Diet and Overweight Perception

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Diet and Overweight Perception
An explorative study among Turkish, Moroccan and Surinamese migrants living in the Netherlands
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Diet and Overweight Perception
An explorative study among Turkish, Moroccan and Surinamese migrants living in the Netherlands

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door

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General Introduction
Introduction

Overweight and obesity are a major public health problem both internationally and in the Netherlands, leading to increased risk of cardiovascular diseases, type 2 diabetes, cancer, musculoskeletal disorders and respiratory diseases. In addition, obesity may impact on the quality of life of individuals through their experience of social bias and discrimination. These in turn may have consequences for educational and professional achievement as well as potentially impacting on psychological wellbeing.

Globally, there is evidence that the prevalence of overweight and obesity is reaching epidemic proportions with an estimated 1 billion overweight and 300 million obese adults. In the Netherlands more than half of the general adult population is either overweight (51% of males, 42% of females) or obese (10% of males, 12% of females), with marked increases in the past 20 years. Internationally and in the Netherlands therefore, the treatment and prevention of overweight and obesity have received increased attention.

A high risk group for the development of overweight and obesity are non-Western migrants to Western societies. Among these groups the prevalence of excessive weight is often higher than among host populations.

Non-western migrants form an increasing proportion of the populations of many Western countries, including the Netherlands where 11% of the population comprises non-western migrants and their children (from this point on migrants and their children will be referred to collectively as migrants). Among this group a large proportion originates from Suriname, Turkey or Morocco, each of these represent approximately 2% of the total population of the Netherlands and, counted together, close to 60% of all non-western migrants. Many live in large cities, for example 35% of the inhabitants of Amsterdam are of non-western origin, migrants originating from Morocco and Suriname each form 9% and from Turkey 5% of all residents.

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Overweight 25.0 ≤ BMI ≤ 29.9 Obese BMI ≥ 30.0
Source: Dijkshoorn H et al, 2008, and SUNSET study, data not published.

The prevalence of overweight and obesity in these population groups seems to be high. Data from studies in Amsterdam, table 1, shows that more than half of Surinamese, Turkish and Moroccan adults aged 35 years or older are either overweight or obese and that obesity, in particular, is a problem among women.
Figures originating from a nationally representative sample, shown in table 2 indicate that while ethnic differences in prevalence of overweight and obesity among men are less striking, migrant women are more often obese, compared to their ethnic Dutch peers. At a first glance it appears that overweight and obesity prevalence is higher among migrants living in Amsterdam, however it’s important to note the difference in age groups studied.

Considering the increasing proportions of migrants in Western populations, public health efforts need to account for these groups.

| Table 2: Percent individuals with overweight or obesity: Figures based on national data (18-70 years) |
|--------------------------------------------------|--------------------------------------------------|
| Men | Women |
|----|----|----|----|----|----|----|----|
| 39  | 42  | 38  | 28  | 40  | 29  | 31  | 35  | 29  | 33  |
| 10  | 15  | 10  | 9   | 7   | 12  | 21  | 18  | 24  | 11  |

Overweight 25.0≤BMI≤29.9 obese BMI≥30.0
Source: Dagevos J and Dagevos H, 2008

Potential underlying causes of overweight and obesity

The aetiology of overweight and obesity is complex, but at the most basic level, overweight is a result of behaviour that results in excessive energy intake or insufficient energy expenditure. Influences on behaviour include genetic, biological as well as environmental factors.

Among migrant groups higher overweight and obesity prevalence can be partly attributed to genetic susceptibility. However, there is general consensus that genetic influences interact with environmental factors, and that the latter probably have a dominant influence on overweight development.

Environmental influences on energy balance have been conceptualised by the ANGEL0 framework, (Analysis Grid for Environments Linked to Obesity) and include physical, economic, political and socio-cultural factors. These four influences can act at the macro level, i.e. the broader context, including amongst others, food production and distribution, transportation infrastructure, media and at the micro level, the local context which includes schools, work places, shops and neighbourhoods.

This thesis focuses on two important determinants of overweight in four non-western migrant groups living in the Netherlands: Surinamese Hindustani and Creoles, Turks and Moroccans. Firstly, diet as one half of the energy balance equation and, secondly, the perception of overweight as an important underlying motivator for engaging in weight control. Three of the environmental influences as defined by the ANGEL0 framework are the basis of our studies; we focus on physical, economic and socio-cultural changes as they relate to migration.

In the following paragraphs we discuss some of the current insights into the diet and body weight perception of migrants, as well as some potential determinants of these. The main aims
Box 1: Turkish, Moroccan and Surinamese immigrant populations

Migration from Turkey and Morocco to the Netherlands was encouraged in the 1970’s in order to fill labour shortages, especially in the lower occupation classes. The initial migrants were male but within a few years they were joined by their families. Since that initial wave, further migration has occurred due to family formation; many Turkish and Moroccan young people choose a partner from their home country.26

The Surinamese group migrated from the former Dutch colony of Suriname and consists largely of people of African (45%) and South Asian origin (45%)27. The initial migrants to the Netherlands were from the higher socio-economic groups and migrated for educational reasons. The majority of the current migrant population migrated when Suriname gained its independence in 1975 and when a visa requirement was introduced in 1980. 28

The average socio-economic status of the three migrant groups is lower than that of the ethnic Dutch population. Among them the Surinamese groups enjoy a relatively higher socio-economic status. In the age group 35-54 years 74% and 84% of Turkish and Moroccan migrants respectively have had primary level education or less, with high rates of illiteracy, particularly among Moroccans. In the same age category 31% of Surinamese migrants have primary education only. Furthermore, a relatively high proportion of these migrant groups is unemployed and household incomes are lower than among ethnic Dutch.29

Many first generation Turkish and Moroccan migrants have difficulty with the Dutch language which has an impact on their contact with the ethnic Dutch population. In contrast, familiarity with Dutch (it is also the official language of Suriname) and the Dutch culture prior to migration means that Surinamese migrants have more contact with ethnic Dutch. 28. There are differences within the Surinamese; African origin migrants generally have more social contact.

Finally, the majority of Turkish and Moroccan migrants are Muslim, whereas among the Surinamese there is greater religious diversity (Christian, Hindu, Muslim)29.

and research questions of this thesis will be presented, followed by a short description of the studies that form its basis. We conclude with a short outline of the remaining chapters.

Diet

The role of diet in causing overweight and obesity is undeniable, making it an important factor to consider in the development of public health interventions. In order to be relevant, interventions need to account for the food preferences of the group which they target.

It is well established that the diet of migrants often differs from that of host populations 27-30. As part of the PhD project described in this thesis we conducted food consumption studies
among Surinamese (participants in the SUNSET study) and Turkish and Moroccan (participants in the LASER study) men and women in order to obtain baseline information on their diets. We compared the diet of the migrant groups with the ethnic Dutch population based on data from national Nutrition Consumption Studies (VCP, 1998/99 and 2002/2003). These studies are described elsewhere \(31,32\), tables 3 and 4 summarise some of the findings.

We found that young adults (aged 18-30 years) of Turkish and Moroccan origin, just as their ethnic Dutch counterparts, had a higher intake of saturated fat, (with exception of the Turkish women) a lower intake of fruit and vegetables than recommended and that they were more likely to skip breakfast. In addition, intakes of some key micronutrients were below

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**Box 2: Terminology of Surinamese migrant groups**

The majority of Surinamese migrants are of either African origin, commonly referred to as Creole or South Asian origin, referred to as Hindustani. The Creole group has a mixed African and European ancestry and the Hindustani originated from the Indian sub-continent.

In this thesis we have chosen to use terminology that is commonly used by the international scientific community.

In the chapters 2 and 5 Creoles are referred to as Afro-Caribbean and African origin, respectively. Chapter 2 was published in a UK journal and therefore we chose to use the term Afro-Caribbean as this group in the UK is most comparable to Surinamese Creoles. Chapter 5 was offered to a US journal; here the term African origin was used as Creole has particular connotations in the US. The term Hindustani is not recognised by an international readership, and is often associated with the Hindu religion, in order to avoid misunderstandings we chose therefore to use the term South Asian.

**Ethnic Dutch population**

In the Netherlands ethnic origin is registered by the Central Office of Statistics on the basis of the country of birth individuals themselves or that of their parents. ‘Foreigners’ are born abroad or have one parent born abroad, thus second generation migrants are also classified as ‘foreigners’. Registration of ethnic origin does not extend beyond the second generation. Throughout this thesis, therefore, we have chosen to use the term ethnic Dutch. The ethnic Dutch group is not necessarily ‘Dutch’ in the accepted sense of the word, but may actually also include third generation migrants.
recommendations. These results differ somewhat from earlier findings among Turkish and Moroccan migrants, in particular with regard to the intake of macronutrients and some food groups; however, our study population differs somewhat from previous studies through its inclusion of younger men and women.

Surinamese men and women had lower intakes of total fat and saturated fat than the ethnic Dutch population, although the fruit and vegetable consumption of South Asian Surinamese was slightly higher, none of the three groups meet the recommendations of 200g vegetables and 2 pieces of fruit daily and intakes of certain key micronutrients were below recommendations. Finally, more Surinamese men and women skipped breakfast than did their ethnic Dutch peers. These findings were consistent with the findings of other studies in the Netherlands.

We concluded that for these groups, health policy aimed at improving dietary intakes should have similar priorities as interventions targeting the general population. Namely, the use of fruits, vegetables and breakfast should be stimulated. Among Turkish and Moroccan young people, the intake of saturated fat should be discouraged. While Surinamese migrants appear to meet the guidelines for fat intake, it is important to note that up till now studies of food consumption in this group have only included adults aged 35 years and older, the dietary intakes of younger Surinamese migrants may differ.

Importantly, we observed that migrants continue to consume foods that are typical of their cultures of origin. For example, Surinamese men and women ate white rice, fish and Surinamese vegetables while their consumption of milk and milk products was limited; many Turkish young

| Table 3: Summary of findings from 24 hour recall study in SUNSET participants |
|---------------------------------|-----------------|-----------------|-----------------|
|                                   | Men             | Women           |
|                                  | Dutch a         | African Origin (n=21) | South Asian (n=15) | Dutch a         | African Origin (n=49) | South Asian (n=21) |
| **Nutrients**                    |                 |                 |                 |                 |                 |                 |
| Total fat % energy intake        | 20-40%          | 36.5            | 27.1            | 34.5            | 37.0            | 31.5            | 31.5            |
| Saturated Fat % energy intake    | < 10%           | 14.2            | 8.9             | 10.5            | 14.6            | 10.2            | 10.3            |
| Calcium, mg                      | 1000            | 1068            | 782             | 712             | 963             | 574             | 529             |
| Iron, mg                         | ♂: 11 ♀: 16     | 13.0            | 10.8            | 14.4            | 10.7            | 8.9             | 7.8             |
| **Food Groups**                  |                 |                 |                 |                 |                 |                 |                 |
| Vegetables, g                    | 200             | 129             | 107             | 210             | 127             | 128             | 158             |
| Fruit, g                         | 200             | 92              | 62              | 123             | 103             | 98              | 92              |
| Rice, g                          | 61              | 180             | 269             | 51              | 148             | 137             |
| Milk & milk products g           | 357             | 206             | 134             | 332             | 153             | 97              |
| **Meal pattern**                 |                 |                 |                 |                 |                 |                 |                 |
| Breakfast % of users             | 100             | >90             | 81              | >90             | 72              | 85              |

a Based on the Dutch Nutrition Survey 1998, men and women aged 22-50 years.
b Norm if BMI ≤25, for overweight the recommendation is 20-30% of energy intake.
c Rice intake for Dutch not specific to rice only but includes other grains.
people ate typically Turkish foods and mixed dishes; Moroccan young people consumed more olive oil and fish than other groups. Therefore, although dietary goals for migrant groups may not differ from those for ethnic Dutch groups, it remains important to consider the different foods commonly consumed in translating these goals into healthier choices.

Food consumption studies provide important baseline information that can guide interventions. In order to be relevant, interventions need to account for food preferences and be phrased in terms understood by the audience for which they are intended. Alongside this, interventions need to account for the important determinants of dietary behaviour. These include environmental influences such as socio-economic, physical and socio-cultural factors. Information on these determinants will help to further differentiate target groups within migrant populations.

Socio-economic position is an important determinant of dietary quality. Both income level (via purchasing power) and educational level (via knowledge) have the potential to influence diet. In western countries higher level of education is associated with improved diet quality including lower saturated fat and red meat intakes and higher fruit and vegetable intakes. As migrants often have a relatively low socioeconomic status, it might be expected that they may have poorer diets than their host populations, but that improvements in socioeconomic status would also lead to improved diets. However the association of educational level and diet quality among immigrant groups is not so straightforward. Within migrant groups themselves both positive and negative associations between educational level and diet have been observed. In addition, despite lower socioeconomic status, first generation migrants have been shown to have ‘healthier’ diets than their ethnic Dutch peers.

Table 4: Summary of findings from 24 hour recall study in LASER participants

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dutch a (n=325)</td>
<td>Turkish (n=52)</td>
</tr>
<tr>
<td>Total fat b % energy intake</td>
<td>34.4</td>
<td>34.4</td>
</tr>
<tr>
<td>Saturated Fat % energy intake</td>
<td>&lt; 10%</td>
<td>12.7</td>
</tr>
<tr>
<td>Calcium, mg</td>
<td>1000</td>
<td>1135</td>
</tr>
<tr>
<td>Iron, mg</td>
<td>♂: 11 ♀: 16</td>
<td>12.2</td>
</tr>
<tr>
<td>Food Groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables, g</td>
<td>200</td>
<td>111</td>
</tr>
<tr>
<td>Fruit, g</td>
<td>200</td>
<td>86</td>
</tr>
<tr>
<td>Bread, g</td>
<td>183</td>
<td>233</td>
</tr>
<tr>
<td>Milk &amp; milk products, g</td>
<td>404</td>
<td>115</td>
</tr>
<tr>
<td>Meal pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast % of users</td>
<td>100</td>
<td>93</td>
</tr>
</tbody>
</table>

a Based on the Dutch Nutrition Survey 2003, men and women aged 18-30 years.
b Norm if BMI ≤ 25, for overweight the recommendation is 20-30% of energy intake
Migration is likely to bring about lifestyle changes due to a change in physical and socio-cultural environment. Depending on their place of origin, migration to a Western society exposes individuals to ‘obesogenic’ environments where the abundance of food along with limited opportunities for physical activity are likely to promote weight gain. This may work in tandem with cultural beliefs to influence lifestyle. For example, high fat foods such as meat may have a high cultural value, leading to their preferential consumption when possible. In many cultures physical activity is related to the tasks of daily living, therefore engaging in exercise for pleasure may not be a familiar concept for many migrants. However, while culture may have an influence on behaviour, it is also important to recognize that cultures are dynamic. In the case of migrants, the process of acculturation, which is defined as a ‘process of cultural change resulting from contact with the dominant culture’ may have an impact on food intake. Factors such as length of exposure to the new environment and the extent of social contact with people of the host culture have been shown to be associated with dietary change. Additionally, acculturation may have an effect on the beliefs that govern the eating patterns and food customs of migrants. Differentiating migrants on their degree of acculturation, therefore, has implications for nutrition interventions.

In this thesis we will explore the influence of socio-economic, physical and socio-cultural determinants on the diets of migrants.

Body size preference and perception of overweight
Public health promotion efforts aimed at overweight prevention often proceed from the assumption that most individuals prefer to be thin and that the first step in motivating individuals to lose weight is to raise awareness of weight status among those who are overweight. This approach is justified for Western populations where thinness is valued, particularly among women, but where awareness of overweight among those with overweight is often low. However, many non-Western cultures traditionally prefer larger bodies in both males and females and associate these with prosperity and health. It may be that non-Western migrants adhere to the ideal from their traditional cultures which may in turn explain the higher prevalence of overweight and obesity in these groups. More specifically, if larger body sizes are preferred, individuals would be less likely to perceive themselves as being overweight which would ultimately be a barrier for weight control or weight loss. There are indications that self rated body weight is likely to influence motivation to avoid weight gain and that overweight perception may be a barrier to healthy lifestyles.

Literature from Morocco indicates that increased overweight and obesity prevalence, particularly among women, may be partly due to a tradition that values plumpness. Anecdotal evidence from Turkey indicates that also in this country, there is a tradition of preference for large body sizes. However, Turkish adolescents demonstrate body size preferences that are similar to many typical Western populations. Information from Suriname is lacking, although there are reports that African origin populations have a cultural preference
for larger bodies 66-68. Reports among South Asian migrants to the UK indicate that second generation migrants have similar preferences to their British born peers 69.

Whether these findings are applicable to migrants in the Netherlands is not known, as few studies of this topic have been conducted. A qualitative study based in the Westerpark Amsterdam, indicated that Turkish and Moroccan women prefer thin figures 70. However, we are not aware of other similar studies based on larger samples. Another recent study reported lower overweight perception among migrant origin groups, although the total number of migrants was too small to distinguish between different groups 60. The latter study also reported that underestimation of weight status was associated with lower intention to engage in weight loss. An earlier study (from 1997) that considered ethnicity and weight loss behaviour in adolescents indicated however that Turkish girls were more likely to report dieting than their ethnic Dutch peers 71.

Socio-cultural factors interacting with migration-related issues and acculturation may have an influence on body size preference and the perception of overweight among migrants. With acculturation, it is generally expected that migrants will adopt the body size ideals of their ‘host’ peers. As thin figures are preferred in most Western countries, particularly for women 53, highly acculturated migrants would exhibit a preference for thinner figures.

Considering its relevance for weight loss behaviour, information on body size preference and its determinants is necessary for the planning of overweight interventions. Therefore this thesis aims to explore the body size preferences and perception of overweight and their influence on weight loss behaviour among Surinamese, Turkish and Moroccan migrants.

**Main aim of thesis and research questions**

To gain insight into environmental influences of diet and body weight in 4 ethnic groups living in the Netherlands – Surinamese Hindustani and Creoles, Turks and Moroccans in order to inform the development of nutrition health promotion activities among these groups in the Netherlands.

To address this goal we formulated the following questions:

1. What are important influences on the diet of migrants?
   This question particularly focuses on socio-economic, socio-cultural influences as well as the impact of the physical environment.

2. a What is the body size preference and body weight perception of migrants?
   b What is the influence of migration, socio-economic and socio-cultural factors on body size preference and body weight perception?
   c How do body size preference and weight perception relate to weight loss practice?
Data and methods

The studies described in this thesis were based on three sources of data. Quantitative data were obtained from the LASER study which included Turkish and Moroccan men and women and from the SUNSET study which included Surinamese and ethnic Dutch men and women. In addition we conducted a qualitative study which included Turkish and Moroccan participants in Amsterdam and Moroccan women in Morocco.

LASER study: Lifestyle among young people in Amsterdam: Study among Ethnic Groups. LASER included young men and women (aged 10-30 years) that were either born in Turkey or Morocco or had at least one parent born in one of those countries. A random sample was drawn from the Amsterdam population register which resulted in a total of 1210 participants. Participants were interviewed at their home using a structured questionnaire by trained interviewers of the same sex and ethnic background as themselves. Data collection took place between April 2003 and December 2004.

For our study of body size preference and body weight perception we included participants aged 18 to 30 years, which resulted in 291 Turkish and 160 Moroccan participants. Younger participants of the LASER study were not included as our studies focus on adults.

SUNSET study: Surinamese in the Netherlands: Study on Ethnicity and health. This study was based on a stratified random sample of 2975 individuals, aged 35 to 60 years of age, drawn from the population register of two neighbourhoods in Amsterdam. These two neighbourhoods were selected due to their large concentration of Surinamese-origin residents. For the sampling procedure the ethnicity of respondents was determined by the country of birth of the respondent and of his/her parents. Thus, subjects were considered to be ethnic Dutch if they and their parents were born in the Netherlands and to be Surinamese if they or their parents were born in Suriname. During the interview, the ethnicity of Surinamese respondents was further determined by self report, i.e. if they considered their origin to be South Asian or African.

Data collection took place during 2001 to 2003. Participants were interviewed in their home using a structured questionnaire by trained interviewers of the same ethnic background as themselves. Upon completion of the questionnaire, they were invited to attend a physical examination, held at a local health centre or at the Academic Medical Centre of the University of Amsterdam.

Focus groups study: Focus group discussions were conducted from June to November 2005 in the city of Amsterdam, the Netherlands and during the month of May 2005 in the city of Al Hoceima and two surrounding villages, in the Rif region of Morocco.

Netherlands: We included men and women in this study but conducted separate focus groups on the basis of sex and ethnicity. The interviews were moderated by professional moderators that were matched to the target group, i.e. Moroccan men were interviewed by a Moroccan man etc. Participants were invited to take part in focus groups at locations where they would normally meet such as community centres and mosques. The focus groups were conducted in the language of preference of the participants. They were recorded, were...
simultaneously translated into Dutch and (verbatim) transcribed by the discussion moderators. The Dutch transcripts were checked for completeness and accuracy by native Turkish and Moroccan speakers who were also fluent in Dutch.

**Morocco:** We included only women in this study. Participants were recruited amongst the women that attended the activities of a local, non-governmental organization (NGO) which aims to improve the status of women in North Morocco. The focus groups were held at different locations that are used by the NGO for conducting its activities. Women were invited to take part in the discussions during the times they would normally be attending classes or other activities/meetings. The focus groups were moderated by a local woman in the Tamazight dialect and were recorded onto mini disc. The recordings were translated and transcribed into English by a recognised Tamazight-English translation agency based in the Netherlands. Two of the transcripts were checked for accuracy by an independent researcher that is a native speaker of the dialect common to the Al Hoceima region.

**Outline of the thesis**

Table 5 summarizes the topics covered in each chapter. The first part which includes chapters 2 and 3 focuses on the diet of migrants.

*Chapter 2* presents a study of diet quality and the intake of specific food groups among Surinamese and ethnic Dutch men and women. The associations with ethnicity, acculturation and educational level were studied (question 1). *Chapter 3* describes a focus group study among Turkish and Moroccan men and women. This study aimed to gain insight into the mechanisms underlying ethnic differences in diet by exploring the socio-cultural influences on food intake and their relevance considering migration-related changes in physical, social and cultural context (question 1).

The focus in the second part of the thesis is weight perception and its relationship with weight loss action. In *chapter 4*, we evaluated body size preference and body weight perception in Turkish and Moroccan young adults and explored whether body size preference was associated with acculturation (question 2a). *Chapter 5* aimed to investigate ethnic differences in the perception of overweight among Surinamese and ethnic Dutch men and women (question 2a). Both chapters 4 and 5 also consider the association of the studied outcomes with reported weight loss behaviour (question 2b). *Chapter 6* presents the results of a focus group study on the perceptions of Moroccan women on overweight and its causes, with a particular emphasis on contextual and socio-cultural influences on lifestyle and perceptions of overweight. This study compared and contrasted the perspectives of Moroccan women living in Morocco with those that have migrated to the Netherlands (questions 2a and b). *Chapter 7* summarizes the main findings of these studies, discusses some of the methodological considerations, reflects on the main findings and discusses their relevance for public health practice as well as making some suggestions for future research.
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<th>Study population</th>
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<td>Food intake.</td>
<td>Socio-cultural influences, Migration, Acculturation.</td>
<td>Turkish and Moroccan origin men and women. Aged 18-44 years</td>
</tr>
<tr>
<td>4</td>
<td>Body Size Preference and Body Weight Perception among Two non-Western Migrant Origin Groups</td>
<td>Body size preference and perception of body weight.</td>
<td>Ethnicity, Acculturation.</td>
<td>Turkish and Moroccan young men and women aged 18-30</td>
</tr>
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References


Ethnicity, Acculturation and Education Level in Relation to Quality of the Diet:
a study of Surinamese residents of the Netherlands

Mary Nicolaou
Rob M. van Dam
Karien Stronks

Abstract

Background:
To examine the associations of ethnicity, acculturation variables and education level with diet in Surinamese (South Asian and Afro-Caribbean origin) and ethnic Dutch residents of the Netherlands.

Methods:
We included 1528 randomly selected men and women aged 35-60yrs. Intakes of fruit, vegetables, red meat, fish, vegetable oils, breakfast and salt were measured using a short questionnaire that formed the basis for a “diet quality indicator” score. Highest education was measured and acculturation of the Surinamese was assessed by age at migration, number of resident years and a scale measure of social contacts with ethnic Dutch.

Results:
Compared with ethnic Dutch, Surinamese scored higher on overall diet quality (p≤0.001) but some aspects of diet (breakfast and salt use) were less prudent. Education was positively associated with diet quality in ethnic Dutch (p≤0.01), but not in Surinamese. Associations with social contact with ethnic Dutch varied for different aspects of the diet. Residence duration (mean=22yrs) and age at migration (mean=21yrs) were not associated with diet.

Conclusions:
A greater degree of acculturation does not necessarily lead to a less healthful diet. The association of education level with diet may differ for migrant groups. Ethnicity was associated with differences in diet, suggesting that it should be considered in nutrition health promotion.
Introduction

In the last decades, western societies have experienced changes in dietary patterns with increases in the intake of saturated fat, refined carbohydrates and animal protein and decreases in the intake of fruit, vegetables and fibre, also known as the “Western” diet. These changes were accompanied by shifts in disease patterns whereby the diseases of affluence (cardiovascular disease, diabetes and obesity) have become more prevalent \(^1,2\). Consequently, public health efforts need to focus on improving population dietary intakes \(^3\).

Migrants are a growing segment of many western populations, including the Netherlands \(^4,5\). Dietary habits are strongly influenced by ethnicity, culture and place of birth and it has been observed that the diet of migrants and ethnic minority groups often differs from that of the host population \(^6-8\). The process of migration is likely to influence diet; the expectation is that migration to a western country is likely to lead to adoption of the “western” diet at the cost of the traditional (presumably healthier) diet, resulting in negative consequences for health. Considering the increasing proportions of migrants in Western populations, public health nutrition efforts need to account for these groups.

Two factors that influence dietary change among migrants are likely to be acculturation and education level. Insight into these factors is important to help identify groups at risk of unhealthy behaviour. Acculturation is defined as a ‘process of cultural changes as a result of contact with the dominant culture’ \(^9\). Factors such as length of exposure to the new environment and the extent of social contact with people of the host culture are likely to lead to dietary change \(^10-12\). In western countries higher education level is associated with improved diet quality including lower saturated fat and red meat intakes and higher fruit and vegetable intakes \(^13,14\). However the association of education level and diet quality among migrant groups is more variable. For instance, both positive and negative associations have been shown between education level and diet \(^11,15\).

Studies of the association of acculturation and education level with diet have focused on specific food groups and nutrients \(^12,15\). However, recently there has been interest in looking at the overall healthfulness of the diet \(^16\). Researchers have compiled a score or index to indicate either consistency with established nutrition guidelines or to categorise existing food combinations within a diet that may be associated with a particular disease risk \(^16-18\). Few researchers have used this approach in studying the differences in diet between ethnic groups \(^19\). As acculturation and education may have mixed associations with different aspects of the diet it may be useful to consider their influence on the quality of the diet in order to identify trends in overall dietary change.

This is a study of Surinamese residents of the Netherlands that aims to explore ethnic differences in diet with attention to the overall diet using a ‘diet quality indicator’ score. The determinants acculturation and education level will be explored with the aim of differentiating the group in order to provide insight for the development of interventions.
Methods

Survey Design
Data were obtained from the SUNSET study (acronym for: SUrinamese in the Netherland: Study on ETnicity and health). SUNSET is a cross-sectional study that aims to assess the cardiovascular risk profile of three ethnic groups in the Netherlands: Surinamese of South Asian and Afro-Caribbean origin and ethnic Dutch. It was based on a sample of 35-60 year old, non-institutionalized men and women, in Amsterdam South East, the Netherlands. A random sample of ca. 2000 persons of Surinamese origin and ca. 1000 persons of Dutch origin was drawn from the Amsterdam population register. In 2001-2003, people in this sample were approached for an interview. The interviewers were matched by ethnicity and sex. The questionnaire contained questions on (among others) the health status, cardiovascular risk factors such as diet, smoking and physical exercise, and background variables such as socio-economic status and migration history. The study was approved by the Institutional Review Board of the Academic Medical Centre of the University of Amsterdam.

