those with poor self-rated health have more chronic conditions. According to Johnson and Wolinsky (1993) reported in a study that self-rated health is affected directly by atherosclerosis, cardiovascular diseases and high blood pressure, they contribute to affect self-rated health independent of disability and limitations. Self-rated health is independent predictor of coronary heart disease (Moller et al, 1996). There is independent effect of self rated health on mortality and morbidity (Benyamini et al,

2004). Poor self-rated health is associated with the regular use of medications. Medications decline self-rated health and have an impact on it (Santiago et al, 2009).

Physical fitness, psychological wellbeing and health behaviors such as exercise, alcohol consumption, smoking and obesity are associated with self-rated health (Manderbacka et al, 1999). Studies have shown that participation in exercise, balanced diet and non smoking over the time predicted good self-rated health at follow-up (Leinonen et al, 2001). Older people with good cognitive functions, visual abilities, hearing have better self-rated health. They can communicate effectively and can perform all the activities of daily life independently (Leinonen et al, 2002). Among older people problems in mobility increases with aging. It is a critical element which affects functional performance and leads to hospitalization. Self-rated health is associated with walking speed and walking difficulty (Jylhä et al, 2000). Disability is one of the key aspect which older people takes into account while rating there health (Jylhä et al, 2001). Studies have shown that women suffers from more chronic conditions such as increased chances of disability as compared to men who have more chances to suffer from severe diseases such as cancer (Spiers et al, 2002).

The detailed knowledge of family history of chronic disease, life style characteristics, personality and psychosocial characteristics has influence on self-rated health (Martikainen et al, 1999). Previous studies have shown that older people with low socio-economic status and low-educational level have poor self-rated health as compared to those having high socio-economic status and high-educational level (Molarius et al, 2006 & Borrell et al, 2011). Older people with high socio-economic status can maintain their health more conveniently than those with low socio-economic status. Poor self-rated health is associated with lack of exercise, pain, unemployment, obesity and smoking (Svedberg et al, 2006). Previous research showed that physically inactive and obese people tend to report their self-rated health as poor (Molarius et al, 2006).

3. ORAL HEALTH STATUS

Oral health is a state of the mouth and associated structures where disease is contained, future disease is inhibited, the occlusion is sufficient to masticate food and the teeth are of a socially acceptable appearance (Locker, 1997). The definition indicates toward social and functional concerns, and in doing so it tries to pass the division between medical and socio environmental paradigm of health. An alternative definition was presented by Dolan (1997) in which she defined oral health as comfortable and functional dentition which allows individual to continue in desired social role. Oral diseases have adverse effects on an individual's physical and psychological well-being and reduce quality of life (Locker et al, 2000 & Weyant et al, 2004). Moreover oral diseases are among the common chronic diseases which make them important issues in public health and have adverse effects on general health. In the present thesis the term oral health includes need of dental care.

3.1 Consequences of poor oral health

Retaining healthy teeth for as long as possible contributes significantly for well-being and length of life in general. In addition, poor-dental health is related to increased mortality among older people (Hamalainen et al, 2003). Cardiovascular morbidity and mortality are also linked with poor dental status (Meurman et al, 2004), and premature death has been reported to correlate with poor oral health (Appollonio et al, 1997, Shimazaki et al, 2001). In a prospective cohort study from Japan by Shimazaki and coworkers (2001) reported that the six years mortality rate among edentulous people was significantly higher than their dentate counterparts. Studies have shown associations between oral infections and systemic diseases. Deaths from upper gastrointestinal cancer, heart diseases and stroke were associated with tooth loss (Abnet et al, 2005). A person's general health status may be affected by oral infections. Moreover, increased serum inflammatory markers such as cytokine reactive protein (CRP) have been linked with periodontal diseases and periapical infections (Joshipura et al, 2004, Radics et al, 2003, Barkhordar et al, 1999). Previously it is reported that serum cytokines are associated with mortality (Mooradian et al, 1991). Therefore, oral health

status is of prime importance in the older population, because research shows that oral health status also predicts about mortality.

