Self-reported oral status and oral health: an exploratory research in the province Flevoland

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Anica Dannenberg MSc

Student number 5717825

Supervisor: Dr. J.S. Benjamins

Second reader:

Abstract

Background: Oral health is an important part of the overall health. Bad oral health can result in serious health problems such as diabetes, atherosclerosis, and pulmonary inflammation. Very little data are available on the oral health status of the Dutch population. Therefore, the aim of this study is to get insight in the oral status and oral health of the inhabitants of Flevoland. Additionally, the relation between age and frailty was determined and associated with oral status.

Methods: In this exploratory, cross-sectional study, 1154 people (≥19 years of age) were invited to complete a questionnaire on oral health, oral status, and frailty. The Oral Status Score (OSS) was calculated and associations between OSS, frailty, and other variables were determined. The correlation between frailty and age was calculated.

Results: 567 filled out the questionnaire (49% response rate) whereof the data of 532 participants were analysed. 39.7% had remaining teeth, 18.8% were edentulous, and 41.5% had implants and/or prosthesis. 19.0% of the total population was frail (GFI ≥4). An important finding between frail and non-frail people was the significantly lower mark frail people gave for their oral health. Education level showed an association with the OSS: lower educated people showed worst OSS and the people with a high education level showed best OSS. People who visited the dentist or dental hygienist twice a year showed the best OSS. In addition, people who are brushing their teeth at least twice a day showed the best OSS in comparison to people with a lower brushing teeth frequency. No correlation was found between age and frailty.

Conclusion: Although no significant differences were found in oral status and oral health between frail and non-frail people, the results of this study showed negative effects of low teeth brushing frequencies and dentist visits on the oral status. Since bad oral health is associated with negative consequences for overall health, it is important to increase awareness among inhabitants and caregivers about the importance of good oral health. Moreover, the results of this study showed that there is a need for additional research to find out what the exact effect is of age on frailty and whether frailty is a better measure than age when looking at oral status or oral health.

Keywords: Oral status – oral health – frailty – Oral Status Score

Preface

I would like to thank GGD Flevoland for the opportunity they gave me when accepting me as their intern in September 2016. I started with an exploratory research on the subject oral health in the province of Flevoland. Myrthe Tienstra, thank you for your supervision and support during this internship. With your help I was able to write the advice report 'Oral health of elderly in the province Flevoland'.

After finishing my internship, GGD Flevoland gave me the opportunity to do more research on the topic I am really interested in. In March 2017 I started the research on self-reported oral status and oral health of inhabitants of the province Flevoland.

Thank you, Eefje Willemse, for the quick set up of a research panel which made the continuation of my research possible. Thank you, participants of the research panel for filling out my questionnaire about oral health.

Linda Strijbis and Carola Meulenbroek, thank you for our pleasant cooperation on the vaccination project, which was too short.

Of course, I also want to thank all the other colleagues of the department 'Beleid en Onderzoek' for the support and compassion during my time with you.

Jeroen Benjamins, many thanks for the appointments (sometimes on very short notice from my side) and your supervision. Your critical and sharp comments made it possible for me to order my thoughts and put it down on paper.

Last but not least, Willeke Wijburg, thank you so much for your supervision and your expertise on the statistics part of my thesis. I could not have done this without you! Also your critical view and your eye for detail resulted in many clarifications in my thesis. Thank you!

Anica Dannenberg MSc

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1. Introduction

The elderly population is constantly growing due to the ongoing increase in life expectancy and the ageing baby boom generation. The number of Dutch people over the age of 65 years is 3.1 million in 2017 and will increase to 4.8 million in 2040 (Centraal Bureau voor de Statistiek, December 2016). In addition, the number of elderly over the age of 80 will increase in a marked degree from 0.7 million in 2017 to 1.6 million in 2040 (Centraal Bureau voor de Statistiek, 2015).

With age, the risk of health problems increases. An underestimated problem in these health risks are oral diseases and dental problems, which can result in severe consequences for the general health, especially in elderly. Caries, gingival inflammation, jawbone degradation, missing teeth, dry mouth, and mastication limitations are frequently occurring problems in elderly (Thomson, 2004; Kassebaum et al., 2014; Gil-Montoya et al., 2015). These oral-related problems increase the chance of serious health problems like diabetes, atherosclerosis, rheumatoid arthritis, kidney diseases, pulmonary inflammation, multiple sclerosis, cognitive decline (Iwasaki et al., 2016), eating problems (Walls & Steele, 2004), and psychological problems (Ling & Tao, 2016; Scannapieco & Cantos, 2016; Lee et al., 2015; Alkan et al., 2015; Hoeksema, 2016). Poor oral health has also negative consequences for social wellbeing and quality of life (Gil-Montoya et al., 2015; Naito et al., 2006).

The Dutch Health Care Inspectorate published a report which revealed the insufficient quality of oral care for frail elderly living in nursing homes (Inspectie voor de Gezondheidszorg, 2014). The attention towards the importance of oral care for frail elderly in nursing homes is essential for improving oral care. However, only a small percentage of all Dutch elderly live in nursing homes. 25 years ago 30 percent of the people over the age of 80 years used to live in a care institution. In 2015, this percentage dropped to 13 percent. The expectation for 2040 is that only 8 percent of the elderly over the age of 80 will live in a care institution (Centraal Bureau voor de Statistiek, 2015). Therefore, it is important to focus on community-dwelling elderly too.

Differences amongst community-dwelling elderly, such as the diversity in disabilities or care-dependency, can be associated with differences in oral health status (De Visschere et al., 2016). Often chronological age is used as selection criterion in finding associations. However, chronological age is not always the best selection criterion to use and frailty seems a better selection criterion, because of taking more domains of functioning into account (Schuurmans et al., 2004; Steverink et al., 2001). Recent research shows the relation between frailty and oral status in which Watanabe et al. (2017) showed that frail elderly had poorer oral function than pre-frail and robust elderly.

The Municipal Health Service of Flevoland (GGD Flevoland) is responsible for protecting and promoting the health of people living in the province Flevoland. Because the Ministry of Public Health Welfare and Sport has stressed the importance of oral care in elderly (Schippers, 2016), GGD Flevoland wants to know what the oral status and oral health is of their inhabitants. This is important for local health policy of the municipalities.

The aim of this research is to gain insight in the self-reported oral status and the oral health of residents of the province Flevoland and which factors can be associated with this. We expect to find associations between socio-demographic characteristics such as age, living situation, and education completed and oral status defined by having own teeth, wearing dentures, wearing implant-dentures. It is hypothesized that older age, living alone, and lower education level will be associated with a worse oral status and oral health. Another expectation is that there will be an association between oral status

and oral health and frailty in which frail people will report a worse oral status and oral health in comparison with non-frail people. This consideration of frailty as a contribution to oral health as opposed to age is novel and thus gain new insights.

2. Methods

2.1. Study population

This cross-sectional descriptive study took place between 7 April and 2 May 2017. Data were collected using a research panel (n=1154). This research panel consisted of people who have previously indicated their intention to participate in future research of GGD Flevoland. People could indicate their intention to participate after they filled out the quadrennial Health questionnaire in 2016. The 14,000 people who received an invitation for the quadrennial Health questionnaire was a randomly selected sample of all inhabitants of the province Flevoland with the age of 19 years and older. Institutionalized people, people living in prison and refugee centres were excluded from participation.

2.2. Procedure

The online questionnaire was sent to 1154 people. After 11 days, a reminder was sent to the people of the research panel who did not filled out the questionnaire yet. The data were collected and processed in IBM SPSS Statistics 23.