The overall response to the interview was 59.9% (59.5% among the Surinamese, and 60.6% among the ethnic Dutch). Participation rates were higher among women than among men. In addition, participants in the interview were more likely than non-participants to be married and to be living with a partner and/or children, to have a higher age, to have a higher income, and to live in a less urban area (address density <2500 addresses/km²). However, differences between participants and non-participants in these characteristics were not significant and similar across ethnic groups (data not shown).

Assessment of Ethnicity
In the Netherlands the Surinamese is one of the largest migrant groups, representing approximately 20% of non-western migrants. In Amsterdam they comprise 10% of the total population (Research and Statistics Service, 2004). Suriname, a former Dutch colony, gained independence in 1975 and underwent political unrest in the 1980’s. Both events gave rise to migration. Approximately 80% of Surinamese residents of the Netherlands are either of South Asian or Afro-Caribbean origin (a mix of African, European and other groups); this paper focuses on these two Surinamese groups. The ethnicity of respondents was determined by the country of birth of the respondent and of his/her parents. Thus, subjects were considered to be ethnic Dutch if they and their parents were born in the Netherlands and to be Surinamese if they or their parents were born in Suriname. Surinamese respondents were further classified according to the place of birth of their ancestors: South Asian if they reported that their ancestors originated from India, Pakistan or Bangladesh; Afro-Caribbean if their ancestors originated from Africa/Europe or the Caribbean. In cases where parentage was mixed the ethnic origin of the mother was used.
**Measurement of Diet**

Diet was measured with 24 questions designed to elicit information about the usual frequency of intake of a number of food items that are of interest to public health nutrition and are relevant for common chronic diseases such as type 2 diabetes and cardiovascular diseases \(^{20-23}\). These included fruit, vegetables (not including potatoes), red meat and fish intake. Additionally we asked questions about the type of fat used in cooking, the use of salt and salty products in cooking and added at the table, and the consumption of breakfast. Frequency categories were based on weekly intake, for example, the categories for fruit and vegetables were: daily use; 5-6 days per week; 4 days per week or less; never. For fruit, participants were also asked how many pieces per day they consumed, a piece being equivalent to an average apple/banana or a handful of small fruit such as grapes.

The dietary items were dichotomised: 1 ‘favourable intake’ and 0 ‘unfavourable intake’ according to dietary recommendations. The scores on the seven dietary items were added together to form a “diet quality indicator score”, a continuous variable from 0 to 7 with higher scores indicating a higher overall diet quality. Table 1 indicates how intakes of the individual dietary items were measured and scored.

**Table 1: The Diet Quality Indicator Score**

<table>
<thead>
<tr>
<th>Component</th>
<th>Measures</th>
<th>Intake level for favourable intake</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
<td>Number of days per week fruit is eaten</td>
<td>Fulfils norm:</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Number of pieces of fruit eaten per day</td>
<td>Daily 2 pieces of fruit OR 1 piece of fruit and 1 glass of fruit juice * daily (juice only, no sugar added)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of days per week fruit juice is consumed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td>Number of days per week vegetables are eaten</td>
<td>Daily use of vegetables (not including potatoes)</td>
<td>1</td>
</tr>
<tr>
<td>Salt</td>
<td>Number of days per week that salt or salt rich products are added during cooking and at the table</td>
<td>“Low” Added Salt: Use of salt and salt rich products in cooking and at the table less than twice a week</td>
<td>1</td>
</tr>
<tr>
<td>Fish</td>
<td>Number of days per week fish is eaten as a meal or snack.</td>
<td>Eaten ≥1x per week</td>
<td>1</td>
</tr>
<tr>
<td>Red Meat</td>
<td>Number of days per week red meat is eaten as a meal or snack.</td>
<td>Eaten ≤2x per week</td>
<td>1</td>
</tr>
<tr>
<td>Breakfast</td>
<td>Number of days per week that breakfast is consumed.</td>
<td>Used ≥6x per week</td>
<td>1</td>
</tr>
<tr>
<td>Fat in cooking</td>
<td>Type of oil or fat used in cooking chicken, fish, meat and vegetables.</td>
<td>Mostly oil for cooking: Oil in preference to combination of oil and hard fats or only hard fats</td>
<td>1</td>
</tr>
</tbody>
</table>

* Maximum score 7

* Consistent with recommendation that 1 piece of fruit may be interchanged with 1 glass of fruit juice
A random selection of Surinamese respondents also completed a 24hr dietary recall (109 participants, response 64%) \(^{24}\). To get an impression of the validity of the questions on food consumption, we calculated average intakes (and standard error) as assessed with the 24hr recall for subgroups the sample according to the scores from the questionnaire (i.e. 1 or 0, as in table). The following results are presented for those with a favourable intake and those with an unfavourable intake respectively. For the fruit score, average intakes were 147g (28) and 60g (12); for the vegetables score, averages intakes were 142g (12.7) and 139g (18.2); for the fish score, averages intakes were 30g (7) and 21g (16); for the meat score, averages intakes were 95g (9) and 125g (18); and for the use of oil in cooking score, average polyunsaturated fat intakes were 9.3 (0.46) and 7.3 (0.88) percent of total energy intake. The intake assessed by the questionnaire was generally more favourable among participants that also had more favourable intakes as assessed by the 24hr recall.

**Assessment of Acculturation and Education Level**

Acculturation in the Surinamese group was assessed by number of residence years and age of arrival in the Netherlands. In addition we constructed a scale for social contacts with ethnic Dutch in the free time. This consisted of three questions: ‘Do you have contact with Dutch people in your free time?’; ‘Do you have more contact with Dutch or Surinamese in your free time?’ and ‘How many of your best friends are Dutch?’ (Factor analysis indicated high internal consistency, Cronbach’s =0.80). For analysis, the total score over the three questions (possible score per question was 1-3 giving a range of total scores of 3-9) was categorised into tertiles based on the scores of the Surinamese participants as a whole in order to denote individuals’ degree of acculturation (subjects in tertile 1 having the least social contact with ethnic Dutch).

We also formed tertiles based on distribution for the variables age of arrival (1≤16yrs old, 2=17-24yrs, 3≥25yrs) and number of resident years in the Netherlands (1≤17yrs, 2=18-26yrs, 3≥27yrs). Highest attained education level was divided into 4 categories: never been to school or elementary school only; lower vocational schooling and lower secondary schooling; intermediate vocational schooling and intermediate/higher secondary schooling (general); higher vocational schooling and university.

**Statistical Analyses**

For the present analyses we excluded all respondents who indicated that they were following a diet for diabetes, hypertension or hypercholesterolemia (52 subjects). As a result 1528 respondents remained. We analysed data using Statistical Package for Social Sciences version 11.5 (Chicago SPSS Inc, 2003). Analysis of covariance (ANCOVA) was used to obtain adjusted means and percentages. For the Diet quality indicator, the average score per group was calculated. For the individual items we calculated the percentage of respondents achieving a ‘favourable’ intake. The initial analysis considered ethnic differences in dietary intake stratified by sex. For the determinants acculturation and education level we calculated the p-values for trend using linear regression (diet quality indicator score as dependent variable) and logistic
regression (individual dietary items as dependent variable) by entering the acculturation variables or education level as continuous variables in the multivariate model.

**Results**

Table 2 summarises subject characteristics. The average age ranged from 43.3yrs (Afro-Caribbean women) to 47.7yrs (ethnic Dutch men). The Surinamese subjects were all first generation migrants. The average age at migration varied from 19.6yrs (South Asian men) to 23.5yrs (South Asian women) and the number of years since migration averaged 20.7yrs (South Asian women) to 23.6yrs (South Asian men). Education level was highest in the ethnic Dutch. Among South Asian the distribution into tertiles for social contact with ethnic Dutch was uneven with more clustering in tertiles one and two.

<table>
<thead>
<tr>
<th></th>
<th>South Asian</th>
<th>Afro-Caribbean</th>
<th>Ethnic Dutch</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (n=137)</td>
<td>Female (n=169)</td>
<td>Male (n=225)</td>
</tr>
<tr>
<td>Age, yrs (s.d.)</td>
<td>43.7 (6.5)</td>
<td>44.6 (6.4)</td>
<td>43.8 (6.3)</td>
</tr>
<tr>
<td>No. yrs since migration (s.d.)</td>
<td>23.6 (6.5)</td>
<td>20.7 (7.8)</td>
<td>22.7 (8.8)</td>
</tr>
<tr>
<td>Age in yrs at migration (s.d.)</td>
<td>19.6 (9.2)</td>
<td>23.5 (10.0)</td>
<td>20.9 (9.2)</td>
</tr>
<tr>
<td>Social contacts with Dutch in leisure time n (%)</td>
<td>69 (50.7)</td>
<td>89 (52.7)</td>
<td>53 (24.0)</td>
</tr>
<tr>
<td>Tertile 1 (score 3)</td>
<td>39 (28.7)</td>
<td>36 (21.3)</td>
<td>82 (37.1)</td>
</tr>
<tr>
<td>Tertile 2 (score 4-5)</td>
<td>28 (20.6)</td>
<td>44 (26.0)</td>
<td>86 (38.9)</td>
</tr>
<tr>
<td>Tertile 3 (score 6-9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education level, n (%)</td>
<td>42 (31.1)</td>
<td>68 (41.0)</td>
<td>118 (52.2)</td>
</tr>
<tr>
<td>1 (low)</td>
<td>55 (40.7)</td>
<td>34 (20.5)</td>
<td>53 (23.9)</td>
</tr>
<tr>
<td>2</td>
<td>25 (18.3)</td>
<td>78 (46.0)</td>
<td>110 (51.2)</td>
</tr>
<tr>
<td>3</td>
<td>12 (9.1)</td>
<td>16 (9.6)</td>
<td>37 (16.7)</td>
</tr>
</tbody>
</table>

Education level: 1= never been to school or primary school only; 2=lower vocational and lower secondary education; 3= intermediate vocational and intermediate/higher secondary education; 4=higher vocational education and university.

Table 3 shows the results of the ‘diet quality indicator’ score and the specific characteristics of the diet. There were significant differences in the diet quality between groups (p≤0.001 for ethnic differences in both men and women). Further, Surinamese ate vegetables more frequently than did ethnic Dutch subjects. Fruit intake was higher among Surinamese women but did not differ substantially by ethnicity amongst the men. Surinamese participants scored better on the type of fat used in cooking, low consumption of red meat and frequent intake of fish compared with ethnic Dutch. However, among the Dutch, women were more likely to eat breakfast daily and both men and women reported using less salt and salty products in
cooking and at the table. For most items Afro-Caribbean respondents took a middle position between the South Asian and the Dutch.

Number of years since migration and age at migration were not associated with the diet quality indicator score or individual dietary variables. For example, the diet quality indicator score in women varied from 4.46 to 4.49 (p-for trend=0.874) with increased residence duration and from 4.41 to 4.47 (p-for trend=0.726) with older age at time of migration. In men the score varied from 4.08 to 3.94 (p-for trend=0.493) with residence duration 3.89 to 4.00 (p-for trend=0.619) with older age at migration. No significant trends were observed for any of the

**Table 3: Ethnic Differences in Dietary Intake**

<table>
<thead>
<tr>
<th>Diet Quality Indicator Score (average)</th>
<th>Fruit (fulfils norm) (%)</th>
<th>Vegetables (daily use) (%)</th>
<th>Breakfast (≥6x per week) (%)</th>
<th>Mostly oil for cooking (%)</th>
<th>Red Meat ≤2x per week (%)</th>
<th>Fish ≥1x per week (%)</th>
<th>“Low” Added Salt (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Asian</td>
<td>4.83</td>
<td>51.7</td>
<td>80.4</td>
<td>70.0</td>
<td>89.7</td>
<td>79.2</td>
<td>84.7</td>
</tr>
<tr>
<td>Afro-Caribbean</td>
<td>4.36</td>
<td>48.4</td>
<td>62.2</td>
<td>58.8</td>
<td>75.1</td>
<td>63.6</td>
<td>68.4</td>
</tr>
<tr>
<td>Dutch</td>
<td>3.79</td>
<td>36.1</td>
<td>54.0</td>
<td>70.3</td>
<td>68.5</td>
<td>34.3</td>
<td>50.6</td>
</tr>
<tr>
<td>p-value</td>
<td>0.000</td>
<td>0.006</td>
<td>0.000</td>
<td>0.009</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Asian</td>
<td>4.20</td>
<td>40.4</td>
<td>61.2</td>
<td>56.1</td>
<td>89.0</td>
<td>73.1</td>
<td>76.6</td>
</tr>
<tr>
<td>Afro-Caribbean</td>
<td>3.92</td>
<td>28.6</td>
<td>59.6</td>
<td>52.4</td>
<td>73.7</td>
<td>53.4</td>
<td>72.7</td>
</tr>
<tr>
<td>Dutch</td>
<td>3.55</td>
<td>30.7</td>
<td>46.2</td>
<td>63.9</td>
<td>67.5</td>
<td>23.4</td>
<td>51.6</td>
</tr>
<tr>
<td>p-value</td>
<td>0.000</td>
<td>0.111</td>
<td>0.014</td>
<td>0.081</td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Diet Quality Indicator: average score. Individual items: percentage of subjects achieving score. Adjusted for age, marital status, education level

**Table 4: Social contact with ethnic Dutch in free time and diet in Surinamese**

<table>
<thead>
<tr>
<th>Social Contact with ethnic Dutch In free time</th>
<th>Diet Quality Indicator Score (average)</th>
<th>Fruit (fulfils norm) (%)</th>
<th>Vegetables (daily use) (%)</th>
<th>Breakfast (≥6x per week) (%)</th>
<th>Mostly oil for cooking (%)</th>
<th>Red Meat ≤2x per week (%)</th>
<th>Fish ≥1x per week (%)</th>
<th>“Low” Added Salt (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surinamese women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score 3 (low)</td>
<td>4.51</td>
<td>37.5</td>
<td>62.6</td>
<td>57.5</td>
<td>89.2</td>
<td>75.3</td>
<td>73.4</td>
<td>54.2</td>
</tr>
<tr>
<td>score 4-5</td>
<td>4.18</td>
<td>47.7</td>
<td>63.0</td>
<td>62.9</td>
<td>74.7</td>
<td>59.3</td>
<td>68.9</td>
<td>49.0</td>
</tr>
<tr>
<td>score 6-9 (high)</td>
<td>4.68</td>
<td>49.4</td>
<td>71.6</td>
<td>59.3</td>
<td>74.4</td>
<td>70.4</td>
<td>78.4</td>
<td>65.0</td>
</tr>
<tr>
<td>p-for trend</td>
<td>0.048</td>
<td>0.043</td>
<td>0.093</td>
<td>0.713</td>
<td>0.001</td>
<td>0.833</td>
<td>0.068</td>
<td>0.017</td>
</tr>
<tr>
<td><strong>Surinamese Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score 3 (low)</td>
<td>3.91</td>
<td>27.5</td>
<td>54.1</td>
<td>58.1</td>
<td>86.1</td>
<td>59.1</td>
<td>70.0</td>
<td>34.3</td>
</tr>
<tr>
<td>score 4-5</td>
<td>4.22</td>
<td>36.3</td>
<td>57.9</td>
<td>51.6</td>
<td>83.9</td>
<td>59.5</td>
<td>74.1</td>
<td>48.4</td>
</tr>
<tr>
<td>score 6-9 (high)</td>
<td>3.78</td>
<td>30.5</td>
<td>58.0</td>
<td>47.4</td>
<td>75.0</td>
<td>54.4</td>
<td>76.0</td>
<td>35.9</td>
</tr>
<tr>
<td>p-for trend</td>
<td>0.502</td>
<td>0.305</td>
<td>0.426</td>
<td>0.125</td>
<td>0.020</td>
<td>0.161</td>
<td>0.542</td>
<td>0.698</td>
</tr>
</tbody>
</table>

Diet Quality Indicator: average score. Individual items: percentage of subjects in category. Adjusted for age, marital status, and ethnicity.
individual dietary items. Table 4 shows the association between diet and social contact with ethnic Dutch among Surinamese participants. In women having more social contacts with ethnic Dutch was associated with higher fruit consumption and adding less salt to cooking. In both men and women, having more social contacts with ethnic Dutch was associated with less use of oil in cooking.

Table 5 shows the association between education level and diet. In Dutch men and women higher education level was associated with a higher diet quality indicator score and with more frequent fruit and vegetable intake, lower red meat consumption, greater use of vegetable oils in cooking amongst women and breakfast use amongst men. For the Surinamese groups the associations were more variable. Higher education level was associated with higher diet quality indicator scores and more frequent vegetable intake in Afro-Caribbean men as well as with higher fruit intakes in women. South Asian men and women of higher education level used oil less frequently (and other sources of fat more frequently) in cooking compared to their lower educated fellow migrants.

Discussion

We examined ethnic differences in diet with specific attention for the role of a number of measures of acculturation and education level in a population-based study of 1528 men and women of Surinamese Afro-Caribbean and South Asian and ethnic Dutch origin. As compared with ethnic Dutch participants, Surinamese respondents scored higher on overall diet quality, consumed fruit, vegetables and fish and used oil for cooking more frequently and consumed red meat less frequently. Among the Surinamese, residence duration and age at migration were not associated with diet. Having more social contact with ethnic Dutch was associated with less frequent use of oil in cooking but also with higher fruit consumption and adding salt less frequently in women. A higher education level was strongly associated with a higher diet quality indicator score in the ethnic Dutch, but not in the Surinamese.

Surinamese living in the Netherlands have an increased risk of a number of diet related disorders, particularly obesity, diabetes type II, hypertension and cardiovascular diseases. This is consistent with results of studies amongst similar groups in the UK and the US (Black Africans and Asian-Indians) and with evidence among migrant groups in general, underlining the importance of paying particular attention to the diet of migrants in order to guide the development of health promotion activities.

Our observation of substantial ethnic differences in diet is consistent with the results of another Dutch study that included participants of Surinamese origin. That study indicated that macronutrient intakes, particularly saturated fat intake of Surinamese residents was more in line with guidelines as compared with the ethnic Dutch. In studies in other countries a more favourable fat intake was also observed for comparable groups originating from the Caribbean or the Indian sub-continent as compared with the host population. Nutrient intakes have often been the focus of studies that have compared the diet of different ethnic
groups. Because people choose foods rather than nutrients, information on food groups and dietary patterns are of interest for public health promotion. For migrant groups, focusing on positive aspects of the diet and promoting their maintenance is an important aspect of health promotion programmes. However, it is also important not to ignore aspects of the diet that are less optimal, even if intakes are more favourable than in the host population. In the case of our study group, fruit and vegetable intake were lower than recommended. Additionally, breakfast use and salt intake require attention. Meal pattern has been associated with a risk of obesity and fruit and vegetable and salt intake can affect risk of cardiovascular diseases. Within the context of the disease risks of Surinamese the less favourable aspects of the diet warrant attention.

We found no associations between acculturation measured as the number of years of residence or age at migration and diet. In contrast, residence duration was associated with changes that are consistent with a westernisation of the diet in several earlier studies. Acculturation as measured by social contact with ethnic Dutch was associated with several aspects of the diet, particularly in Surinamese women. The associations with use of oil in cooking and added salt are in line with convergence to the diet of the host population, but the association with higher fruit consumption was unexpected. The latter might reflect a greater awareness of public health messages. For several aspects of the diet associations with social contact in this study were weak or inconsistent. Other studies that have used a variety of methods to measure acculturation have observed similar inconsistencies. This indicates that the association between acculturation and diet is complex and will not

| Table 5: Education level and Diet  
Diet Quality Indicator |
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Score (average)</td>
</tr>
<tr>
<td>Fruit (fulfils norm)</td>
</tr>
<tr>
<td>Vegetables (daily use)</td>
</tr>
<tr>
<td>Breakfast (≥6x per week)</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
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<th>2</th>
<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td>Women</td>
<td></td>
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</tr>
<tr>
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<tr>
<td>20.55</td>
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</tr>
<tr>
<td>p-for trend</td>
<td>0.519</td>
<td>0.585</td>
<td>0.000</td>
<td>0.047</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Men</th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
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<tr>
<td>20.55</td>
<td></td>
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<tr>
<td>20.55</td>
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<tr>
<td>p-for trend</td>
<td>0.08</td>
<td>0.87</td>
<td>0.004</td>
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</tr>
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</table>

S.A. South Asian, A-C Afro-Caribbean. Diet Quality Indicator: average score. Individual items: percentage of subjects achieving score. Adjusted for age, marital status, Education level: 1= never been to school or primary school only; 2=lower vocational and lower secondary education; 3= intermediate vocational and intermediate/higher secondary education; 4=higher vocational education and university.

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necessarily lead to either a deterioration of the diet or to a convergence of eating patterns to that of the host population.

In ethnic Dutch higher education level was associated with a higher diet quality. This finding agrees with that of previous research in western populations \(^{13,14,38}\). In Surinamese participants education level was not clearly associated with a higher overall diet quality. The observation of both positive and negative associations between education level and the dietary factors in migrant groups agrees with the findings of others \(^{11,15}\). Education level does not appear to be a differentiating factor that can enable targeting migrant populations. This emphasises the need for health promotion to encourage the maintenance of positive aspects of the diet in both low and high educated migrant groups.

Advantages of our study were the population-based design and the availability of data on education, ethnicity, several measures of acculturation, and diet. The study also had potential limitations. Firstly, our dietary questionnaire assessed consumption of only a limited number of food items. However, we did not aim to link specific aspects of diet to disease outcomes or to examine the intake of various nutrients. Rather our focus was on comparing the different ethnic groups. In addition we were interested in components of the diet that are currently considered relevant for health promotion and the combination of these items to form an indicator of overall diet quality with regard to risk of common chronic diseases \(^{20-23}\). Secondly, the questions used to measure habitual food intake were compared with the outcomes of a single 24 hour recall among a sub-group of Surinamese participants (see methods). There was some agreement in outcomes between the two methods used and the associations

<table>
<thead>
<tr>
<th>Mostly oil for cooking (%)</th>
<th>Red Meat ≤2x per week (%)</th>
<th>Fish ≥1x per week (%)</th>
<th>“Low” Added Salt (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S.A. A-C Dutch</td>
<td>S.A. A-C Dutch</td>
<td>S.A. A-C Dutch</td>
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<tr>
<td></td>
<td></td>
<td>S.A. A-C Dutch</td>
<td>S.A. A-C Dutch</td>
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<td></td>
<td></td>
<td>S.A. A-C Dutch</td>
<td>S.A. A-C Dutch</td>
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<tr>
<td></td>
<td></td>
<td>S.A. A-C Dutch</td>
<td>S.A. A-C Dutch</td>
</tr>
<tr>
<td>94.4</td>
<td>78.8</td>
<td>44.1</td>
<td>92.8</td>
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<td>89.8</td>
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<td>75.2</td>
<td>75.4</td>
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<tr>
<td>93.7</td>
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<td>68.7</td>
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<tr>
<td>92.2</td>
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<td>58.9</td>
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<td>66.9</td>
<td>66.9</td>
<td>62.6</td>
<td>76.9</td>
</tr>
<tr>
<td>0.016</td>
<td>0.139</td>
<td>0.164</td>
<td>0.376</td>
</tr>
</tbody>
</table>
between ethnicity and diet found by this study are consistent with the findings of others. Furthermore, the outcomes of the 24 hour recall generally agreed with the current findings: fish consumption and intake of polyunsaturated fat was higher and intake of saturated fat was lower for the Surinamese compared with the general Dutch population. Although no clear differences in fruit consumption were observed, consumption of vegetables was higher in South Asian as compared with Afro-Caribbean and the ethnic Dutch. Thirdly, the concept of acculturation is not straightforward; it is limited by the definition of culture and the measures used to detect the process of cultural change. Commonly used measures such as residence duration, age at migration or generation level do not capture the complexity of the issue. Our study included a measure of the degree of social interaction with ethnic Dutch people; as food often plays an important role in social interactions this is an appropriate indicator when studying the association between acculturation and diet. Finally, it could be argued that the inconsistent associations between the indicators of acculturation studied and diet observed may be due to the nature of the history of the studied population: the process of westernisation of the diet may have been initiated prior to migration. However, the clear differences in the diet of Surinamese as compared to the ethnic Dutch do not support this view.

Our findings indicate that greater degree of acculturation in western countries does not necessarily lead to a less healthful diet. In addition, education level among migrant groups may have different associations with diet than in the host population. Ethnicity was associated with clear differences in diet, despite long duration of residence. This suggests that ethnicity should be considered in the development of nutrition health promotion activities.
References


Cultural and Social Influences on Food Consumption in Dutch Residents of Turkish and Moroccan Origin:
A Qualitative Study

M. Nicolaou
C.M. Doak
R.M. van Dam
J. Brug
K. Stronks
J.C. Seidell

Journal of Nutrition Education and Behaviour, in press
Abstract

Background
This study aimed to explore the social and cultural influences on food intake in two non-western migrant origin groups. We were particularly interested in the influence of the traditional culture and its relevance within the context of migration and associated changes in social, economic and cultural context, including acculturation.

Methods
Focus group discussions among young adults of Turkish and Moroccan migrant origin were held in Amsterdam, the Netherlands during June to November 2005. We included both men and women in groups that were separated on the basis of sex and ethnicity. The focus groups were recorded, transcribed and analyzed using framework analysis.

Results
A dominant theme that emerged is that of hospitality and the central role of food herein. Hospitality is rooted within the cultural and religious tradition of both groups. Additional themes that emerged were: cultural identity; migration and lifestyle change; and acculturation.

Conclusions
Among Dutch residents of Turkish and Moroccan migrant origin, the central role of food in culture coupled with the changes that come about as a result of migration create an environment of abundance that can lead to overeating, which may impact on energy balance and overweight development. Our results indicate that younger members of migrant origin populations continue to value their traditional food cultures underpinning the need for interventions to be culturally sensitive.
Introduction

Many migrant groups of non-western origin living in Western societies have high levels of overweight and obesity 1-4. This is likely to be a result of health behaviours, including diet and physical activity 2. As these groups form an increasingly important part of many western societies (including the Netherlands) it is necessary to consider them in the development of intervention strategies aimed at improving diet, increasing physical activity and preventing overweight.

However, many interventions do not succeed in recruiting or retaining migrant origin or ethnic minority groups 5-9. Although it is generally accepted that culture has an influence on health behaviours including diet 10-12, interventions may be poorly adapted to the cultural context that drives health behaviour 13, which may partly explain this phenomenon. Therefore, interventions need to be sensitive to culture, ideally by incorporating ethnic/cultural characteristics, experiences, norms, values, behavioural patterns and beliefs of a target population as well as relevant historical, environmental and social forces in their design, delivery and evaluation 14.

While culture may have an influence on health related behaviour, it is also important to recognize that culture is not a static concept. In the case of migrants, the process of acculturation, which “comprehends those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact with subsequent changes in the original culture patterns of either or both groups” 15 may have an impact on health behaviour and ultimately the place of culture in interventions. Numerous studies have shown that acculturation influences the diet of migrant origin groups 16-20. However, there is little explicit discussion in the literature on whether culturally sensitive interventions continue to be necessary for migrants that are acculturated to their host environment, or for younger members of migrant communities that are likely to have been born in the host country. Additionally, although it has been shown that the foods eaten may change with acculturation; we found no studies that considered whether this is also the case for the beliefs governing the eating habits of migrants or ethnic minority groups. This information is necessary for the development of interventions targeting migrant origin groups, more importantly it is relevant for making decisions regarding the need for culturally sensitive approaches when targeting younger or more acculturated members of these groups.

Two of the largest non-western migrant groups in Western European countries are of Turkish origin (the Netherlands, Germany, Sweden, UK) and of Moroccan origin (the Netherlands, Belgium, France, Spain). In these countries, migration from Turkey and Morocco was encouraged in the 1970’s in order to fill labour shortages, since that time further migration has occurred due to family reunification and formation. In the Netherlands many reside in the larger cities; in Amsterdam, Turkish and Moroccan individuals of migrant origin represent 5% and 9% of the total population respectively 21.

Data on the socio-cultural factors that influence the dietary behaviours of migrant origin groups with traditional eating cultures that differ from the host culture in the Netherlands are
sparse. We therefore conducted a qualitative study using focus groups to explore the social and cultural influences on food intake of Turkish and Moroccan origin residents of Amsterdam aged 20-40 years. Specifically, we aimed to elucidate the influence of the traditional culture and its relevance within the context of migration and acculturation. Our study included younger potentially more acculturated, members of these groups to facilitate the evaluation of acculturation on dietary behaviours.

