

# Identification of high nutrition risk using SCREENII among older people in Woerden, The Netherlands

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Woerden, The Netherlands

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## Preface

My name is Tineke Haakma and I am the researcher and writer of this report. I study Nutrition and Dietetics at The Hague University of applied sciences in The Hague. Part of my education is doing research for 20 weeks and writing a final report. In January 2014 I had to send in a proposal about what research I had in mind. At the time I was in New Zealand doing an internship at Massey University and at the time I became really interested in Public Health, mostly due to the interesting classes of Dr. Wham. That is why I approached Dr. Wham to support me in my research and writing my final project. Luckily, Dr. Wham was willing to help me and we had some follow-up appointments to define what subject was interesting for the both of us. I had done research with older people in Woerden before and Dr. Wham had experience with the SCREEN II tool for screening for nutrition risk in older people. That way the idea existed to screen older people for nutrition risk in Woerden, with the SCREEN II tool.

I would like to give thanks to everyone who participated, everyone in particular who helped me to get in contact with older people and to the organisation 'Welzijn Woerden' for their cooperation. Also I would like to thank Mrs. Van Rooijen for helping me with my English writing and Mr. Boukiour for helping me with SPSS. I would like to give special thanks to Dr. Wham for giving me inspiration with finding the right subject and for the help with writing my final project. Furthermore I would like to give thanks to Ms. Blinde for guiding me through the research and helping me with making the right choices in my research.

This research report is for everyone who is interested in the health of older people living in the community.

## Summary

**Introduction** Nutrition is an important determinant in maintaining health and functionality in older people. Undernutrition is still a common problem in Dutch older people and is related to increased length of stay in hospitals, early institutionalization, decreased quality of life and possibly contributes to the development of disease. Undernutrition is preceded by a state of nutrition risk, what can be identified by nutritional screening. Early identification is important in reducing the risk for complications. Therefore investigating nutrition risk factors could be useful.

**Main research question** *'What is the influence of homecare on community dwelling older people (75-85y) in Woerden, in relation to nutritional risk status and factors for nutrition risk, identified with use of the SCREENII tool?'*

**Methods** This research has been undertaken with use of a postal survey in April/May 2014 to community dwelling older people in Woerden, the Netherlands. The survey participants were aged between 75 to 85 years. The identification of older people at high nutrition risk was undertaken using the SCREEN II (Seniors in the Community: Risk Evaluation for Eating and Nutrition, version II). (translated in Dutch). Demographic and personal characteristics of the participants were collected including, gender, living situation and whether the participants received home-care.

**Results** There were 381 older people invited to participate and 335 older people responded, giving a response rate of 88%. There were 32.2% men and 39.4% received homecare. 46.3% lived alone, and 53.7% lived with others. Nutrition risk was present in 63.6% of the respondents (36.4% 'at high risk', 27.2% 'at risk', 31.3% 'not at risk' and 5.1% unspecified). 49.6% of the older people who received home-care were 'at high risk' against 27.7% of people who did not receive home-care. Older people who received home-care were 1.76 ( $p=0.035$ ) times more likely to be at nutrition risk than people without home-care. Also people living alone were 3.19 ( $p<0.001$ ) times more likely to be at nutrition risk than people living with someone. Main factor for people at risk were low meat and -alternative intake (64.8%), low milk product intake (59.2%), low fruit and vegetable intake (58.7) and eating alone (55.4)

**Discussion** This study gives an indication of the nutrition status among community dwelling older people aged 75-85 years old in Woerden and The Netherlands. It is recommended to validate the SCREENII tool in Dutch.

**Conclusion** Dutch community living older people in Woerden (74-85y) are significantly more likely to be at nutrition risk, when they are receiving home-care.

**Keywords** Nutrition Risk, Woerden, Older People, SCREENII

## Samenvatting

**Introductie** Voeding is een belangrijke determinant bij het in stand houden van een goede gezondheid en functionaliteit in ouderen. Ondervoeding is nog steeds een veel voorkomend probleem in Nederlandse ouderen en is gerelateerd aan een verlengd ziekenhuisverblijf, eerdere verhuizing naar een verpleeg- of verzorgingshuis, verminderde kwaliteit van leven en draagt mogelijk bij aan het ontstaan van ziektes. Voedingsrisico is een voorstadium van ondervoeding, wat geïdentificeerd kan worden door een screeningsinstrument. Vroege identificatie is belangrijk bij preventie van complicaties. Hierbij zouden de factoren van voedingsrisico zeer nuttig kunnen zijn.

**Hoofvraag** *‘Wat is de invloed van thuiszorg op voedingsstatus en factoren bij zelfstandig wonende ouderen (75-85 jaar oud) in Woerden, geïdentificeerd door het SCREENII instrument?’*

**Methoden** Dit onderzoek is door een schriftelijke enquête afgenomen in april/mei 2014 bij zelfstandig wonende ouderen in Woerden, Nederland. De participanten hadden de leeftijd tussen 75 en 85 jaar oud. De identificatie van ouderen met voedingsrisico is met behulp van het SCREENII (Seniors in the Community: Risk Evaluation for Eating and Nutrition, version II). instrument gebeurd. Er zijn demografische en persoonlijke gegevens van de participanten verzameld van o.a. geslacht, woonsituatie en of the participanten thuiszorg ontvingen.

**Resultaten** Er zijn 383 ouderen uitgenodigd om mee te doen met dit onderzoek en 335 mensen gaven respons, dat geeft een percentage van respons van 88%. 32.2% van de respondenten waren mannen en 39.4% kreeg thuiszorg. 46.3% woonde alleen en 53.7% woonde met anderen. Voedingsrisico kwam voor in 63.6% van de respondenten (36.4% hoog risico, 27.2% matig risico, 31.3% geen risico en 5.1% onbekend) 49.6% van de ouderen die thuiszorg ontvingen hadden een hoog voedingsrisico tegenover 27.7% van de ouderen zonder thuiszorg. Ouderen die thuiszorg kregen hadden 1.76 ( $p=0.035$ ) keer zoveel risico dan ouderen die met iemand woonde. Hoofdfactoren voor voedingsrisico waren weinig vlees en vleesalternatieven (64.8%), weinig melk en melkproducten (59.2%), weinig fruit en groente (58.7%) en alleen eten (55.4%).

**Discussie** Dit onderzoek geeft een indicatie van de voedingsstatus in zelfstandig wonende ouderen (75-85 jaar oud) voor Woerden en voor Nederland. Er wordt aanbevolen om een validatieonderzoek uit te voeren naar het vertaald SCREENII instrument.