The questionnaire consisted of three parts (see Appendix I):

1. Demographic characteristics;
2. Oral status and oral health;
3. Groningen Frailty Index questionnaire.

2.2.1. Demographic characteristics

Eight questions about demographic characteristics were included, such as questions about sex, year of birth, living situation, and education. Highest education completed was categorized in three levels: low, middle, and high. The low education group includes people with no education or people who completed preparatory secondary vocational education. The second group is defined as the middle group and includes people who completed senior secondary general education, pre-university education, or senior secondary vocational education. The high education group consists of people who completed higher education or university education.

2.2.2. Oral status and oral health

The second part of the questionnaire consisted of 8 to 15 questions relating oral status and oral health. The number of questions differed due to several referral questions.

Oral Status Score

Five questions from the questionnaire were about oral status. The Oral Status Score (OSS) was calculated using different values for each separate answer to the five oral status questions (see Appendix II). The answer option about having full dentures in upper and lower jaw will be defined as the people with complete dentures or full dentures. People with complete dentures or full dentures can also be defined as edentulous. The maximum OSS was 10 for edentulous subjects. The minimum OSS was one, which entails having all own teeth and molars.

Oral health

7 to 10 questions about oral health (behaviour) were included in the questionnaire. These questions touched upon topics such as dentist and dental hygienist visit, frequency of teeth brushing, tools

people use to take care of their teeth and mouth, problems with teeth, dentures, and mouth, and grade for overall oral health. Only people who indicated not visiting the dentist and/or dental hygienist at all or less than once a year got the referral questions about the reasons why people did not visit the dentist and/or dental hygienist. To determine oral health no validated questionnaire or composed score was used. The answers were analysed per oral health question.

2.2.3. Groningen Frailty Index questionnaire

The Groningen Frailty Index questionnaire (GFI) consisted of 15 questions: 9 questions belong to the physical component, 1 question to the cognitive component, 3 to the social component, and 2 to the psychological component. All questions, except for one, could be answered with 'yes', 'no', or 'sometimes'. The exception question was about marking physical fitness and could be answered with a mark from 1 to 10. Peters et al. (2012) assessed the feasibility, reliability, and construct validity of the Groningen Frailty Index questionnaire people fill out themselves. Internal consistency was 0.68 (reliability). The construct validity of the GFI was good. Peters et al. (2012) showed a convergent validity ranged from 0.45 to 0.61 and a discriminant validity ranged from 0.08 to 0.50. According to Schuurmans et al. (2004) frailty was defined with a GFI score of 4 or higher (GFI ≥4).
When respondents did not fill out four or more components of the GFI questions, no GFI score was calculated. A missing answer was not included in the sum of the GFI score.

2.3. Statistical analyses

Baseline characteristics were determined using frequency tables and crosstabs. Differences between groups were tested with the chi-square test. Correlations were determined with Pearson for normally distributed variables such as age and Spearman's rho tests for variables that were measured on a ordinal or nominal scale such as education level, dentist check frequency, and teeth brushing frequency. A p-value<0.05 was defined as significant. Descriptive statistics and frequency tables were used to provide demographic characteristics, OSS, GFI score, and number of frail people for the total population (see Table 1). Pearson correlations were used to determine correlations between age, frailty, and OSS. Differences between characteristics of frail and non-frail respondents were determined using Chi-square tests and ANOVA tests (see Table 2). OSS of different characteristics were compared using ANOVA tests (see Table 3). For ordinal variables, ANOVA tests for linearity were used.

3. Results

3.1. Respondents

567 of the 1154 invited people filled out the questionnaire which means a 49% response rate (see Figure 1). 35 responses were excluded from analysis because of missing demographic data (n=1), missing oral status data (n=12), or conflicting answers in oral status data (n=22).

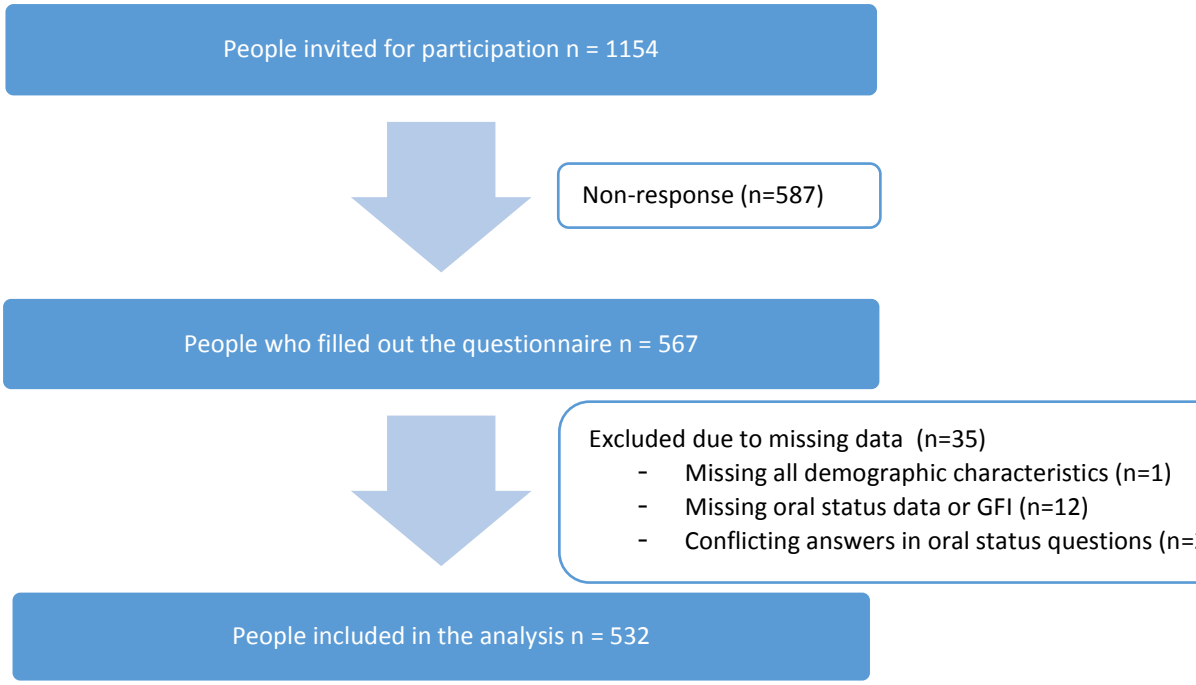

Figure 1. Flowchart of people who were invited for participation and those who completed the questionnaire.

Table 1 shows characteristics of the respondents (n=532). Median age of all respondents was 65 years (IQR 51-71) and 49.4% was male. 100 of all respondents were edentulous (18.8%) and 100 respondents were frail (19.0%). The median Oral Status Score was 2 with IQR 1-5.

Table 1. Characteristics of respondents.

	Total (n=532)
Age, median (IQR)	65 (51-70)
Sex, n (%)	
Male	263 (49.4%)
Marital status, n (%)	n=525
Married, registered partnership, living together	403 (76.8%)
Single or divorced	85 (16.2%)
Widow or widower	37 (7.0%)
Living situation, n (%)	
With someone (partner/kids/other adult)	435 (81.8%)
Living alone	86 (16.2%)
Education, n (%)	n=530
Low	127 (24.0%)
Middle	189 (35.6%)
High	214 (40.4%)
Oral Status Score, median (IQR)	2 (1-5)
Oral status, n (%)	
Edentulous	100 (18.8%)
Implants and/or prosthesis	221 (41.5%)

Remaining teeth	211 (39.7%)
GFI score, median (IQR)	1 (0-3)
Frailty, n (%)	n=527
Frail	100 (19.0%)

Figure 2 shows the age distribution of population separately for different genders. The group of people from <65 years consisted of 47.7% of the total population and from this group only 37.8% was male. The group of ≥65 years old (52.3% of the total population) had a higher percentage males: 60.1%.