Methods

Research Design

Focus group discussions were conducted from June to November 2005 in the city of Amsterdam, the Netherlands. Focus groups were considered appropriate as the topic, food intake within the social and cultural context lends itself to this methodology; interaction between participants may facilitate individuals’ ability to explain or account for their attitudes. As cultural/religious characteristics of our target group may discourage male and female interaction in the public sphere, we planned separate focus groups amongst men and women. Furthermore, we conducted separate focus groups for participants of Turkish and Moroccan origin. Lastly we attempted to include the perspective of younger migrants (in the age range of 20 to 40 years) in order to consider how acculturation may impact food intake.

The study was designed with reference to the research code for qualitative research of the Academic Medical Centre, University of Amsterdam. In line with Dutch legislation, the study was approved by the Netherlands Organization for Health Research and Development and judged to need no further review by a medical ethics committee as participants were recruited on a volunteer basis and were not required to undergo physical examination.

Participants

Participants were invited to take part in focus groups at locations where they would normally meet such as community centres and mosques (convenience sampling). A female member of the research team personally approached several organizations and invited them to participate in our study. A key figure within the interested organizations was identified, this person served as contact point for the planning of the focus groups. We were not successful in establishing contact with male-oriented organizations and therefore we engaged an external bureau specialized in intercultural communication and training for this task. They used their existing network of contacts for the recruitment of male participants. The key figures further advised us regarding the recruitment of participants within their specific context. This resulted in scheduled sessions that took place during times that people would normally be visiting a particular location. Leading up to the date of the focus groups we distributed leaflets announcing the study. Individuals were also approached personally by workers of the participating organizations.
Once participants were gathered they were informed of the general aims of the study. We explained that the focus groups would be recorded and that recordings would be transcribed, anonymity in the transcripts and reporting was assured. Participants were asked to give their consent verbally and were given the opportunity to discontinue participation, no participants refused to continue at that point. At the end of the focus group a brief, anonymous questionnaire that included questions on demographics, migration history, and education level was completed. Participants and local contact persons received a gift voucher to the value of 10 euros.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of focus groups</th>
<th>Location</th>
<th>Number of participants</th>
<th>Mean age (range)</th>
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</thead>
<tbody>
<tr>
<td>Moroccan men</td>
<td>3</td>
<td>Youth Centre</td>
<td>5</td>
<td>22 (20-25)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td>24 (18-31)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>24 (18-31)</td>
</tr>
<tr>
<td>Turkish men</td>
<td>2</td>
<td>Mosque</td>
<td>6</td>
<td>23 (18-31)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>20 (18-23)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Youth Centre</td>
<td>5</td>
<td>26 (23-30)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Home of participant</td>
<td>6</td>
<td>27 (24-30)</td>
</tr>
<tr>
<td>Moroccan women</td>
<td>1</td>
<td>Mother-child Centre</td>
<td>4</td>
<td>34 (27-44)</td>
</tr>
<tr>
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<td>Women’s centre 8</td>
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<td></td>
<td></td>
<td>4</td>
<td>42 (28-55)</td>
</tr>
<tr>
<td>Turkish women</td>
<td>1</td>
<td>Mother-child Centre</td>
<td>6</td>
<td>33 (28-36)</td>
</tr>
<tr>
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<td>Women’s centre 9</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Home of participant</td>
<td>5</td>
<td>25 (21-30)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mosque</td>
<td>8</td>
<td>32 (28-35)</td>
</tr>
</tbody>
</table>

Mother-child centre: locations where primarily activities related to mothering are carried out.
Women’s centre: locations where the focus is the personal development of women.
* Questionnaires were not filled in at this location.

Table one shows the locations where participants were recruited, number of focus groups and number of participants per group. The locations used were spread out over the city of Amsterdam.

**Theoretical Framework and Interview Instrument**

The underlying aim of this study was to generate information that could be used for intervention development. We used a theoretical framework to guide our exploration of the topic; the theory of triadic influence. This is a unified social-ecological theoretical framework which combines many constructs from other theories of health-related behaviours (HRBs). Briefly, the theory postulates that there are three main streams of influence on HRBs:

- **Intrapersonal influences:** biology and personality – self-efficacy
- **Attitudinal influences:** the cultural environment – attitudes
- **Social influences:** the social context – social normative beliefs
Each stream begins with the ‘ultimate’ causes, factors in which behaviour is rooted, i.e. biology and personality, the culture environment and the social context. As our study was explorative of nature and interested in the influences on behaviour of a group as a whole we focused on the tier of the theory that represents the ‘ultimate’ causes in planning the topic list, and then specifically on the cultural and social environments. In addition we added questions that specifically related to migration and acculturation. The topic list was developed as follows:

1. A literature search to identify potentially relevant issues for non-western groups.
2. We added to the themes identified in the literature using insights gained from informal discussions with target group members, health professionals or other researchers.
3. We developed a number of relevant questions using our theoretical framework; these were discussed and refined by the research team.
4. The topic guide was subsequently tested with members of the target groups to ensure congruence of topics and appropriateness of language used.

**Moderation and Transcription of Focus Groups**

The focus group moderators were matched for sex and ethnicity with the target group, i.e. Moroccan men were interviewed by a Moroccan man etc. We worked with four experienced moderators recruited via the same bureau used to facilitate contact with participants. MN trained the moderators on the topic of interest and the topic guide. In addition to this initial training, MN and a research assistant observed all the focus groups with women and provided feedback to the moderators for the improvement of their techniques. In the case of the male groups it was felt that the presence of a female observer would be obtrusive, therefore MN observed parts of some focus groups. The transcripts were used to pinpoint areas of improvement in the way the focus groups were moderated. This process led us to adapt the topic list for Turkish origin men; we used propositions to stimulate discussion, for example “you have to serve plenty of food to your guests, otherwise they will gossip about you.”

The focus groups were conducted in the language of preference of the participants and recorded onto mini disc. Subsequently, they were simultaneously translated into Dutch and (verbatim) transcribed by the discussion moderators themselves. The Dutch transcripts were checked for completeness and accuracy by native Turkish and Moroccan speakers who were also fluent in Dutch.

**Analysis**

The full transcripts were entered into a computer software program, MAXQDA for the analysis. This program facilitates the assignment of codes and themes to text fragments. We used the framework approach in our analysis. An initial code system based on the theory of triadic influence was developed, under the broad headings attitudinal (cultural) influences and social (context) influences. Two of the researchers (MN and CD) independently coded one of the focus group transcripts. We each added additional codes to cover the themes that
emerged during the analysis. We subsequently compared our coding of that transcript and the emergent themes that we had each identified. Differences were discussed and the coding system was adjusted. The remaining transcripts were primarily analyzed by MN and checked by CD.

Validity
The general themes identified by the analysis were presented to some of the focus group participants as well as to health professionals and researchers that have experience with our target groups for comment and verification. Due to the low representation of higher educated Moroccan women in the focus groups we held a supplementary discussion with three female Moroccan university students. The aim was to establish whether the main themes that arose from the focus groups with the Moroccan women are also relevant for them.

The quotes used in presenting the results were translated from Dutch into English by MN. The origin of each quote is denoted by using ‘T’ for Turkish, ‘M’ for Moroccan, followed by a small ‘w’ for women or ‘m’ for men. Fragments of focus groups are indicated by the use of letters (A, B, C etc.) at the beginning of a citation, with the letters denoting different participants.

Results
Table 2 shows the general characteristics of our participants. Noteworthy is that the Moroccan men were younger, more often born in the Netherlands, unmarried and still studying compared to the other groups. Of the women, a large number had little or no formal education, and the average age is older. This reflects our recruitment strategy, i.e. we used the context of existing groups which meant we were dependent on the willingness of community organizations to participate in the study for the recruitment of participants. A number of focus groups were held at women’s centres which are more often used by lower educated, non-working women and at mother-and-child centres that are attended by slightly older women with children. As our study includes a mixture of individuals born in their country of origin and those born in the Netherlands, references to ‘migrants’ or ‘migrant origin’ individuals in the manuscript includes the groups as a whole.

The focus groups generated extensive discussion of the interaction between food and culture and its relevance for the Turkish and Moroccan communities. A dominant theme that emerged is that of hospitality; its roots within the cultural tradition and its place within the groups’ shared religion, Islam. Interwoven with this was discussion of issues that related to migration and acculturation. We found a great deal of overlap between the cultural and social influences on food intake when we conducted our analysis. Therefore we chose not to present the results according to the ultimate determinants as described by the Theory of Triadic Influence but according the main themes that emerged: tradition of hospitality; religion; hospitality in the migrant context; migration and lifestyle change; ethnic identity; acculturation.
Tradition of Hospitality

Participants argued that Turkish and Moroccan cultures are characterized by a tradition of hospitality within which food plays a central role.

“You know what it is? Food is hospitality, it means your guest is welcome, that’s how it should be and that’s what we do” Mw.

During the interviews it was expressed that guests are welcome at any time and will always be offered food. Guests themselves anticipate that they will be served a variety of different foods while hosts expect that their guests will indulge. Not meeting these expectations leads to dissatisfaction from both sides.

“I don’t like it when people don’t eat what I’ve prepared for them…The same counts for me, if I’m going to visit someone then I try not to eat too much beforehand, I eat there so that the hostess can see that I appreciate her food.” Tw

It was suggested that given the relevance of food as an expression of hospitality, it is customary to prepare an abundance and variety of foods to emphasize the value placed on the visitor. It is customary in both Turkish and Moroccan cultures for the host to insist that their guests eat. Moroccan participants reported that it is even expected that guests will initially refuse food; etiquette allows guests to refuse up to three times before giving in to the host’s pressure. This negotiation between host and guest emphasizes their mutual respect. Our participants mentioned that it is considered impolite to refuse food, it may be considered to be an insult to the cooking skills of the hostess and may even create the impression that

Table 2: participant characteristics

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Moroccan (n=14)</td>
<td>Turkish (n=21)</td>
</tr>
<tr>
<td>Average age, yrs (SD), range (yrs)</td>
<td>23.3 (3.6)</td>
<td>24.3 (4.2)</td>
</tr>
<tr>
<td></td>
<td>(18-31)</td>
<td>(18-31)</td>
</tr>
<tr>
<td>Birth place, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkey or Morocco</td>
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<td>12 (57)</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>13 (93)</td>
<td>9 (43)</td>
</tr>
<tr>
<td>Years of residence in the Netherlands * yrs (SD), range (yrs)</td>
<td>25</td>
<td>11 (7.9)</td>
</tr>
<tr>
<td></td>
<td>(1-26)</td>
<td>(1-29)</td>
</tr>
<tr>
<td>Married, n (%)</td>
<td>0</td>
<td>9 (43)</td>
</tr>
<tr>
<td>Has children, n (%)</td>
<td>0</td>
<td>6 (29)</td>
</tr>
<tr>
<td>Work status, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paid work</td>
<td>5 (36)</td>
<td>13 (62)</td>
</tr>
<tr>
<td>Student</td>
<td>9 (64)</td>
<td>7 (33)</td>
</tr>
<tr>
<td>Unemployed or housewife</td>
<td>0</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None or elementary school only</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>High school level or higher</td>
<td>14 (100)</td>
<td>21 (100)</td>
</tr>
</tbody>
</table>

* This number represents only those born in their country of origin.
the guests considers themselves to be above the hospitality being offered. There are few ‘legitimate’ reasons to limit food intake, dieting for anything other than a medical condition such as diabetes or heart disease is not taken seriously.

Moderator: “What happens if someone is following a diet? Is it then acceptable to refuse food?

A: If it’s for their health then of course that’s no problem but if it’s only because they’re concerned about their appearance then that person should just forget it and eat.

B: most of the people that diet for health are above 50 or 60 (years of age), for everyone else it’s just a question of appearance.

A: Mostly you should just forget your diet when visiting people; you’re there for the company and the food.” Tm

“People don’t support you if you want to diet, they always say, just this once…” Mw

Women in particular talked about the fact that social occasions where food is served can be frequent. This is especially so among non-working women who formed a large proportion of our participants, amongst this group it common to meet each other during the day. Food is an important component in these daily interactions and may contain a competitive element.

“It’s not unusual with us that if the one time ‘A’ serves 4 or 5 items with the tea that the next time we get together ‘B’ might serve 5 or 6 items.” Tw

The abundance of food at social occasions creates a challenge for individuals that wish to control their food intake.

A: “If I see a cake I can’t just leave it. I shouldn’t but I eat cake and cookies.

B: At that moment you’re not even aware that you’re overeating.” Mw

Religion

Participants emphasized that the importance placed on hospitality within the Turkish and Moroccan cultures is inextricably tied with its value within their shared religion, Islam.

“Visitors are very important, according to our religion. Hospitality is rewarded… Visitors bring blessings with them, we believe in that, it is part of our religion” Tw.

This appears to reinforce the culture of hospitality and is seen as justification for the traditions mentioned in the previous section. In addition to valuing hospitality, Islam teaches temperance, an issue that was widely discussed by the focus groups. Two relevant concepts were raised: food should not be wasted and individuals should avoid over-indulgence. Moroccan participants mentioned the idea that there should be one third air, one third water and one third food in the stomach once a meal is finished. The same theme was also raised by the Turkish participants although it was expressed differently. Turkish groups discussed the importance of temperance within Islam and how this promotes caring for one’s health. The majority of the participants agreed that this was an important teaching within their religion but mentioned that in contrast to the laws governing food choice (i.e. eating halal foods) this is experienced as being less compulsory.

“It’s difficult to combine the ideal of moderation with a culture where food is so central” Mm
Hospitality and the Migrant Context
During the focus groups there was some discussion about the economic aspects of hospitality. Turkish participants discussed the point that preparing and serving numerous and ‘special’ dishes was possible due to their better economic circumstances in the Netherlands. In contrast to people still living in Turkey, who were perceived as having fewer financial resources. Among Moroccans there was considerable discussion over the ‘problem’ of entertaining. Participants reported that it is not uncommon for people to borrow large amounts of money in order to throw lavish parties. Some participants discussed how this was becoming increasingly the case among the second generation of whom it is expected that they will attain higher social status.

Traditionally, guests arrive unexpectedly, an issue that was extensively discussed by the female focus groups. On a daily basis, extra food is prepared at meal times to cover the eventuality of unexpected visitors. The practical consequence is that often there are leftovers to be dealt with. Focus group respondents reported that in Turkey and Morocco food wastage does not present problems; giving leftover food to the poor is encouraged and ‘rewarded’ by their religion and it also is a convenient way to avoid food waste. It is also customary to share foods that you cook with neighbours.

“…the smell of your cooking might whet their appetite…” Tw

Within the context of life in the Netherlands however, leftovers present a dilemma. Our female participants expressed a perception of few needy recipients for food in the Netherlands. In addition, many of the women talked about being uncomfortable offering food to their Dutch neighbours. They feared that their neighbours may not understand their giving food or that the food itself may not be acceptable to the Dutch palate. If suitable, leftovers may be kept for another meal. This practice is not popular among other family members, particularly older and more traditional family members who expect fresh food at each meal. However, wasting food by throwing it away is discouraged by Islam. Some women mentioned that they ate leftovers at the end of the day in order to avoid throwing food away. This issue was not experienced as a dilemma by all participants, many talked about freezing leftovers for another occasion, and others mentioned that although not desirable, throwing food away was becoming increasingly acceptable to them.

Migration and Lifestyle Change
Differences in lifestyle between the home country and the Netherlands were widely discussed. In Turkey and Morocco the working day is divided into two with a long midday pause during which those who can, may go home for a hot meal. The evening meal is also hot and generally eaten late (8pm or later). Life in the Netherlands, on the other hand has a different rhythm; lunch breaks are short so family members will eat a quick lunch at their workplace, the working day ends sooner and so evening meals are generally eaten earlier. Family members may have activities after school or engage in shift work, both of which interfere with meal times. Participants perceived the pace of life and timing of meals in their home country to
be healthier whereas their lifestyle in the Netherlands was experienced as being problematic, contributing to irregular eating patterns and frequent snacking.

“In Morocco people eat on time, here we can’t do that, the kids are at school, husband at work…our lives are different, we’re busy…our heads are full of other things.” Mw

Some women reported eating two evening meals; with the children at the usual Dutch dinner time (around 6pm) and a second meal with their husband, usually eaten much later depending on his work schedule.

“I eat with my children, but when my husband comes home I eat with him as well, it’s not nice for him to have to eat alone” Tw

Among Turkish women there was discussion about skipping breakfast, with many participants, mentioning that they did this in order to compensate for eating late at night. In general, many participants believed that their lifestyles contrast significantly to those of Dutch people, who are perceived as having a very regular meal pattern.

Identity

Participants talked about the importance they place on the flavour of food and the spices and ingredients that are typically used in their respective cuisines. Particular foods and dishes were named to illustrate their relevance to identity and a sense of being connected to the country of origin.

“Where ever in the world we go, we take our food with us. No Turk could resist a dish of kurufasulye (dried bean dish).” Tm

A: “My father always brings 50-60 litres of olive oil back from Morocco each year, and sugar, onions, all the things he likes and that taste different here….he wants the authentic flavour. B: I bring olive oil with me every year. In my village they have the most delicious olive oil” Mm

Participants discussed the fact that the culture associated with food, particularly the importance placed on food as an expression of hospitality as being something that is typical of their respective group. This point was often illustrated by the participants by contrasting their own approach to hospitality to that of the Dutch. The following citations, a fragment from a discussion amongst Turkish women and a quote from a Moroccan man exemplify the general feelings on this subject.

A: “Maybe it sounds strange but we don’t want to become like the Dutch. With us, anyone can come anytime they wish; we will always serve them food. B: My Dutch language teacher told me: “everyone may have one cookie, and then the cookie tin lid goes back on” With us everything just stays out on the table. C: If a Dutch person comes to visit they only take one cookie and will not help themselves to more unless you invite them to do so. D: I don’t want to become like that. E: I would even think: What’s their cookie worth? I just wouldn’t eat at all” Tw

“Everyone knows the story, you go to visit a Dutch family at dinner time and you get a cup of coffee until they finish eating. With us Moroccans, you just join in.” Mm
Acculturation
Among male and female Moroccan participants there was extensive discussion about the differences between generations in food preferences. The picture that emerged among the Moroccan participants is that they generally prepare dishes from different cuisines, albeit with addition of their favourite traditional spices. Younger Moroccans seem less willing to eat traditional dishes on a daily basis and expect more variety in the types of food they are served at home. Interestingly, the majority of participants named a Moroccan dish when asked to talk about their favourite food; this was one of the questions designed to get the focus groups going. Adults, particularly of the first generation, have a strong preference for traditional foods, prepared in a traditional way. On a daily basis therefore, a variety of foods may be prepared to account for different tastes, traditional dishes for the adults and western foods (fries, lasagne etc) for the children.

“My children don’t like traditional foods. If I prepare these foods they just go out to the snack bar or they order pizza…my daughter sometimes calls from work to ask what’s for dinner. If it’s something she likes then she’ll come home” Mw

Moroccan children will take supplies of typically Dutch products such as peanut butter to Morocco with them for the summer vacation. Despite this, Moroccan participants of all ages emphasized the importance of food as an expression of hospitality. This is something that parents instil in their children.

“A couple of days ago I had some friends to visit, my mother happened to call and I told her I had visitors. She immediately asked me what I had served for them. You learn that from your parents.” Mm

Although many of the younger participants talked of having simpler expectations when just visiting friends they also talked about how they anticipated their own behaviour to change as they grew older and had their own household.

“...at a certain moment you get married and have your own house and then you just expect something like that...you end up living in the way you’re accustomed.” Mm

The issue of differing tastes between the generations appeared less problematic among the Turkish groups. The preferences of younger children’s do differ; like Moroccan children they prefer fries, hamburgers, pizza etc. Therefore, there is adjustment made to suit them but often the alternatives that are offered are from within the Turkish cuisine. The female participants emphasized that the types and quantities of foods prepared are strongly determined by what is learned from the previous generation.

“We make what we learned from our mothers, taste doesn’t change” Tw.

Some of the participants expressed the opinion that Turks living in Turkey are more experimental with food than those living in the Netherlands. The continuing importance of tradition and upbringing with regard to hospitality and food received less attention among the Turkish participants but was presented as being self-evident.
Discussion

This study provided some interesting insights into the role of culture in the food habits of younger Turkish and Moroccan migrant origin individuals. A major theme that emerged in the focus groups was that of hospitality. Participants discussed that within their cultures it is a highly valued concept that is promoted and ‘rewarded’ by their shared religion, Islam. The present study suggests that food plays a central role in expressing hospitality, resulting in a social context where food is abundant and difficult to refuse. Respondents reported that food and the food culture are considered to be important markers of ethnic identity and confirm the sense of connection to one’s place of origin. Acculturation seems to influence the types of foods that are preferred and eaten on a daily basis; however, it seems that the social and cultural significance that is attributed to food changes less readily.

Our study has some limitations that need to be discussed. Firstly our recruitment strategy for the focus groups meant that we had little control over the age and number of participants included. Among women, this resulted in an over-representation of older, married, first generation migrants, who were more often at home. The implication is that the women may be less “acculturated” which would bias our results. However the major themes discussed in this paper were consistent for all the groups including the male groups which were on average younger, more likely to be born in the Netherlands, and, through their work or study activities, more likely to be in contact with the Dutch population (and therefore ‘acculturated’). Furthermore the results were confirmed by our discussions with practitioners that are experienced with the groups being studied. And by our supplementary discussion with young Moroccan women which was planned in order to ‘check’ our findings. A second potential limitation of this study is the first author’s own migrant status. This as well as her Mediterranean origin may have biased the interpretation of the results. Careful verification of the results with co-authors, particularly C.D. as well as the literature was used to overcome this issue.

Our finding that these Turkish and Moroccan groups place great emphasis on the tradition of hospitality is not unexpected. Hospitality is generally valued by traditional societies 27 and in particular by Middle Eastern cultures 28. Within a human evolutionary context, the culture of hospitality is likely to have evolved as a response to physical challenges: in a context of food shortage sharing resources by welcoming guests and serving them food may have ensured group survival. Serving the physical need also helped to create bonds within groups, promoting the development of social networks 29,30. Seen within the context of migration, the tradition of hospitality continues to serve a function in ensuring cohesion within the migrant group in the Diaspora. Although hospitality ostensibly promotes cohesion within the group, it is also a medium for distinguishing individuals. On one level, serving an abundance of luxury foods to guests may reinforce hosts’ social and economic status. Turks and Moroccans originally migrated to the Netherlands for economic reasons; this may add to the desire to exhibit one’s financial success in the host context. On another level, serving an abundance of challenging dishes may enhance the image of the hostess as an accomplished and successful woman, the cooking skills of women are highly valued in Middle Eastern cultures 31. The result
is that an abundance of food is prepared and served to guests. Focus group participants talked extensively about the difficulties of declining food in social situations. It appears that in the absence of health problems, dieting to lose weight is not taken seriously. Intriguingly, it was also suggested that the link between overweight and ill health is only relevant for older individuals. Therefore, as social norms make it difficult for individuals to decline food, the traditional culture can be seen as contributing to overeating and ultimately overweight.

On another level, the changes in lifestyle that resulted from migration were also experienced as problematic. Our participants talked about the difficulties in reconciling the lifestyle from their home countries with that in the Netherlands and indicated that some of the more “unhealthy” eating practices (overeating and irregular meal patterns) are a result of this mismatch. It seemed as though participants viewed the consequences of this mismatch between lifestyles as something outside their control.

The influence of religion on the food practices of Muslims is well documented, the most well known being the prescriptions within the Koran forbidding certain foods and drinks as well as those guiding the slaughter of animals for consumption. Additional influences on food practices originate from a second set of texts, the Hadith, a collection of narratives that relate to the deeds of Mohammed and his companions. It is within these texts that issues such as frugality, sharing food with others and taking care of underprivileged members of society are dealt with. The particular emphasis on hospitality within Islam may be a result of the context within which this religion originated and grew. Mecca’s citizens were originally nomads who settled and became traders. Friendly relationships with the surrounding tribes were most likely necessary for ensuring the safe passage of trade caravans through the desert, the tradition of hospitality helped to promote cohesion between tribal groups. The existing tradition of hospitality is likely to have been adopted and encouraged by Islam in order to help create a wider community based on religious rather than tribal connections. Interestingly, modern day Muslims find it easier to adhere to the religious value of hospitality whereas, as mentioned by our participants, the value of frugality are more difficult to apply to their daily lives. On a theoretical level, the idea that food should not be wasted or thrown away may be a way of discouraging excessive food preparation. In reality there is a custom of preparing extra food, and, as food should not be thrown away and migrants have problems giving food away this is likely to result in overeating.

In this study there were indications that as may be expected, a certain degree of dietary acculturation is occurring; new foods are being adopted and young migrants often have a preference for the foods consumed by their peers. At the same time, it seems that the traditions that govern food behaviours are valued, also by younger members of the groups studied. Our finding is supported by reports that the underlying values driving dietary behaviour may not change so readily when confronted with a new environment and is also in line with studies of the Italian community in the US that showed continuity in meal formats and cycles alongside changes in the food being consumed (Goode, 1984, cited by Messer, p227). While the complexity of the acculturation process and its measurement, particularly in regard to diet has been acknowledged, many of the studies on dietary acculturation focus on
the intake of foods or nutrients, without paying attention to ‘how’ foods are eaten. For example, the foods being offered at social occasions may change but the expectations regarding the offering and accepting of food not.

This idea is consistent with the integration strategy of acculturation, whereby adaptation to the host environment is coupled with the maintenance of the norms and valued associated with the culture of origin. Berry proposes that integration is the most successful of acculturation strategies, individuals pursuing this course experience less stress and adapt better to their ‘host’ environment. Studies in the Netherlands show that integration confers more positive psychological outcomes in young Moroccans and that young Turks continue to value their culture of origin, with a preference for the integration strategy of acculturation. It would seem that continuing to value one’s traditional food culture is to be expected among integrated migrants and, above all, that this has positive consequences for psychological well being.

Closely linked with the discussion of acculturation is the issue of ethnic identity. Our study highlights the relevance of food and the food culture as markers of ethnic identity, a connection that is well established. There is evidence that a strong sense of ethnic identity remains relevant for minority groups and that retaining this sense may confer benefits for the functioning of individuals within multi-cultural societies. However, a strong ethnic identity may also be a reaction to the “host” context. Recent events, both internationally and nationally have created some distance between Western European populations and Muslim migrants. A recent study in the Netherlands has shown that many young Turks and Moroccans feel themselves excluded from mainstream Dutch society and have a tendency to socialize in their own ethnic groups. Within this context, the dual roles of food as a marker of identity and as a promoter of social cohesion may be reaffirmed.

Finally, adherence to a particular custom is likely to reflect the value placed on it. Within our study populations the value attributed to the tradition of hospitality is strongly reinforced by religion. Korf et al. found indications that young Muslims in the Netherlands consider being Muslim as increasingly important to their identity.

Thus, it seems that cultural sensitivity remains a relevant issue in the planning of interventions that target younger and potentially more acculturated individuals of Turkish and Moroccan migrant origin. Importantly, within the concept of cultural sensitivity there are two structural levels; surface and deep. Surface structure involves issues such as language and marketing strategies. Deep structure includes consideration of how ethnic, cultural, social, environmental and historical factors may influence specific health behaviours. We found some reports of interventions aimed at the Turkish and Moroccan groups that go some way to answering this need by using peer educators to deliver the intervention. However, there is little documentation of the cultural and social determinants at the root of health related behaviours of these groups and how these were accounted for in developing the interventions. To our knowledge, this study is the first to examine the mechanisms underlying the diet of these two migrant origin groups and provides important insights for the development of interventions that wish to include culture on a structural level.
Implications for Research and Practice

Among Turkish and Moroccan origin populations, the central role of food in culture coupled with the economic and physical changes that come about as a result of migration create an environment of abundance that can lead to overeating, impacting on energy balance and overweight development. Migration and acculturation may influence the types of foods that are eaten; however our results indicate that young members of migrant origin groups value their traditional food cultures leading us to conclude that the social and cultural context of food intake cannot be ignored if interventions aimed at these groups are to be effective.

In the case of Turkish and Moroccan groups, interventions need to account for the value-system that underlies the offering and accepting of food in social situations and the consequences this has for habitual food intake. In addition, interventions need to be sensitive to the relevance that food and the food culture have for migrants’ sense of identity. Changes are more likely to be acceptable if they are offered within a culturally sensitive context, in dialogue with members of the target group themselves.