3.2 Factors underlying oral health status

One of the important indicators of oral health and dental care is considered to be edentulism among adults. During the last decade dental state has changed rapidly in developed countries. The number of total edentulous persons is rapidly decreasing in Finland (Taipale et al, 1999). Previous research shows that the prevalence of edentulousness is more common in women than in men. Moreover, the strongest risk factors for edentulousness are female gender and age between 80 and 89 years in a study population in Eastern Finland (Pajukoski et al, 1999). The most common reason for tooth extraction is caries (Linda et al, 2007). Men have more decayed teeth and fewer filled teeth as compared to women (Ambjørnsen, 1986).

Studies have shown that most of the people over 65 years of age wear removable-partial dentures. However, a favorable environment for the growth of various micro organisms is created by the usage of removable-partial dentures. Furthermore, the use of removable-partial dentures and male gender is considered to be a risk factor for tooth loss (Nevalainen et al, 2004). Among the people wearing dentures most of them are satisfied with their prosthesis, however prosthetic examination may reveal various problems, as ill fitting dentures can cause some oral ulcers and may lead to severe oral diseases. Moreover, food intake and selection can become modified by ill fitting dentures and result in malnutrition (Raymer et al, 2003).

One of the common infections among older people is periodontitis. It is portrayed by a chronic infection and inflammation in the periodontal tissue leading to the destruction of the bone surrounding the teeth and eventually to tooth loss (Söder et al, 2005). Furthermore, research indicates the role of inflammation in the pathogenesis of atherosclerosis and subsequent coronary-heart disease. In persons with severe gingivitis or periodontitis the level of inflammatory markers including C-reactive protein (CRP), fibrinogen, and leukocyte counts is higher than those who are free of it (Janket et al, 2003). As the level of inflammatory markers increases in the body it shows that individual is more prone to cardiovascular disease. It can predict about individuals having high risks for cardiovascular diseases. All these studies reflect that there is a

relationship between periodontitis and increased incidence of coronary-heart disease, myocardial infarction and cerbrovascular events which shows its clinical significance.

One of the domains of health is oral health and it can affect the overall feeling of health. It can lead to problems such as pain, discomfort and severe diseases e.g. oral carcinomas and problems in eating, communication, and appearance, and consequently to embarrassment, social problems and low self-esteem (Slade & Spencer, 1993). Self-rated oral health also had an independent effect on self-rated general health (Benyamini et al, 2004). Studies have shown that a person's self-esteem and feelings of social well-being are influenced by oral health status (Akifusa et al, 2005). Previous research shows that poor-oral health status (edentulous without dentures or with dentures) increases difficulty in eating hard foods and decreases eating pleasure. It has been suggested that decline in chewing ability due to loss of permanent teeth affects eating habits, and they have high risk of malnutrition (Lamy et al, 1998). Besides eating, the oral cavity performs various functions, such as speech, esthetics and contributing to facial appearance. Therefore, it is important to retain teeth for as long as possible because this contributes significantly to life.

4. SHARED RISK FACTORS FOR ORAL HEALTH AND SELF RATED HEALTH

Low socio-economic status is a risk factor for poor self-rated health. Highly educated people are known to have better self-rated health than those with low education (Molarius et al, 2006 & Borrell et al, 2011). Low socio-economic status associated with poor oral health (Nakazono et al, 1997), dental caries and need of dental treatment (Irigoyen et al, 1999). Previous research showed that the number of missing teeth was highest among those who had less education and lowest among those who had more education (Ambjørnsen, 1986). It can be explained by the fact that people with high level of education and better socio-economic status have been found to have better oral hygiene and they have received better dental and medical treatment during their lives than the less educated (Loesche et al, 1995 & McMillan et al, 2003). Researchers have also mentioned that visiting the dentist regularly and high education trends are associated with high number of filled teeth and low percentage of decayed teeth (Ambjørnsen, 1986). It can be concluded that people with high education have good oral and self-rated health (Forslund et al, 2002 & Molarius et al, 2006).