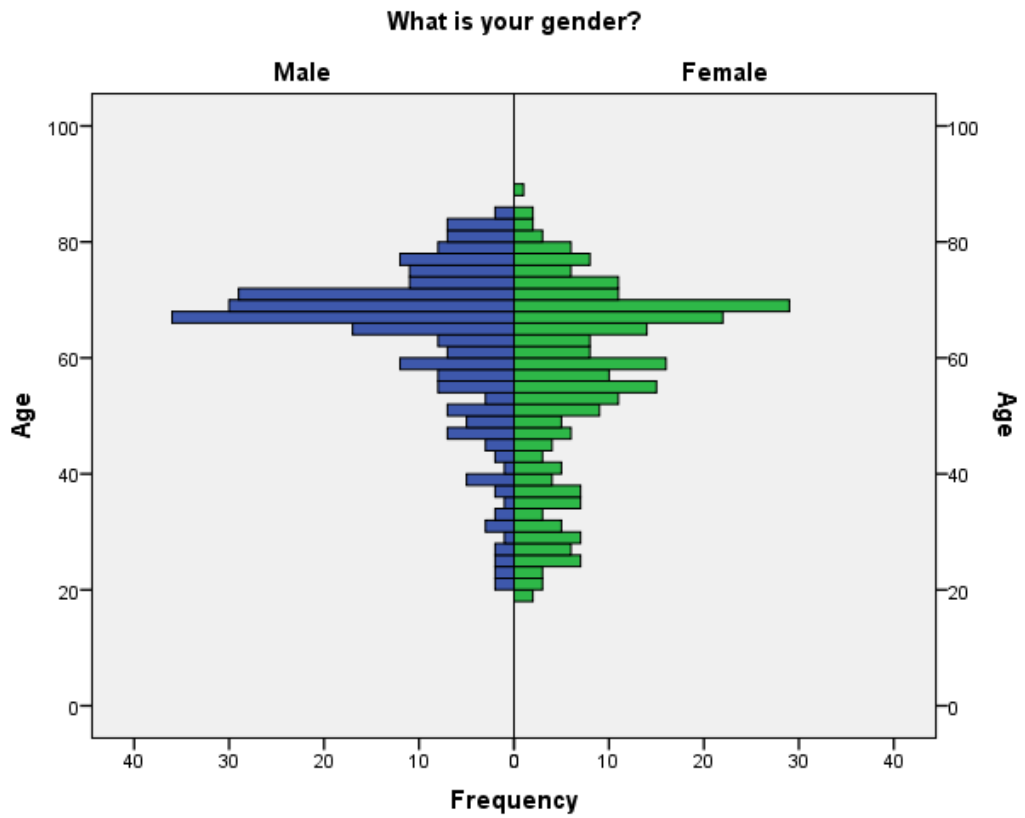

Figure 2. Population pyramid of total population (n=532).

3.2. Age, frailty, and Oral Status Score

A moderate correlation was found between age and OSS of the total population (Pearson correlation 0.447, p-value=0.000). There was no correlation between frailty (total GFI score) and OSS (Pearson correlation 0.078, p-value=0.074). Also no correlation between age and frailty (Pearson correlation 0.032, p-value=0.457) was found.

3.3. Frailty and oral status and oral health

Table 2 shows the characteristics of all respondents based on frailty. 100 respondents (19.0% of total population) were frail based on the Groningen Frailty Index (GFI≥4). There was a significant difference between the percentage of male in the frail group and non-frail group. 40.0% of the frail respondents were male and 51.5% of the non-frail respondents was male (p-value=0.038). 44 of the 100 frail people were under the age of 64 years (results not shown).

A significant difference was seen in living situation (p-value=0.000): less frail respondents than non-frail respondents lived together (respectively 65.0% versus 85.9%). Also, a significant difference was seen in the median of the mark frail and non-frail people gave for their overall oral health (p-

value=0.000). Frail people gave a significantly lower oral health mark than the non-frail (7 (6-8) versus 8 (7-8)). No significant differences were found in age (p-value=0.662), education level (p-value=0.059), and OSS (p-value=0.161) between the frail and the non-frail group.

Table 2. Characteristics of respondents based on frailty.

	Frail (n=100)	Non-frail (n=427)	Difference between subgroups
Age, median (IQR)	66 (52-71)	65 (51-69)	0.662
Sex, n (%)			0.038
Male	40 (40.0%)	220 (51.5%)	
Living situation, n (%)	N=97	N=419	0.000
With someone (partner/kids/other adult)	65 (67.0%)	367 (87.6%)	
Living alone	32 (33.0%)	52 (12.4%)	
Education, n (%)		N=425	0.059
Low	30 (30.0%)	96 (22.6%)	
Middle	40 (40.0%)	148 (34.8%)	
High	30 (30.0%)	181 (42.6%)	
Oral Status Score, median (IQR)	2 (1-7)	2 (1-4)	0.161
Oral status, n (%)			0.308
Edentulous	20 (20.0%)	79 (18.5%)	
Implants	47 (47.0%)	172 (40.3%)	
Remaining teeth	33 (33.0%)	176 (41.2%)	0.131
	N=93	N=400	0.000
Oral health mark, median (IQR)	7 (6-8)	8 (7-8)	

3.4. Education level

As mentioned before, no significant differences were found between education level of frail and non-frail respondents. However, there was a weak significant correlation between education level and total GFI score of the total group (Pearson correlation=-0.121, p-value=0.006). The higher the education level the lower the GFI score (GFI score ≥4 means frail). Also a weak correlation between education level and OSS was found in the total population (Pearson correlation=-0.220, p-value=0.000). The higher the education level the lower the OSS (OSS=1 means having all dentures and OSS=10 means having complete dentures in upper and lower jaw).

No significant correlations were found between education level and oral health: education level and dentist check frequency (Spearman's rho=0.077 with p-value=0.078), education level and teeth brushing frequency (Spearman's rho=-0.043 with p-value=0.329).

3.5. Oral Status Score

Table 3 shows the OSS of the total population in relation to other characteristics. Significant differences in OSS medians were seen in sex, education level, dental check frequency, dental hygienist visits, and brushing teeth frequency. Only the comparison of OSS between respondents living alone (OSS median 2, IQR 1-7) and respondents not living alone (OSS median 2, IQR 1-4) resulted in non-significant difference (p-value=0.196).

61 respondents specifically indicated they did not visit the dentist because of having complete dentures. A corrected analysis was executed to see whether differences in OSS in different dental checks and brushing teeth frequencies would be still significant. After correction, in which edentulous people (n=100) were excluded from analysis, differences in OSS in dental checks were not significant any more (Kruskall-Wallis Test, Chi-Square 4.550 with p-value=0.208, n=432). After the correction for edentulous people, also no significant differences in OSS were seen in dental hygienist visits (Kruskall-

Wallis Test, Chi-Square 4.928 with p-value=0.177, n=432) and brushing teeth frequency (Kruskall-Wallis Test, Chi-Square 2.633 with p-value=0.268, n=429).

Table 3. Oral Status Score of total population.

	Total group (n=532)	Mean rank	Difference between groups p-value
Oral Status Score, median (IQR)	2 (1-5)	-	-
Sex, median (IQR)			0.000
Male (n=263)	2 (1-7)	289.52	
Female (n=269)	2 (1-4)	243.99	
Living situation, median (IQR)			0.196
Living alone (n=86)	2 (1-7)	279.31	
Living with partner (n=435)	2 (1-4)	257.38	
Education level, median (IQR)			0.001
Low (n=127)	3 (1-10)	306.84	
Middle (n=189)	2 (1-5)	258.07	
High (n=214)	2 (1-2)	247.53	
Dental check, median (IQR)			0.000
Never (n=64)	10 (10-10)	417.44	
Less than once a year (n=41)	3 (1-10)	300.80	
Once a year (n=146)	2 (1-5)	278.40	
Twice a year (n=281)	2 (1-2)	220.93	
Dental hygienist visits, median (IQR)			0.000
Never (n=285)	2 (1-10)	294.77	
Less than once a year (n=54)	2 (1-4)	271.05	
Once a year (n=78)	2 (1-2)	219.10	
Twice a year (n=115)	2 (1-2)	226.45	
Brushing teeth frequency, median (IQR)			0.000
At least 2 times a day (n=356)	2 (1-3)	246.50	
Once a day (n=157)	2 (1-10)	294.40	
Now and then, not daily (n=12)	6.5 (1.25-10)	341.75	

Figure 3 shows an overview of the spread of oral status scores among ages. This figure shows that the highest frequencies of the different OSS are seen in the age group of approximately 66-74 years.