On a group level, interventions should address the social norms that govern food behaviour and may need to emphasize existing values that promote healthy behaviour such as the teaching of temperance within Islam. On a more personal level, the impact of cultural ideals on food intake needs to be acknowledged, it may be that individuals’ require help in developing strategies to increase their self-efficacy in social situations: How does one say no without insulting one’s host? Additionally, it seems that adjusting to the lifestyle of the host country can be experienced as problematic; leading to unhealthy practices. Individuals may need help in making this adjustment.

The framework provided by the Theory of Triadic influence was useful in the exploration of this subject; it provided a good basis for the topic list development and formed a useful first step for the analysis. However, we departed from this framework during the latter stages of the analysis process and in reporting our findings due to the complexity of the interrelationship between the cultural and social context. The theoretical underpinning of this study requires more development.

Additionally, we wanted to explore the influence of acculturation on the beliefs underlying the diet of our study groups. We found indications that the mechanisms underlying food intake in migrant origin groups may be quite stable and that this may be consistent with the integration strategy within the acculturation theory. It would be interesting to further explore this issue and to test it in a quantitative study.

Finally, the results of this study are applicable to many groups that originate from food centred cultures such as migrants with Middle Eastern and Mediterranean origin. Considering that food has some significance for most cultures, studying the interaction between migration, food intake and culture is relevant to all migrant origin groups. It would be interesting to repeat this study among other groups.
References

Body Size Preference and Body Weight Perception among Two non-Western Migrant Origin Groups

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Abstract

Background
To evaluate body size preference, body weight perception and their relationship with actual weight in two non-Western migrant origin groups, Turks and Moroccans. In addition: to study the association between body size preference and acculturation.

Methods
Participants for this study were 18-30 year olds that took part in “LASER,” a cross-sectional study of health behaviour among Turkish and Moroccan migrants aged 10 to 30 years living in Amsterdam, the Netherlands. We included Males and females randomly selected from the population registry (n=451). Participants, or at least one of their parents, were born in Turkey or Morocco. Body size preference was assessed using 7 silhouette drawings, body weight perception was assessed by asking opinion of own weight. Acculturation variables were generation status and two scale measures: cultural orientation and social contacts.

Results
Participants showed preference for a thin body size. The discrepancy between ideal and current size was significant in women but not men (p<0.001). Perceived current body size was correlated with BMI (Spearman’s correlation coefficient 0.60, p<0.001 (men) and 0.73, p<0.001 (women)). Among overweight participants (BMI 25-29.9 kg/m²), 63-82% of men and 35% of women perceived themselves as “average.” Paying attention to own body weight was associated with a discrepancy between ideal and current size amongst women and with perceiving oneself as ‘overweight’ amongst men. Body size preference was not significantly associated with the three acculturation variables.

Conclusions
We did not observe a preference for large body sizes in these two non-Western migrant groups. Similar to western populations, most women wished to be thinner than they were. This was not the case among men, the majority of whom were also unaware of being overweight.
Introduction

Overweight and obesity are a major public health problem and are associated with increased risk for type 2 diabetes, cardiovascular diseases and several types of cancer \(^1\). Globally, their prevalence is reaching epidemic proportions with an estimated 1 billion overweight and 300 million obese adults \(^2\). Among non-Western migrants which represent an increasing proportion of many Western populations \(^3\), the prevalence of overweight and obesity is often higher than that among host populations \(^4\)\(^-\)\(^6\). In the Netherlands more than half of the general adult population is either overweight (51% of males, 42% of females) or obese (10% of males, 12% of females) \(^7\). In two of the main non-Western migrant groups, Turks and Moroccans, it is estimated that 25-32% of women and 37-44% of men are overweight while 39-40% of women and 13-16% of men are obese \(^8\)\(^,\)\(^9\).

Public health promotion efforts aimed at overweight prevention often proceed from the assumption that most individuals prefer to be thin and that the first step in motivating individuals to lose weight is to raise awareness of weight status among those with overweight \(^10\). This approach is justified for Western populations that value thinness in women and lean, muscular physiques in men \(^11\)\(^-\)\(^13\), but where awareness of overweight among those with overweight is often low \(^14\)\(^,\)\(^15\). It may be, however, that this assumption does not hold for non-Western migrant groups among whom body size preference may differ. For example, in many traditional non-Western cultures large bodies in both males and females are associated with prosperity and health \(^16\)\(^-\)\(^21\). Migrants originating from non-Western societies may adhere to the ideals from their traditional cultures. Although this may protect them from experiencing dissatisfaction with their body size, it may also negatively influence the motivation for weight control or weight loss.

However, living in a Western society is also likely to influence the preferred body size of migrants, through the process of acculturation \(^22\). Acculturation is a concept that "comprehends those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact with subsequent changes in the original culture patterns of either or both groups" \(^23\), usually with a greater change taking place in the ‘minority’ group \(^24\). The expectation is that migrants are likely to adopt the body size ideals of their ‘host’ peers. Thus, highly acculturated migrants to Western societies would develop a preference for thinner figures.

The idea that culture influences body size preference has been the rationale of many studies that studied this topic among different ethnic groups. However, many of the studies of this topic have either focused on non-Western populations in their country of origin \(^19\)\(^,\)\(^20\)\(^,\)\(^25\)\(^-\)\(^28\) or have been conducted among US ethnic minority groups \(^29\)\(^-\)\(^32\). Few studies have considered this issue among non-Western migrants to European countries \(^33\)\(^-\)\(^36\). Likewise, the association between body size preference and acculturation among ethnic minorities has seldom been studied in Europe. We found two UK studies, one that reported similar attitudes to body size among second generation Asian women and white British women \(^34\) and another where Kenyan Asians residing in the UK were more similar to white British women in their body...
size preferences than to women still living in Kenya. Considering that body size preference may be an important factor in motivating individuals to lose weight, information about this determinant among European migrants is necessary.

Two of the largest non-Western migrant groups in Western Europe originate from Turkey (the Netherlands, Germany, Denmark, Sweden) or Morocco (the Netherlands, Belgium, France, Spain). Migration from Turkey and Morocco was encouraged in the 1970's in order to fill labour shortages, particularly for lower manual positions. The initial migrants came from particularly deprived areas of their home country. Since that time further migration has occurred due to family reunification and formation, with many young Turkish and Moroccan adults choosing partners from their country of origin. In the Netherlands many reside in the larger cities; in Amsterdam, persons of Turkish or Moroccan origin form respectively 5% and 9% of the total population.

Literature from Morocco indicates that overweight and obesity prevalence, particularly among women, is on the increase and that this may be partly due to a tradition that values plumpness. Although we found literature that indicates high overweight and obesity prevalence in Turkey we found no studies of body size preference among Turkish adults. Anecdotal evidence indicates that, also in Turkey, there is a tradition of preference for large figures.

As already mentioned, the prevalence of overweight and obesity among Turkish and Moroccan migrants to the Netherlands is high. However there is little information about body size preference (the body size considered to be 'ideal'), or the perception of overweight (whether individuals classify their body weight correctly), amongst these two migrant populations. It may be that a preference for larger figures and/or the misperception of overweight is highly prevalent in these groups which would have important implications for intervention development. Therefore this study aimed to:

- Evaluate body size preference and body weight perception among young men and women of Turkish and Moroccan origin.
- Investigate whether preference and perception are related to actual body weight and to whether individuals pay attention to their body weight.
- To examine the association between body size preference and acculturation level.

**Methods**

**Study Population**

Participants for this study were 18-30 year olds that took part in “LASER,” a study of health behaviour among Turks and Moroccans aged 10 to 30 years living in Amsterdam, the Netherlands. In the LASER-study a random sample of people born in Turkey or Morocco or with at least one parent born in Turkey or Morocco was drawn from the Amsterdam municipal population register. Participants born in Turkey or Morocco were classified as first generation migrants. The second generation were those born in the Netherlands and who had at least
one parent born in either Turkey or Morocco. As mentioned in the introduction, migration to the Netherlands from Turkey and Morocco began in the 1970's. Therefore, the majority of adult Turks and Moroccans are of the first generation, as has been observed in studies that have included adults. The LASER study focused on younger participants in order to ensure more equal representation of the second generation.

The total Turkish sample consisted of 1556 persons. Approximately 13% of the sample could not be traced because of incorrect address information. Of the 1354 respondents that could be traced, 768 participated in the study (57%). Most cases of ‘non response’ were due to refusals to participate (32%) or not being able to contact potential participants after three attempts (12%). The Moroccan sample consisted of 995 individuals of whom 12% had incorrect address information. Of the 872 persons that could be traced, 476 participated in the study (55%). Within the non-response group, 26% refused to participate and approximately 19% could not be reached after three attempts. The study population is similar to the Turkish and Moroccan population aged 10-30 living in Amsterdam, according to sex, generational status (country of birth) and city district. Except for the Moroccan male population, among whom the age category 20-30 is underrepresented and participants from one city district were slightly overrepresented.

For the current study we analysed participants aged 18-30 years (n=567). We excluded respondents with missing information on body weight perception (n=50) and BMI (n=66) to end with a total sample size of 451.

Data Collection
Face-to-face interviews were held from April 2003 until December 2004, by trained interviewers of the same ethnic background and sex. A structured questionnaire was used; this was available in Dutch, Turkish or Moroccan Arabic so that the interview could be held in the participants’ language of preference. Included were questions about demographics, socio-economic status and migration status. Acculturation was evaluated using a proxy measure, place of birth (generation) as well as scale measures of the level of social contact with ethnic Dutch (3 questions on social contacts in leisure time) and orientation towards Dutch society (10 items measuring language and media use, shopping preference and emancipation as examples of Western norms and values). The data collection strategy, the questionnaire design and the acculturation measures have been fully described elsewhere.

Body-size Preference and Body Weight Perception
Body size preference was evaluated using 7 silhouette drawings developed by Collins. Respondents were asked to select the silhouette that most corresponded to the way they currently look and also to select the ideal silhouette for themselves. A discrepancy score was calculated by subtracting the ideal from the current silhouette as was done by Fallon and Rozin. Participants were also asked to select ideals for members of the same sex and opposite sex.
Body weight perception was evaluated by how participants described their body weight; answer categories included “thin,” “average” or “overweight.” Participants received no specific instructions relating to this question, therefore the answers obtained are not standardised but reflect individuals’ personal evaluations. Finally, we asked “Do you pay attention to your weight?” possible answers were either “yes” or “no.” We formulated this question in a neutral way to avoid the association with dieting to lose weight.

**Measurement of Body Weight**

Participants were weighed and measured during the home visit. Weight was measured using an electronic scale to the nearest 0.1kg after removal of shoes, jackets, heavier clothing and pocket contents. Height was measured twice without shoes in an upright position with a measuring tape and ruler to the nearest 0.1cm. We calculated the Body Mass Index (weight(kg)/height(m)²). Underweight was classified as having a BMI lower than 18.5. There were six participants that fell into this category (2 Moroccan women, 2 Turkish women, 1 Moroccan man and 1 Turkish man). We chose to include them together with the normal weight group for the analyses. Due to logistic problems not all participants could be weighed during the interview. In these cases (40% of all participants) weight and height were based on self-report. We performed additional analyses to explore the impact on our results. We found no difference in the prevalence of overweight between self reporters and the weighed group. We also tested mean BMI between the two groups using the Mann-Whitney test and found no differences in BMI between them with the exception of Moroccan women where median BMI was 22.3 in the self reporters versus 24.1 in the measured group (p=0.05). Finally, we stratified according to self-report and compared on the basis of demographics, SES, acculturation variables, and on the perception variables but found no significant differences between them. We therefore decided to include the self-reporters in the analyses in order to maximise our sample size.

**Statistical Analysis**

We analysed data using the Statistical Package for Social Sciences version 12 (SPSS Inc., 2003 Chicago, IL, USA). The sample was stratified according to sex and ethnicity for all the analyses. For categorical variables we applied the chi-square test. Differences in body size preference and weight awareness between groups of respondents were tested using the Mann-Whitney test. Differences within groups were tested using the Wilcoxon signed-rank test. Spearman’s rank correlations were calculated for the relationships of current and ideal silhouettes (body size preference) and BMI. In order to explore the association with acculturation we performed the analyses with the “ideal” silhouette as dependent variable.

**Results**

Table 1 summarises the participant characteristics. There were some statistically significant differences between the groups. Fewer Moroccan men were married or had children compared
to the other groups. Within the ethnic groups, more women were married, had children and were not in paid employment. Moroccan men and women had a slightly higher education level than the Turkish participants although this was not statistically significant (p=0.08 in men and p=0.07 in women). BMI values ranged from 15.6 to 36.7. Women were more often first generation migrants. The majority of participants had a low level of social contact with ethnic Dutch (23.1%-32.7% had high a level of contact) with no significant differences between the groups. More Moroccans than Turks were highly culturally oriented towards Dutch society (42.0% versus 25.6% of women and 48.2% versus 35.5% of men 34%, p< 0.001), but this was still less than half of the Moroccan group. More Turkish men were overweight (35.5%) and the prevalence of overweight and obesity was 37.6% among Turkish women and 34.6% among Moroccan women.

Table 1: Participant characteristics

<table>
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<th></th>
<th>Men Turkish (n=169)</th>
<th>Women Turkish (n=122)</th>
<th>Men Moroccan (n=56)</th>
<th>Women Moroccan (n=104)</th>
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<tr>
<td>Mean Age, years (SD)</td>
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<td>21.6 (3.4)</td>
<td>24.6 (4.3)</td>
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<td>55.2</td>
<td>49.0</td>
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<td>5.4</td>
<td>55.2</td>
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<td>Education Level, %</td>
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<td>12.9</td>
<td>7.3</td>
<td>18.3</td>
<td>16.8</td>
</tr>
<tr>
<td>2</td>
<td>28.2</td>
<td>14.5</td>
<td>32.5</td>
<td>21.8</td>
</tr>
<tr>
<td>3</td>
<td>45.4</td>
<td>58.2</td>
<td>37.5</td>
<td>37.6</td>
</tr>
<tr>
<td>4 (high)</td>
<td>13.5</td>
<td>20.0</td>
<td>11.7</td>
<td>23.8</td>
</tr>
<tr>
<td><strong>Work status, %</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>37.6</td>
<td>54.7</td>
<td>29.5</td>
<td>35.3</td>
</tr>
<tr>
<td>Paid employment</td>
<td>52.2</td>
<td>37.7</td>
<td>24.6</td>
<td>29.4</td>
</tr>
<tr>
<td>Unemployed/home maker</td>
<td>10.2</td>
<td>7.5</td>
<td>45.9</td>
<td>35.3</td>
</tr>
<tr>
<td><strong>Acculturation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First generation, %a</td>
<td>42.6</td>
<td>37.5</td>
<td>60.8</td>
<td>51.0</td>
</tr>
<tr>
<td>Social contacts with Dutch High, %</td>
<td>26.2</td>
<td>33.9</td>
<td>28.0</td>
<td>22.1</td>
</tr>
<tr>
<td>Cultural orientation to Dutch society bHigh, %</td>
<td>35.5</td>
<td>48.2</td>
<td>25.6</td>
<td>42.0</td>
</tr>
<tr>
<td><strong>Body Weight</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td>24.5 (3.2)</td>
<td>23.4 (2.8)</td>
<td>24.6 (4.3)</td>
<td>24.1 (4.1)</td>
</tr>
<tr>
<td>Overweight, %</td>
<td>35.5</td>
<td>19.6</td>
<td>24.8</td>
<td>23.1</td>
</tr>
<tr>
<td>Obesity, %</td>
<td>4.7</td>
<td>3.6</td>
<td>12.8</td>
<td>11.5</td>
</tr>
</tbody>
</table>

Education level: 1= never been to school or primary school only; 2=lower vocational and lower secondary education; 3= intermediate vocational and intermediate/higher secondary education; 4=higher vocational education and university. a within ethnic groups, women more likely to be from first generation, be married and have children, p<0.01. b Turkish participants lower cultural orientation than Moroccan participants, p<0.001. No other significant differences between Turkish or Moroccan participants (p<0.05)
Table 3: Mean BMI of participants per silhouette they selected to represent current body size

<table>
<thead>
<tr>
<th>Silhouette</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkish, n (%)</td>
<td>2 (1.2)</td>
<td>6 (3.6)</td>
<td>41 (24.3)</td>
<td>63 (37.3)</td>
<td>48 (28.4)</td>
<td>9 (5.3)</td>
<td>1 (0.6)</td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td>21.7 (3.3)</td>
<td>22.5 (0.9)</td>
<td>22.4 (2.0)</td>
<td>23.7 (2.3)</td>
<td>26.7 (2.6)</td>
<td>30.9 (3.1)</td>
<td>40.8</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkish, n (%)</td>
<td>4 (3.3)</td>
<td>30 (24.6)</td>
<td>39 (32.0)</td>
<td>33 (27.0)</td>
<td>13 (10.7)</td>
<td>3 (2.5)</td>
<td></td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td>20.5 (1.4)</td>
<td>21.5 (2.0)</td>
<td>23.0 (1.9)</td>
<td>26.9 (2.7)</td>
<td>32.7 (4.4)</td>
<td>34.0 (5.4)</td>
<td></td>
</tr>
<tr>
<td><strong>Spearman’s ρ</strong></td>
<td>0.66, p&lt;0.001</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Moroccan, n (%)</td>
<td>1 (1.8)</td>
<td>10 (17.9)</td>
<td>28 (50.0)</td>
<td>15 (26.8)</td>
<td>2 (3.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td>21.2</td>
<td>21.6 (2.1)</td>
<td>23.3 (1.8)</td>
<td>24.3 (3.0)</td>
<td>30.3 (1.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spearman’s ρ</strong></td>
<td>0.43, p&lt;0.001</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turkish, n (%)</td>
<td>1 (1.0)</td>
<td>11 (10.6)</td>
<td>42 (40.4)</td>
<td>33 (31.7)</td>
<td>13 (12.5)</td>
<td>4 (3.8)</td>
<td></td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td>20.7</td>
<td>20.7 (1.4)</td>
<td>22.3 (2.4)</td>
<td>25.3 (2.9)</td>
<td>30.0 (4.6)</td>
<td>33.7 (4.1)</td>
<td></td>
</tr>
<tr>
<td><strong>Spearman’s ρ</strong></td>
<td>0.71, p&lt;0.001</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Ethnic groups combined: In men spearman’s 0.60, p<0.001, in women spearman’s 0.73, p<0.001

* Significant difference among women in actual BMI according to selected silhouette, p<0.05.
Table 2 shows the results of body size preference, body weight perception and the percentage of participants that pay attention to their weight. Men’s preferred size was similar to their current size whereas women selected an ideal that was significantly smaller than their current size. Based on the calculated discrepancy between current and ideal silhouette, the majority of women (60.3% Turkish and 57.7% Moroccan) prefer a smaller size for themselves whereas this was less the case amongst the men, 21.8% and 29.0% for the Moroccan and Turkish men respectively.

All groups chose a thinner ideal size for themselves than for others of their own sex. Further, Turkish men and women had a significantly thinner ideal for members of the opposite sex than did Moroccans. Most of the men (67.7%-70.9%) and almost half the women (47.1%-51.6%) perceived their body weight to be “average”. The majority of women (60.2-69.0%) and Turkish men (56.8%) reported that they pay attention to their weight, whereas less than half (45.5%) of Moroccan men did so.

Table 3 shows mean BMI according to silhouette selected to represent current body size. The correlation coefficient for BMI and current silhouette was low but statistically significant in all groups. We tested ethnic differences and found that per silhouette Moroccan women had a lower BMI than the Turkish women (p<0.05), while there were no differences between the men.

Figure 1 shows body weight perception according to BMI category. Here we see that a relatively large proportion of men that are overweight (BMI of 25.0-29.9) described themselves as ‘average’, 63.0% of Turkish men and 82.0% of Moroccan men. One third of overweight Turkish and Moroccan women respectively described themselves as ‘average’.

![Figure 1: Body weight perception according to actual BMI](image-url)

Figure 1: Body weight perception according to actual BMI. *Numbers insufficient (n=2) to present results.
Table 4 shows that body size preference does not differ according to generation status, level of cultural orientation to Dutch society or level of social contacts with ethnic Dutch. Among Turkish women who have more contacts with ethnic Dutch the ideal silhouette was slightly thinner \((p=0.06)\). Among second generation men the ideal was slightly larger \((p=0.06\) in Turkish men and \(p=0.09\) in Moroccan men).

Table 4: Acculturation and body size preference (mean silhouette chosen to represent ideal)

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Turkish ((n=169))</td>
<td>Moroccan ((n=56))</td>
</tr>
<tr>
<td><strong>Generation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>first</td>
<td>3.83</td>
<td>4.00</td>
</tr>
<tr>
<td>second</td>
<td>4.05</td>
<td>4.26</td>
</tr>
<tr>
<td><strong>Social Contacts with Dutch</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>4.01</td>
<td>4.24</td>
</tr>
<tr>
<td>High</td>
<td>3.80</td>
<td>4.00</td>
</tr>
<tr>
<td><strong>Cultural orientation Dutch society</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>3.95</td>
<td>4.14</td>
</tr>
<tr>
<td>High</td>
<td>3.95</td>
<td>4.19</td>
</tr>
</tbody>
</table>

None of the differences by acculturation variables were statistically significant \((p<0.05)\). Some borderline significant results: ap\(=0.06\) in Turkish men, \(p=0.09\) in Moroccan men. b Turkish women, \(p=0.06\).

Table 5 shows self reported weight behaviour offset against the main outcome variables. There were no statistically significant differences between participants that reported watching their weight versus those that did not on the basis of preferred body size (mean silhouette), body size discrepancy (difference between current and ideal size) or overweight perception.

As the findings followed a similar trend for both ethnic groups we combined them and stratified according to sex in order to increase the power of our calculations. We found that more women reported paying attention to their weight if their preferred body size was smaller than their current body size \((\chi^2=6.7, p=0.01)\). Amongst men, this was the case if they perceived themselves to be overweight \((\chi^2=8.8, p=0.01)\).

Table 5: Pays attention to body weight versus body size preference and body weight perception

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Turkish</td>
<td>Moroccan</td>
</tr>
<tr>
<td></td>
<td>No (N=73)</td>
<td>Yes (N=94)</td>
</tr>
<tr>
<td><strong>Body size preference</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preferred silhouette, mean</td>
<td>4.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Would like to be thinner*, %</td>
<td>27.4</td>
<td>30.2</td>
</tr>
<tr>
<td><strong>Body weight perception</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceives self as overweight, %</td>
<td>17.8</td>
<td>23.4</td>
</tr>
</tbody>
</table>

* based on discrepancy in silhouettes chosen to represent ideal and current size.
Discussion

This population-based study is the first to offer insight into the issue of body size preference and body weight perception among these two important European non-Western migrant groups. In our study we did not observe a preference for a large body size, in contrast, this group of Turkish and Moroccan participants selected relatively thin ideal silhouettes to represent their ideal. The silhouette selected to represent current body size was correlated with BMI indicating that individuals’ perception of their body size is realistic. As is generally found in Western populations, the preferred body size among women was significantly thinner than their current size whereas this was not the case amongst men. Furthermore, a large proportion of overweight and obese men perceived their weight to be ‘average’ which may indicate greater acceptance of overweight. A discrepancy between ideal and current size was associated with paying attention to body weight in women. Amongst men, paying attention to body weight was associated with the perception of overweight. Finally, we did not observe an association between body size preference and acculturation variables such as generation status, social contacts with Dutch or orientation with Dutch society.

This study has some limitations that merit mention. Firstly the response rate was quite low, 57% among Turks and 55% among Moroccans, which means that our study population may not be representative of Turkish and Moroccan residents of the Netherlands. However, the response is comparable to that obtained by other studies of the same groups 9,45, and our participants are comparable to the Turkish and Moroccan population living in Amsterdam. Secondly, we used a combination of both measured and self-reported data of weight and height. We tested the effect of this methodological issue but found no differences in the main outcomes between the self reporters and the weighed group indicating limited impact on our main conclusions. Thirdly, we cannot rule out the possibility that participants gave socially desirable answers. As culture is likely to influence body size preference, our use of interviewers matched for sex and ethnicity may have minimised this possibility. Fourthly, we cannot place the results from this study within the context of their host environment as we did not include ethnic Dutch participants. It may be that ethnic Dutch men and women prefer even thinner bodies. A study of US residents aged 18-30 that used similar figural stimuli showed that men tended to prefer figure 4 and women figure 3 46. This preference is not dissimilar to the silhouettes chosen by participants in our study. However it is not certain whether this population can be used as a reference considering that overweight and obesity prevalence is higher in the US than in the Netherlands 7,47. It may be that the overweight/obesity prevalence in the general population may influence body size preference as is speculated by Cash et al in their study of changes of body image among US college students 48 and by Bennett et al a study of attitudes towards overweight in African Americans 49. Finally, although the figural stimuli used in our study have not been validated for the Turkish and Moroccan populations, similar instruments have been widely used in various study populations which lends support to our choice of instrument 19,20,25,50.
Much of the research conducted on this area originates in the US and compares white American, African American, Hispanic and Asian groups. The results and conclusions have been mixed but two recent meta-analyses have shown that ethnic differences seem to be diminishing: Roberts et al found that differences in body dissatisfaction between African American and white women were converging 51; Grabe et al found that ethnic differences in the perception of body weight between women were small 30. Our finding that that these Turkish and Moroccan origin groups have a preference for thinner body size is in consistent with the idea that a preference for thinness is common, particularly among women.

In addition, our study indicates that this preference is not related to acculturation, as might have been expected based on the findings of others 22,34,36,52. However the comparison of these findings with ours is problematic due to differences in the measurement of acculturation. Furthermore, we measured a limited number of indicators of acculturation; it may be that other dimensions of acculturation (e.g. ethnic identity) and migration related issues (e.g. acculturative stress) are more relevant for body size preference and the associated consequences thereof 53,54. The issue of methodology has been highlighted by others and remains a barrier to understanding the relationships between acculturation, body size preference and body dissatisfaction 55,56.

Our finding that a large proportion of non-Western origin women experience a discrepancy between desired and actual body size is similar to those among Western populations 14,15. Interestingly, although the majority of women chose a thinner ideal body size for themselves (57.7%-60.3%), fewer women perceived themselves as “overweight” (35.7%-45.2%) which implies that wanting to be thinner is not always related to the belief that one is overweight. Fitzgibbon 32 argues that these are two distinct issues, the discrepancy between the ideal and current body size is more likely to reflect body dissatisfaction and may be a factor that stimulates attention to weight loss activities. Our observation that a larger majority of women pay attention to their weight if their perceived size is larger than their desired size supports this idea. Body dissatisfaction, whether appropriate or not, may be a stimulus for weight watching behaviour among women and may contribute to reduced quality of life 57 as well as to eating pathology 15,31 The latter does not appear to differ for women of non-Western origin 32. Further research of this issue is warranted. But in the meantime, interventions should be sensitive for potentially negative effects on women’s dieting practices.

Two studies in Europe have shown a lower awareness of overweight among migrant-origin groups 33, including South Asian groups 35. Within our populations we observed that a high proportion of overweight men (63-82%) and overweight women (35%) perceived themselves as average. Although we cannot compare our group to the general population, the finding that more men than women are unaware of their overweight is consistent with that of others 14,58. As mentioned previously, in a setting where overweight and obesity are common, overweight individuals may be more likely to experience themselves as being ‘average’. This effect may be stronger among men whereas among women the socio-cultural stigma associated with overweight may dominate. Considering that paying attention to body weight is more prevalent among men that perceive themselves as overweight it appears that raising awareness of ones
weight status may be important in stimulating weight watching behaviour amongst all men, including those of non-Western origin.