There is a direct association between smoking, general and oral health status. Smoking is considered as an indicator of a negative attitude to health. Previous studies have confirmed that smokers are more prone to diseases when compared to non-smokers e.g. oral carcinomas of lip, tongue, carcinoma lung, asthma and chronic obstructive pulmonary disease (Henley et al, 2004). Cigarette smoking was related with mortality from cardiovascular disease, lung cancer and chronic obstructive pulmonary disease, while both the number of cigarettes smoked as well as duration of cigarette smoking was strongly associated with all-cause mortality. The total life expectancy was reduced by 6.8 years for average cigarette smoking, while heavy cigarette smoking reduced the total life expectancy by 8.8 years. Quitting cigarette smoking at age 40 increased the life expectancy considerably (Steppel et al, 2007). Researchers have reported that poor self-rated health is associated with smoking (Kawachi et al, 1999 & Svedberg et al, 2006). In a Canadian population poor self- rated health was associated with chronic diseases with significant contribution from lifestyle factors including smoking (Cott et al, 1999). Smoking has been reported to correlate significantly with the loss of teeth and decayed teeth (Ojima et al, 2007).

In older people oral diseases not only play an important role in the quality of life, but can result in severe morbidity and mortality (Weyant et al, 2004). People with poor oral health have difficulty in eating certain food stuffs essential for human body (Budtz-Johnson et al, 2001). Furthermore, research indicates that tooth loss affects nutrients intake in a manner that the risk of systemic diseases is potentially increased (Ritchie et al, 2002). Moreover, malnutrition increases the severity of oral infections and may lead to their evolution into life threatening diseases (Enwonwu et al, 2002). In older people missing teeth's together with ill fitting dentures are associated with reduced masticatory ability and eventually to dietary restrictions (Kossioni et al, 2008 & Raymer et al, 2003)). Edentulous people are prone to inappropriate dietary intake ingesting calorie rich and high fat food. Healthy diet rich in fruit and vegetables can be maintained by having a natural dentition (Joshipura et al, 1996). Edentulousness is an important risk factor for weight loss as discomfort due to poorly fitting dentures can contribute to decrease nutrient intake (Ritchie et al, 2000). All these factors contribute to increase the risk of premature mortality.

Previous studies showed that dentists judged oral health more precisely and positively than reported by people themselves (Atchison et al, 1993). In a US study Benson et al (1984) reported that the dental treatment needs among institutionalized older people includes mostly denture related services, oral surgical services and operative procedures. Drake et al (2007) reported that older people living at home required extraction treatment needs and lacked restorative treatment needs. In addition, caries, pocket depth and educational level were associated with treatment need. In a Finnish study Pajukoski et al (1999) reported that among older adults the mean number of decayed teeth in non hospitalized and hospitalized patients were 0.6±0.9 and 1.3±2.2. Oral health related quality of life is poor among those with perceived need to relieve dental pain (Seirawan et al, 2011). General health status declines as the average intake of drugs increases. Studies have shown that the number of drugs taken daily has an association with the loss of teeth (Pajukoski et al, 1999). Older people with chronic diseases and high intake of medication have a high risk of oral diseases such as xerostomia, which is due to malfunctioning of salivary glands and results in a decline of salivary flow (Field et al, 2008). This decline in salivary flow can have adverse effects on oral health, general well-being and lifestyle.

According to previous studies oral diseases are risk indicator of death due to cardiovascular disease, especially in combination with a strong risk factor such as smoking. Further more, that there is an association between poor oral health status and cardiovascular morbidity and mortality (Buhlin et al, 2003). Dental infections are common infections in the human body, have a linkage with atherosclerosis and mortality (Desvarieux et al, 2004). Furthermore, deaths from upper gastrointestinal cancer, heart diseases and stroke have been associated with tooth loss (Abnet et al, 2005). Poor oral health is related with poor self-rated health (Benyamini et al, 2004 & Matthias et al, 1995). Therefore, as all these factors contribute to poor oral health they also contribute to poor self-rated health.

5. AIMS AND RESEARCH QUESTIONS

The purpose of the present study was to examine oral health of 80- year- old men and women and how oral health associates with self-rated health. More specifically the aim was to study relationship of self-rated health with oral health status including need of dental care. The research questions are:

1. What is the level of oral health of 80 years old men and women?
2. What are the factors affecting oral health status and self-rated health?
3. Is oral health status associated with self-rated health?