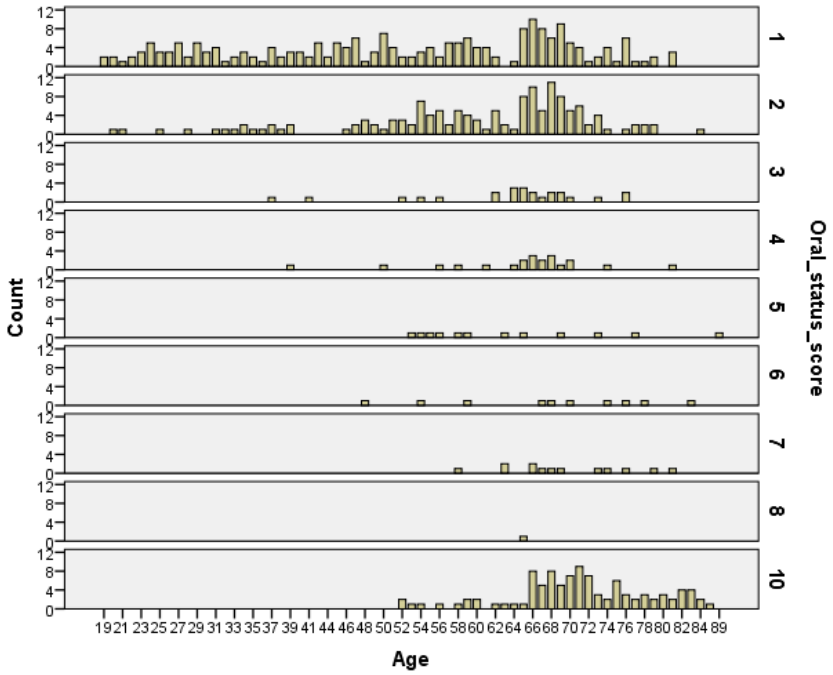

Figure 3. Overview of histograms per Oral Status Score.

Figure 4 shows the mean of average marks people gave per Oral Status Score group. This graph suggests that people with all own teeth gave approximately the same mark for their oral health as people with complete dentures. All people with an OSS between 1 and 10 gave their oral health a lower mark.

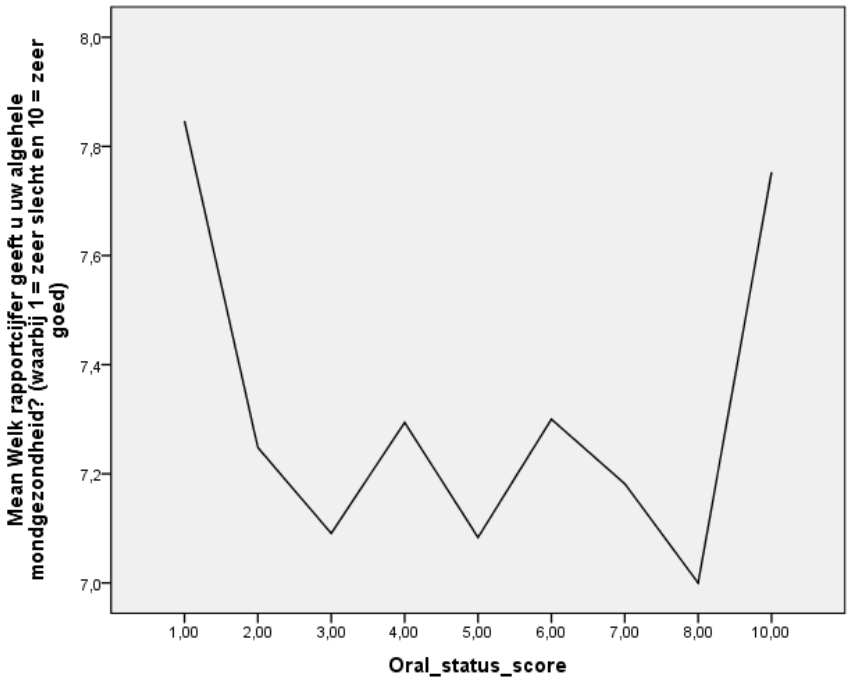

Figure 4. Graph of average marks people gave per oral status score.

3.6. Oral health

Table 4 shows the oral health problems of frail and non-frail respondents. Higher percentages of almost all oral health problems were seen in the frail group than in the non-frail group. Bad taste/breath, jaw joint/chewing pain, and dry mouth was significantly more prevalent in frail people than in non-frail people (p-value = 0.000).

Table 4. Overview of different oral health problems in frail and non-frail people.

	Frail (n=100)	Non-frail (n=427)	Difference between subgroups
Pain or discomfort last month, n (%)			
Bad taste/breath	24 (24.0%)	37 (8.7%)	0.000
Bleeding gums	21 (21.0%)	65 (15.2%)	0.159
Residual food residues	25 (25.0%)	71 (16.6%)	0.051
Loose teeth/molar	4 (4.0%)	10 (2.3%)	0.353
Jaw joint/chewing pain	10 (10.0%)	9 (2.1%)	0.000
Dry mouth	30 (30.0%)	50 (11.7%)	0.000
Painful sores/mouth ulcers	11 (11.0%)	28 (6.6%)	0.127
Broken mouth corners	4 (4.0%)	12 (2.8%)	0.533
Nothing bothering	31 (31.0%)	237 (55.5%)	0.000
Other	5 (5.0%)	9 (2.1%)	0.105

4. Discussion

In this cross-sectional exploratory study, self-reported oral status and oral health of inhabitants of Flevoland were obtained via an online questionnaire. In contrast to the hypothesis, in which an association between oral status and oral health and frailty was expected, only minor differences in oral status and oral health were found between frail and non-frail people. However, a moderate correlation was found between age and oral status. Further, people with higher education showed better Oral Status Scores (OSS) than people with lower education. In addition, more frequent dental checks were associated with better OSS. People who brush their teeth more often show lower OSS that implies better oral status. These results were in line with the hypothesis.

Frailty and oral status

The minor significant differences in OSS and oral health between frail and non-frail respondents is in contrast with the results of a recent article of Hoeksema et al. (2017). He found convincing evidence for the fact that frail elderly were more often edentulous and reported worse oral health in comparison with non-frail elderly. It is important to mention that the research population of Hoeksema consisted of elderly above the age of 75 years, while the research population of this study consisted of adults above the age of 19 years. Because the prevalence of frailty increases with age (Collard et al., 2012) it is expected that the percentage of frail people is higher in a population with only adults above the age of 75 years than in a population with only adults of 19 years and older. Comparing both study populations showed that 22% of the population of Hoeksema consisted of elderly with complex care needs and 21% of the population was defined as frail, while 19% of the adults of this study population was defined as frail. Additionally, Hoeksema made use of an extra subgroup to classify frailty, which enables the possibility to make an extra specification among frail elderly (Hoeksema et al., 2017). The use of only two subgroups in frailty (frail and non-frail) and the broad range of age in the frail adults in this study resulted in a less precise distinction between frail and non-frail adults and therefore minor significant differences in OSS and oral health between frail and non-frail were found.