Although we did not aim to compare Turks and Moroccans with each other, we did observe some differences between these groups. Per silhouette selected to represent current body size Moroccan women had lower BMI levels. In other words they viewed themselves as ‘larger’ than did Turkish participants. In addition Turkish women preferred a smaller ideal silhouette than did Moroccan women and both Turkish men and women preferred significantly body sizes ideals for members of the opposite sex. This apparently stronger preference for thinner body sizes among Turkish participants could be reflected in their more ‘optimistic’ choice of silhouette to represent themselves. Our finding of a thin body size ideal among this group is in line with a study in Turkey which showed that the desire to be thinner in Turkish adolescents is similar to that amongst adolescents in developed countries 59. Among Moroccans there may be a greater acceptance for larger body sizes. Literature from Morocco indicates that adiposity in women is associated with higher social status 16,17, it may be that Moroccans may be less concerned with thinness as an ideal. However, this is not entirely consistent with our finding that 45% of Moroccan women perceived themselves as ‘overweight’ even though prevalence of overweight and obesity in this group is 36.6% and that the majority of women, 57.7%, preferred a smaller body size. Comparable data from Turkey and Morocco would help in understanding these results.

Conclusions

In this first exploration of body size preference and body weight perception in young adults of Turkish and Moroccan origin we did not observe a preference for large body sizes. Similar to western populations, most women wished to be thinner than they were whereas this was less the case among men, the majority of whom were also unaware of being overweight.

Amongst the majority of men raising awareness of overweight appears to be an important intervention goal. However, caution is advisable when targeting women. Although a third do not perceive themselves to be overweight, the majority exhibit dissatisfaction with their body size which may make them susceptible to inappropriate dieting practices.
References


Ethnic Differences in Perception of Overweight and Association with Weight Loss: the SUNSET study

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C.M. Doak
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K. Stronks
J.C. Seidell

Submitted for publication
Abstract

Background
We aimed to investigate ethnic differences in perception of overweight and its association with weight loss behaviour.

Methods
Data was obtained from a cross sectional study of 1441 men and women (35-60 years) in two neighbourhoods in Amsterdam, the Netherlands (2001-2003). Included were South Asian, African origin Surinamese migrants and ethnic Dutch. We measured body weight perception, self reported weight loss, lifestyle (physical activity, diet), height, weight and waist circumference.

Results
Compared with their Dutch peers, overweight Surinamese African origin men and women were less likely to perceive themselves as overweight. After adjustment for body mass index (BMI), the odds ratio for perceiving oneself as overweight was 0.3 (95% CI 0.15, 0.57) in African origin men and 0.4 (95% CI 0.20, 0.77) in African origin women compared with ethnic Dutch. A similar but not significant trend was observed in overweight Surinamese South Asian men, but not in overweight South Asian women. Nonetheless, Surinamese participants were more likely than their Dutch peers to report trying to lose weight and to use physical activity rather than diet as a weight loss strategy. In all three ethnic groups, we observed only weak associations between reported weight loss attempts, diet and physical activity.

Conclusion
Contrary to expectations, lower perception of overweight did not appear to be a barrier to weight loss behaviour in Surinamese men and women. Ethnic differences in the weight loss strategies used imply different preferences which need to be accounted for by public health activities. The weak association between lifestyle variables and reported weight loss activity implies that individuals require support in realising their intentions.
Introduction

the increasing prevalence of overweight and obesity is a major international public health problem. In many Western populations, ethnic minority groups often suffer from higher rates of both overweight and obesity, this is particularly the case amongst women.

African origin and South Asian groups form two of the largest ethnic minority groups in many Western countries, including the Netherlands. Both groups experience high risk of obesity related lifestyle diseases such as type 2 diabetes, hypertension, coronary heart disease and stroke, making them important targets for weight loss interventions.

Possible explanations for ethnic differences in the prevalence of overweight and obesity are numerous, but it generally thought that differences in body size preference and perception of one's own body weight may be important underlying determinants. More specifically, if larger body sizes are preferred, individuals within that context would be less likely to perceive themselves as being overweight which would ultimately be a barrier for weight loss action. However, this relationship may not be so straightforward. For example, reports that African Americans generally prefer larger body shapes have been challenged by more recent studies that have corrected for covariates such as age, education level and body weight. Even so, it seems that African Americans are less likely to perceive themselves as overweight, similarly, among South Asian groups, there are indications that body size preference is comparable to that of white populations but that they too are more likely to underestimate their overweight.

From a public health perspective, the issues of body size preference and perception of overweight are only relevant with regard to their influence on weight loss behaviour. There are indications that self rated body weight is likely to influence motivation to avoid weight gain and that overweight perception may be a barrier to healthy lifestyles. However, although there have been many studies of weight perception among different ethnic groups, fewer have looked at ethnic differences in the relationship between perception, reported weight loss action and lifestyle variables and few have included men.

In this study we compare body weight perception and its association with weight loss behaviour in three ethnic groups residing in the Netherlands: Surinamese migrants of South Asian or African origin and ethnic Dutch.

We will address the following research questions for the three ethnic groups:
1. Does body weight perception match actual weight status?
2. Is body weight perception associated with reported weight loss action?
3. Is weight loss action associated with reported diet and physical activity?
Methods

Survey Design
Data were obtained from the SUNSET study (acronym for: SUrinamese in the Netherlends: Study on ETHnicity and health), a cross-sectional study that aims to assess the cardiovascular risk profile of three ethnic groups in Amsterdam, the Netherlands: Surinamese South Asians, Surinamese of African origin, and ethnic Dutch. The SUNSET study is based on a stratified random sample of 2975 individuals, aged 35 to 60 years of age, drawn from the population register of two neighbourhoods in Amsterdam (Figure 1). These two neighbourhoods were selected due to their large concentration of Surinamese-origin residents. For the sampling procedure, persons who were born in the Netherlands and whose parents were both born in the Netherlands were presumed to be ethnic Dutch participants. Persons of whom both parents were born in Suriname or persons who were born in Suriname and who had at least one parent who was born in Suriname were presumed to be Surinamese participants.

Statement of Ethics
We certify that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during this research. Furthermore, the study was approved by the Institutional Review Board of the Academic Medical Centre of the University of Amsterdam.

Assessment of Ethnicity
In the Netherlands the Surinamese is one of the largest immigrant groups; in Amsterdam they form approximately 10% of the population. Suriname, a former Dutch colony, gained independence in 1975 and underwent political unrest in the 1980's. Both events gave rise to migration. Approximately 80% of Surinamese immigrants in the Netherlands are either of predominantly African origin (a mix of African, European and other groups) or South Asian (originally from the Indian sub-continent). In the SUNSET study ethnicity of the Surinamese respondents was further determined by self report, i.e. if they considered their origin to be South Asian or African. If information on the self-reported ethnicity of the individual was lacking, the ethnic origin of the mother and father was used, if that was unclear we used the origin of the mother’s ancestors to classify participants.

Interview and Medical Examination
In 2001-2003, people in this sample were invited to participate in a face-to-face structured interview which took place at the participants’ home. The interviewers were matched by ethnicity. In order to enhance participation among Surinamese candidates invitation letters included endorsement by key figures in the Surinamese community.

The questionnaire contained questions on (among others) the health status, cardiovascular risk factors such as diet, smoking and physical exercise, and background variables such as
socio-economic status and migration history. During the face-to-face interview participants of South Asian, African Surinamese or ethnic Dutch origin were invited for a medical examination at a local health care centre. A signed informed consent form for the physical examination was filled in during the interview and appointments were also made at the same moment in order to encourage attendance. During the medical examination, a team of specially trained research assistants and two medical doctors recorded the following characteristics: weight in light clothing on a SECA mechanical scale to the nearest 200 grams and height to the nearest 0.01 meter by wall tape measure. Waist circumference midway between the lower rib margin and the iliac crest was determined to the nearest 0.01 meter by tape measure. All anthropometric measurements were obtained twice and the means (rounded off to the nearest integer) were used for analysis.

**Measures and Definitions**

We calculated the Body Mass Index (BMI=weight (kg)/height (m)^2). Overweight was defined as BMI ≥ 25 kg/m², obesity as BMI ≥ 30 and abdominal obesity was defined as a waist circumference >102 cm for men and >88 cm for women.

Weight perception was determined by the question “what do you think of your body weight” (too high, too low or about right). Behaviour was determined by the question “Are you at the moment doing anything about your weight” (trying to lose, maintaining, nothing, trying to gain), we also included an open question where we asked participants to describe what they were doing to achieve their weight-related goal. Answers were categorised accordingly (nothing, Physical activity only, diet only, combination of diet and physical activity, other). Dietary variables measured were Fruit intake (achieves Dutch norm of 2 pieces daily), vegetable intake (daily use of vegetables), daily breakfast use and Diet Quality Indicator score (DQI). The latter is a indicative of the intake of a number of food items that are of interest to public health nutrition and is a continuous variable from 0 to 7; higher scores indicate a higher overall diet quality. A full description of the dietary variables measured can be found elsewhere 28.

We used the validated Short Questionnaire to Assess Health Enhancing Physical Activity (SQUASH) to evaluate physical activity 29. The questionnaire included questions about transportation to work or school, occupational activity, household activities, participation in sport and other leisure time activities. Total minutes of activity were calculated by multiplying frequency (days/week) by duration (min/day) while accounting for age and self reported intensity which were used to calculate MET (i.e. metabolic equivalent or number of times resting metabolic rate).

We also calculated whether participants met the Dutch activity guidelines of at least 30 minutes moderate activity on five or more days per week. The cut-off point for moderate activity was either self reported high intensity or 4 MET or higher for participants aged up to 55yrs or 3 MET for participants older than 55yrs.

Highest attained education level was used as indicator of Socio-economic status. We classified participants on the basis of one of four categories: never been to school or elementary
school only; lower vocational schooling and lower secondary education; intermediate vocational education and intermediate/higher secondary education; higher vocational education and university.

Finally, we asked if participants had ever had a medical diagnosis of diabetes, hypertension or elevated cholesterol levels.

**Participation Rate**

We attempted to contact potential participants by telephone (when possible) or home visit up to three times; if contact was not established or candidates refused to participate they were classified as non-responders. The overall response to the interview was 60% (figure 1). Participation rates were higher among women than among men. In addition, participants in the interview were more likely to be married and living with a partner and/or children, have a higher age at recruitment, have a higher income and live in a less urban area (address density of 1500-2500 addresses/km² vs. ≥ 2500). However, there were small absolute and relative

**Figure 1.** Flow chart of the inclusion into the study

```
Sample
2975

Not eligible a 148
Non-response 1130

Interview
1697 (59.9) a

Not eligible b 71
Non-response 182

Physical examination
1444 (88.8) b

Excluded c 3

Inclusion criteria
1441

South Asian
338

African origin
595

Ethnic Dutch
508
```

a Persons who had moved, were deceased or could not be reached at the registered address were not considered as potential participants. b Only persons of South Asian Surinamese, African Surinamese, and ethnic Dutch origin were invited for the physical examination (n=1626). Javanese or Chinese persons and persons with missing ethnicity were excluded (n=71). c Three persons without a full weight measurements were excluded.
differences between participants and non-participants for these characteristics and reported trends were similar across ethnic groups (data not shown).

Of all participants in the interview, 71 were not included in the study due to being of Javanese or Chinese ethnicity or having missing information on self-reported ethnicity. In addition, 182 persons were excluded because they had not undergone a physical exam. Finally, we excluded 3 participants because of incomplete information on measures of overweight and abdominal obesity. In total, 1441 persons were included in the analyses: 339 South Asians, 596 African Surinamese and 508 ethnic Dutch.

**Statistical Analyses**

We analysed data using Statistical Package for Social Sciences version 12 (SPSS Inc., 2003 Chicago, IL, USA). We tested for differences between the three ethnic groups and conducted post-hoc tests to compare ethnic Dutch to each of the Surinamese groups as well as the Surinamese groups to each other. Differences were assessed using the Chi-square test for percentages and ANCOVA for continuous variables.

Multivariable logistic regression analysis was performed to determine ethnic differences in body weight perception and behaviour regarding weight with adjustment for relevant covariates. The main outcome variables were “perception of overweight” (considers self overweight or not) and “reports trying to lose weight” (yes/no). All reported P-values are two-sided and P-values <0.05 were considered statistically significant. Analyses were conducted with stratification according to sex, ethnicity and weight status.

**Results**

Table 1 presents participant characteristics. Ethnic Dutch men and women were slightly older than both the Surinamese groups. Almost all Surinamese participants were first generation migrants with residence duration in the Netherlands greater than 20 years. Education level was highest among the ethnic Dutch participants followed by the African origin participants. Medically diagnosed morbidity in the form of diabetes mellitus (DM), hypertension (HT), elevated cholesterol levels or a combination of the three was more often reported by South Asian participants. Average BMI and prevalence of overweight did not differ by ethnicity amongst the men but average waist circumference and prevalence of abdominal obesity was significantly lower among those of African origin. Amongst women, mean BMI, prevalence of overweight and obesity, mean waist circumference and abdominal obesity was significantly higher in the Surinamese groups. Adjustment for education level and age did not substantially influence the observed ethnic differences in BMI. In addition, Table 1 presents data on body weight perception and weight loss behaviour. Amongst the men, ethnic Dutch were more often of the opinion that they weigh too much but were less often trying to lose weight. Amongst the women, more Surinamese were of the opinion that they weigh too much and more were trying to lose weight.
Table 2 shows the results of the multivariable logistic regression analysis of ethnic differences in the match between body weight perception and actual body weight variables. Among the overweight men we observed that both African origin and South Asian men were less likely to perceive themselves as overweight than did Dutch men, although these differences were not statistically significant for SA men compared to Dutch men. Adding BMI or waist circumference into the model did not change the relationships observed. Among overweight women, there were no significant differences in perception. However, African origin women were less likely to perceive themselves as overweight when BMI was accounted for.

Table 1: Participant characteristics

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dutch n=251</td>
<td>Afr-Sur n=193</td>
</tr>
<tr>
<td>Age, mean, yrs (SD)</td>
<td>48.1 ± (6.6)</td>
<td>44.0 (6.2)</td>
</tr>
<tr>
<td>Born in Suriname %</td>
<td>n.a.</td>
<td>99.5</td>
</tr>
<tr>
<td>Residence in Netherlands, yrs (SD)</td>
<td>n.a.</td>
<td>23.1 (8.7)</td>
</tr>
<tr>
<td>Education level, n (%),</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (low)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self reported morbidity</td>
<td>31.1</td>
<td>27.5</td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI ≥25 n, (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI ≥30 n, (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waist circumference mean, cm (SD)</td>
<td>95.9 ± (12.5)</td>
<td>90.4 (12.5)</td>
</tr>
<tr>
<td>Abdominal obesity n,( %)</td>
<td>65 ± (25.9)</td>
<td>32 (16.6)</td>
</tr>
<tr>
<td>Perceived too little</td>
<td>4.8</td>
<td>6.7</td>
</tr>
<tr>
<td>Just about right</td>
<td>43.8</td>
<td>58.5</td>
</tr>
<tr>
<td>Weigh too much</td>
<td>51.4</td>
<td>34.2</td>
</tr>
<tr>
<td>Behaviour, %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Try to lose</td>
<td>21.7</td>
<td>25.9</td>
</tr>
<tr>
<td>No action</td>
<td>58.6</td>
<td>59.1</td>
</tr>
<tr>
<td>Try to maintain</td>
<td>19.3</td>
<td>7.3</td>
</tr>
<tr>
<td>Try to gain</td>
<td>0.4</td>
<td>7.3</td>
</tr>
</tbody>
</table>

SA-Sur=South Asian Surinamese, Afr-Sur=African Surinamese, Dutch= ethnic Dutch. Self reported morbidity includes type 2 diabetes, hypertension, and/or elevated cholesterol level. Education level: 1= never been to school or elementary school only; 2=lower vocational and lower secondary education; 3= intermediate vocational education and intermediate/higher secondary education; 4=higher vocational education and university.. Abdominal obesity: waist circumference ≥102cm for men, ≥88cm for women. Differences between the three groups  a p<0.0001,  b p<0.05. Differences between SA-Sur and Afr-Sur groups  c p<0.0001  d p<0.05
not statistically significant there was apparent interaction between body weight perception and weight status in SA women: compared with Dutch women, overweight SA women were more likely to perceive themselves as overweight whereas normal weight women were less likely to perceive themselves as overweight.

In order to explore the association between body weight perception and weight behaviour we cross-tabulated these two variables, the result of which can be seen in figures 2 and 3. The figures show that among participants that perceive themselves to be overweight, fewer Dutch men and women reported that they were undertaking action to lose weight; whereas among the Surinamese we observed a reverse pattern, the majority of individuals that perceived themselves to be overweight also reported trying to lose weight.

The finding that Surinamese participants were more likely to report trying to lose weight was confirmed using a multivariable logistic regression analysis, as seen in table 3. The first row shows that after correction for age, education level and self reported morbidity, African origin
and SA participants were more likely to report trying to lose weight than Dutch participants; this was statistically significant in overweight SA men, all overweight women and also in normal weight African origin women. After controlling for perception, the ethnic differences were stronger and became statistically significant in all groups with overweight. In addition, the relationships observed remained statistically significant amongst the overweight participants when either BMI or waist circumference were added instead of perception. In other words, SA men and women and African origin women were more likely to report trying to lose weight. African origin men were the exception; in this group perception of overweight was the only significant contributor to reported weight loss action.

### Table 2: Ethnic differences in perception of overweight by overweight status

<table>
<thead>
<tr>
<th></th>
<th>BMI $\geq 25.0$ kg/m$^2$</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dutch</td>
<td>Afr-Sur</td>
<td>SA-Sur</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odds ratio (95% CI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of considering self</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>overweight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivariable model</td>
<td>1 (ref)</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>MV + BMI</td>
<td>1 (ref)</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>MV + WC</td>
<td>1 (ref)</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odds ratio (95% CI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of trying to lose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivariable model</td>
<td>1 (ref)</td>
<td>0.6</td>
<td>1.5</td>
</tr>
<tr>
<td>MV + Perception</td>
<td>1 (ref)</td>
<td>0.4</td>
<td>1.4</td>
</tr>
<tr>
<td>MV + BMI</td>
<td>1 (ref)</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>MV + WC</td>
<td>1 (ref)</td>
<td>0.27</td>
<td>0.65</td>
</tr>
</tbody>
</table>

SA-Sur=South Asian Surinamese, Afr-Sur=African Surinamese, Dutch= ethnic Dutch, ref= reference. Multivariable model (MV) includes age, education level (Education level: 1= never been to school or elementary school only; 2=lower vocational and lower secondary education; 3= intermediate vocational)

### Table 3: Ethnic differences in self reported weight behaviour

<table>
<thead>
<tr>
<th></th>
<th>BMI $\geq 25.0$ kg/m$^2$</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dutch</td>
<td>Afr-Sur</td>
<td>SA-Sur</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odds ratio (95% CI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of trying to lose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivariable model</td>
<td>1 (ref)</td>
<td>1.4</td>
<td>3.6</td>
</tr>
<tr>
<td>MV + Perception</td>
<td>1 (ref)</td>
<td>2.4</td>
<td>5.6</td>
</tr>
<tr>
<td>MV + BMI</td>
<td>1 (ref)</td>
<td>1.5</td>
<td>3.8</td>
</tr>
<tr>
<td>MV + WC</td>
<td>1 (ref)</td>
<td>1.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odds ratio (95% CI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of trying to lose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multivariable model</td>
<td>1 (ref)</td>
<td>2.8</td>
<td>3.7</td>
</tr>
<tr>
<td>MV + Perception</td>
<td>1 (ref)</td>
<td>3.4</td>
<td>3.8</td>
</tr>
<tr>
<td>MV + BMI</td>
<td>1 (ref)</td>
<td>2.7</td>
<td>3.7</td>
</tr>
<tr>
<td>MV + WC</td>
<td>1 (ref)</td>
<td>2.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

SA-Sur=South Asian Surinamese, Afr-Sur=African Surinamese, Dutch= ethnic Dutch, ref= reference. Multivariable model (MV) includes age, education level (Education level: 1= never been to school or elementary school only; 2=lower vocational and lower secondary education; 3= intermediate vocational education and intermediate/higher secondary education; 4=higher vocational education and university)
In table 4 we studied the associations between reported weight loss attempts, lifestyle variables and preferred weight loss strategy per ethnic group. Within the ethnic groups we observed few statistically significant differences between participants that reported attempting to lose weight (dieters) and those that did not (non-dieters). Among men, South Asians dieters had more total physical activity, ethnic Dutch participants dieters had higher DQI scores but African origin dieters were less likely to achieve the fit-norm than their non-dieting counterparts. Among women there were no statistically significant differences between dieters and non-dieters, except that African origin dieters more often achieved the norm of 2 pieces (200g) of fruit daily.
For preferred weight loss strategy, we only considered participants that reported trying to lose weight and compared the ethnic groups with each other. Overall there were no statistical differences in preferred weight loss strategy but Dutch men and women reported using physical activity least and diet most frequently. Post-hoc tests showed the differences to be statistically significant only between African origin and Ethnic Dutch men and women, i.e. more African origin men and women reported using physical activity to lose weight, whereas more ethnic Dutch participants reported using diet to do so.

As a final step we looked at lifestyle variables according to reported weight loss strategy. We found a limited number of associations and for simplicity we have chosen not to report these in table form. We found that more African origin women that reported using diet or diet and physical activity to lose weight achieved the norm for physical activity (p<0.05); fewer of the women that reported using diet only ate breakfast daily (p<0.05), and women that reported diet only had a lower diet quality score (p<0.05). Dutch men and women that reported using physical activity only or diet and physical activity had higher a diet quality score (p<0.05 in women and p<0.05 in men).

### Table 4a: Association of reported weight loss attempt and lifestyle variables in Men

<table>
<thead>
<tr>
<th></th>
<th>Dutch wt loss n=53</th>
<th>Dutch no wt loss n=190</th>
<th>Afr-Sur wt loss n=50</th>
<th>Afr-Sur no wt loss n=85</th>
<th>SA-Sur wt loss n=63</th>
<th>SA-Sur no wt loss n=141</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diet</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eats vegetables daily, %</td>
<td>56.6</td>
<td>51.6</td>
<td>52.0</td>
<td>53.5</td>
<td>58.7</td>
<td>56.5</td>
</tr>
<tr>
<td>Achieves fruit norm, %</td>
<td>37.7</td>
<td>31.6</td>
<td>32.0</td>
<td>24.5</td>
<td>36.5</td>
<td>31.8</td>
</tr>
<tr>
<td>Eats breakfast daily, %</td>
<td>75.5</td>
<td>70.0</td>
<td>56.0</td>
<td>51.4</td>
<td>57.1</td>
<td>50.6</td>
</tr>
<tr>
<td>Diet quality score, mean (SD)</td>
<td>4.1 (1.5) a</td>
<td>3.5 (1.4)</td>
<td>4.0 (1.4)</td>
<td>3.7 (1.4)</td>
<td>4.3 (1.3)</td>
<td>4.1 (1.4)</td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achieves norm, %</td>
<td>50.9</td>
<td>48.4</td>
<td>26.0 a</td>
<td>41.8</td>
<td>36.5</td>
<td>34.1</td>
</tr>
<tr>
<td>Total PA, median (IQR)</td>
<td>3425</td>
<td>3266</td>
<td>3263</td>
<td>3380</td>
<td>2940 a</td>
<td>2180 (1327, 3698)</td>
</tr>
<tr>
<td></td>
<td>(2117, 5830)</td>
<td>(1984, 4654)</td>
<td>(2450, 4572)</td>
<td>(1977, 6245)</td>
<td>(2040, 4872)</td>
<td></td>
</tr>
<tr>
<td><strong>Reported action taken to lose weight, %</strong> b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA only</td>
<td>18.9</td>
<td>-</td>
<td>46.0</td>
<td>-</td>
<td>34.9</td>
<td>-</td>
</tr>
<tr>
<td>Diet only</td>
<td>56.6</td>
<td>-</td>
<td>28.0</td>
<td>-</td>
<td>41.3</td>
<td>-</td>
</tr>
<tr>
<td>Diet and PA</td>
<td>20.8</td>
<td>-</td>
<td>22.0</td>
<td>-</td>
<td>23.8</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>1.9</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
<tr>
<td>Nothing/n.a.</td>
<td>1.9</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>0.0</td>
<td>-</td>
</tr>
</tbody>
</table>

SA-Sur=South Asian Surinamese, Afr-Sur=African Surinamese, Dutch= ethnic Dutch. a p≤0.05 for differences between participants reporting weight loss and those reporting no weight loss activity. b Differences in reported action to lose weight between Afr-Sur and Dutch men and women, p<0.05
This population-based study is one of the first to consider ethnic differences in the perception of body weight and its relationship to reported weight loss action and lifestyle variables in both men and women. We found that, compared with their Dutch peers, overweight African origin men and women were less likely to perceive themselves as overweight. Although not statistically significant, a similar trend was observed in overweight South Asian men, but not in overweight South Asian women. Despite being less likely to perceive themselves as overweight, however, Surinamese participants were more likely than their Dutch peers to report trying to lose weight.

In all three ethnic groups only weak associations were observed between weight loss attempts and dietary and physical activity behaviour. Finally, there appeared to be differences in the strategies employed to achieve weight loss, with African Surinamese reporting a preference for increasing physical activity and Dutch participants reporting a preference for adjusting their diet.
Limitations and Strengths

Before interpreting the findings of this study it is important to consider the potential limitations of our study. Firstly, our questionnaire relied on self-reported weight loss behaviour, diet and physical activity variables. As the SUNSET study clearly focuses on health and health-related behaviour it is possible that participants gave socially desirable answers. It may be that the tendency to answer in a socially desirable way is more prevalent among Surinamese than Dutch participants. It may also be that ‘that trying to lose weight’ has different meanings for different ethnic groups. Secondly, we relied on self-reported data over the presence of DM, HT and elevated cholesterol level; it may be that reporting of these conditions differs among ethnic groups, however, a previous study of the SUNSET population found no differences in reporting of HT between ethnic groups \(^{11}\). Thirdly, as our study was cross-sectional we have no information on baseline diet and physical activity to which we can relate the reported weight loss behaviour to. In addition, we assessed diet in a limited way and have no information the behaviour that is relevant for dieting to lose weight, i.e. total energy intake. Finally, we based our stratification on the conventional definition for overweight (BMI \(\geq 25.0\) kg/m\(^2\)) and did not further analyse according to South Asian cut-off points. This was a conscious choice based on the aims of this study: to determine individuals’ perception of their own weight. At the time the SUNSET study was initiated (2001) there were no alternative cut off points for South Asian populations published. This means that individuals of South Asian origin (and also the doctors and physicians treating them) would have been likely to evaluate their weight status according to usual standards for overweight. Applying adjusted cut-off for South Asians (overweight defined as BMI \(\geq 23.0\) kg/m\(^2\))\(^{30,31}\) would impact on our results regarding perception.

A clear strength of our study is that it was carried out in a setting that enables a comparison of different ethnic groups with a similar neighbourhood environment. Another major strength of our study is the fact that it was population-based, which reduces the possibility of bias due to pre-selection according to attendance at a certain clinic or employment at a certain factory. In addition, the recruitment strategy included specific measures to increase the participation among the various ethnic groups, such as endorsement by key figures in the community and matching of interviewers by ethnicity resulting in a high response rate among all ethnic groups. Furthermore, weight, height and waist circumference were measured in a clinic setting by trained assistants according to a clearly defined protocol.

Internationally, the South Asian Surinamese are relatively unique in that as a group they migrated from India to the Netherlands via Suriname. However, genetically they are comparable to other South Asian populations and experience similar disease risks. Similarly, Surinamese African origin groups differ from other African origin groups in terms of their migration history; however they also share some similarities with African American and Afro-Caribbean populations.

Studies of the perception of body weight among SA groups have mainly been conducted in the UK and results have suggested that South Asian women are less aware of their obesity than white populations \(^{6,22}\), we are not aware of research that has looked at body weight perception of South Asian groups residing in other Western countries. Studies in the US have
found that African Americans are more likely to misperceive their overweight than white Americans. Similarly, a study by Pomerleau et al showed that Afro-Caribbean women, were less likely to rate themselves as overweight. Our findings on overweight perception are consistent with those mentioned above as well as the results of another recent Dutch study.

Among the women in our study, the prevalence of overweight and obesity was higher in both Surinamese groups as compared with the Dutch group. Recent studies have shown increased overweight prevalence to be associated with decreased awareness of overweight, implying that individuals may have a tendency to compare themselves to the average when evaluating their own weight status; this may explain some of our results. However, we observed strong interaction between perception and weight status in South Asian women, with overweight women being more likely to perceive themselves as overweight than overweight Dutch women. This may indicate that South Asian women are not unrealistic in their body weight concerns. Interestingly, lower overweight perception in overweight African origin women was only significant when BMI was accounted for implying that elevated body weight is less likely to be taken as a sign of overweight by this group, this is consistent with studies that have shown a preference for pear shaped bodies among African origin men and women.