6. PARTICIPANTS AND METHODS

6.1 Study design and participants

The study was part of Evergreen project, conducted by University of Jyväskylä. The study included community living people living in city of Jyväskylä, born in 1910. The inclusion criteria were: community living people and excluded people living in institutions and nursing homes. The study is based on base line data collected in 1990 by interviews, questionnaires and examinations carried out either at study centre or participant homes. The sample consisted of 291 older adults (78 males, 213 females) of whom 283 (76 males, 207 females) were eligible. The eight missing persons were one man and five women who died, and two persons moved away from Jyväskylä before the starting of examination. Of the eligible population 262 (74 males, 188 females) 92.6% took part in the interview and 72.4 % in examinations. Furthermore of the eligible population 21 persons refused to participate for unknown reasons.

6.2 Data acquisition and variables

Self-rated health was elicited by the question "How would you describe your health?" The scale used was as follow 1= excellent, 2=good, 3=moderate, 4=not so good, 5= poor. For statistical analysis the number of categories was reduced to three: 1-2, 3 and 4-5. Educational level was assessed by asking "What is the level of your education?" Due to small number of answers in extreme categories the answers were categorize into primary school- middle school, high school and university. Participants were asked to rate their socio-economic status into three categories: good, fair and bad. Smoking was elicited by the questions "How many years have you been smoking?" Duration of smoking in years was regrouped into two classes: those who had never smoked and those who had smoked for one year or more. The information on heart disease is included in present study. Heart diseases were regrouped into two classes: those who had one or more heart diseases and those who had no heart diseases.

The dental examinations were performed by the dentist assisted by the nurse. It was clinical examination only and no radiographs were taken. Healthy teeth, decayed teeth, filled teeth and missing teeth were recorded. World Health Organization

recommendations were followed for the diagnosis of carious lesions (WHO, 1987). Decayed missing filled teeth (DMFT) index was calculated and coding was used for recording dentition status. 0= Healthy teeth, 1=carious teeth, 2=filled crown with decay, 3=filled crown with no decay, 4=missing tooth as result of caries, 5= permanent missing tooth due to other reasons, 6=special crown, 7=unerupted crown/tooth, 8=not recorded. The subject was regarded as in need of dental care if there was pain or clinical detectable infection or infection which could lead to severe disease if not treated. Coding was used for recording need of dental care. 0= No need of dental care, 1= Dental hygienist care, 2= Tooth extraction, 3= Tooth extraction with special care, 4= Difficult treatment. For statistical analysis it was regrouped into two categories: 0, 1-2-3-4.

6.3 Statistical analysis

To describe the baseline characteristics according to gender cross tabulation was used. To compare means for various characteristics between men and women, independent sample t-test was used. To investigate association of self-rated health and oral health with base line characteristics chi square test was used. P value <0.05 was considered statistically significant. Binary logistic regression analysis was performed. Three models were created, all adjusted for sex. In the first model, self-rated health was included. Smoking was added to second model. In the third model education and heart diseases were added. The data was analysed with SPSS 19 for Windows.

7. RESULTS

Baseline characteristics according to gender are presented in Table 1. In self-rated health the participants were quite equally distributed to good, fair and bad categories. Majority of the men were married while most of the women were unmarried. The difference between the sexes was significant (p<0001). Furthermore, women were more likely to be diagnosed with heart diseases (p=0.004). Smoking was more common among men than women 75% of men, but 5% of women had smoked (p<0001). There were no gender differences in other variables.

Table 1: Baseline characteristics of 80 year old people according to gender

Characteristic	**Male (n=74) f (%)**	**Female (n=188) f (%)**	**χ2 Test P -value**
Education			
School	57(80)	162(87)	
University	14(20)	24(13)	
			0.169
Economic situation			
Good	22(32)	46(25)	
Fair	48(58)	114(63)	
Bad	6(9)	18(10)	
			0.777
Marital status			
Unmarried	2(3)	32(17)	
Married	51(69)	34(18)	
Widow/Divorced	21(28)	122(65)	
			<0.001
Self rated health			
Good	13(19)	27(15)	
Fair	39(57)	113(63)	
Bad	16(24)	14(22)	
			0.673
Heart diseases			
Yes	32(49)	107(69)	
No	34(51)	48(31)	**0.004**
Smoking			
Current			
No	56(81)	177(99)	
Yes	13(19)	1(1)	
			<0.001
Earlier			

No	12(22)	156(89)	
Yes	42(78)	19(11)	
			<0.001
Number of years			
No	13(25)	158(95)	
>1	39(75)	9(5)	
			<0.001

The details for oral health characteristics are given in Table 2. There were statistically significant gender differences in number of intact teeth (p=0.003), decayed teeth (p<0001) and DMFT index (p=0.013) among dentate men and women.