When looking at the demographic characteristics of the total population of this research, no remarkable findings were found, except for the skewness in distribution between men and women regarding age (see Table 1 and Figure 2). The total population consists of more young women than young men and more old men than old women. If frailty would occur mainly in people above the age of 65 years this skewness in sex could have influenced the percentage of frail people and the correlation between frailty and age. This because research showed that in general more elderly women than elderly men are frail (Etman et al., 2012; Santos-Eggiman et al., 2009). However, in this study population frailty was also seen in people under the age of 65 years. Despite the skewness in sex, the results still show more frail women than frail men.

The non-significant correlation between frailty and age supports the idea of using age and frailty as different and separate concepts (Schuurmans et al., 2004). When using the age of 65 years and older as inclusion criterion in this study, 44 of the 100 frail people in this study would be excluded because they were younger than 65 years old. These results show the importance of letting go of the use of age groups and the use of frailty in only the oldest old. Especially in the context of prevention, both in oral health and general health, the concepts robust, pre-frail, and frail are essential. Watanabe et al. (2017) and Hoeksema et al. (2017) used these different stages in frailty in relation to oral health. They both found that frail elderly had poorer oral function than pre-frail and robust elderly. In contrary to the results of Hoeksema and Watanabe the results of this study did not show a correlation between frailty

and OSS. This can mean that the findings of Hoeksema are confounded because of only including people above the age of 75 years. The questions arises whether he would have found the same results when including people above the age of 50 years old or above the age of 19. According to this the question arises whether frailty really is a better measure than age.

Comparing other variables, such as oral status, between frail and non-frail people did not show significant differences. Only a significant difference was seen in the mark frail and non-frail people gave for their overall oral health (p-value=0.000). Frail people marked their oral health with a lower grade than non-frail people. This is in line with a research in which people who rated their oral health worse had a higher probability of being frail than others who rated their oral health as better (Castrejón-Perez et al., 2012).

Oral Status Score

Significant differences were found in OSS when looking at the total population. The moderate significant correlation between age and OSS was an expected result. In comparison with a few decades ago, people are getting full dentures at a later age (Otten, 2003). More and more elderly are getting partial prosthesis instead of removing all teeth, (Centraal Bureau voor Statistiek, 2010). The significant difference between the OSS of men (OSS median 2, IQR 1-7) and women (OSS median 2, IQR 1-4) was a not expected result. However, this result can possibly be explained by the previously mentioned skewness in distribution of men and women of certain age groups. Figure 3 shows the high frequency of elderly (above the age of 60 years) with an OSS of 10. Thus, the high proportion of old men in the total group probably contribute to the higher median OSS with IQR in men than in women.

Differences in Oral Status Scores for education level, dental check frequency, dental hygienist visits, and brushing teeth frequency were all significant as expected. People with lower education level show a higher mean OSS while higher educated people show a lower mean OSS. These results are in line with the results of the cohort study of Vettore et al. (2016). Vettore showed the negative impact of poor social position (in which education was included) on adults oral health.

The group of people who indicated visiting a dentist or dental hygienist twice a year showed the best OSS. The group of people who indicated never visiting a dentist showed the worst OSS. It is important to mention that many people in this study indicated that they never visit a dentist because they have full dentures. This is an interesting result because wearing full dentures are associated with different diseases. For example, wearing dentures overnight is associated with oral inflammation and pneumonia (Iinuma et al., 2015). Also, it is recommended to visit at least once every two years a dental technician, dentist, or dental hygienist when having full dentures (Ivoren Kruis, 2017). During a dentist visit not only dentures and oral health are checked, also instructions regarding oral hygiene can be given to improve oral health. Oral hygiene is very important for people with full dentures because poor denture hygiene showed a correlation with oral candidosis, a fungal infection of the yeast Candida (Kanli et al., 2005).

Differences in OSS of brushing teeth frequency were significant. People who brushed their teeth at least two times a day showed a better OSS than the people who brushed once a day or just now and then. A recent systematic review and meta-analysis showed that infrequent tooth brushers have a higher incidence of dental caries and a higher risk of new carious lesions than frequent brushers have (Kumar et al., 2016; Holmes, 2016).

Oral health

A surprising result was found when looking at the mark people gave for their oral health (Figure 4). The expectation was that people with a lower OSS would judge their oral health superior to people with a higher OSS. However, people with the maximum OSS, which means having complete dentures, gave approximately the same mark for their oral health as the people with all own teeth. The expectation was that people with full dentures have pain from wearing dentures, or have more difficulties with eating (Lahti et al., 2008), but in this sample this seems not to be the case. A linear relationship between OSS and oral health mark was expected, however having full dentures deviate from this linearity. When people with full dentures judge their oral health as good as the people with natural teeth, maybe it is not correct to give full dentures a maximum OSS of 10. Maybe it would be better to calculate the OSS with help of the oral health mark. Like self-perceived physical health is part of the GFI, self-perceived oral health could be a part of OSS. With this extra factor, differences between people with natural teeth can be made. People with natural teeth with a lot of pain will have a worse OSS than people with natural teeth without any pain of discomfort. The same applies for people with full dentures were people with a low oral health mark and having full dentures will get the worst score.

From the eight oral health problems the frail people show most of the times a higher percentages of these problems than non-frail people. Although the results were not significant, the direction points towards more oral health problems among frail people than non-frail people. Because of the relatively small research population, the differences between frail and non-frail are difficult to determine. In future research this should be further explored with bigger research populations.

Strengths and limitations of the study

The strength of this research is that, as far as known, this is the first study in which inhabitants of Flevoland filled out a questionnaire about their oral health. Another strength of this study is that not only people above the age of 65 years old were included. This gave an opportunity to compare the oral status and oral health of the younger population with the older population. Next to that, the relation between age and frailty could be analysed. The results showed no correlation between age and frailty, probably because of the fact that frailty was also quite common in the younger population (19-64 years).

A limitation of this research is that the study population consisted of a selection from a selection of the inhabitants of Flevoland. Probably this study population is not generalizable to all inhabitants of Flevoland. The people from the study population were asked to participate and the responders are thus motivated people who are most likely interested in health related subjects. It is possible that non-respondents are less interested in health and have worse health. This is an effect that Hoeksema et al. (2017) found in his study. To avoid the effect of only attracting people who are interested in oral health, the more or less neutral title 'care use' was used in the invitation of the questionnaire. As this study was conducted in a small and specific population of Flevoland, it is unclear how these results can be extrapolated to the rest of the residents of Flevoland or the Netherlands.

Another limitation of this study concerns the OSS in which the number of missing teeth were not included, because this was not queried in the questionnaire. There are studies that found a relation between missing teeth and certain diseases. Tôrres et al. (2015) found that number of teeth are associated with myocardial infarction and Tsakos et al. (2015) found that tooth loss was associated with physical and cognitive decline in elderly. This shows the impact of the number of teeth mission

on the health. Probably when the number of missing teeth or remaining teeth were included in the OSS, a more accurate score could be calculated to define oral status.

Conclusion

This study gives insight in the oral health status of the inhabitants of the province Flevoland. No significant differences were found in oral status and oral health between frail and non-frail people. However, the results of this study show the negative effects on oral status when having lower frequencies of teeth brushing and dentist visits. Because bad oral health can have negative consequences for the overall health, it is important that caregivers as well as people themselves are aware of their oral health status and how to keep it healthy. Additionally, the results of this study did not show the expected results of worse oral status in frail people than in non-frail people. There is a need for additional research to find out what the exact effect is of age on frailty and whether frailty is a better measure than age when looking at oral status or oral health.

Clinical significance

With the results of this study, GGD Flevoland has more insight in the oral status and oral health of their inhabitants. In addition to the already existing oral health education for children, oral health education for adults should be considered to improve oral health practices of both frail and non-frail adults.