The postulation that ethnic differences in perception may be explained by prevalence differences does not hold for men, among whom overweight and obesity prevalence was similar. Within African origin men, body fat distribution may have played a role in their perception. In this group, mean waist circumference and the prevalence of abdominal obesity were significantly lower. The lower perception of overweight among African origin men was somewhat attenuated by addition of waist circumference into the multivariable model, which could mean that (just as in the African origin women) an enlarged waist circumference is more likely to be perceived as ‘fat’.

Given that weight loss action is likely to be associated with self estimated weight we would have expected that due to the greater underestimation of overweight amongst African origin and (to a lesser extent) South Asian men and women would be less likely to be attempting to lose weight. This would have also been consistent with reports in the literature: A study by Bush showed South Asian women to be less likely to be engaging in dieting behaviour; Tull et al found that Caribbean women’s lack of preference for large body sizes did not induce weight management behaviours; Preference for larger body sizes seems to form a barrier for weight loss action in African American women. Our finding that both Surinamese groups were more actively trying to lose weight than ethnic Dutch participants was therefore unexpected. Although we have not studied this, ethnic differences in reported behaviour to lose weight may reflect perception of health risk as this may be an important motivator for weight loss action. Among South Asian Surinamese, a high prevalence of type 2 diabetes may have served to enhance risk perception; resulting in greater attention to weight loss. However, we cannot speculate on the role of risk perception in the African origin Surinamese group, amongst whom overweight-related health risks had been little studied prior to the SUNSET project.
As previously mentioned, it may simply be that Surinamese participants’ reports that they were trying to lose weight reflect social desirability in their answers. By further exploring the relationship between reported wanting to lose weight and lifestyle variables we gained some insight into this issue. Our expectation was that reported weight loss attempts would be positively associated with lifestyle; however, we only observed this for a limited number of behaviours, in other words weight reducers did not differ much from non-weight reducers with regard to diet or physical activity. There were some statistically significant associations according to stated weight loss strategy; these implied that attempting to lose weight through dieting has some negative influences on actual diet. We found no other studies that compared ethnic groups on this basis, although one study found that African American women differ from white American women with regards to weight control methods being used 41. Other studies of weight loss have found that few ‘dieters’ use appropriate methods to achieve weight loss 42,43. Taken together, our results may imply that reported weight loss action is more indicative of intention than actual behaviour. Additionally, it may be that individuals trying to lose weight have problems sustaining their efforts 36,44. Nonetheless, we are led to conclude that Surinamese men and women are more likely to want to lose weight than are Dutch men and women.

Conclusions and Implications:

Although Surinamese residents of the Netherlands are less likely to perceive themselves as overweight, this does not seem to form a barrier for weight loss behaviour. Compared with their ethnic Dutch peers, they are more likely to report trying to lose weight. Amongst African origin men, perception of overweight does seem to matter however, making awareness raising an important aim in this group. The weak association between reported weight loss activity and lifestyle behaviours may indicate that individuals require support in adopting appropriate behaviour to achieve weight loss; this seems to be particularly the case for African origin women. Finally, reported weight loss strategies differ among groups; Surinamese indicate a preference for physical activity and ethnic Dutch report a preference for dieting. Public health strategies need to account for these preferences.
References


Cultural Transition: A Qualitative Study of Body Weight in Moroccan Migrants and their Non-migrant Compatriots

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Submitted for Publication
Abstract

Background
The high prevalence of overweight and obesity among non-western migrants to western countries may be a result of migration-related changes in lifestyle superimposed on pre-existing cultural norms regarding lifestyle and the perceptions of body weight. Insight into migrants’ culture may contribute to our understanding of their weight related behaviour. This paper presents the results of a qualitative study among Moroccan women living in Morocco and in the Netherlands. We aimed to gain answers to the following questions: 1) What are the perceived lifestyle and socio-cultural influences on body weight in Moroccan women living in the Netherlands? 2) Is the excess prevalence of overweight observed a reflection of traditional Moroccan views that value large body sizes?

Methods
We conducted focus groups during the period of June to November 2005 in the city of Amsterdam, the Netherlands and during the month of May 2005 in the city of Al Hoceima and two surrounding villages, in northern Morocco.

Results
The Contrast between Moroccans in Morocco and Moroccans living in Europe formed a thread that linked the major themes that emerged during the discussions. In both settings, the perceived influences of lifestyle on overweight development among migrants were similar; participants attributed overweight to an environment where food is abundant but where opportunities for physical activity are limited. Participants in all settings reported changes in the traditional preference for large body sizes. However, they also discussed that traditional preferences persisted in others; women in the Netherlands talked about this being the case amongst older people and in Morocco while Moroccan women in the city talked about this being the case among women living in villages. Women mentioned that, within their communities, weight loss is viewed as a sign of psychological, economic and social problems.

Conclusions
Migrants’ close contact with Morocco means that consideration of their culture of origin is an important aspect to consider in seeking explanations for their high rates of overweight and obesity.
Introduction

In many Western countries, the prevalence of overweight and obesity is higher among migrants from developing countries than it is among host populations, particularly among women. In some migrant groups overweight prevalence is higher than among their compatriots residing in their country of origin. Additionally, overweight prevalence may increase with duration of residence in the host society. This implies that changes in body weight may partly be attributed to migration. Specifically, by exposing migrants to new physical, economic, social and cultural environments, all of which are likely to have an impact on behavior and, ultimately, overweight development.

The initial change in the behavior of migrants is likely to be in response to the physical environment in their new context. In many modern and Western societies the physical environment is ‘obesogenic’, meaning that the sum influences of the surroundings, opportunities and conditions of life promote obesity. The obesogenic environment is characterized by a high availability of energy dense foods as well as limited opportunities for physical activity. This situation is often more extreme among lower socio-economic groups, among whom non-western migrants are well represented. However, migrants are not alone in their exposure to this environment; in other words, they often live in similar environments as members of their host society. The fact that migrants have higher rates of overweight and obesity may indicate that they somehow respond differently to their environment.

One of the domains upon which migrants are likely to differ from their host peers is that of culture. Culture has an influence on food intake and physical activity patterns as well as the perceptions regarding body weight. For example, high fat and sugary foods may enjoy a high cultural status, resulting in their more frequent consumption, when possible. In some cultures it may not be customary to engage in physical activity for pleasure, therefore migrants originating from those cultures would be less likely to participate in sport or use a bicycle for transport. Finally, it’s possible that non-western migrants originate from cultures that value large body sizes, and therefore they may be less likely to engage in weight controlling activities.

Culture, however, is not static. Migration exposes individuals to a new, ‘host’ culture which may bring about change, this process, known as acculturation, “comprehends those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact with subsequent changes in the original culture patterns of either or both groups”, usually with a greater change taking place in the ‘minority’ group. Studies have shown that acculturation influences diet, physical activity and body size preference of migrants. However, the direction of change in the behavior of migrants does not always follow expected patterns (i.e. convergence towards the host society), and not all behaviors change in the same direction (i.e. become either healthier or less healthy). It has been speculated that this is dependent on the prevalence of and/or attitudes towards a particular behavior in migrants’ culture of origin versus their host environment. Therefore,
in order to understand migrants’ health related behavior and its outcomes, information regarding their culture of origin is necessary.

**Moroccan migrants in the Netherlands**

In the Netherlands, like some other Western European countries (Belgium, France, Spain, Italy and Germany), Moroccans form an important migrant group. Migration from Morocco was encouraged in the 1970’s in order to fill labor shortages, usually in the lower occupation classes. Since that initial wave, further migration has occurred due to family formation; many Moroccan young people choose a partner from their region of origin. Moroccan migrants to the Netherlands are either Arabic or Amazigh (Berber) origin, mainly originating from the Rif Mountains in northern Morocco, a region that in many parts is economically deprived. Many reside in the larger cities of the Netherlands, in Amsterdam for example they represent 9% of the total population.

The rates of overweight and obesity in Moroccan migrant women living in Amsterdam are high, 78% of women aged 35 years or more are either overweight or obese. Data based on population surveys in Morocco (1999) indicate that 45% of women aged 20 or older are overweight or obese. This can be partly attributed to the nutrition transition, but researchers speculate that it is working in tandem with the culture that associates overweight with beauty, wealth and success.

In the Netherlands, studies have shown that young Moroccans prefer relatively ‘thin’ body sizes and it seems that the rates of overweight among young Moroccan women born in the Netherlands is lower than among women in the same age group that migrated from Morocco. Nonetheless, this last study showed that even in the second generation, the prevalence of overweight and obesity remains higher than among Dutch women.

This paper reports the results of an explorative focus group study among Moroccan women living in Morocco and in the Netherlands. By contrasting and comparing the perceptions of these two groups of women we aimed to gain some understanding of the socio-cultural context that has an influence on Moroccan women’s body weight. Our research questions were as follows:

- What are the perceived lifestyle and socio-cultural influences on body weight in Moroccan women living in the Netherlands?
- Is the excess prevalence of overweight observed a reflection of a traditional Moroccan preference for large body sizes?

**Methods**

**Research Design**

We conducted focus groups from June to November 2005 in the city of Amsterdam, the Netherlands and during May 2005 in the city of Al Hoceima and two surrounding villages, in the Rif region, north coast of Morocco. Focus groups were considered appropriate for our
topic as the interaction between participants may facilitate individuals’ ability to explain or account for their attitudes. The study was designed according to the research code for qualitative research, Academic Medical Centre, University of Amsterdam. It was approved by the Netherlands Organization for Health Research and Development and judged to need no further review by a medical ethics committee as participants were recruited on a volunteer basis.

**Participants**

*Amsterdam:* Results are based on a study of dietary habits of migrants to the Netherlands the details of which are available elsewhere (Nicolaou et al., in press). Women were invited to take part in focus groups at locations where they would normally meet such as community centers and mosques (convenience sampling). Leaflets announcing the study were circulated and individuals were approached personally by workers of the participating organizations.

*Morocco:* Participants were recruited within a group of women that attended the activities of a local, non-governmental organization (NGO) that aims to improve the status of women in North Morocco. A local English-speaking woman served as guide to the main researcher (MN) during the study period. Women were invited to take part in the discussions during the times they would normally be attending classes or other activities/meetings. At all locations we aimed to include 4 to 10 women, table 1 provides information on the locations used and the participants in the focus groups.

Once participants were gathered they were informed of the general aims of the study. We explained that the discussions would be recorded, anonymity in the reporting of the study was assured. Participants were asked to give their consent verbally. In the Netherlands we included a brief questionnaire with questions on demographics, migration history, and education level at the completion of the discussion. Participants and local contact persons received a gift voucher to the value of 10 Euros. In Morocco we asked participants’ age and education level during the introduction round of the discussion. We did not provide a financial incentive to participants; instead we made a donation to the NGO.

We conducted 7 focus group discussions. Table 1 provides further information about the locations used. In Morocco, participants in the focus groups in Al Hoceima city were higher.

**Table 1:** Descriptive information of focus groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of focus groups</th>
<th>Location</th>
<th>Number of participants</th>
<th>Mean age (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dutch Moroccan women</td>
<td>1</td>
<td>Mother-child Centre (MCC)</td>
<td>4</td>
<td>34 (27-44)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Women’s centre (WC)</td>
<td>8</td>
<td>29 (20-34)</td>
</tr>
<tr>
<td>Moroccan women in Morocco</td>
<td>2</td>
<td>Al Hoceima town (Al H)</td>
<td>9</td>
<td>28 (21-37)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Small village (SV)</td>
<td>6</td>
<td>22 (16-32)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Medium sized village (MV)</td>
<td>8</td>
<td>28 (20-48)</td>
</tr>
</tbody>
</table>

Mother-child centre: locations where primarily activities related to mothering are carried out. Women’s centre: locations where the focus is the personal development of women.
educated than the rural women; ten of the women had obtained a baccalaureate (the highest high school diploma) or higher. In contrast, all the village women had attended primary school for a few years only or had no formal education. In Amsterdam 11 women had attended primary school or had no education, and 5 had a high school diploma or higher.

**Interview Guide**

The questions relating to this particular study were embedded in a study that focused primarily on dietary intake. In addition we included questions on the perception of body weight and used seven silhouette drawings of male and female figures, developed by Collins 37 to stimulate discussion (see figure 1). Participants were asked to select the figure they found most desirable for themselves and for members of the opposite sex. In addition, we asked their associations between concepts such as health, wealth and happiness and the silhouettes.

*Figure 1:* silhouette drawings used to initiate discussion of body weight.

*Collins, ME, 1991*

**Moderation and Transcription of Discussions**

*In the Netherlands,* moderators were recruited via an external research agency and were trained by MN. Focus groups were conducted in the language of preference of the participants. They were recorded onto mini disc and were simultaneously translated into Dutch and (verbatim) transcribed by the moderators. The transcripts were checked for completeness by a native Moroccan speaker who was also fluent in Dutch.

*In Morocco,* the discussions were conducted by MN's guide in the local Tamazight dialect and were recorded onto mini disc. The moderator was briefed by MN and SB prior to the initiation of the focus groups. MN observed the focus groups, and discussed the main findings with the moderator at the completion of each session, at which time additional questions were formulated to provide clarification where needed. The recordings were translated and (verbatim) transcribed into English by an official translation agency in the Netherlands. Two of the transcripts were checked for accuracy by an independent researcher that is a native speaker of the dialect common to the Al Hoceima region.
Analysis
The full transcripts were entered into a computer software program, MAXQDA for the analysis (www.maxqda.com). Data were analyzed using framework analysis, that is, the objective of the analysis (research questions) was determined prior to the process 38. In addition to the focus group discussions field notes, made by MN during her visit to Morocco, were used to inform the interpretation of the results. MN and an independent researcher WS each coded two focus groups and conferred with each other to establish agreement regarding the main themes identified. The remaining focus groups were coded by MN and checked by SB and CD.

In the Netherlands the general themes identified by the analysis were presented to a number of participants as well as to researchers that have experience with our target group for verification. Due to the low representation of higher educated women we held a supplementary discussion with three university students in order to establish the applicability of the main themes to their situations.

The quotes used from the focus groups in Amsterdam were translated from Dutch into English by MN. The origin of each quote is indicated using the abbreviations (in brackets) as shown in table 1. Fragments of discussions are indicated by the use of letters (A, B, C etc.) at the beginning of a citation, with the letters denoting different participants.

Results
The focus groups generated extensive discussion about overweight, particularly among the Moroccan women residing in the Netherlands. Discussion of the differences between Moroccans in Morocco versus Moroccans living in the Netherlands formed a common thread throughout the discussions. A general point that emerged is the perception among migrant women that they do not fully belong in their host society (the Netherlands).

A: It’s difficult for a woman here; she’s not European but also not Moroccan. She doesn’t know what she is or how she should live. She doesn’t live as a Moroccan woman but also not as a Dutch woman…

A: Yes, you’re between two cultures. (WC, Amsterdam)

In addition, the women also discussed that they no longer belong in Morocco.

A: You know, they always pick you out as a ‘foreigner’ in Morocco…even if you’re walking around in a djelaba [robe worn over clothing], somehow they sense it.

B: And they say things like “welcome to Morocco”. Then you think, what? welcome to Morocco? And then on top of that, welcome to the Netherlands… (MCC, Amsterdam)

The results are organized into two main sections: perceived causes of overweight and perceptions regarding body size.

Perceived causes of overweight
Many universal themes emerged as having an impact on women’s body weight. These include the impact of marriage, child bearing and the availability of time to participate in activities
outside the home. Below we focus on the issues raised that appear to be particularly relevant for migrant women.

**Diet**

Two important elements were named as causing overweight, the role of the traditional diet and the influence of Westernization. The emphasis placed on either point reflected the location of the focus group. Moroccan women in the Netherlands mentioned that they consumed a variety of ‘snack’ foods such as chips and cookies, mostly while watching television. They mentioned that these foods are readily available in the Netherlands compared with Morocco. However, their main focus was on the role of traditional Moroccan foods and dishes in causing overweight, particularly in contrast to their perception of the Dutch cuisine which was described as healthier than their own traditional way of eating. In particular, the women mentioned that Dutch people use less oil and spices, both of which are perceived as unhealthy, but an intrinsic aspect of the traditional Moroccan diet.

“Our traditional food is fatty. It just is like that, you can’t change it” (MCC, Amsterdam)

In addition, there was discussion of the fact that Dutch people are more precise about the amounts they cook resulting in less overindulgence, but on the other hand less flexibility to accommodate unexpected guests.

“My neighbor cooks two potatoes per person; if you turn up unexpectedly around dinner time you are shown to the living room.” (MCC, Amsterdam)

Participants also recognized some of the positive aspects of their traditional diets, particularly the frequent consumption of fish, olive oil and fruit.

You know our problem is not that our food is unhealthy, we just eat too much of it, we use too many spices, too much fat and we eat it with lots of bread” (WC, Amsterdam)

In addition to these points, Dutch Moroccan women also mentioned that they perceived their eating patterns in the Netherlands to be a problem; differing work schedules within the family and busy routines resulted in irregular meal times. In contrast meals in Morocco were described as being more regular as working and school hours allow family members to eat together. Furthermore, many extended families in Morocco eat together; there is often at least one woman within the family that cooks for the rest.

“Here you’re alone, you don’t have family in the neighborhood so you do everything on your own, so you have no time to cook well” (WC, Amsterdam).

The women in Morocco spent more time discussing their perceptions of the causes of overweight in European women than about the issue of overweight among themselves. The discussion of traditional Moroccan food as a cause of overweight was limited although the women mentioned that European Moroccans eat more meat, more frequently, as well as heavier versions of traditional dishes. They mostly discussed the idea that integration into the European way of life is likely to be the main cause of overweight. Specifically, they perceived that European Moroccans consume fried fast foods, chocolate, other snack foods and soft drinks. “They prefer to drink coca [cola] with their meals instead of water.” (Al H, Morocco). The
women in Morocco mentioned that this appears to be particularly the case among migrant children who are perceived as having abandoned the traditional Moroccan diet in preference for a more Western pattern. “When they are here they eat fried potatoes with mayonnaise, even during tea time in the afternoon” (Al H, Morocco). This latter point was also discussed by the Moroccan women in Amsterdam who talked about accommodating their children’s tastes by cooking more Western foods (e.g. pizza and fries), in addition to Moroccan dishes which are preferred by their husbands.

**Physical Activity**
Participants discussed that in Morocco it is not customary for women to engage in formal exercise such as fitness classes or sport.

“A: Sport is also important, we do not do sport, only when doing housework.
B: That’s also sport.
A: no, sport means jogging and other things.” (MV, Morocco)

Household tasks and transportation, contribute most significantly to the physical activity of women. The women at both locations attributed overweight to a lack of physical activity which was linked to migrant women’s living environment.

“The women in Holland do not walk, they have a car and they do not have much work in the house, they have washing machines…” (Al H, Morocco)

“In Morocco you live differently, there the houses are bigger, just walking from room to room is sport. Here your room is 2x2.” (WC, Amsterdam)

Among Dutch Moroccans, the climate was mentioned as being important in stimulating physical activity. “In Morocco, people are healthier than here, and they eat everything. The difference is there you have the sun, you’re busy the whole time and you burn fat. Here the weather is always bad, and we have little opportunity for movement.” (MCC, Amsterdam)

Furthermore there are few possibilities for exercise for women only in the Netherlands, which forms a barrier for attending organized activities.

“Everything is mixed, so we can’t join in. Sometimes they organize activities for women only, but once a week is not going to do it.” (MCC, Amsterdam)

**Perceptions of Body Weight and Cultural Ideals**
The women in all locations selected relatively thin silhouettes, silhouettes 2 to 4, to represent ideal figures for themselves and many discussed their wish to lose weight. However, throughout the discussions there were many references to the influence of traditional views of women’s weight as well as the expectations from their social environments regarding body weight.

**Traditional Cultural Ideals**
The focus group participants talked about how plump female figures are valued by traditional Moroccan society. Large figures are associated with health, happiness, wealth and beauty. Tellingly, in the Tamazight language, the word used to describe a healthy or vital individual (sa')
also means plump. However, participants reported that traditional views are in the process of change. The figure chosen to represent a desirable weight by the majority of women in both the Netherlands and in Morocco was number 4, the middle silhouette. In addition, participants mentioned that young girls prefer to be slim and that women are exercising to lose weight.

“You know, most of the older people will say that being fat is healthy and also good because it means that you have a generous nature. But looking at young people, they all want to be slim… my daughter is very unhappy if she even gains a gram of weight, then she’ll eat less and exercise more… we don’t do that, we have other problems to deal with.” (MCC, Amsterdam)

Despite this the women mentioned the persistence of the plump figure as a cultural ideal, in settings other than their own. Thus the women in the Netherlands talked about this still being the case in Morocco, particularly in the villages and the women in Al Hoceima mentioned this to be the case in the villages but not in cities and large towns of Morocco.

“Those women in the countryside are uneducated and would rather be fat.” (Al H, Morocco)

In contrast to what might be expected, the women in the villages were quite insistent in their preference for the thinner silhouettes.

The expectations of ‘others’ appeared to have some influence on women. “Yes, it’s really like that with us, especially if you’re at a wedding and you look a little thin in your dress, people immediately wonder what’s wrong.” (WC, Amsterdam)

Although some mentioned that they were increasingly less concerned about the opinions of others “My thoughts have changed with time, in the beginning I used to think it was important to look a bit fat so that people would say, ‘hey, look, she lives abroad’. But now I’m smarter, I know that being fat is not healthy so I don’t care so much what others say” (MCC, Amsterdam) few women expressed this sentiment.

“In Al Hoceima there is a proverb: you eat what you like but you wear what others like” (Al H, Morocco)

Happiness and Wealth

A: “When I got married I got fatter”
B, laughing: “yeah, you have a good life……” (WC, Amsterdam)

The associations that are made between weight, happiness and prosperity were often discussed in a joking fashion and accompanied by much laughter among the participants.

A: “I’m a [silhouette] 5 and half but before I got married I was very thin.”
B: “She’s my sister-in-law and it’s true, now that she’s with us she’s put on weight. She wasn’t allowed to eat at her father’s house; now that she lives with us we feed her well.” (Lots of laughter accompanied this statement) (WC, Amsterdam)

Despite the joking tone, the occurrence of these types of statements appears to belie an element of truth, as is exemplified by an attitude expressed by a rural woman,

“They [European Moroccan women] get thin there because they are away from their family, suffer from homesickness, and when they are here they are with their family, they enjoy it.” (SV, Morocco)
On the other hand, stress or unhappiness was also perceived as causing weight gain. Moroccan women in the Netherlands described how worries about their children and their financial situation can result in little ‘space’ to consider activities that promote personal health. They described how this contrasts with Moroccans in Morocco who were perceived as having a more stable, quiet life “the women there do not have to worry about their children, they [the children] are all working or studying” (Al H, Morocco). They also contrasted their situation to that of Dutch women “Dutch women are in a completely different situation, they have a monthly salary, they have social security, everything is well organized. Our lives are very different; we have children that cause us to lie awake at night” (WC, Amsterdam).

In Morocco, however, similar points were made about European Moroccan women. “They have freedom, their children work, they have few cares and are no longer dependent on their parents. They have a secured future.” (Al H, Morocco)

Happiness was linked to being well looked after and material wealth. The women in Morocco talked about European Moroccans becoming fat due to their “good life” and “wealth”. “They can afford to eat fast food.” (MV, Morocco)

They also described how European Moroccan women show off their wealth and success during their yearly holidays to Morocco:

“Some women from Europe put on weight to show that they are doing well when they come to Morocco on vacation.” (Al H, Morocco)

However, the women in the Netherlands talked about the perceived pressure to look well when visiting their relatives in Morocco:

A: What you notice is that when you’re on vacation and you’re thin, people will wonder if you have problems with your husband...

Moderator: do you think that the expectation from your family in Morocco is changing?
A: No, it’s the same every year. If you’re fat you’re happy and if you’re thin you’re unhappy.
(WC, Amsterdam)

**Clothing Styles**

Along with happiness and wealth, there was much discussion of what is considered attractive for women. Women talked about thin figures signifying youth and modernity and that losing weight is often motivated by the desire to look good in “Western” clothes. This desire is fuelled by the media, especially satellite television, which has enabled the dissemination of a thinner body image ideal amongst women in many different settings.

“In the countryside in Morocco people don’t watch TV, so they are not influenced by the media, that’s why they still prefer to be fat” (WC, Amsterdam)

The women also talked about looking good in traditional clothing which consists mainly of long loose robes.

“I think that [silhouette] number 6 looks good in a Moroccan dress, and number 4 is a more ‘everyday’ figure.” (MCC, Amsterdam). The Takshita, a traditional Moroccan party dress fits best “those who have the form of a married woman” (Al H, Morocco).
The summer vacation in Morocco is a time for visiting family members and also for celebrating special events; weddings are often planned during the summer when family members can attend. This may impact women in two ways. Firstly, women often dress in more traditional clothing for special events, which may influence the way they prepare for their vacation. Secondly, food plays a central role in social occasions, meaning that a vacation in Morocco is also likely to impact on women's body weight.

“Weddings in Morocco can last up to seven days. Each day there’s an extensive menu, there are women hired to ensure that there’s a constant supply of food” (WC, Morocco)

The women discussed that the tradition of extensive wedding celebrations is less common in the cities but stated that this is still the case during the summer and in the villages.

Preferences of Men

Women's perception of male preferences has some influence on women's weight. The women indicated that younger men prefer thin women.

“The generation of now likes thin women, even if the woman is beautiful and a little fat, they do not like her” (MV, Morocco)

However, women also report that men prefer women that are not too thin.

A: I know two cases of two women who are too thin, and they are now in the process of divorce
B: my husband says to me do not lose weight, I love full women (AI H, Morocco)

Body Weight and Physical Health

The discussion of health as a concept varied somewhat according to the different contexts. In the Netherlands and in Al Hoceima there was some discussion of the link between overweight and diabetes. In general, however, the concept of health and overweight was little explored by the women and amongst rural women not at all. The discussion of health was more extensive in the segments of the focus groups that dealt with diet. In rural Morocco the women expressed that they did not know what healthy food is but mentioned that to be health food should be “clean” (i.e. well cooked and free from contaminants and pesticides) and “fresh” (i.e. not frozen, canned or pre-cooked). Furthermore they mentioned that it was important to eat a variety of foods and considered certain foods to be particularly healthy, these being meat, lentils, milk and dairy products. Interestingly some women’s reaction to silhouette 6 was that she “obviously eats meat.” (SV, Amsterdam)

In Al Hoceima the women mentioned the same points but also added that avoiding excessive intake, eating moderate amounts of meat, including vegetables and limiting oil or other fats as being important. However, this discussion was less extensive than their discussion of the importance of fresh food. In the Netherlands the discussions about healthy food reflected public health nutrition messages, the main ones being: limiting saturated fat intake, encouraging the use of olive oil, increasing fruit and vegetable intakes.
Discussion

This study explored the perceptions of body weight and overweight causes among migrant women of Moroccan origin and contrasted them with the perceptions of their compatriots still residing in Morocco. In both settings, women perceived that diet and physical activity were important contributors to overweight development and discussed how the living environment of migrant women plays an important role in promoting overconsumption of food while providing limited opportunities for physical activity. Participants reported that cultural ideals regarding women’s body weight are changing and indicated that thinner figures are increasingly preferred. However, the women also mentioned that traditional ideals still persist in their social environment, particularly among ‘others’; women in the Netherlands talked about this being the case amongst their families in Morocco; women living in the city in Morocco talked about this being the case among women living in villages. Women explained that, within their communities, thinness is viewed as a sign of psychological, economic and social problems and implied that they are under social pressure to comply with the expectations of others. Finally, it seems that the link between weight and health is not readily made; excess body weight appears to be considered more of an esthetic problem for women.