### Conclusie

Nederlandse zelfstandig wonende ouderen in Woerden (75-85 jaar oud) hebben significant vaker voedingsrisico, wanneer zij thuiszorg ontvangen

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# Research report

## Introduction

Maintaining health and functionality in older people (>65y) is very important for the maintenance of independence (Beswick, et al., 2008). The Dutch government aims to keep older people healthy to allow them to live independently as long as possible in the community with relatively little care (Government of the Netherlands, nd). The background for this aim is not explained in this source, but it seems plausible that it has to do with costs. This assumption derives from the fact that the population is aging and the health costs are increasing (Doekhie, Veer, Rademakers, Schellevis, & Francke, 2014). Besides, the cabinet wants to cut down on health costs (5.3 billion in four years) according to the coalition agreement of this moment (Rutte & Samson, 2012). Research have shown that living in an institution is 6.000 to 16.000 euros per person, per year more expensive than living at home (SCP & SEO, 2004). A review from Doekhie et al. (2014) shows that older people who live at home desire to stay at home, even when more care is needed. A qualitative research with 29 participants who are in transition to move into an institution, suggested that the most important reason to move to an institution is a decrease in mobility (Brands & Zijdeveld, 2012). A key strategy, the government uses, trying to maintain independence is the deployment of staff for home-care by a program called Visible Link (in Dutch: 'Zichtbare Schakel') (Government of the Netherlands, nd)

Nutrition is an important determinant of health and functionality in older people (American Dietetic Association, 2005). Poor nutrition, which refers to an inadequate, unbalanced diet (World Health Organisation, nd) leads to undernutrition (Shetty, 2003). In the literature, the terms malnutrition and undernutrition are used loosely and interchangeably. In this research the definition of undernutrition will be used, the term malnutrition is too broad as it refers to all deviations from an optimal nutrition status (Shetty, 2003). The exact definition of undernutrition that will be used, corresponding to the definition of Schilp et al. (2012) "*a disorder of nutritional status from reduced nutrient intake or impaired metabolism.*" Undernutrition is preceded by a state of nutrition risk, which can be identified by nutrition screening (McElnay, et al., 2012).

The Dutch National Prevalence Measurement of Care Problems (In Dutch: Landelijke Prevalentie Meting, LPZ), has measured the prevalence of undernutrition annually since 2004. The prevalence of undernutrition is measured per type of setting within acute care (academical and general hospitals), chronic care (living, care and wellbeing institutions) and home-care (Halffens, et al., 2012). Nursing homes are included in the chronic care sector. Patients who have a BMI (Body mass Index) below 20, or described as thin or very thin, or have lost 6 kg in the past 6 months, or 3kg in the past month are classified in the undernutrition category Halffens (2005).

The prevalence of undernutrition varies within older people living in different settings. In 2004, 31.5% of patients in chronic care institutions in The Netherlands had undernutrition, compared to 17% in 2012. In the home care sector 27% of the patients had undernutrition by LPZ criteria, against 17.1% in 2010 (RIVM, 2013). A study from Schilp et al. (2012) used data from 1998/1999 from the LASA (Longitudinal Aging Study Amsterdam) to determine the prevalence of undernutrition among community dwelling<sup>1</sup> older individuals (>65y). The LASA study used two criteria for undernutrition; BMI below 20 and/or 5% weight loss in the past six months which usually results in a lower prevalence compared to the LPZ criteria (Health Council of the Netherlands, 2011). The LASA study showed 10.7% prevalence of undernutrition in 1998/1999 and in 2005/2006 7% undernourishment among community

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<sup>1</sup> In other words: living at home

dwelling older people (Health Council of the Netherlands, 2011). Data from 2009/2010 showed the percentage of undernourished people in home care was 34.8% (Schilp, et al., 2012). However, participants may have been screened selectively by the home care nurses at the beginning of that study (Schilp, et al., 2012).

In absolute numbers undernutrition among older people is the largest problem in community dwelling older people, given more than 95% of the Dutch older people (>65y) were living at home in 2013 (CBS Statline, 2013). Furthermore, the Dutch population is aging. From 2013 the number of older people will increase rapidly (Giesbers, Verweij, & Beer, 2013). The number of older people (>65y) is expected to increase from 2.7 million in 2012 to a maximum of 4.7 million in 2041. Undernutrition is among other causes (Chen, Schilling, & Lyder, 2001) related to increase length of stay in hospitals, early institutionalization (Isabel, Correia, & Waitzberg, 2003), decreased quality of life (Amarantos, Martinez, & Dwyer, 2001) and possibly contributes to the development of disease (Mowe, Bohmer, & Kindt, 1994). Above all, undernutrition is also related to long-term mortality in community dwelling as well as institutionalized older populations (Vischer, et al., 2011) (Schilp, et al., 2012). Therefore undernutrition is likely to cause indirectly an increase in healthcare costs (Correia & Waitzberg, 2003) (Meijers, Halfens, Wilson, & Schols, 2011).

In conclusion, although the percentage of undernutrition is the lowest in community dwelling older people (7% in 2005/2006), in absolute numbers this setting presents the largest problem. The most concerning aspect is that about one third of the community dwelling older people who receive homecare are undernourished. Despite the fact that it is measured with different criteria, there is a relatively big difference between two types of community dwelling older people. Minimizing undernutrition in community dwelling seniors is both valuable for individuals and society, because it is in general beneficial for health. Therefore, nutrition risk screening is recommended to identify those who are at risk of undernutrition (Wham, Teh, Robinson, & Kerse, 2011). After identifying seniors who are undernourished or at nutrition risk, they should be followed up by further evaluation and treatment. Early recognition of undernutrition is very important as it supports prevention of complications and further impairment of nutritional status (Elia, Zellipour, & Stratton, 2005), (Schilp, et al., 2012). Next to identifying patients at nutrition risk, it is important to investigate the factors, related to this phenomenon. When nutrition risk is identified, prevention of undernutrition through nutritional education may be appropriate (Keller, Goy, & Kane, 2005). To know the factors responsible for nutritional risk, could be very useful in prevention of nutritional risk. Therefore the aim of this research is to identify nutrition risk and the main factors of nutrition risk among community dwelling older people in The Netherlands. The community dwelling older people in the community of Woerden will be divided in two groups, one that receives professional home-care and the other one without home-care to research the influence of home-care on nutritional status and factors. The main research question is: *'What is the influence of homecare on community dwelling older people (75-85y) in Woerden, in relation to nutritional risk status and factors for nutrition risk, identified with use of the SCREENII tool?'* All the aspects of the main question are specified in the chapter methods and therefore no sub-questions have been formulated (Verhoeven, 2011).



## Methods

The methodology focuses on three different aspects: firstly a specification of the population, secondly the data collection protocol and thirdly the data analysis. This is a quantitative research approach. The interest lies in numerical data such as how many older people are at nutrition risk and what are the main factors responsible for that risk (Verhoeven, 2011). There were 20 weeks available for this research project.

For this research, 47 sources have been used including books, reports, articles from databases and websites. In the search for relevant sources, the following criteria have been used, based on the characteristics for relevant literature by Baarda and Goede (2001).

Firstly, the reference source must be as recent as possible, to avoid outdated information.