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Appendix I – Questionnaire

ALGEMENE VRAGEN

1. Wat is uw geslacht?

O Man O Vrouw

2. Wat is uw achternaam

3. Wat is uw geboortejaar?

4. Wat is uw woonplaats?

- ○ Almere
- ○ Bant
- ○ Biddinghuizen
- ○ Creil
- ○ Dronten
- ○ Emmeloord
- ○ Kraggenburg
- ○ Lelystad
- ○ Luttelgeest
- ○ Marknesse
- ○ Espel
- ○ Ens
- ○ Nagele
- ○ Rutten
- ○ Swifterbant
- ○ Tollebeek
- ○ Urk
- ○ Zeewolde

5. Wat is uw burgerlijke staat?

- ○ Gehuwd of geregistreerd partnerschap
- ○ Samenwonend
- ○ Ongehuwd of nooit gehuwd geweest
- ○ Gescheiden of gescheiden levend
- ○ Weduwe of weduwnaar

6. Met welke personen woont u samen? (u mag meerdere antwoorden geven)

- □ Met een partner/echtgenoot of echtgenote

- ☐ Met kind(eren) jonger dan 18 jaar
- ☐ Met kind(eren) van 18 jaar of ouder
- ☐ Met mijn ouder(s)
- ☐ Met een andere volwassene/andere volwassenen
- ☐ Ik woon niet samen met een partner, maar heb wel een duurzame relatie
- ☐ Ik woon alleen

7. Wat is uw (werk)situatie?

- ○ Ik heb betaald werk
- ○ Ik ben werkloos of werkzoekende
- ○ Ik ben met pensioen
- ○ Ik ben arbeidsongeschikt
- ○ Ik ben gedeeltelijk arbeidsongeschikt
- ○ Ik volg onderwijs/ik studeer

8. Wat is uw hoogst voltooide opleiding?

- ○ Geen opleiding of lager onderwijs
- ○ MAVO of LBO
- ○ HAVO, VWO of MBO
- ○ HBO of WO

Dit is het einde van de algemene vragenlijst. Dan volgt er nu een deel dat gaat over mondgezondheid.

ALGEMENE VRAGEN OVER MONDZORG

1. Hoe vaak gaat u voor controle naar de **tandarts**?

- ○ Nooit (door naar vraag 2)
- ○ Minder dan 1 keer per jaar (door naar vraag 3)
- ○ 1 keer per jaar (door naar vraag 3)
- ○ 2 keer per jaar (door naar vraag 3)

2. Wilt u hulp bij het vinden van een tandarts?

- ○ Ja (door naar pagina met contactgegevens van Ciska)
- ○ Nee (door naar vraag 3)

3. Waarom gaat u (bijna) nooit voor controle naar de **tandarts**? (meerdere antwoorden mogelijk, maximaal 3)

- □ Ik vind de tandarts duur
- □ Ik ben bang voor de tandarts
- □ Ik heb geen tandartsverzekering
- □ Ik heb geen tandarts
- □ Ik heb geen vervoer
- □ Ik kan niet alleen naar de tandarts
- □ Ik heb geen tijd
- □ Ik vind controle niet belangrijk/ik ga alleen naar de tandarts wanneer ik pijn heb
- □ Anders, namelijk ……..

4. Hoe vaak gaat u voor behandeling naar de **mondhygiënist**?

- ○ Nooit (door naar vraag 5)
- ○ Minder dan 1 keer per jaar (door naar vraag 5)
- ○ 1 keer per jaar (door naar vraag 6)

- ○ 2 keer per jaar (door naar vraag 6)

5. Waarom gaat u (bijna) nooit naar de **mondhygiënist**? (u mag meerdere antwoorden geven, maximaal 3)

- □ Ik vind het te duur
- □ Ik weet niet wat de mondhygiënist precies doet
- □ Mijn tandarts maakt mijn gebit schoon tijdens controle
- □ Ik ben bang voor de mondhygiënist
- □ Ik heb geen tandartsverzekering (als deze is ingevuld)
- □ Ik heb geen vervoer
- □ Ik kan niet alleen naar de mondhygiënist
- □ Ik heb geen tijd
- □ Ik ga alleen naar de mondhygiënist als ik klachten heb
- □ Ik ga alleen naar de mondhygiënist wanneer ik word doorverwezen door mijn tandarts
- □ Anders, namelijk ….

6. Heeft u een aanvullende tandartsverzekering?

- ○ Ja
- ○ Nee

VRAGEN OVER GEBIT

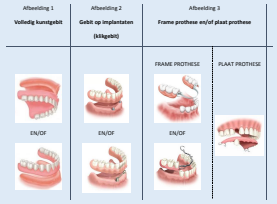
Er volgen nu een aantal vragen over uw gebit. Bekijk onderstaande afbeeldingen goed voordat u de volgende vragen beantwoord.

Afbeelding 1	Afbeelding 2	Afbeelding 3		Afbeelding 4	
Volledig kunstgebit	**Gebit op implantaten (klikgebit)**	**Frame prothese en/of plaat prothese**		**Kroon en/of brug (eventueel op implantaten)**	
		FRAME PROTHESE	PLAAT PROTHESE	KROON	BRUG
					
EN/OF	EN/OF	EN/OF			
					
				Kroon op implantaat	Brug op implantaat

7. Heeft u al uw eigen tanden en/of kiezen nog? *Verstandskiezen hoeft u hier niet bij mee te rekenen.*

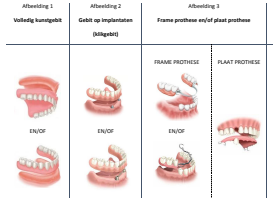
- ○ Ja (naar vraag 12)
- ○ Nee

8. Heeft u een volledig kunstgebit zoals te zien is op afbeelding 1?



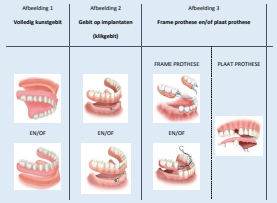
- ○ Nee
- ○ Ja, alleen bovengebit
- ○ Ja, alleen ondergebit
- ○ Ja, zowel boven- als ondergebit (naar vraag 12)

9. Heeft u een gebit op implantaten zoals te zien is op afbeelding 2?



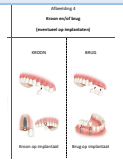
- ○ Nee
- ○ Ja, alleen bovengebit
- ○ Ja, alleen ondergebit
- ○ Ja, zowel boven- als ondergebit (naar vraag 12)

10. Heeft u een gedeeltelijke gebitsprothese zoals een frame prothese en/of plaat prothese zoals te zien is op afbeelding 3?



- ○ Nee
- ○ Ja, alleen bovengebit
- ○ Ja, alleen ondergebit
- ○ Ja, zowel boven- als ondergebit (naar vraag 11)

11. Heeft u 1 of meerdere bruggen en/of kronen (eventueel op implantaten) zoals te zien is op afbeelding 4?



- ○ Nee
- ○ Ja

VRAGEN OVER MONDVERZORGING

12. Hoe vaak poetst u uw tanden?

- ○ Minstens 2 keer per dag
- ○ 1 keer per dag
- ○ Af en toe, maar niet dagelijks

13. Wat gebruikt u voor het verzorgen van uw gebit en mond? (u mag meerdere antwoorden geven)

- ☐ Airfloss of Waterpik waterflosser
- ☐ CB12 (mondwater speciaal tegen slechte adem)
- ☐ Tongborstel/tongschraper
- ☐ Mondwater
- ☐ Ragers
- ☐ Tandenstokers
- ☐ Flosdraad
- ☐ Elektrische tandenborstel
- ☐ Gewone tandenborstel

VRAGEN OVER MONDGEZONDHEID

14. Waar heeft u afgelopen maand wel eens last van gehad? (u mag meerdere antwoorden geven)

- ☐ Vieze smaak/slechte adem
- ☐ Bloedend tandvlees
- ☐ Achterblijven van voedselresten
- ☐ Voelbaar losstaande tand of kies
- ☐ Kaakgewricht/pijn bij kauwen
- ☐ Droge mond
- ☐ Pijnlijke blaasjes in de mond/aften
- ☐ Kapotte mondhoeken

- ☐ Anders, namelijk ……
- ☐ Ik heb nergens last van

15. Welk cijfer geeft u uw algehele mondgezondheid op een schaal van 1 tot 10 (waarbij 1 = zeer slecht en 10 = zeer goed)

O 1 O 2 O 3 O 4 O 5 O 6 O 7 O 8 O 9 O 10

VRAGEN OVER DAGELIJKS FUNCTIONEREN

Deze vragen gaan over uw situatie van de **afgelopen maand**.