Lifestyle

The participants of this study report that their diets are influenced by migration to a Western environment. Migrants reported that they eat a diet that is high in fat. Interestingly, participants placed a different emphasis in explaining the link between diet and overweight depending on their location. Women in Morocco perceived that migrants eat a more Western diet, including high fat and high sugar snack foods whereas migrants ascribed their excessive energy intake mostly to the traditional Moroccan diet and food culture. They perceived that traditional foods which were described as rich and fatty were a reason for overweight within their community. This point contrasts the common view of traditional diets as being low in fat and sugar and high in fruit, vegetable and fiber content. However, there is some truth in both views, many traditional diets, when eaten selectively, can be energy dense, thus there is often not just one traditional diet, but variations on it depending on the resources available to those eating it. Migration to a western environment enables greater access to ‘luxury’ ingredients and often also leads to improvements in economic circumstances which may enable migrants to consume these more frequently. This would result in the consumption of a richer version of the Moroccan diet. The changes described by participants are not unique to migrants but are also taking place in Morocco as consequence of economic development and the nutrition transition. Unique to migrants, however, is that their exposure to the host culture may enhance the awareness of their cultural traditions regarding food. This may promote highly valued aspects of the food culture, for example Moroccan culture prizes hospitality, which is expressed by serving an abundance of food (Nicolaou, in press). Furthermore, enhanced awareness of their status of the ‘other’ may stimulate migrants to seek explanations for health and health outcomes within the very thing that makes them different; their own culture and traditions.
Interestingly, the discussions of food and health seemed to reflect the phase of the nutrition transition in which participants are located. Thus rural women focused more on hygiene and freshness as being important aspects of health, whereas Dutch women’s explanations reflected Western public health messages regarding diet. Overall, however, there was little attention for the consequences of body weight on health. Rather body weight was discussed from a psychological and an aesthetic perspective.

Consistent with the findings of other studies, insufficient physical activity among women also appears to be rooted in tradition. In Morocco physical activity is a normal part of daily living and household tasks, particularly as in rural areas public transportation is limited and few have access to cars, making personal transport an important contributor to general activity. In the Netherlands household appliances, small houses and the availability of cars and public transport explain lower levels of activity. Cultural norms that discourage interaction between men and women in public appear to discourage sport participation in migrant women. In addition, other barriers such as the climate and knowledge of appropriate activities appear to be relevant. The contextual barriers mentioned are applicable to migrant women, but also applicable to women living in Moroccan cities.

**Perceptions of Body Weight**

We speculated that the high overweight prevalence among migrant women of Moroccan origin may partly be explained by preference for large body sizes but found that migrant women in the Netherlands expressed a preference for ‘thin’ bodies. We also found a preference for ‘thin’ bodies among the women living in Morocco, including women from rural settings. These findings are consistent with a quantitative study among Moroccan women in the Netherlands, as well as with reports of changing body size preference among non-western populations. However, they contrast studies in Morocco which indicate the persistence of traditional ideals among Saharawi women and high Atlas Berbers. Within Morocco there are many cultural groups, often living in starkly different physical environments, the differences between our study and others are most likely a reflection of these differences.

Our study, however, also revealed some ambivalence regarding body weight. Although women expressed a personal preference for a ‘thin’ figure they also discussed the persistence of traditional ideals, the perceived social pressure to comply with these ideals and their concern with avoiding the negative perceptions of others. It may be that the cultural ideas regarding body weight reflect the nutrition transition in that the collective memory of famine in Morocco is relatively recent, potentially explaining some of the attitudes towards body size that were expressed. However, with the transition and associated economic development the roles of women in society are also changing, with more women being employed outside the home. These changes are often accompanied by a shift in the value assigned to women; from enablers of others (as wife and mother) to individual contributors to society, with each of these roles requiring different physical attributes from the women fulfilling them. This may, subsequently, reflect changes in the perception of body size and, associated with this,
a difference in the clothes women wear. Despite apparent changes, in Morocco the role of women as wife and mother is most common in and still highly valued. This was evident to some extent in migrant women also, participants often referred to marital happiness, the preferences of men and discussed the attributes associated with mothers’ body sizes as well as bodies to fit traditional versus modern clothes.

It seems inevitable that migration and contact with the host environment would lead to acculturation, and ultimately impact on migrant women’s perceptions of body weight. In addition, women would presumably be less influenced by norms prevalent in Morocco. However, the process of change is dependent on the interaction between the host context and the migrants themselves. Specifically, acculturation into a new environment is to a great extent dependent on the openness of the host society to the migrant group. Recent events, both internationally and nationally have created some distance between Western European populations and Muslim migrants. Studies in the Netherlands have shown that many young Moroccans feel themselves excluded from mainstream Dutch society and feel most strongly connected to their own ethnic group. Another study showed that more than two thirds of young adults (aged 18-30 years) had limited social contacts with ethnic Dutch people during their leisure time, while less than half were highly orientated towards Dutch culture (a measure of language and media use, shopping preference and emancipation as examples of Western norms and values). In addition, Dutch Moroccans maintain close ties with Morocco: through their yearly summer vacation, their reliance on Moroccan media for information and entertainment and a preference for marriage partners from their land of origin. Therefore, the influences from Morocco and cultural traditions remain salient for migrant women and may go some way to explaining the ambivalence towards body weight observed.

Limitations
Our study has some limitations. The locations used and our recruitment strategy meant that we had a high representation of specific groups. In the Netherlands, married, first generation women and housewives were highly represented. The implication is that these women may be less “aculturated” which would influence our results. In order to compensate we conducted a supplementary focus group with young women to ‘check’ our findings and found consistency in the themes discussed. In Morocco, our participants were recruited within the setting of one specific organization implying that the women may have had similar characteristics. Due to time and language constraints we were unable to compensate for this with additional focus groups or member checks. However, we held focus groups at both rural and city locations and our groups included higher educated women, as well as women that had little formal education. The presence of an outsider (MN) during the focus groups may have stimulated women to offer a more “Western” perspective than they otherwise would have done, in particular with regard to their perceived ideal silhouette. In anticipation of this we planned the topic list so that body size and shape were discussed at the end of the focus groups; by that stage women may have felt more at ease in offering their own opinions.
Conclusions

This qualitative study indicated that migration to an obesogenic environment appears to impact on lifestyle. In addition, it seems that pre-existing cultural norms underlying lifestyle and the perceptions regarding body size continue to influence migrant women. Migrants’ position in their host society as well as the maintenance of contact with Morocco means that their culture of origin is an important aspect to consider in seeking explanations for their high rates of overweight and obesity.
References


General Discussion
General Discussion

Surinamese, Turkish and Moroccan migrants form approximately 6% of the Dutch population. Among these groups overweight and obesity is high. More than half of Surinamese, Turkish and Moroccan adults aged 35 years or older are either overweight or obese. Two factors associated with being overweight or obese are diet and body weight perception. Information regarding these two factors is necessary to guide the development of effective promotional activities that target healthy living and eating.

To serve this goal, the studies described by this thesis aimed to gain insight into the environmental influences of diet and body weight in 4 ethnic groups living in the Netherlands – Surinamese of Hindustani origin and of Creole origin, Turks and Moroccans. The following research questions with respect to the four studied ethnic groups were addressed:

1. What are important influences on the diet of migrants? This question particularly focuses on socio-economic, socio-cultural influences and the impact of the physical environment. (Chapters 2, 3 and 6)
2. a What is the body size preference and body weight perception of migrants?
   b What is the influence of migration, socio-economic and socio-cultural factors on body size preference and body weight perception?
   c How do body size preference and weight perception relate to weight loss practice (Chapters 4, 5 and 6)

This final chapter addresses the main findings of the studies, including some of the methodological limitations. The results are discussed in light of their relevance for public health practice. Finally, some recommendations for future research are made.

Summary of the Findings

What are important influences on the diet of migrants?
Chapters 2 and 3, focused on identifying the influences on the diet of migrant groups, from Suriname, Morocco and Turkey. Chapter 2 describes the results of a quantitative study of the diet of SUNSET participants and explored ethnic differences in diet by comparing Surinamese South Asians and Surinamese of African origin with ethnic Dutch individuals. We found statistically significant differences in the diet of the three ethnic groups. Both Surinamese groups had more favourable intakes of fruits, vegetables, red meat, fish and vegetable oils but scored less positively on the use of breakfast and salt. South Asian origin migrants’ diets differed most from that of ethnic Dutch men and women while, although different, the diet of African origin participants’ was more similar to that of their Dutch peers. We also found that socio-economic status had the expected association with the diet of ethnic Dutch individuals, i.e. higher level of education was associated with healthier diets. This was not the case for migrants; among whom we found no consistent association between these two variables. Furthermore we found no consistent association between diet and acculturation level, based on the duration...
of residence, age at migration or level of contact with ethnic Dutch. We concluded from this study that ethnic origin itself is an important determinant of dietary intake.

Our observation of substantial ethnic differences in diet is consistent with the results of another Dutch study that included participants of Surinamese origin, as well as studies of comparable groups internationally. We are not aware of any recent food consumption studies in Suriname that would allow us to compare the diets of migrants to that of their compatriots still living in Suriname.

Chapter 3 described a focus group study among men and women of Turkish and Moroccan origin. In this study we explored the influence of socio-economic and socio-cultural factors on the diet of migrants. The findings suggested that in these two migrant groups, food plays a central role in expressing hospitality, resulting in a social context where food is abundant and difficult to refuse. Participants reported that serving an abundance of luxury foods to guests is perceived to reinforce the host’s social and economic status. Some migrants reported that their improved financial situation in the Netherlands meant that they consumed ‘luxury’ foods more frequently than in their countries of origin. Furthermore, respondents reported that they considered food and their food cultures as important markers of ethnic identity. Although there were indications that dietary acculturation is occurring, it also seemed that the traditions that govern hospitality in particular continue to be valued by migrants. Our finding is supported by reports that the underlying values driving dietary behaviour may not change so readily when confronted with a new environment.

The focus group studies described in chapters 3 and 6 provided some insights into the influence of the changed physical environment on food intake and dietary patterns. Participants reported an increased consumption of snacks and fast foods as these foods are more readily available in the Netherlands than in their country of origin. Fresh produce in the Netherlands is perceived as being less tasty than foods in Turkey/Morocco, resulting in greater use of ingredients such as meat to enhance the flavour of traditional dishes. In addition, changes in lifestyle with migration were perceived as a problem by some respondents. Differences in the way work and school times are structured, as well as activities outside the home, may result in ‘unhealthy’ eating practices such as the skipping of meals and irregular meal patterns. Finally, busy lifestyles result in less time for the preparation of ‘healthy’ meals. These findings are consistent with similar reports among migrant groups in other settings.

What is the body size preference and body weight perception of migrants?
What influence do migration, acculturation, socio-economic and socio-cultural factors have on body size preference?

Body size preference
Contrary to our expectations, we did not observe a preference for large body sizes among young adults of Turkish and Moroccan origin. The participants in the study described in chapter 4 selected relatively thin silhouettes to represent their ideal body size. We had postulated that
acculturation may influence body size preference, i.e. that less acculturated individuals would have a preference for larger bodies. However, we found no association between body size preference and acculturation variables such as place of birth, social contacts with ethnic Dutch or orientation to Dutch society. Our focus groups study among Turkish and Moroccan men and women in Amsterdam 13 and among Moroccan women (chapter 6) confirm the preference for thinner figures in these population groups. The findings in chapter 6 contrast with those of two recent studies in Morocco which indicate that the traditional preference for overweight women still exists among some specific groups 14,15. Morocco is a vast country with many sub-cultures so it is likely that many Dutch Moroccans are culturally different from the groups described in these studies. Our finding of a thin body size ideal among Turkish migrants is in line with a study in Turkey which showed that the desire to be thinner in Turkish adolescents is similar to that amongst adolescents in developed countries 16. However it’s important to mention that the participants in the focus groups also indicated that the traditional preference for plump figures still exists within their communities, in particular among older people and in their countries of origin. In the study described in chapter 6, Moroccan women discussed that in their cultures large body size is traditionally associated with wealth and high social status, but indicated that the maintenance of these traditions is characteristic of poorly educated groups, particularly in the villages of Morocco. We were unable to test the association between education level and body size preference quantitatively (in the study described in chapter 4) due to insufficient statistical power.

Perception of body weight: We found some degree of misperception of overweight in all four study populations. In chapter 4 we reported that more than 60% of overweight Turkish and Moroccan men perceived themselves to be ‘average’ and that this was the case amongst approximately one third of the overweight women. Unfortunately we were unable to compare these groups to their ethnic Dutch peers, but the finding that more men than women are unaware that they were overweight is consistent with that of another Dutch study that included participants aged 20-60 years of age 17. In this latter study 45% of overweight men and 20% of overweight women described themselves as being ‘just right’.

Chapter 5 compared the weight perceptions of Surinamese and ethnic Dutch participants. We found that African origin Surinamese were less likely to perceive themselves to be overweight than were their Dutch peers. In men the difference with Dutch remained significant even when we adjusted for BMI or waist circumference. Similar trends were observed in Surinamese men of South Asian origin, whereas overweight South Asian women had a more appropriate perception of their weight status.

Our findings on overweight perception are consistent with the results of another recent Dutch study 18. Unfortunately we found no studies from Suriname. Studies of the perception of body weight among South Asian groups have mainly been conducted in the UK and results have suggested that South Asian women are less aware of their obesity than white populations 19,20. We are not aware of research that has looked at body weight perception of South Asian groups residing in other Western countries. Studies in the US have found that African Americans are more likely to misperceive their overweight than white Americans 21-23.
but have indicated that the differences observed may partly be due to differences in socio-economic status. Higher income and education are more likely to be associated with accurate perception of overweight amongst African Americans (and Hispanic Americans) 23-25.

**How does weight perception relate to weight loss practice?**

The relationship between weight perception and weight loss behaviour varied according to sex and, to a certain extent, ethnic group.

Among young adults of Turkish and Moroccan origin (chapter 4), we observed clear differences between men and women. Men that perceived themselves to be overweight were also likely to report paying attention to their body weight. In women, it was not overweight perception but body size dissatisfaction, i.e. a discrepancy between ideal and current size that was associated with paying attention to body weight. Approximately two thirds of women reported paying attention to their weight which corresponded to the proportion that expressed dissatisfaction with their body size. The gender differences observed are comparable with what is commonly observed in Western populations 17,26.

In chapter 6 we explored the perceptions of Moroccan women on the causes of overweight, including discussion of the role of body size preference. The results from this focus group study indicated that traditional ideas regarding body size may impede women's weight loss efforts. This idea was discussed by Diaz and colleagues in a paper that reported a study of Latino Americans 27. However we found no other studies that explicitly discussed this issue.

In Surinamese men and women, we also observed some differences according to gender and ethnicity (chapter 5). Despite a more common misperception of overweight, Surinamese participants were more likely than their Dutch peers to report trying to lose weight. African origin men were the exception; we found that this group of men were more likely than their Dutch peers to report dieting only if they perceived themselves to be overweight. Our results were in contrast to what might be expected, based on observations in similar groups 28-31 and considering that weight loss action is usually associated with self estimated weight status 18,32.

**Methodological Considerations**

Before reflecting on the main findings of this thesis we will highlight some of the practical problems that were encountered in the conception and planning of the studies included in this thesis. This will be followed by a discussion of the methodological issues regarding the internal and external validity of the data upon which this thesis is based.

**Practical issues that were encountered**

In both the SUNSET and LASER studies it was intended to include assessment of diet in order to link it to health outcomes. However, the lack of available validated instruments to measure the diet of Surinamese, Turkish and Moroccan migrants was one barrier encountered. In addition, the time required to measure diet in an interview situation was prohibitive considering the
desire to measure other determinants of health, such as socio-economic status, acculturation, migration history, smoking, physical activity and alcohol use.

In both studies we decided to conduct 24 hour recalls in randomly selected individuals that had participated in SUNSET or LASER. Our aim was to obtain baseline information on the diet of these three important population groups. Although the 24 hour recall does not represent the habitual diet of individuals, it provides useful information on the intake of a group as a whole as the mean group intake is not affected much by intra-individual variation. Furthermore, the open nature of this method provides useful information regarding commonly used foods which forms a good basis upon which alternative instruments to measure diet (e.g. Food Frequency Questionnaires) can be developed.

In order to stimulate participation, potential respondents were approached by interviewers of their own sex and ethnicity. In the case of the LASER study we expected that a considerable proportion of participants would speak little Dutch, therefore we planned for interviews to be conducted in the language of preference of participants. In reality we encountered many problems in conducting our studies:

1. It proved difficult to find interviewers with sufficient training in conducting 24 hour recalls and who also fulfilled our other criteria for ethnicity. In the case of SUNSET we deemed that language and sex did not form a real barrier for participation and therefore the interviews were conducted by myself and a number of female Nutrition and Dietetic Students. For the LASER study, we failed to recruit dietitians or dietetic students from the relevant ethnic groups and therefore we trained young Turkish and Moroccan men and women to administer the 24 hour recalls.

2. Our study groups were difficult to contact and recruit. The consequence of striving to include interviewers that match the characteristics of the study population was that we encountered similar problems with the interviewers as with the study population. Specifically, interviewers were difficult to find and once engaged, maintaining contact with them was difficult. In addition, interviewers found it difficult to remain motivated in the face of low response rates, so we had a high interviewer drop out rate. As a result, data gathering took much longer than expected.

**Non-response and representativeness**

The LASER study: overall response rate was 57% (54.6% among Moroccan and 56.7% among Turkish origin migrants) meaning that 43% of the approached participants did not want to participate in the study or were not able to be contacted on three occasions. Nonetheless, despite the inclusion of adolescents and young adults (both difficult groups to engage in research) the response rate is comparable to other studies conducted in the Turkish and Moroccan population in the Netherlands. Analyses showed that the response and non-response group did not significantly differ according to age, gender, neighbourhood and generational status. However, we did find that among Moroccan males, younger age groups (15 to 19 year) were slightly overrepresented. As a result this group differed slightly from the other subgroups; fewer were married, more were born in the Netherlands and more were
still studying. With the exception of Moroccan males, it seems that the LASER population is comparable to the Turkish and Moroccan population aged 18-30 years living in Amsterdam.

SUNSET study: The overall response to the interview was 60%. Participation rates were higher among women than among men. In addition, participants in the interview were more likely to be married and living with a partner and/or children, had a higher age at recruitment, had a higher income and lived in a less urban area (address density of 1500-2500 addresses/km² vs. ≥ 2500). However, there were only small absolute and relative differences between participants and non-participants for these characteristics and reported trends were similar across ethnic groups. Therefore it seems that the study population is likely to be representative of the original sample.

Focus groups in Amsterdam: the Moroccan men in our focus group study were younger and more likely to be born in the Netherlands, to be unmarried and to be students as compared with the other groups. Of the women, a large number had little or no formal education. This reflects our recruitment strategy, i.e. we used the context of existing groups which meant we were dependent on the willingness of community organizations to participate in the study for the recruitment of participants. A number of focus groups were held at women’s centres which are more often used by lower educated, non-working women and at mother-and-child centres that are attended by slightly older women with children. However the major themes discussed in this paper were consistent for all the groups and were confirmed by a supplementary discussion with younger women as well as by professionals familiar with these groups.

Focus groups in Morocco: participants were recruited within the setting of one specific organization implying that the women may have shared certain characteristics. Due to time and language constraints we were unable to compensate for this with additional focus groups. However, we held focus groups at both rural and city locations and our groups included higher educated women, as well as women that had little formal education.

Cross-sectional design
The findings in the quantitative studies described in this thesis were based on cross-sectional data implying that inferences about temporal relationships (causality) should be made with caution. In particular, causality in the relationship between perception of body weight and weight loss action (chapter 5) or paying attention to weight (chapter 4) is uncertain. In the case of reported weight loss activity and lifestyle factors (chapter 5), information about lifestyle prior to reported weight loss attempt is necessary to determine whether changes in behaviour were actually made. Longitudinal data would help in unravelling these associations. However for other associations causality cannot be disputed, as in the case of ethnic origin and diet.

Ethnic Dutch comparison group
The LASER-study did not include ethnic Dutch participants and we were unable to find comparable studies of body size preference among the ethnic Dutch population. It may be that the link between body size preference, overweight perception and paying attention
to body weight differs in Dutch men and women in the same age category. Our qualitative studies were also restricted to Turkish and Moroccan participants. It would be useful to have compared the socio-cultural and environmental influences on diet with those reported by ethnic Dutch men and women. The SUNSET study included a comparable ethnic Dutch population which enabled us to contrast the diets, weight perception and weight related behaviour of Surinamese and Dutch men and women.

**Self-reported behaviour and social desirability**

LASER: the study described in chapter 4 included a combination of measured and self reported heights and weights. Due to practical issues not all participants could be measured during the interview. Data on 40% of all participants was based on self-report. We performed additional analyses and found no difference in the prevalence of overweight between self reporters and the weighed group. We also tested mean BMI between the two groups and found no differences in BMI between them with the exception of Moroccan women where median BMI was slightly lower in self reporters. As a final step, we stratified according to self-report and compared on the basis of demographics, socio-economic status (SES), acculturation variables, and on the perception variables but found no significant differences between them. We therefore decided to include the self-reporters in the analyses in order to optimise our sample size.

SUNSET: a strength of the SUNSET study is that height and weight were measured in a controlled environment by trained assistants. However, dieting behaviour, physical activity and diet were all self-reported. As the SUNSET study clearly focuses on health and health-related behaviour it is possible that participants gave socially desirable answers. What is considered to be socially desirable may differs across groups, or that some groups are more likely to answer in a socially desirable way. It may also be that ‘trying to lose weight’ has different meanings for different groups. Information from qualitative studies may help in understanding these findings.

Focus groups: social desirability may also have been an issue in the focus group interviews, perhaps more so in situations where the participants already know each other, as was the case in our study. Conforming to the view of the majority is a known phenomenon in groups 34. Therefore it is possible that we did not hear strongly diverging views from our focus group participants. Our member checks (discussion of the results with participants) as well as discussions with external experts during the analysis indicated that the focus groups highlighted the points considered as most salient by these migrant groups. However, it is worth mentioning that some topics, for example personal financial matters and their impact on lifestyle are highly sensitive, making them inappropriate for discussion in focus group settings. Therefore our exploration of the topic of diet and socio-economic status was limited.

**Generalisability of the results**

Our studies were based in Amsterdam. This may mean that our findings per migrant group are not applicable to their peers, migrants of the same ethnic origin living elsewhere. However, a
The large majority of migrants in the Netherlands live in large cities and although cities differ from each other it is probable that our findings also apply to these groups.

This thesis describes a number of different ethnic groups, using data from a number of different studies, with differences in design and including participants of different ages. For example, from the LASER study we limited our analysis to participants aged 18-30 years, our SUNSET population was aged 53 to 60 years and our focus groups included men and women ranging from 18 to 45 years of age. The advantage of our approach is that we have a broad perspective from different age groups with different migration histories. It may be that many of the mechanisms described overarch the individual ethnicities. However, we cannot be sure that this is the case for findings that relate to specific cultures, for example when considering the cultural traditions regarding body weight, or the role of food as an expression of hospitality. Therefore we need to be cautious in generalising results between the migrant groups studied and to other non-western migrant groups.

The use of mixed methods
At the time that the studies described by this thesis were initiated, many of the topics covered were largely unexplored. Therefore the use of qualitative and quantitative methods was a logical choice. The qualitative studies allowed us to gain some understanding of the mechanisms underlying the quantitative results regarding diet and body weight perception. Unfortunately, as already mentioned, we were not able to study all the ethnic groups covered by this thesis to a similar extent. However, we expect that the mechanisms identified in the individual studies provide insights that are relevant for the ethnic differences in the Netherlands.

Reflection on the Results
In this section the main results will be discussed and reflected upon. I will explore potential explanations for the observations made in the light of existing theoretical frameworks.

1. The diet of migrants does not appear to change so readily.
The studies described in this thesis indicated that public health priorities targeting the dietary behaviour of the general adult population in the Netherlands also apply to migrants. However, the foods being eaten and the determinants of dietary habits differ. In the study described in chapter 2 we had expected that long residence duration in the Netherlands would have some impact on the diet of migrants and that the diet of highly acculturated individuals would more closely resemble that of their ethnic Dutch peers. However, in this group of Surinamese first generation migrants, we did not observe consistent associations between overall diet quality or individual dietary items and time since migration, age of migration and acculturation (determined using measures of social contacts with ethnic Dutch). Although only a relatively small number of foods and dietary behaviours were measured, the finding of ethnic differences in diet was confirmed by a supplementary study using 24 hour recalls among a sub-sample
of the Surinamese population as described elsewhere \(^35\) and briefly summarised in chapter 1 of this thesis. This is perhaps not surprising considering that we focused on first generation migrants, among whom the average age at migration was 21 years. There is much evidence to suggest that eating behaviour is learned during childhood and even though habits and preferences can continue to be acquired in adulthood, childhood experiences may largely determine food choice later in life \(^36,37\). This implies that a persistence of differences in the diets of migrants may be simply a consequence of habitual behaviour which was learned during childhood; among first generation migrants in their country of origin.

It may well be that the children of migrants will develop dietary habits that are closer to those of their ethnic Dutch peers. The Turkish and Moroccan participants of the focus group study (chapter 3) reported that there are differences in what is being eaten by younger and second generation migrant-origin individuals. Comparison of food consumption data from a sub-sample of the LASER population \(^38\) with an earlier Dutch study by Brussaard et al \(^39\) provides some support for this idea. The study of LASER participants indicated that their intakes of saturated fat and some food groups, such as fruit and vegetables were similar to those of ethnic Dutch men and women of the same age group. Brussaard et al reported that the Turkish and Moroccan mothers in their study had more favourable intakes of the same items than Dutch women but that the intakes of their 8 year old children were less favourable.

However, even in this relatively young group, the food consumption data from LASER indicated that food products and mixed dishes from their traditional cuisines remain in use. This is not unexpected considering that children learn their dietary behaviour from their parents, who are first generation migrants.

Dietary behaviour reflects more than just habits learned in childhood. The qualitative study of the socio-cultural determinants of the diet of Turkish and Moroccan men and women (chapter 3) allowed us to explore the contribution to dietary intake by other concepts that underlie ethnicity, such as culture, religion and identity and their particular relevance to being a migrant. We found that diet is governed by deeply rooted cultural norms and values, and that it has particular significance for migrants’ sense of their ethnic and cultural identity. This may mean that dietary change occurs in a differential fashion; some aspects of the diet may be relinquished or adopted more readily than others, perhaps depending on the value for ethnic identity that is ascribed to particular foods.

This concept was offered as an explanation for the dynamic underlying dietary change by Koctürk-Runefors \(^10\) in a study of the diets of Turkish migrants in Sweden. According to this theoretical model (figure 1), foods that are strongly associated with cultural identity may be the last to change. Whereas accessory foods are less valued and change in their use is often related to availability or the economic situation. This results in a situation where change occurs while the basic features of the diet, those associated with cultural identity are retained. International studies have provided some support for this concept; the consumption of snack foods and sugared drinks are often the first to change in migrants’ diets, \(^40-42\) but that this may coexist with a situation where even highly acculturated individuals retain some of their own food habits \(^41,43\). We observed that many Surinamese continue to eat white rice as their main
staple food and bread remains an important component of both Turkish and Moroccan meals. At the same time, within the Turkish cuisine for example there are often many variations possible on basic recipes, with the addition of meat when available. Turkish migrants to the Netherlands often incorporate meat into traditionally vegetarian dishes, like lentil soup. Amongst Moroccans, the national soup, harira, is based on pulses, but chicken or meat may be added if available. Thus, the energy density of the diet may change while migrants perceive that they have retained their traditional diets.

The findings of our studies are compatible with the Koctürk-Runefors model but add a new dimension to it. Our focus group participants (chapter 3) contrasted the central role of food in their own cultures with that of the mainstream Dutch culture, with particular reference to the concept of hospitality. In that chapter we discussed how food behaviour, such as the serving and accepting of food in social situations, is perceived by migrants to be an important aspect of their cultural identity. This implies that not only what is eaten but how and why should be included when considering dietary change. Specifically, migrants may change the types of food they serve during social occasions but the value that is attributed to the offering and accepting food may persist.