Furthermore the level of evidence of all articles must be at least C, but preferably B, A1 or A2. Articles that used the term malnutrition other than how undernutrition is defined, were excluded. The search for articles was undertaken in Dutch and English, because there was more specific information available in Dutch about the specific problem in The Netherlands.

The search facility Google and furthermore databases like Google Scholar, Pubmed, ScienceDirect and Medline have been used. In order to reduce the likelihood of missing relevant information, a systematic approach was used. Therefore, two main search methods were applied in the search for relevant information. Firstly the Boolean method, which means, using as many search terms as possible in the same operation (Dutch Defence Academy (NLDA), 2013). Secondly the snowball method, which means, using the references of articles were used to find other relevant articles. Search terms were dependent on what information needed at that time, but the main search terms were: 'Undernutrition in older people', 'Malnutrition in older people' combined with terms like 'homecare', 'nutrition risk', 'costs', 'health', 'independence', 'community living' and 'consequences'.

## Participants

The participants were aged between 75-85 years (birthdate between 1929 to 1939) and indicates the usual age of transition from independence to moving to an institution (CBS Statline, 2013). The narrow age range for the participants was necessary, considering the limited time that was available for this research project.

In order to keep older people living independently as long as possible, it is important to determine undernutrition as soon as possible to prevent complications. Therefore nutrition risk screening is useful to identify risk of undernutrition. Subsequently it is of interest to identify which factors are responsible for that risk, so that appropriate intervention can be undertaken.

The *theoretical population* of this research will be 75-85 year old community dwelling seniors in The Netherlands. This population consists of 850.144 people (CBS Statline, 2013), which is too large a population to assess in the available time. Therefore the theoretical population will be contained within four steps (Baarda & Goede, 2001). These are described in the next section, the last two steps are described in the *results* chapter.

The first step is to select an *operational population*. This research will focus on the community called Woerden which is a demographically representative community of The Netherlands (Horstik & Veuger, 2012). Representation is provided in a report by the department WiseWoerden of the town council (in Dutch: WoerdenWijzer) based on population demographics such as age, income, nationality. Woerden is therefore the most representative community for this research in The Netherlands. This research can therefore provide an impression of nutrition risk in 75-85 year olds in The Netherlands. There were 2,522 75-85 year old community dwelling people in Woerden on the 13<sup>th</sup> of May 2014 (obtained by contact with Mw H. Verhorst from the Town Council).

The aim for the *sample-size* was set at 334, calculated by a sample calculator. The reliability level was 95%, (Verhoeven, 2011). Furthermore, a 5% margin of error was applied for reliability without making the sample-size too large.

The sample in this research could not be randomized, since there is no information available about the operational population. Therefore the sample was selected. A select sample is usually not valid to generalize to the operational population. The generalization of a select sample is restricted to the units, researched in the study (Baarda & Goede, 2001). In case of a select sample the representativeness of the sample is affected, because not everyone in the population has an equal chance to participate the research. To increase the representativeness of the sample, the sample will be analyzed by four variables and compared with the operational population. The selected variables and subvariables are based on the available information about the operational population and on indications from the literature. Several studies have shown a relationship between the nominal subgroups gender, ethnicity and living situation (Schilp, et al., 2012) (McElnay, et al., 2012) (Wham, Teh, Robinson, & Kerse, 2011). This study will add home-care to investigate the influence of home-care on nutrition risk. Schilp et al, (2012) identified a difference between community living older people who receive home-care versus those who do not receive home-care. The variable home-care has been chosen because one third of the community dwelling seniors who do receive homecare have undernutrition (Schilp, et al., 2012). Within these variables subgroups has been identified by gender, ethnicity (Dutch and possibly other ethnicities) Living situation (live alone or live with others including living with husband or children) and home-care (having professional care with domestic chores, with personal care or both).

### **Participant recruitment**

Recruitment consisted of two parts, divided by specificity. In order to avoid systematic measurement errors, the focus of the first part of recruitment was a maximum coverage of the eligible people in the area. Recruitment in the first part was undertaken by advertisements in newspapers, advertisement on webpages, placing flyers at relevant shops such as supermarkets and home-care shops. The advertisements and flyers were calling eligible people to apply for participating in this research. The newspapers used for advertisements were the 'Woerdense Courant' and the 'Var'. The 'Woerdense Courant' has a coverage of 23.100 of the households in Woerden. The 'Var' has coverage of households only in Harmelen, a part of Woerden. The maximum households reach of the 'Var' is 3.220. Both newspapers are free and delivered in every mailbox except for people where there is a rejection sticker for free newspapers. Research has shown that 93% of the older people (>50y) reads a newspaper, regional newspapers are most popular with 33% of the participated older people (W., 2008). This particular research excluded systematically older people who did not have internet, since the survey was conducted on the internet. The Central Bureau for Statistics (CBS) has measured the amount of older people (among 65-75y) who make use of the internet, and this amount has been more than doubled since 2005 (CBS (Central Bureau for Statistics), 2013). In specific terms, eight out of ten older people used the internet in 2013, compared to three out of ten in 2005. Therefore this research also recruited via the internet, by advertisement on the webpages of the newspaper 'Woerdense Courant' and the organization 'Welzijn Woerden'. The organization 'Welzijn Woerden' arranges activities in accommodations across the community. The second part of recruitment was more specific, in order to achieve a representative sample-size for the community Woerden. Hereby eligible people were asked straight by the researcher or home-care staff if they wanted to fill in a brief questionnaire about foodhabits. Recruitment in the second part was undertaken by attending venues of activities for older people, attending venues for association meetings for older people, churches, house to house visiting and through participant acquaintances. Furthermore the home-care organizations were asked to help with handing out the questionnaires to everyone eligible.

### **Data collection**

Data collection was undertaken using a postal survey in April 2014, and included the use of a self administered nutrition screening tool. Eligible people were asked if they wanted to participate in research to investigate food habits by completing a brief questionnaire. Some

participants were asked to fill in the survey in their own time and send it back, others were completed in groups of people and a few questionnaires have been surveyed face to face.