Met zelfstandig bedoelen we: zonder enige vorm van hulp van iemand. Gebruik maken van hulpmiddelen als stok, rollator, rolstoel, geldt als zelfstandig.

16. Kunt u geheel zelfstandig boodschappen doen?

- ○ Ja
- ○ Nee

17. Kunt u geheel zelfstandig buitenshuis rondlopen (rondom het huis of naar de buren)?

- ○ Ja
- ○ Nee

18. Kunt u zich geheel zelfstandig aan- en uitkleden?

- ○ Ja
- ○ Nee

19. Kunt u geheel zelfstandig van en naar het toilet gaan?

- ○ Ja
- ○ Nee

20. Als u een rapportcijfer zou moeten geven voor uw lichamelijke fitheid, waarbij een 1 staat voor heel slecht, en een 10 voor uitstekend, wat zou dit cijfer dan zijn?

O 1 O 2 O 3 O 4 O 5 O 6 O 7 O 8 O 9 O 10

21. Ondervindt u problemen in het dagelijks leven doordat u slecht ziet?

- ○ Ja
- ○ Nee

22. Ondervindt u problemen in het dagelijks leven doordat u slecht hoort?

- ○ Ja
- ○ Nee

23. Bent u de afgelopen 6 maanden veel afgevallen zonder dat u dat wilde?

- ○ Ja
- ○ Nee

24. Gebruikt u op dit moment 4 of meer verschillende soorten medicijnen?

- ○ Ja
- ○ Nee

25. Heeft u klachten over uw geheugen?

- ○ Ja
- ○ Soms
- ○ Nee

26. Ervaart u wel eens een leegte om u heen?

- ○ Ja
- ○ Soms
- ○ Nee

27. Mist u wel eens mensen om u heen?

- Ja
- Soms
- Nee

28. Voelt u zich wel eens in de steek gelaten?

- Ja
- Soms
- Nee

29. Heeft u zich de laatste tijd somber of neerslachtig gevoeld?

- Ja
- Soms
- Nee

30. Heeft u zich de laatste tijd nerveus of angstig gevoeld?

- Ja
- Soms
- Nee

Bedankt voor het invullen van deze vragenlijst, heeft u nog vragen of opmerkingen dan horen wij dat graag:……..

ALGEMENE VRAGEN

9. Wat is uw geslacht?

O Man O Vrouw

10. Wat is uw achternaam

11. Wat is uw geboortejaar?

12. Wat is uw woonplaats?

- ○ Almere
- ○ Bant
- ○ Biddinghuizen
- ○ Creil
- ○ Dronten
- ○ Emmeloord
- ○ Kraggenburg
- ○ Lelystad
- ○ Luttelgeest
- ○ Marknesse
- ○ Espel
- ○ Ens
- ○ Nagele
- ○ Rutten
- ○ Swifterbant
- ○ Tollebeek
- ○ Urk
- ○ Zeewolde

13. Wat is uw burgerlijke staat?

- ○ Gehuwd of geregistreerd partnerschap
- ○ Samenwonend
- ○ Ongehuwd of nooit gehuwd geweest
- ○ Gescheiden of gescheiden levend
- ○ Weduwe of weduwnaar

14. Met welke personen woont u samen? (u mag meerdere antwoorden geven)

- □ Met een partner/echtgenoot of echtgenote

- ☐ Met kind(eren) jonger dan 18 jaar
- ☐ Met kind(eren) van 18 jaar of ouder
- ☐ Met mijn ouder(s)
- ☐ Met een andere volwassene/andere volwassenen
- ☐ Ik woon niet samen met een partner, maar heb wel een duurzame relatie
- ☐ Ik woon alleen

15. Wat is uw (werk)situatie?

- ○ Ik heb betaald werk
- ○ Ik ben werkloos of werkzoekende
- ○ Ik ben met pensioen
- ○ Ik ben arbeidsongeschikt
- ○ Ik ben gedeeltelijk arbeidsongeschikt
- ○ Ik volg onderwijs/ik studeer

16. Wat is uw hoogst voltooide opleiding?

- ○ Geen opleiding of lager onderwijs
- ○ MAVO of LBO
- ○ HAVO, VWO of MBO
- ○ HBO of WO

Dit is het einde van de algemene vragenlijst. Dan volgt er nu een deel dat gaat over mondgezondheid.

ALGEMENE VRAGEN OVER MONDZORG

31. Hoe vaak gaat u voor controle naar de **tandarts**?

- ○ Nooit (door naar vraag 2)
- ○ Minder dan 1 keer per jaar (door naar vraag 3)
- ○ 1 keer per jaar (door naar vraag 3)
- ○ 2 keer per jaar (door naar vraag 3)

32. Wilt u hulp bij het vinden van een tandarts?

- ○ Ja (door naar pagina met contactgegevens van Ciska)
- ○ Nee (door naar vraag 3)

33. Waarom gaat u (bijna) nooit voor controle naar de **tandarts**? (meerdere antwoorden mogelijk, maximaal 3)

- □ Ik vind de tandarts duur
- □ Ik ben bang voor de tandarts
- □ Ik heb geen tandartsverzekering
- □ Ik heb geen tandarts
- □ Ik heb geen vervoer
- □ Ik kan niet alleen naar de tandarts
- □ Ik heb geen tijd
- □ Ik vind controle niet belangrijk/ik ga alleen naar de tandarts wanneer ik pijn heb
- □ Anders, namelijk ……..

34. Hoe vaak gaat u voor behandeling naar de **mondhygiënist**?

- ○ Nooit (door naar vraag 5)
- ○ Minder dan 1 keer per jaar (door naar vraag 5)
- ○ 1 keer per jaar (door naar vraag 6)

- ○ 2 keer per jaar (door naar vraag 6)

35. Waarom gaat u (bijna) nooit naar de **mondhygiënist**? (u mag meerdere antwoorden geven, maximaal 3)

- □ Ik vind het te duur
- □ Ik weet niet wat de mondhygiënist precies doet
- □ Mijn tandarts maakt mijn gebit schoon tijdens controle
- □ Ik ben bang voor de mondhygiënist
- □ Ik heb geen tandartsverzekering (als deze is ingevuld)
- □ Ik heb geen vervoer
- □ Ik kan niet alleen naar de mondhygiënist
- □ Ik heb geen tijd
- □ Ik ga alleen naar de mondhygiënist als ik klachten heb
- □ Ik ga alleen naar de mondhygiënist wanneer ik word doorverwezen door mijn tandarts
- □ Anders, namelijk ….

36. Heeft u een aanvullende tandartsverzekering?

- ○ Ja
- ○ Nee

VRAGEN OVER GEBIT

Er volgen nu een aantal vragen over uw gebit. Bekijk onderstaande afbeeldingen goed voordat u de volgende vragen beantwoord.