Table 2: Oral health characteristics of 80 year old dentulous participants

Characteristic	**Men (n=22) mean±SD**	**Women (n=52) mean±SD**	**p value**
Number of intact teeth†	7.80±5.08	4.57±3.20	**0.003**
Number of decayed teeth†	6.79±4.35	2.21±1.77	**<0.001**
Number of filled teeth†	6.09±4.26	8.00±5.99	0.180
DMFT†	29.49±4.63	30.72±2.63	**0.013**

† t- test for independent samples
SD Standard deviation

Table 3 shows association of baseline characteristics with self-rated health. There was statistically significant association between self-rated health and economic situation (p= 0.001). Among participants 47% with good self-rated health have good economic situation while 64% with fair self-rated health reported fair economic situation but 67% with bad self-rated health have fair economic situation. There was no association was with other variables.

Table 3: Association of baseline characteristics with self-rated health among 80-year old people

Characteristic	Good (n=40) f (%)	Fair (n=152) f (%)	Bad (n=56) f (%)	χ2 Test P -value
Education				
School	36(90)	127(85)	48(86)	
University	4(10)	23(15)	8(14)	
				0.692
Economic situation				
Good	19(47)	41(28)	9(16)	
Fair	18(45)	96(64)	37(67)	
Bad	3(8)	12(8)	9(17)	
				0.001
Marital status				
Unmarried	8(20)	20(13)	3(5)	
Married	9(22)	46(30)	24(43)	
Widow/Divorced	23(58)	86(57)	29(52)	
				0.104
Heart diseases				
Yes	17(57)	82(62)	38(75)	
No	13(43)	50(38)	13(25)	
				0.187
Smoking				
Current				
No smoking	38(95)	141(95)	52(93)	
Yes	2(5)	8(5)	4(7)	
				0.868
Earlier				
No smoking	24(65)	106(76)	36(72)	
Yes	13(35)	34(24)	14(28)	
				0.408
Number of years				
no smoking	25(71)	107(80)	37(77)	
> 1 year	10(29)	27(20)	11(23)	
				0.558

Table 4 shows how the study variables are distributed among need of dental care. There was statistically significant association between education level and need of dental care ($p<0001$).Those who needed dental care 71% have school education while those in no

need of dental care 93% have school education. Most of the participants rated their health as fair and no significant association was found with self-rated health and other variables.

Table 4: Association of self-rated heath and need of dental care

	No n(=141) f(%)	**Yes n(=85) f(%)**	**χ2 Test P -value**
Self rated health			
Good	17(13)	14(17)	
Fair	81(60)	52(63)	
Bad	36(27)	17(20)	
			0.467
Smoking			
Current			
No	124(90)	80(96)	
Yes	10(8)	3(4)	
			0.246
Earlier			
No	88(71)	57(73)	
Yes	35(29)	21(27)	
			0.813
Number of years			
No smoking	90(75)	58(81)	
> 1 year	30(25)	14(19)	
			0.375
Education			
School	128(93)	60(71)	
University	10(7)	24(29)	
			<0.001
Economic situation			
Good	33(25)	29(35)	
Fair	86(65)	45(54)	
Bad	14(10)	9(11)	
			0.253
Heart diseases			
Yes	86(63)	52(63)	
No	50(37)	31(37)	
			0.931

Results of logistic regression analysis are presented in Table 5. Model 1 shows that there was no association between self-rated health and need of dental care (OR 1.6 95% CI 0.67-4.2) from bad to good self-rated health. In Model 3 adding other variables to it

(OR 2.5 95% CI 0.80-7.5) didn't changed the association between self-rated health and need of dental care. Excluding edentulous cases didn't changed association between self-rated health and need of dental care.