## **Measures**

Nutrition screening is intended for assessing large numbers of people in contrast to detailed nutrition assessment, which is intended for smaller groups (Keller, 2009). Nutrition screening tools help detect people who are at nutrition risk or undernourished using a simple and rapid method (Wham, Teh, Robinson, & Kerse, 2011). As defined in the introduction, the screening tool needs to identify undernutrition. There is no golden standard for the use of nutrition screening tools (Meijers, Halfens, Wilson, & Schols, 2011). The usual screening tool that is used for older people in the Netherlands is the Short Nutritional Assessment Questionnaire 65+ (SNAQ65+). The SNAQ65+ is a 5-item method to screen for undernutrition among community dwelling older people (>65y). The strength of the SNAQ65+ is that it is developed to be "fast and easy to apply" (Wijnhoven, et al., 2012, p. 351). For this research SCREEN II (Seniors in the Community: Risk Evaluation for Eating and Nutrition, version II), has been selected as it is more extensive than the SNAQ65+ and it can be validly self-administered (Keller, Goy, & Kane, 2005). SCREEN II is a screening tool that has been specifically designed to screen seniors (>55y) in the community for grades of nutrition risk. SCREEN II has been validated and has excellent test-retest reliability and inter-rater reliability (Keller, Goy, & Kane, 2005). More than 30% of the Canadian participants in the validation study undertaken by Keller et al (2005) were aged between 75-85 years. Permission to use SCREEN II was obtained from the licensor. SCREEN II is a 17-item questionnaire, with questions about weight change, risk factors and food intake. For each question there are scores ranging from zero to four. The total score for each individual concerning nutritional risk will be categorized in 'not at risk' (score >54), 'at risk' (score= 50-53) or 'at high risk' (score <49) (Keller, Goy, & Kane, 2005). The main factors for nutrition risk will be examined for participants 'at risk' or 'at high risk'. For each questionnaire item, the participant is 'at risk' for the particular item when the score is equal to or below two out of a total score of four (Keller, Goy, & Kane, 2005). The SCREEN II tool has been translated to Dutch by the researcher, whose native language is Dutch and checked by the English teacher from The Hague University, Mrs. Van Rooijen (see Enclosure A).

Additional to the SCREEN II tool the questionnaire included questions for demographic characteristics including gender, ethnicity, living situation and home-care status. These variables were necessary to regain representativeness, as described in *Population*.

An ethical aspect of nutrition screening is to provide the seniors 'at risk' and 'at high risk' with opportunities to improve their nutritional intake (Keller, Seniors in the Community Risk Evaluation for Eating and Nutrition, User Guide, 2009). Participants will receive their score after participating in this study and those 'at risk' or 'at high risk' for undernutrition will be provided with nutrition education materials. Participants who are identified 'at high risk', will be advised to visit a dietitian or a physician.

## **Data analysis**

In this research descriptive statistics as well as inductive statistics will be used. Descriptive statistics will be used to show the variables of the response and to show grades of undernutrition among the response. Inductive statistics will be used for analyzing the data, because the use of inductive statistics gives the opportunity to test whether the differences between the sample and the operational population is due to coincidence or to a systematic approach of the independent variable (Baarda & Goede, 2001). P value below 0.05 is considered as significant, to exclude that the results are based on coincidence. This value is most commonly used by researchers (Verhoeven, 2011). The Pearson Chi-Square test will be used to test whether the scatter within the sample is similar to the scatter of the operational population. The Pearson Chi-Square test is designed to test the difference between two categorical variables and the best choice to test nominal variables (Vocht, 2011). This test will

show how representative the sample is for generalizing to the operational population. This will be done for each of the four different variables, Gender, Living situation, Nationality and Home-care. Home-care will be analyzed using two subcategories, with or without homecare. Subsequently the Pearson Chi-Square test will be used to test whether the different variables have a significant association with nutrition status. The variables, which are not significantly associated with nutrition status will be excluded for further analysis. The risk differences between separate subcategories in nutrition status, will be tested by the odds-ratio test. The multivariate binary logistic regression will be used to test the influence of the separate variables on nutritional status with the other variables taken into account. The results of the univariate and multivariate model will be displayed in one table. Additionally, the correlations will be tested to see whether there are correlations between the variables, because this could influence the outcome. These tests will be executed firstly for the risk groups combined versus people not at risk. Secondly the difference within the combined risk group will be tested to ensure whether there is a significant difference between the two groups (Vocht, 2011). To determine the main reasons for risk of undernutrition, the questions will be displayed in a *frequency generated crosstable*, in order to compare groups within the tested items (Nijdam, 2003). Additional to the differences in prevalence of nutrition risk among older people who do receive home-care, the main factors of both groups will be investigated. The results from this research are subject to restrictions of the variables that are been researched in the sample, because it was a select sample (Baarda & Goede, 2001). Statistical analysis will be executed with SPSS statistics 22 for Mac

## Results

### Participant characteristics

Initially 381 older people were recruited for this research, 46 people were ineligible due to the age criteria or essential missing data. From the 335 community living older people (75-85 years old and living in Woerden), 39.7% received professional homecare. The average age of the final response was 79.9 years (sd 2.96). The characteristics of the respondents have been compared to the data from the *operational population* in table 1. The Chi-square values have been calculated for Gender, Living situation and Home-care. The variable home-care has been calculated for whether or not home-care, because the data from the town council is about people who receive reimbursement for their professional home-care. Applying for reimbursement is restricted to people with low income, according to the coalition agreement (Rutte & Samson, 2012). Therefore further subcategories of home care are excluded for further analysis. The Chi-square value for a representative variable with one degree of freedom and a reliability level of 95%, the value should be 3.84 or below. The sample is representative for the community Woerden for home-care ( $\chi^2= 2.37$ ). Gender and living situation were not representative for the community Woerden (severally  $\chi^2=4.7$  and  $\chi^2= 4.49$ ). There were no eligible people with a nationality other than Dutch participating in this research. Therefore nationality was excluded for further analysis and all conclusions are only applicable to Dutch older people.

Table 1. Comparison of Respondents against Population of 75-85 year-olds in Woerden

		N	% Respondents	% Woerden <sup>1</sup>
<b>Gender</b>	Male	108	32.2	43
	Female	227	67.8	57
<b>Living situation</b>	Lives alone	155	46.3	56.8
	Lives with others	180	53.7	43.2
<b>Ethnicity</b>	Dutch	335	100	98
<b>Professional Home-care</b>	Domestic chores	92	27.4	13.4 <sup>2</sup>
	Personal care	9	2.6	19.1 <sup>3</sup>
	Both	32	9.5	
	Total home-care	160	39.7	32.5

1. n=2573 on the 13<sup>th</sup> of May 2014, information about population obtained by contact with Town Council and includes people living in institutions (n=59).

2. 38% of people who receive home-care with domestic chores is 75-85y old.

3. On base of the percentage of valid AWBZ indications in Woerden on the 1<sup>st</sup> of January 2013, AWBZ indications are statements for the right to receive chronic care (CIZ Care Assessment Centre, 2013).

### Nutrition risk

Nutrition risk has been measured with the SCREENII tool. The SCREENII tool categorized 36.4% of the respondents as 'at high risk', 27.2% as 'at risk' and 31.3% 'not at risk'. For 5.1% of the respondents a score could not be assigned due to missing data. Half (49.6%) of the older people who received home-care were 'at high risk' compared to 27.7% of people who did not receive home-care. All variables were significantly associated to high nutritional risk status, especially for female gender ( $p=0.03$ ), living alone ( $p<0.001$ ) and receiving professional homecare ( $p=0.001$ ).