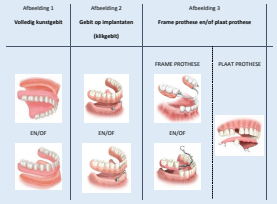
Afbeelding 1	Afbeelding 2	Afbeelding 3		Afbeelding 4	
Volledig kunstgebit	**Gebit op implantaten (klikgebit)**	**Frame prothese en/of plaat prothese**		**Kroon en/of brug (eventueel op implantaten)**	
		FRAME PROTHESE	PLAAT PROTHESE	KROON	BRUG
					
EN/OF	EN/OF	EN/OF			
					
				Kroon op implantaat	Brug op implantaat

Bronnen afbeelding 1 t/m 4: https://vergelijkmondzorg.nl/wpblog/wp-content/uploads/2014/10/volledig_kunstgebit.jpg; http://tandprothetischepraktijkdewit.nl/wpimages/wp3f5e84d3_05_06.jpg; http://www.protheva-tandtechniek.nl/wp-content/uploads/2014/08/Protheva_Frame.jpg; https://www.smileclinic.nl/cms/wp-content/uploads/2011/05/plaatprothese.jpg; http://www.mzcdegrave.nl/upload/68/UserFiles/Image/drukknop%20en%20steg.jpg; http://www.implantologiewoerden.nl/photos/faq1.jpg; http://www.tandartsenpraktijkdejong.nl/afb/brug%20op%20implantaten.jpg; https://www.springdental.nl/dynamic/media/16/images/producten/Kroon.jpg; https://www.springdental.nl/dynamic/media/16/images/producten/Brug.jpg

37. Heeft u al uw eigen tanden en/of kiezen nog? *Verstandskiezen hoeft u hier niet bij mee te rekenen.*

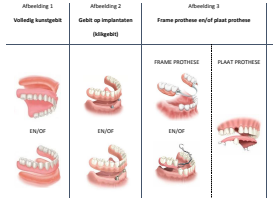
- ○ Ja (naar vraag 12)
- ○ Nee

38. Heeft u een volledig kunstgebit zoals te zien is op afbeelding 1?



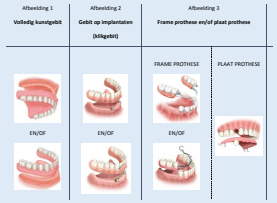
- ○ Nee
- ○ Ja, alleen bovengebit
- ○ Ja, alleen ondergebit
- ○ Ja, zowel boven- als ondergebit (naar vraag 12)

39. Heeft u een gebit op implantaten zoals te zien is op afbeelding 2?



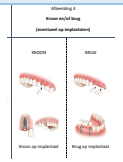
- ○ Nee
- ○ Ja, alleen bovengebit
- ○ Ja, alleen ondergebit
- ○ Ja, zowel boven- als ondergebit (naar vraag 12)

40. Heeft u een gedeeltelijke gebitsprothese zoals een frame prothese en/of plaat prothese zoals te zien is op afbeelding 3?



- ○ Nee
- ○ Ja, alleen bovengebit
- ○ Ja, alleen ondergebit
- ○ Ja, zowel boven- als ondergebit (naar vraag 11)

41. Heeft u 1 of meerdere bruggen en/of kronen (eventueel op implantaten) zoals te zien is op afbeelding 4?



- ○ Nee
- ○ Ja

VRAGEN OVER MONDVERZORGING

42. Hoe vaak poetst u uw tanden?

- ○ Minstens 2 keer per dag
- ○ 1 keer per dag
- ○ Af en toe, maar niet dagelijks

43. Wat gebruikt u voor het verzorgen van uw gebit en mond? (u mag meerdere antwoorden geven)

- ☐ Airfloss of Waterpik waterflosser
- ☐ CB12 (mondwater speciaal tegen slechte adem)
- ☐ Tongborstel/tongschraper
- ☐ Mondwater
- ☐ Ragers
- ☐ Tandenstokers
- ☐ Flosdraad
- ☐ Elektrische tandenborstel
- ☐ Gewone tandenborstel

VRAGEN OVER MONDGEZONDHEID

44. Waar heeft u afgelopen maand wel eens last van gehad? (u mag meerdere antwoorden geven)

- ☐ Vieze smaak/slechte adem
- ☐ Bloedend tandvlees
- ☐ Achterblijven van voedselresten
- ☐ Voelbaar losstaande tand of kies
- ☐ Kaakgewricht/pijn bij kauwen
- ☐ Droge mond
- ☐ Pijnlijke blaasjes in de mond/aften
- ☐ Kapotte mondhoeken

- ☐ Anders, namelijk ……
- ☐ Ik heb nergens last van

45. Welk cijfer geeft u uw algehele mondgezondheid op een schaal van 1 tot 10 (waarbij 1 = zeer slecht en 10 = zeer goed)

O 1 O 2 O 3 O 4 O 5 O 6 O 7 O 8 O 9 O 10

VRAGEN OVER DAGELIJKS FUNCTIONEREN

Deze vragen gaan over uw situatie van de **afgelopen maand**.

Met zelfstandig bedoelen we: zonder enige vorm van hulp van iemand. Gebruik maken van hulpmiddelen als stok, rollator, rolstoel, geldt als zelfstandig.

46. Kunt u geheel zelfstandig boodschappen doen?

- ○ Ja
- ○ Nee

47. Kunt u geheel zelfstandig buitenshuis rondlopen (rondom het huis of naar de buren)?

- ○ Ja
- ○ Nee

48. Kunt u zich geheel zelfstandig aan- en uitkleden?

- ○ Ja
- ○ Nee

49. Kunt u geheel zelfstandig van en naar het toilet gaan?

- ○ Ja
- ○ Nee

50. Als u een rapportcijfer zou moeten geven voor uw lichamelijke fitheid, waarbij een 1 staat voor heel slecht, en een 10 voor uitstekend, wat zou dit cijfer dan zijn?

O 1 O 2 O 3 O 4 O 5 O 6 O 7 O 8 O 9 O 10

51. Ondervindt u problemen in het dagelijks leven doordat u slecht ziet?

- ○ Ja
- ○ Nee

52. Ondervindt u problemen in het dagelijks leven doordat u slecht hoort?

- ○ Ja
- ○ Nee

53. Bent u de afgelopen 6 maanden veel afgevallen zonder dat u dat wilde?

- ○ Ja
- ○ Nee

54. Gebruikt u op dit moment 4 of meer verschillende soorten medicijnen?

- ○ Ja
- ○ Nee

55. Heeft u klachten over uw geheugen?

- ○ Ja
- ○ Soms
- ○ Nee

56. Ervaart u wel eens een leegte om u heen?

- ○ Ja
- ○ Soms
- ○ Nee

57. Mist u wel eens mensen om u heen?

- Ja
- Soms
- Nee

58. Voelt u zich wel eens in de steek gelaten?

- Ja
- Soms
- Nee

59. Heeft u zich de laatste tijd somber of neerslachtig gevoeld?

- Ja
- Soms
- Nee

60. Heeft u zich de laatste tijd nerveus of angstig gevoeld?

- Ja
- Soms
- Nee

Bedankt voor het invullen van deze vragenlijst, heeft u nog vragen of opmerkingen dan horen wij dat graag:……..

Appendix II – Oral Status Score

Questions with answer possibilities	Points
Do you still have your own teeth?	
Yes (X)	1
No	0
Do you have full dentures?	
No	0
Yes, only upper dentures	4
Yes, only lower dentures	4
Yes, upper and lower dentures (X)	10
Do you have dentures on implants?	
No	0
Yes, only upper dentures	3
Yes, only lower dentures	3
Yes, upper and lower dentures (X)	6
Do you have partial dentures or frame prosthesis?	
No	0
Yes, only upper dentures	3
Yes, only lower dentures	3
Yes, upper and lower dentures	4
Do you have 1 or more bridges and/or crowns (on implants)?	
Yes	2
No	0

*(X) = After filling out this answer the respondents did not get additional questions regarding oral status.