Table 5. Association between self-rated health and No need of dental care among 80 year old persons in logistic regression analysis sex adjusted

Variables (ref)	**Model 1** **OR (95% CI)**	**Model 2** **OR (95% CI)**	**Model 3** **OR (95% CI)**
Self rated health			
Bad vs Fair	1.22 (0.55-2.71)	1.34 (0.56-3.23)	1.38 (0.54-3.50)
Bad vs good	1.68 (0.67-4.22)	2.15 (0.77-6.01)	2.50 (0.80-7.56)
Sex(male)	1.40 (0.76- 2.56)	6.85 (1.88-24.91)	6.81 (1.79-25.81)
Smoking(Never vs ever)		6.55 (1.70- 25.26)	7.40 (1.80-30.34)
Education(school)			0.14 (0.05-0.37)
Some heart disease(No)			1.01 (0.51-2.03)
Note: Model 1 adjusted for sex	Model 2 adjusted for sex and smoking; Model 3: Model 1 + Model 2 + adjustment for education and heart diseases		

8. DISCUSSION

The purpose of the present study was to examine oral health of older people and its association with self-rated health. There was no association between self-rated health and oral health status using need of dental care as indicator of oral health. Although previous studies reported association between self-reported oral health status and self-rated health. Participants with good self-rated health reported good self-reported oral health on the other hand those with bad self-rated health reported poor oral health but no association was found to other health variables (Benyamini et al, 2004; Nakazono et al, 1997; Matthias et al, 1995). The studies showed positive association between self-reported oral health and self-rated health, but at the same time it contradicts with present study which showed no association of self-rated health and need of dental care. In comparison to afore mentioned study there are certain limitations in study design and sample.

Unfortunately no previous studies were evident to support the knowledge of present study. The possible explanation for no association between self-rated health and oral health could be that present study includes clinical measures or examinations by dentists and therefore result pertains only to association found between clinical measures not including self-reporting of oral health. There is no way of knowing to what extent these clinical measures correspond with participant self-reporting general health. Need of dental care is one aspect of oral health (Sheiham et al, 1982 & Gift et al, 1997). It is possible that other indicators of oral health are more closely associated to participant's self-rated health. In addition, treatment needs were solely based on clinical criteria of diagnostic needs and it didn't included perceived needs. There was large number of edentulous persons in the present study. So we excluded edentulous cases and analysed the relationship between self-rated health and oral health but it didn't changed and remain the same. However, the dental status of Finnish adult population has changed considerably in current decade and there is decrease in prevalence of edentulism and increase in number of persons with complete dentition (Taipale et al, 1999 & Takala 1994). The dental findings could be much better analyzed if there were not many edentulous cases in present study. An interesting fact seen during data analysis process

was that there was non significant association of self- rated health with need of dental care (p=0.467). Moreover, majority of participants with need of dental care 63% have fair self-rated health while 20% were having bad self-rated health.

Oral health characteristics among men and women showed significant differences in number of intact teeth, number of decayed teeth and DMFT index scores. There were high proportion of edentulous subjects about 56% of men had no teeth and 60% of women were without teeth. However, no significant differences were found in edentulous and number of filled teeth's among gender. The best possible explanation for such high number of edentulous cases could be that smoking is most significant cause of tooth loss. Previous research supports the present findings and reported that smoking is significantly associated with tooth loss and there is high prevalence of decayed teeth in smokers as compared to non smokers (Ojima et al, 2007). Another explanation could be that previously dental infections were treated by extractions rather than complex endodontic procedures and obtaining dentures might be the reason for extractions in women. The higher trends in number of filled teeth's showed that participants were well educated and have good socio-economic status and may have access to quality dental care (Ambjørnsen, 1986).

The present study has certain limitations and should be considered when planning future research. There was large proportion of edentulous participants and uneven distribution among gender. The findings could much better analyzed if the participants were not too old. The strength of the study is that it is among one of the few studies relating self-rated health with oral health. The sample used in the study is representative of general elderly population. The oral health measure used in the present study precisely shows the actual oral health status of older people. Previous studies have shown that oral health judged by dentists is accurate than reported by people themselves (Atchison et al, 1993). Further more, future studies can be conducted by adding self reporting of oral health.

In conclusion, the present study examines oral health among older people and showed no association between self-rated health and oral health. It explains that dental care at old age could affect not only oral health but also can affect individual senses of general health. Future studies should be carried to investigate and reveal more information on oral health and self-rated health.

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