Table 2. Results Nutritional Risk Group According to SCREEN II within Gender, Living Situation and Home-care in Numbers and Percentages

		Nutritional risk status (number and percentage)				
		At high risk	At risk	Not at risk	Unknown	Total
<b>Gender</b>	Female	92 (40.5)	59 (26)	62 (27.3)	14 (6.2)	227 (100)
	Male	30 (27.8)	32 (29.6)	43 (39.8)	3 (2.8)	108 (100)
<b>Living situation</b>	Lives alone	84 (54.2)	36 (23.2)	28 (18.1)	7 (4.5)	155 (100)
	Lives with others	38 (21.1)	55 (30.6)	77 (42.8)	10 (5.6)	180 (100)
<b>Home-care</b>	Professional home-care	66 (49.6)	32 (24)	30 (22.6)	5 (3.8)	133 (100)
	No home-care	56 (27.7)	59 (29.2)	75 (37.1)	12 (5.9)	202 (100)
<b>Total</b>		122 (36.4)	91 (27.2)	105 (31.3)	17 (5.1)	335 (100)

The odds ratios have been tested for every significant variable in combination with nutrition status. Table 3 shows the results for the different nutrition risk groups. The univariate model from *table 3* indicates that people who receive home-care are 2.13 times more likely to be at nutrition risk than people who do not receive home-care. In the multivariate model the variables gender and living situation were been included. The multivariate model indicated that people who received home-care were 1.76 times more likely to be at nutrition risk than people who do not receive home-care. The data from *table 3* indicated that older people living alone were at least 3 times more likely to be at nutrition risk in both univariate and multivariate models (including the variables gender and home-care). Similar associations have been found in research from McElnay et al (2012).

*Table 4* shows that when the risk groups are separated, the associations persisted. The multivariate association the variables living situation and professional home-care were also significantly associated with high nutrition risk status.

Table 3. The Odds ratios <sup>1</sup> between nutritional risk ('Not at risk' v combined risk group) and Gender, Living situation and Home-care

Variable	Univariate model	P-value	Multivariate model	P-value
<b>Gender (Female)</b>	1.69 (1.04-2.75)	0.035	1.05 (0.61-1.80)	0.87
<b>Living situation (Lives alone)</b>	3.55 (2.13-5.91)	<0.001	3.19 (1.84-5.54)	<0.001
<b>Home-care (Yes)</b>	2.13 (1.29-3.52)	0.003	1.76 (1.04-2.97)	0.035

1. Within the brackets, the 95% confidence intervals are displayed

Table 4. The Odds ratios<sup>1</sup> between nutritional risk ('At risk' v 'At high risk') and Gender, Living situation and Home-care

Variable	Univariate model ♦	P-value	Multivariate model ♦	P-value
<b>Gender (Female)</b>	1.66 (0.92-3.02)	0.093	1.02 (0.52-1.99)	0.97
<b>Living situation (Lives alone)</b>	3.38 (1.91-5.96)	<0.001	3.05 (1.63-5.68)	<0.001
<b>Home-care (Yes)</b>	2.17 (1.24-3.8)	0.006	1.81 (1.01-3.24)	0.047

1. Within the brackets, the 95% confidence intervals are displayed

People in the category 'at risk' or 'at high risk' were combined to determine the factors responsible for the nutritional risk. In figure 1, the bar chart shows the main questionnaire items responsible for high nutritional risk in the combined risk group. The five main nutrition items were low meat and alternatives intake (64.8%), low milk product intake (59.2%), low fruit and vegetable intake (58.7%), eating alone (55.4%) and perception of own weight and difficulty cooking (both 42.3%). The five most occurring items are displayed in figure 2, setting people with professional homecare against people who do not receive homecare. According to figure 2, people receiving professional home-care were more likely to have nutritional risk with eating alone (66.3%) than people without home-care (46.1%). Also people with professional home-care tended to eat less meat or meat alternatives, eat less fruit and vegetables and have more trouble with cooking.

Figure 1. Percentages of Respondents at risk ( $\leq 2$ ) per Determinant in the Combined Risk Group

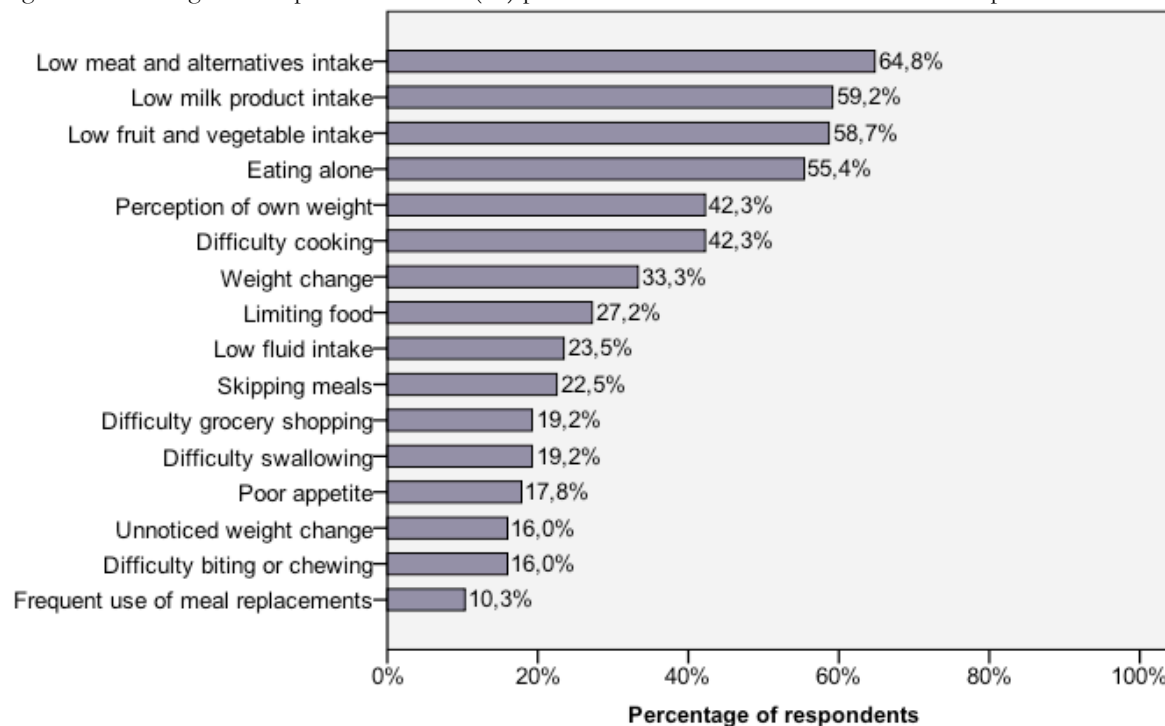
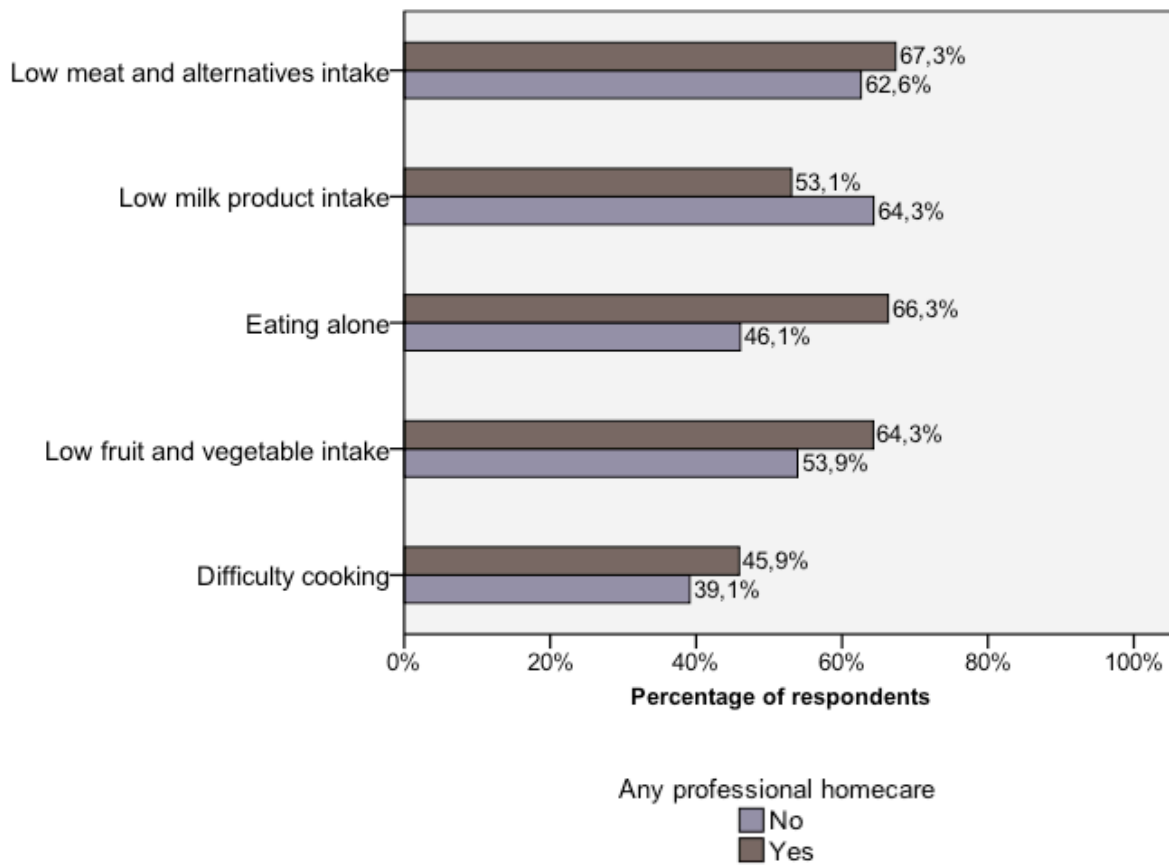


Figure 2. Percentage of respondents at risk ( $\leq 2$ ) per Determinant in the Combined Risk Group, five Main Items for Respondents who Receive Professional Homecare compared to the Respondents who do not Receive Home-care.





## Discussion and recommendations

Data showed that undernourishment in people who received home-care was much more common (34.8% in 2008) than in people living in the community (7% in 2006). Undernutrition can be preceded by a state of nutrition risk, which can be identified by the SCREENII tool. Therefore the influence of home-care on nutrition risk and items of nutrition risk were examined. The results of this research are discussed per investigated variable.

Female gender was significantly correlated to nutrition risk in the univariate model. Gender was not significant in the multivariate model, which could be due to the fact there was a fairly strong correlation between gender and living situation. Suggesting that women were more likely to live alone more often than men. This suggestion was confirmed by data about living situation of people older than 80 years, from the Central Bureau of Statistics (2011). Often men are older than their wife and debase earlier (CBS (Central Bureau for Statistics), 2011). Female gender has been associated with higher risk for nutrition risk

This research shows that nutrition risk among people living in the community is more common in people who live alone. The suggestion that older people living alone are more often at nutrition risk, according to the SCREENII tool has been previously concluded by studies from New Zealand (McElnay, et al., 2012) (Wham, Teh, Robinson, & Kerse, 2011). McElnay et al (2012) found people who live alone were 3.53 times more likely to be at nutrition risk (including gender, age and ethnicity), but the associations did not persisted within the risk-groups. Wham et al (2011) researched nutritional risk among 75-85 year-olds and found that people living with others were less at risk than people living alone.

People receiving professional home-care were next to living alone more at risk according to this present study. Data from 2009/2010 already indicated a relatively high prevalence (34.8%) of undernutrition in older people who receives home-care compared to those who do not receive homecare (Schilp, et al., 2012) (Health Council of the Netherlands, 2011). Schilp et al. (2012) mentioned that the home care nurses at the beginning of the study might have screened the participants selectively. The present study found that almost half of the respondents who received home-care were at high nutrition risk. Other European studies from Finland and Germany found corresponding data about half of the older people receiving home-care being at nutrition risk, these studies used the MNA (Mini Nutritional Assessment) screening tool to identify nutrition risk (Soini, Routasalo, & Lagstrom, 2003) (Kiesswetter, et al., 2013). According to the Care Assessment Centre (2013), home-care is indicated for people who have a functional disability. Whether the risk for nutritional status is dependent on professional home-care or the reason why people receive home-care stays unknown. Further research is recommended.

The main reasons for nutrition risk were mostly related to food intake (intake of meat and – alternatives, milk and -products and fruit and vegetables). Although the foodgroups were divided differently, the results were compared to the Dutch National food consumption survey among people aged above 70 years old in 2010-2012 (Ocke, et al., 2013). The survey did not report an extraordinary insufficient intake of those food groups, but emphasized that only a small number of people with functional disabilities took part in the survey. People with functional disabilities are expected to have a lower energy intake and the amount of protein, vegetables, calcium and magnesium is reduced. Also the risk for undernutrition is increased in people with functional disabilities (Ocke, et al., 2013). In the present study 39.7% of the respondents received home-care, home-care is indicated for people who have a functional disability (CIZ Care Assessment Centre, 2013). Another item that was frequently at risk, was eating alone. How often someone eats alone is dependent on living situation. People living alone or eating alone usually eat less than people who share their meal (Salva & Pera, 2001). A similar research from McElnay et al (2012), had corresponding results in the area of most important factors for nutritional risk.

A methodological limitation of the research includes that the sample was select, not everyone had the equal opportunity to participate in this research. The recruitment has been done on the most thorough way as possible in the available time. The aim was to give everyone the opportunity to register for and participate in this research. But since the sample is select, the conclusions are restricted to the variables taken into account in this research. Furthermore the validity was affected by translating the SCREENII tool to Dutch and has been used without validation. To be sure that the Dutch SCREENII tool has been translated correctly, an English teacher has been asked to check the tool before usage. Furthermore the association between living situation and nutrition risk has been confirmed before in other researches without translation of the SCREENII tool.

Systematic errors in recruitment are avoided as far as possible by telling the people that this was a research for food-habits, so that everyone would feel eligible to participate. Random errors are as far as possible avoided by using a reliability-level of 95% and a margin of error of 5% for the sample-size. Random errors with self-administration concerning the screening tool were tried to avoid by giving the participants a letter with explanation about the questionnaire and asking them to contact the researcher in event of ambiguities (see enclosure B).

One of the purposes of this research was to generalize its conclusions to the operational population. Although the sample was select, the sample was representative to the operational population home-care. Living situation and gender were only slightly deviant from the operational population, what could be due to the fact that the data about the population included people living in an institution. For nationality this was not the case, so the conclusion only applies to Dutch older people, meaning 98% of the operational population. The subvariables within Home-care were not representative for the population of Woerden, therefore those variables have been excluded for further analysis. Particularly the prevalence of the respondents who receive help with domestic chores deviated from the prevalence in the population of Woerden. This could be due to the fact that people who pay their help privately were included in the study, but they were not included in the data about the population. The three chosen variables are not substantial enough to generalize with certainty, but it gives an indication of the nutrition risk in older people (75-85y) living in the community in Woerden. Furthermore, Woerden is the most average community of The Netherlands on basis of population structure, so this result also gives a general indication of the situation within communities of The Netherlands.

The recommendation following from the present study is to validate the SCREENII tool in Dutch. This could be very cost-effective because this screening tool is suitable for self-administration and shows areas for improvement.

The government is employing more home-care staff in order to keep older people living at home. If the prevalence of nutrition risk remains unchanged, it is prospected that the absolute numbers of undernutrition in people who receive home-care will increase. Therefore developing an intervention through home-care staff could be very effective in diminishing nutrition risk among older people who receive home-care. An intervention to reduce nutritional risk could be educating home-care staff in how to use the screen tool. With the purpose that they can screen older people, and guide them with improving risk areas. Another possibility could be a digital version of SCREENII, with sequel advice of which points they are doing good and points for improvement. This intervention is already active in Canada known as Nutri-eScreen.

## Conclusion

The main research question was: *'What is the influence of homecare on community dwelling older people (75-85y) in Woerden, in relation to high nutritional risk and nutrition risk factors, identified with use of the SCREENII tool?'*

This research concludes that there are relatively high levels of nutrition risk among community dwelling Dutch older people within the age of 75 to 85 years and living in Woerden. Half (49.6%) of the older people who received home-care were 'at high risk' compared to 27.7% of people who did not receive home-care. People who receive professional home-care are more frequently at risk for the items eating alone, low meat and – alternatives, low fruit and vegetables and difficulty cooking.

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## Enclosure A Questionnaire in Dutch

### Persoonlijke vragen

Naam:

Datum:

Wat is uw geslacht?

- ☐ Man  
☐ Vrouw

Wat is uw geboortedatum?.....

Wat is uw nationaliteit?

- ☐ Nederlandse  
☐ Anders, namelijk: .....

Waar woont u?

- ☐ Woerden  
☐ Harmelen  
☐ Kamerik  
☐ Zegveld

Wat is uw woonsituatie?

- ☐ Ik woon alleen  
☐ Ik woon samen met iemand

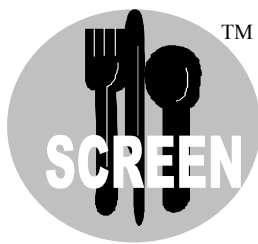
Verkrijgt u hulp bij persoonlijke verzorging en/of huishoudelijke taken?

- ☐ Nee  
☐ Ja, ik ontvang hulp bij mijn persoonlijke verzorging  
☐ Ja, ik ontvang hulp bij huishoudelijke taken

Zo ja, van wie ontvangt u deze hulp?

- ☐ Van een mantelzorger (bv. partner, kinderen, vrijwilligers)  
☐ Van een professional (bv. Een wijkverpleegkundige, medewerker thuiszorg)

Vervolg: ZOZ



SCREENII  
Score

- Voor elke vraag: vink 1 vakje aan, die u het beste omschrijft
- Uw antwoord moet overeenkomen met hoe u gewend bent te eten.
- Voel u vrij om commentaar te schrijven naast elke vraag

1a. Is uw gewicht veranderd de laatste 6 maanden?

- ☐ Nee, mijn gewicht is op een enkele kilogram na hetzelfde gebleven
- ☐ Ik weet niet hoeveel ik weeg en/of mijn gewicht is veranderd

Ja, ik ben aangekomen:

- ☐ Meer dan 5 kg
- ☐ 3.5 tot 5 kg
- ☐ Ongeveer 3.5 kg

Ja, ik heb gewicht verloren:

- ☐ Meer dan 5 kg
- ☐ 3.5 tot 5 kg
- ☐ Ongeveer 3.5 kg

1b. Heeft u geprobeerd uw gewicht te veranderen de laatste 6 maanden?

- ☐ Ja
- ☐ Nee
- ☐ Nee, maar het is toch veranderd

1c. Wat vindt u van uw gewicht?

- ☐ Het is meer dan het zou moeten zijn
- ☐ Het is goed zoals het is
- ☐ Het is minder dan het zou moeten zijn

2. Slaat u weleens maaltijden over?

- ☐ Nooit of zelden
- ☐ Soms
- ☐ Vaak
- ☐ Bijna elke dag

3. Beperkt of vermijdt u bepaalde producten?

- ☐ Ik eet de meeste producten
- ☐ Ik beperk sommige producten, maar ik red mij prima
- ☐ Ik beperk sommige producten, maar vind dat wel lastig

4. Hoe zou u uw eetlust omschrijven?

- ☐ Zeer goed
- ☐ Goed
- ☐ Matig
- ☐ Slecht

5. Hoeveel stukken of porties fruit en groeten eet u per dag?

*Fruit en groenten kunnen vers zijn maar ook uit blik, bevroren of in een sapje. Let op: aardappels worden als groente gerekend.*

- ☐ Vijf of meer
- ☐ Vier
- ☐ Drie
- ☐ Twee
- ☐ Minder dan een.

6. Hoe vaak eet u vlees, eieren, vis, gevogelte OF vleesvervangers?

*Vleesvervangers zijn gedroogde erwten, bonen, linzen, noten, pindakaas of tofu*

- ☐ Twee of meer keer per dag
- ☐ Een tot twee keer per dag
- ☐ Een keer per dag
- ☐ Minder dan een keer per dag



7. Hoe vaak eet of drinkt u zuivel producten?

*Voorbeelden zijn: vloeibare melk, koken met zuivel, toetjes die zuivel bevatten, zoals vla en pudding, (room)ijs, kaas, yoghurt en melkalternatieven zoals verrijkte soya drink.*

- ☐ Drie of meer keer per dag
- ☐ Twee tot drie keer per dag
- ☐ Een tot twee keer per dag
- ☐ Gewoonlijk een keer per dag
- ☐ Minder dan een keer per dag

8. Hoeveel drinkt u gemiddeld per dag?

*Voorbeelden zijn water, thee, koffie, kruidendranken, sapjes en frisdranken maar GEEN alcohol*

- ☐ Acht of meer kopjes
- ☐ Vijf tot zeven kopjes
- ☐ Drie tot vier kopjes
- ☐ Ongeveer twee kopjes
- ☐ Minder dan twee kopjes

9. Heeft u last van kuchen, verslikken of pijn bij het doorslikken van voedsel of dranken?

- ☐ Nooit
- ☐ Zelden
- ☐ Soms
- ☐ Vaak of altijd

10. Is bijten of kauwen van voedsel lastig voor u?

- ☐ Nooit
- ☐ Zelden
- ☐ Soms
- ☐ Vaak of altijd

11. Maakt u gebruik van commerciële maaltijdvervangers of supplementen?

*Bijvoorbeeld shakes, puddings of energie repen?*

- ☐ Nooit of zelden
- ☐ Soms
- ☐ Vaak of altijd

12. Eet u een of meerdere maaltijden per dag samen met iemand?

- ☐ Nooit of zelden
- ☐ Soms
- ☐ Vaak
- ☐ Bijna altijd

13a. Wie bereid uw eten doorgaans?

- ☐ Ik zelf.
- ☐ Ik wissel het af met iemand anders.
- ☐ Iemand anders kookt de meeste maaltijden.

13b. Welke uitspraak omschrijft het beste uw maaltijdvoorbereiding?

- ☐ Meestal geniet ik van het koken van mijn maaltijden.
- ☐ Soms vind ik koken een hele klus.
- ☐ Meestal vind ik koken een hele klus.
- ☐ Ik ben tevreden over de kwaliteit van het voedsel, bereid door anderen.
- ☐ Ik ben ontevreden over de kwaliteit van het voedsel, bereid door anderen.

14. Ondervindt u enige problemen met het verkrijgen van boodschappen?

*Problemen kunnen zijn slechte gezondheid of onvermogen, weinig inkomen, gebrek aan transport, weersomstandigheden, of het vinden van iemand die de boodschappen doet.*

- ☐ Nooit of zelden
- ☐ Soms
- ☐ Vaak
- ☐ Altijd

Vervolg: ZOZ

## Evaluatievragen

Zou u, na dit onderzoek in de toekomst nogmaals benaderd willen worden voor een eventueel vervolg onderzoek?

- ☐ Ja  
☐ Nee

Bent u geïnteresseerd om de resultaten van deze studie, thuisgestuurd te krijgen?

- ☐ Ja, mijn adres is  
.....  
.....  
☐ Nee

Hoe heeft u gehoord over dit onderzoek?

- ☐ Via de Woerdense Courant  
☐ Via mijn thuiszorgorganisatie, namelijk.....  
☐ Anders .....  
.....

## Enclosure B Explanation letter

Breeveld 10a  
3445BA Woerden  
Email [tinekehaakma@hotmail.nl](mailto:tinekehaakma@hotmail.nl)  
Telefoon 0613684251

Woerden, 24 maart 2014

Betreft: Onderzoek voedingstoestand zelfstandig wonende ouderen

Geachte heer/mevrouw,

Ten eerste wil ik u hartelijk bedanken dat u zich heeft aangemeld voor dit onderzoek. Deze brief bevat informatie over het onderzoek, uitleg voor de vragenlijst en het vervolg van dit onderzoek zal worden omschreven. Leest u deze brief alstublieft aandachtig door voordat u begint aan de vragenlijst.

Mijn naam is Tineke Haakma en ik ben woonachtig in Woerden. Voor mijn studie Voeding en Diëtetiek aan de Haagse Hogeschool, ben ik bezig met mijn scriptie. Hiervoor doe ik onderzoek naar zelfstandig wonende ouderen van 75 tot 85 jaar, woonachtig in de gemeente Woerden. Dit onderzoek zal gaan om het identificeren van mensen die wel of geen risico hebben op ondervoeding en te onderzoeken wat de redenen zijn waarom zij eventueel risico hebben. Dit risico wordt onderzocht door middel van een vragenlijst van 25 vragen. De vragenlijst is verdeeld in 3 delen, namelijk persoonlijke vragen, vragen over uw eetgewoonten en evaluatievragen.

Binnen 3 maanden nadat u meegedaan heeft aan het onderzoek, zal ik uw resultaat sturen met een advies. Tevens ontvangt u een brief met de algemene resultaten, wanneer u dit aankruist bij de evaluatievragen. Uw gegevens zullen vertrouwelijk worden behandeld en niet voor andere doeleinden worden gebruikt dan dit betreffende onderzoek of aan derde worden verstrekt.

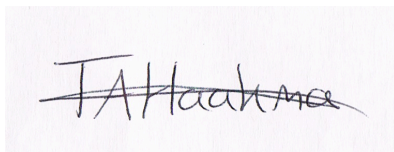
Dit onderzoek duurt van begin april 2014 tot maximaal eind mei 2014. In deze tijd ben ik hard op zoek naar mensen die aan mijn onderzoek mee zouden willen doen. Dus als u nog meer mensen kent die mee zouden willen doen, denk aan partner, burens, familie e.c. vraag ze dan alstublieft contact op te nemen met mij via 0613684251/ [tinekehaakma@hotmail.nl](mailto:tinekehaakma@hotmail.nl) Een andere mogelijkheid is om het adres en

telefoonnummer van de geïnteresseerde achterop uw vragenlijst te schrijven en dan neem ik contact op met diegene.

Ik zou u graag willen vragen deze vragenlijsten in te vullen en terug te sturen naar mij. Dit kunt u doen door de bijgevoegde sticker over uw naam op de envelop te plakken en op de post te doen. Als u niet in de mogelijkheid bent om het terug te sturen, verzoek ik u contact op te nemen met mij via 0613684251/  
tinekehaakma@hotmail.nl. Tevens zou ik u willen vragen de vragenlijsten in te vullen naar uw gewoonlijke eetpatroon. Als u het lastig vindt om de lijst in te vullen kunt u gerust iemand vragen u te helpen, zolang het uw antwoorden blijven.

Hierbij wil ik u nogmaals hartelijk bedanken voor uw deelname en bij onduidelijkheden kunt u mij gerust bellen, schrijven of e-mailen.

Met vriendelijke groet,

A handwritten signature in black ink on a light pink rectangular background. The signature appears to read 'Tineke Haakma' in a cursive, slightly stylized script.

Tineke Haakma, Onderzoeksleider

Bijlagen: Vragenlijst