Figure 1: Koctürk-Runefors model for dietary change

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<th>Retaining food habits</th>
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<tr>
<td><strong>IDENTITY</strong></td>
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<td><strong>Staple foods</strong></td>
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<tr>
<td>Rice, potatoes, pasta, bread</td>
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<tr>
<td><strong>Accessory foods</strong></td>
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<tr>
<td>Meat, chicken, fish</td>
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<tr>
<td>Milk, cheese</td>
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<td>Pulses</td>
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<td>Vegetables</td>
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<td><strong>Extras</strong></td>
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<td>Fats</td>
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<td>Nuts and Spices</td>
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<td>Sweets</td>
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<td>Drinks</td>
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<td>Fruit</td>
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<td><strong>TASTE</strong></td>
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<td><strong>Changing food habits</strong></td>
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</table>

Koctürk - Runefors 1991
2. Evaluation of personal weight status may depend on comparison with others
In chapters 4 and 5 we studied the perception of one’s own weight status in all groups, albeit with slight differences in the methodology. We did find some discrepancy between perceived and measured weight status in almost all groups. Among the Turkish and Moroccan groups, a large proportion of overweight individuals perceived themselves to be ‘average’. Compared with their Dutch peers, overweight African origin men and women and South Asian men were less likely to describe themselves as overweight. We speculated that individuals are likely to evaluate their weight based on their comparison with others in their social environment. In other words overweight may not necessarily be viewed as desirable, but rather that it may be considered ‘normal’. In chapter 4 we observed that only 23%-33% of Turkish men and women had a high level of social contact with ethnic Dutch while in chapter 2, it was apparent that only 20-39% of Surinamese men and women had a high level of contact. It may be that individuals in our study populations compare themselves mostly to members of their own ethnic group. With the exception of Surinamese and Moroccan men, the groups studied have a high prevalence of overweight and obesity, perhaps explaining the tendency to describe oneself as average or normal weight. This is consistent with recent research findings in the US; studies have observed a decreased perception of overweight amongst overweight men and women, transposed on a situation where overweight prevalence has increased. An important implication of the idea that individuals compare themselves to their immediate social group is that increased social contact with ethnic Dutch may result in differential body weight perception among migrants based on the socio-economic status. For example, higher educated migrants would be likely to have more social contact with higher educated ethnic Dutch groups, among whom overweight prevalence is lower. Although we did not have the opportunity to explore this hypothesis, a study of smoking behaviour among Turkish women in Amsterdam by Nierkens et al confirmed the idea that the influence of acculturation on behaviour is dependent on socio-economic status.

3. Culture and the Nutrition Transition
Culture, “the shared values, beliefs and perceptions of the world that lie behind people’s behaviour and are expressed in the ways people live” appears to be an important determinant of diet and body weight. Food culture is likely to have been shaped by biological needs which were exerting their influence on human behaviour in tandem with contextual/environmental factors. Specifically, in order to ensure sufficient energy intake humans have evolved a preference for energy dense foods, which in turn have promoted the status of these foods within many cultures. Until relatively recently in human history, a low availability of energy dense foods in combination with physically demanding circumstances kept energy balance in check. Overweight prevalence was low and associated with wealth and status, making it a desirable characteristic. In recent decades, however, economic development and changes in global food supplies have led to major changes in diets. For example, farming subsidies have stimulated over production of certain foods, particularly sugar, while new technology has resulted in better and cheaper ways to obtain vegetable fats. This has been described
as the Nutrition Transition: traditional diets that were high in fibre and starch and low in animal fats, meat and sugars have given way to modern diets with increased intakes of refined carbohydrates, sugars, meat and fats, including vegetable fats and oils. In parallel, obesity, heart disease and diabetes type two have emerged as predominant public health problems. Two other important transitions have occurred over a similar time frame. Firstly the epidemiological transition, which describes the process of change in disease patterns within populations; infectious diseases decline while chronic diseases predominate. Secondly, the demographic transition which describes the changes that occur in the composition of the population, with age distribution shifting to older ages. Evidence has shown that the Nutrition transition is occurring in many settings and has also been documented in Morocco. However we found no comparable analyses of Turkey or Suriname, although data from the Food and Agriculture Organisation (FAO) of the UN indicates that these countries are also undergoing the nutrition transition. Turkey is further in this transition than both Morocco and Suriname: protein, fat and energy intakes in Turkey are higher while the proportion of the population that is undernourished at 3% is lower than Morocco, 6% and Suriname, 10%. Turkey also most closely resembles the Netherlands in terms of population energy and protein intakes, although total fat intake and intake of animal products is still lower in Turkey.

Popkin in his presentation of the nutrition transition, postulates that a health conscious pattern of nutrition behaviour is the desirable response to current developments. In this pattern, conscious increases in fruit, vegetable and unrefined starch intakes are accompanied by decreases of refined foods, meats and dairy products.

If we accept that human behaviour is a result of the interaction between environmental (cultural and physical) and biological influences, then it's important to consider how culture may fit into the nutrition transition. In a context of food shortage and famine, an abundance of food and overweight are likely to be associated with survival and health, in turn enhancing the cultural value of energy dense foods and large bodies. In some cases, survival in an environment of scarcity may also have been dependent on successful individuals (e.g. hunters) sharing their resources, which presumably would have been the origin of the cultural traditions of hospitality.

Closely linked to this and a recurring theme in the qualitative studies that explored the influence of culture on diet and body weight in this thesis (chapters 3 and 6) is the association between food intake and body weight with socio-economic status. Human's desire to express their higher status may result in behaviour contrary to the mainstream. Thus in a context of scarcity, high status groups distinguish themselves by their consumption of high fat, high sugar foods and by their overweight. With the nutrition transition the opposite pattern eventually develops. High status individuals consume lower fat foods and are more likely to be thin, albeit with gender differences in the latter relationship. Likewise, a wish to exhibit one's status would be reflected in the extent to which hospitality is extended to others, a high status host would be better placed to offer more and higher quality foods to their guests.
Figure 2 illustrates the nutrition, epidemiological and demographic transition as described by Popkin. The concept of the cultural transition is proposed as a further addition to this framework.

Most relevant for overweight development is to consider how these different transitions are related to each other. The demographic, epidemiological and nutrition transitions are relatively new phenomena in human history. The nutrition transition in particular has accelerated in recent years, with many developments occurring within a time span of 20-50 years. Change in culture however may have a different time frame and appears to be influenced by the values (such as religion) that underlie societies. As a result, the cultural response to the obesogenic environment may be neither timely nor proceed in an expected fashion. In the case of migrants, maintenance of cultural traditions may serve the added function of reinforcing a sense of ethnic/cultural identity as well as promoting social cohesion within the migrant group in the Diaspora.

The ‘mismatch’ between culture, behaviour and environment is unlikely to apply solely to migrants. Migrants may originate from environments that are in earlier phases of the nutrition transition, which may in turn place them in a relatively different position. However, even in countries that have undergone the nutrition transition as is the case in many Western countries, including the Netherlands, segments of the population may experience food insecurity which would influence their attitudes towards food.
Implications for Prevention and Policy

This thesis set out to provide insights for interventions targeting migrant groups in the Netherlands. The following section will discuss how the findings and our interpretation of them may be used to develop interventions targeting overweight/obesity prevention and treatment.

1. Cultural sensitivity remains an important issue for dietary interventions

This thesis affirmed that ethnic origin, in its broadest sense, is an important determinant of diet, even for groups with long residence duration. It has an influence on the foods and dishes commonly consumed, on dietary patterns and on the role that food plays within the socio-cultural environment. In order to be effective, interventions need to account for the diversity of meanings ascribed to food and food-related behaviours at all levels; conception, design, implementation and evaluation.

**Foods:** The focus group studies (chapters 3 and 6) indicated that certain foods or traditional dishes have relevance for the identity of migrants. However, it is often these foods that are also perceived to be particularly unhealthy by the groups themselves. For instance, the participants in our focus groups discussed that they considered traditional dishes to be high in fat and overly spiced. It was also stated that vegetables are cooked too long which destroys vitamins and that white rice or bread are eaten in excessive quantities. In contrast, many perceived the Dutch diet to be healthier, for example, vegetables are cooked for a short time, in water rather than oil (and are therefore lower in fat). In addition, there was much discussion about the resistance to changing the preparation of traditional dishes from within the family, due to a perception that taste would be compromised. A consequence of these ideas is that people may perceive that they should abandon their traditional diets for a bland but healthier diet. Although it seems obvious, helping migrants to maintain the healthy aspects of their traditional diets and at the same time adjusting the balance of ingredients or cooking methods to minimise their less healthy qualities remains an important goal for interventions. This strategy is widely employed, including by an intervention for obesity prevention among Turkish and Moroccan women conducted by the Municipal Health Authority of Amsterdam. Finally, it’s important to recognise that the overall quality of the diets of migrants is also influenced by the use of ‘extras’ (sweet and fatty foods), as described by Koctürk-Runefors. These foods are often important contributors to excessive energy intakes. It may be that these foods also have less significance for migrants’ sense of identity. Nonetheless, in addressing the intakes of these foods, interventions need to be sensitive to the role they play in social interactions including the idea that these ‘luxury’ foods may be perceived as enhancing social status.

**Meal patterns:** Our focus groups referred to irregular eating patterns and the skipping of breakfast as being common within their communities (chapter 3). This was also observed in our study described in chapter 1 as well as in both food consumption studies. Although on the surface this appears to be a relatively simple issue, its prevalence requires consideration. Our focus group study (chapter 3) indicated that migrants may have problems adjusting to
the lifestyle of the host country, which can underlie the irregular eating patterns reported. In addition, focus group participants reported that skipping meals may be used as a compensation for behaviours such as eating a second, late meal with unexpected guests. Finally, although not studied in this thesis, it may be that religion has an influence. For example, during Ramadan the usual eating pattern is reversed. Food and drink are not consumed during daylight hours and in the evenings many celebrate by eating together with family and friends. Reverting to a more usual eating pattern after a month of fasting and feasting may cause problems for some.

It may be that the issue of adjustment to a ‘new’ lifestyle will dissipate with time, certainly for migrants born in the Netherlands. However, considering that eating behaviour is learned via the parents during childhood, it’s also likely that some unfavourable eating habits may persist, even in subsequent generations. In addressing migrants’ meal patterns, interventions need to consider the issues underlying them, including the ‘mismatch’ in lifestyles that migrants may experience.

Socio-cultural environment: In the case of Turkish and Moroccan groups, interventions need to account for the value-system that underlies the offering and accepting of food in social situations and the consequences this has for habitual food intake. Existing values within the culture, such as the teachings of temperance within Islam, could form a platform that would appeal to particular segments within these communities. In addition, it seems that the medical risks of overweight may need to be explicitly emphasised in order to lend validity to the message of moderation.

On a more individual level, the impact of social norms on habitual food intake needs to be acknowledged. Some individuals may require help in developing strategies to increase their self-efficacy in social situations. For example “how does one say no without insulting one’s host?” or even, “how does one exercise restraint in the face of temptation?” Although our study was limited to Turkish and Moroccan people living in Amsterdam there is reason to expect that similar issues are relevant for other migrant origin groups. Evidence from qualitative studies (article in preparation) among Surinamese men and women indicates that, also in this community, food plays a central role in social occasions.

2. Physical activity
Physical activity was covered in a limited way in the studies described in this thesis. However, as overweight development is an issue of energy balance, it’s an important discussion point. Particularly for these cultures who were, until recently, exposed to physically demanding lifestyles.

In the study described in chapter 5 we observed that preferred weight loss strategy differs according to ethnicity. Surinamese men and women reported using physical activity to lose weight which could be a reflection on the relative value placed on diet by these groups, i.e. increasing physical activity may be perceived as being easier than forgoing favourite foods. Should interventions focus more on stimulating physical activity and less on changing diet? Unfortunately, neither of these behaviours is easily influenced. Studies among Turkish and Moroccan men and women indicate that contextual factors may form a barrier to physical
activity and that, for some groups, culture also plays a role in whether individuals engage in sports or fitness activities. For example, separate facilities may be required for men and women. While it is important to emphasise the value of physical activity, it is also important to recognise that it is most effective in combination with appropriate dietary changes. Therefore, both are recommended in the prevention and treatment of overweight. Interestingly, it appears that this dual strategy enjoys less popularity than either diet or physical activity alone, as was exemplified in our study of Surinamese and ethnic Dutch men and women (chapter 5).

3. Interventions should enable individuals to act on their intention to lose weight by promoting healthy behaviour.

Despite the desire to be thinner among Turkish and Moroccan young women and the fact that many Surinamese men and women reported that they were trying to lose weight, a large proportion of these groups, particularly of the women, was overweight or obese. This implies that although many would rather be thinner, it seems that few succeed, which is a common phenomenon in many populations, and one of the drivers of the lucrative weight loss industry.

We gained some insights into this issue. In chapter 5 we observed in SUNSET participants (including ethnic Dutch men and women) that reported weight loss attempts were inconsistently associated with appropriate diet or physical activity behaviour, which may imply that reported behaviour is more indicative of intention rather than action or that the weight loss strategies used are largely ineffective. Although we did not study dieting behaviour in Turkish and Moroccan migrants, we observed that women paid attention to their body weight if they were dissatisfied with their body size. Body size dissatisfaction has been associated with unhealthy dieting practices in other studies. Therefore it appears important that interventions emphasise the promotion of healthy behaviour (which would presumably result in healthy weight) than to focus on overweight as a ‘problem’ and thinness as an ‘ideal’.

The focus group discussions with Moroccan women (described in chapter 6) highlighted the importance of the socio-cultural environment for weight loss. Although there is a shift in body size preferences, both in Morocco and among Moroccans in the Netherlands, it seems that traditional ideals regarding body weight do still exist. This may explain the ambivalence with respect to weight loss that was expressed by the women in this study. In these groups, compliance with social norms, including the norms governing body weight and food intake (chapter 3), may be an important barrier to weight control. Finally, it seemed that other pressures, such as financial and social pressures in women’s lives, take priority over the desire to lose weight.

Removing the barriers to action therefore may range from providing individuals with appropriate and effective strategies for weight loss, to supporting them in their autonomous choice for a healthy weight (i.e. by promoting self efficacy), to improving their situation in life so that long term health can be a priority.
4. Political environment.
Recent international discussions regarding the promotion of health as well as Dutch national policy documents have established a baseline commitment from government with regard to health promotion. On a national level it is recognised that health is a necessary for a well functioning community, that healthy living should be a matter of free choice and, finally, that governmental and community organisations have a responsibility to ensure that making healthy choices are enabled, in other words that “the healthy choice is the easy choice”.

Within this concept a number of considerations need to be made by actors in the health promotion field (health professionals, health insurers, local bodies) when considering migrants. Firstly, in order to make the “healthy choice the easy choice” for migrants it would be necessary to include culturally acceptable foods and physical activities in mainstream strategies aimed to improve health. For example: information materials regarding healthy diets should include foods that are familiar to migrants, in a form that is reconcilable with their traditional cuisines (e.g. the advice to consume 200g of vegetables may not translate so easily to a cuisine where vegetables are often served in mixed dishes); initiatives such as “bewegen op recept” [exercise on prescription] would need to account for cultures that require separate exercise facilities for women. This would potentially be applicable to industry led initiative such as the “ik kies bewust” [the healthy choice] logo, which would need to include products from migrants’ traditional cuisines.

Furthermore, it’s important to realise that migrants’ economic and physical contexts may interfere with their ability to implement healthy choices. Addressing neighbourhood environments and income inequalities are increasingly recognised as forming the basis for healthy behaviour and have been addressed by others.

Secondly, implicit in the ideology of free choice is the condition that choice is informed. In other words, choice should be made on the basis of adequate information, by those capable of making it. In promoting free choice, government has a responsibility to ensure that the public is provided with accurate information upon which choices can be made. In the case of migrants, accurate information may not be received due to language barriers and low education levels. It seems, therefore, necessary that information on diet and healthy lifestyles should be available in language that is appropriate for lower educated groups as well as groups that do not speak Dutch.

Recommendations for Future Research

Measurement of diet
As was made clear in the methodological considerations section of this chapter, one of the limitations in carrying out research on the diet of migrant groups is the lack of availability of validated instruments that are able to measure habitual food intake such as, for example, food frequency questionnaires. These are necessary for the monitoring of dietary intakes, establishing links between nutrition and health and for evaluating the effect of dietary
interventions. Development of validated instruments for the groups studied in this thesis but also for other important migrant groups (Ghanaians and Antilleans to name a couple) is still necessary. In the case of Turkish, Moroccan and Surinamese migrants the food consumption studies performed during this study provide a basis for further work.

**Cultural sensitivity in dietary interventions**

Addressing the health and dietary needs of Surinamese, Turkish and Moroccan migrant groups requires that interventions address the aspects of the diet that have been detailed in the paragraph devoted to implications for prevention and policy. The studies described in this thesis provide some indications regarding the types of cultural perceptions or beliefs that need to be accounted for in developing culturally sensitive approaches. However, there has been little research on the types of cultural adaptations necessary to enhance the effectiveness of interventions. In the Netherlands, few culturally sensitive dietary interventions have been developed and evaluated. Studies from the US have indicated that culturally sensitive interventions can be effective in promoting healthy lifestyles in minority groups. However, studies that evaluate the culturally sensitive component are scarce making it difficult to determine the effectiveness of the cultural components used. In some cases the intervention and control groups received quite different interventions making it difficult to establish whether it was the cultural adaptations that made the difference. Others do not specify the cultural component of an intervention sufficiently so that it's not possible to know which elements of the intervention have been effective. Therefore we are left with a number of questions regarding the design of effective culturally sensitive interventions. Some of the following questions require an answer: Is it sufficient to just use peer educators? What are the conditions within which peer educators are most effective? Is it enough to just translate materials? How far should we go in incorporating the values and norms of a group, (also described as deep structure), in an intervention? To answer these and other questions, it is necessary to evaluate interventions targeting migrants on the basis of their inclusion of well defined cultural components by comparing them with similar interventions using standard approaches.

**Acculturation**

In this thesis we discuss how the diet of migrants does not change as readily as might be expected and that this may be due to the association between food intake and ethnic identity, the role of food in social interactions as well as the ‘value’ that is placed on concepts such as hospitality. In chapter 3 we discussed how this idea is compatible with the integration strategy of the acculturation theory, as described by Berry: with integration, individuals retain their cultural identity while at the same time participating in the society as a whole. In chapter 6 we also discussed the importance of paying attention to migrants’ origin when considering their health related behaviour and the potential influence of acculturation, as is proposed by Landrine and Klonoff in their “Operant Theory of Acculturation”. Exploring the integration of these two theories may help to advance our understanding of the subtleties of the process of acculturation and its impact on food intake.
Other migrant groups
This thesis often refers to non-western migrant groups as a whole with the implication that these groups share some common characteristics. As discussed earlier in this chapter, a number of the underlying concepts discussed may overarch individual ethnicities. However, considering the relevance of culture for health behaviour, as well as the growing diversity of the migrant populations in the Netherlands, it seems necessary to explore the perspectives of other migrant groups.

General Conclusions
This thesis has provided insight into the determinants of diet and body weight among migrants of Turkish, Moroccan and Surinamese origin in the Netherlands. By studying a number of different ethnic groups of different ages and using a mixture of qualitative and quantitative methods we were able to gain some broad insights into the mechanisms underlying diet and body weight perception. The studies described in this thesis have led to the following main conclusions:

1. The diet of migrants does not appear to change as readily as might be expected and is likely to contain both positive and negative elements. This is due to a complex interplay of factors that influence diet (such as cultural, social, economic and environmental influences) and the association between diet and migrants’ sense of identity. Interventions, therefore, need to encourage the maintenance of positive characteristics of diet while being sensitive to the value migrants attach to their diet.

2. Lack of awareness of personal weight status may be a barrier for weight loss among men (with South Asian men forming an exception). Raising awareness, therefore, is an important goal for interventions targeting male migrants. In contrast, overweight perception does not appear to be a barrier for weight loss among migrant women. Rather, it seems that the influence of social norms governing behaviour working in tandem with traditional cultural ideas regarding body weight may have greater influence on women’s body weights.

3. The high prevalence of overweight despite preference for thinner figures as well as the inconsistent relationships between reported weight loss activity and lifestyle variables (diet and physical activity) implies that migrants require support in making appropriate changes in lifestyle in order to achieve weight loss. The finding of ethnic differences in weight loss strategy employed lends support to the idea that interventions need to be sensitive to migrants’ preferences with regard to weight loss. However, it’s important to bear in mind that targeting diet and physical activity in tandem is more effective in achieving weight loss or weight maintenance than either of these variables alone. This would ideally involve interventions that account for physical, economic, socio-cultural and political environments at both the macro and micro level.
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Summary
Summary

Non-western migrants form an increasing proportion of the populations of many Western countries, including the Netherlands where 11% of the population comprises non-western migrants and their children. In the Netherlands Surinamese, Turkish and Moroccan migrants form approximately 6% of the population. Among these groups the prevalence of overweight and obesity is high, more than half of Surinamese, Turkish and Moroccan adults aged 35 years or older are either overweight or obese. Overweight and obesity confer an increased risk for cardiovascular diseases, type 2 diabetes, cancer, musculoskeletal disorders and respiratory diseases. In addition overweight or obese individuals may be subject to social bias and discrimination potentially reducing quality of life, educational and professional achievement.

The aetiology of overweight and obesity is complex but at the most basic level is due to behaviour that results in excessive energy intake or insufficient energy expenditure. Influences on behaviour include genetic, biological as well as environmental factors. Among some migrant groups higher overweight and obesity prevalence may be partly attributed to genetic susceptibility, however, it is generally accepted that genetic influences interact with environmental factors.

This thesis focuses on two important determinants of overweight in four non-western migrant groups living in the Netherlands: Surinamese Hindustani and Creoles, Turks and Moroccans. Firstly, diet as part of the energy balance equation and, secondly, the perception of overweight as an important underlying motivator for engaging in weight control. Three environmental influences form the basis of the studies described: physical, economic and socio-cultural determinants and the changes herein as a result of migration.

Information regarding these is necessary to guide the development of effective promotional activities that target healthy living and eating.

To address this goal we formulated the following questions:

1. What are important influences on the diet and dietary habits of migrants? This question particularly focuses on socio-economic, socio-cultural influences as well as the impact of the physical environment.
2. a What is the body size preference and body weight perception of migrants?
   b What influence do migration, acculturation, socio-economic and socio-cultural factors have on body size preference and body weight perception?
   c How do body size preference and weight perception relate to weight loss practice?

The studies described in this thesis were based on three sources of data. Quantitative data were obtained from the LASER study which included Turkish and Moroccan men and women aged 18-30 years and from the SUNSET study which included Surinamese and ethnic Dutch men and women aged 35-60 years. In addition we conducted a qualitative study which included Turkish and Moroccan participants in Amsterdam and Moroccan women in Morocco. The first part of the thesis which includes chapters 2 and 3 focuses on the diet of migrants.
Chapter 2 describes a study of diet quality and the intake of specific food groups among Surinamese and ethnic Dutch men and women. The associations with ethnicity, acculturation and educational level were explored. Compared with ethnic Dutch, Surinamese men and women scored higher on overall diet quality and reported more frequent intakes of fruit, vegetables and fish as well as less frequent intakes of red meat. However, breakfast intake and salt use were less favourable than among ethnic Dutch men and women. Educational level was positively associated with diet quality in ethnic Dutch, as is typical in many Western populations, but we did not observe similar associations in the Surinamese groups. Furthermore we found no consistent associations between acculturation level, measured on the basis of social contact with ethnic Dutch, and diet. Finally, residence duration which on average was 22 years, and age at migration, average 21 years of age, were not associated with diet. Therefore we concluded that ethnic origin, in and of itself, was associated with differences in diet, suggesting that it should be considered in the development of nutrition health promotion activities.

Chapter 3 describes a focus group study among Turkish and Moroccan men and women. This study aimed to gain insight into the mechanisms underlying ethnic differences in diet by exploring the perceived socio-cultural influences on food intake and their relevance considering migration-related changes in physical, social and cultural context. A major theme that emerged in the focus groups was that of hospitality. Participants discussed that within their cultures it is a highly valued concept that is promoted and ‘rewarded’ by their shared religion, Islam. In the Turkish and Moroccan cultures food plays a central role in expressing hospitality, resulting in a social context where food is abundant and difficult to refuse. Improvements in economic situation that come about as a result of migration serve to enhance existing traditions; the host’s status is enhanced by serving an abundance of luxury foods to guests. Participants contrasted their food cultures with what they perceived as the mainstream Dutch culture and reflected on the relevance of food culture for ethnic identity. Additional issues discussed were the difficulties encountered by migrants in reconciling the lifestyle from their home countries with that in the Netherlands and indicated that some of the more “unhealthy” eating practices (overeating and irregular meal patterns) are a result of this mismatch. There were indications that, as may be expected, a certain degree of dietary acculturation is occurring; new foods are being adopted and young migrants often have a preference for the foods consumed by their peers. At the same time, it seems that the traditions that govern food behaviors are valued, also by younger members of the groups studied. The value placed by migrants on their foods and food culture lead us to conclude that the social and cultural context of food intake cannot be ignored if interventions aimed at these groups are to be effective.

Chapters four and five focus on the perception of body weight. In chapter four we aimed to evaluate body size preference, body weight perception and their relationship with actual weight in Turkish and Moroccan migrants. In addition we wished to explore whether acculturation level (measured on the basis of social contacts with ethnic Dutch, cultural orientation and generation level) was associated with preferred body size. We found a general preference for ‘thin’ body sizes in all groups. The majority of women in this study appeared to be dissatisfied with their body size, i.e. their ideal size was thinner than their current body size, whereas most
men appeared satisfied with their current size. Among overweight participants (i.e. those with BMI 25-29.9 kg/m²), two thirds of men and one third of women perceived themselves as ‘average’. Finally, paying attention to own body weight was associated with a discrepancy between ideal and current size amongst women and with perceiving oneself as ‘overweight’ amongst men. Preferred body size was not significantly associated with acculturation level. We concluded that there are some similarities between these two study groups and typical Western populations; most women wished to be thinner than they were whereas men were more likely to be satisfied with their size, in addition, the majority of men was unaware of being overweight.

In chapter five we turned our attention to Surinamese (African origin and South Asian origin) and ethnic Dutch men and women. We aimed to investigate ethnic differences in the perception of overweight and its association with weight loss behaviour. We found that compared with their Dutch peers, overweight African origin men and women were less likely to perceive themselves as overweight. A similar but not significant trend was observed in overweight South Asian origin men, but not in overweight South Asian women. Nonetheless, African origin and South Asian origin participants were more likely than their Dutch peers to report trying to lose weight and to use physical activity rather than diet as a weight loss strategy. In all three ethnic groups, we observed only weak associations between reported weight loss attempts and reported dietary intakes and amount of physical activity. We concluded therefore that, contrary to expectations, the fact that Surinamese men and women were less likely to perceive themselves as overweight did not appear to be a barrier to trying to lose weight. Among those trying to lose weight the ethnic differences in the strategies being used implies that interventions need to take these apparently different preferences into account. Finally, the weak association between lifestyle variables and reported weight loss activity implies that individuals (including ethnic Dutch men and women) require support in realising their intentions.

Chapter 6 reports the results of an explorative focus group study among Moroccan women living in Morocco and in the Netherlands. By comparing the perceptions of these two groups of women we aimed to gain some understanding of the socio-cultural context that has an influence on Moroccan women’s body weight. The contrast between Morocco and the Netherlands formed a thread that linked the major themes that emerged during the discussions. Women in all settings perceived the influence of the physical environment on the lifestyles of migrant women in a similar way; the abundance of food available to migrants in combination with limited opportunities for engaging in familiar and acceptable forms of physical activity were mentioned as important causes of overweight. The participants in all study locations mentioned that, within their communities, weight loss is viewed as a sign of psychological, economic and social problems. Women reported that traditional ideas were changing but also mentioned that they still persisted in others: women in the Netherlands talked about this being the case amongst older people and people in Morocco; in Morocco, women in the city talked about this being the case among women living in villages. Participants indicated that they are influenced by traditional norms in so far as they wish to avoid being
perceived negatively by others in their social environment. We concluded that migration to a Western ‘obesogenic’ environment is perceived to impact on the lifestyle of migrants and seems to work in tandem with pre-existing cultural norms. Migrants’ maintenance of contact with Morocco (through their yearly summer vacation, their reliance on satellite television originating from Morocco and a preference for marriage partners from their land of origin) ensure the continuing relevance of these norms.

Finally, chapter 7 addresses the main findings of the studies, including some of the methodological limitations. The results are discussed in light of their relevance for public health practice and some recommendations for future research are made. The studies described in this thesis have led to the following main conclusions:

Firstly, the diet of migrants does not appear to change as readily as might be expected and is likely to contain both positive and negative elements. This is due to a complex interplay of factors that influence diet (such as cultural, social, economic and environmental influences) and the association between diet and migrants’ sense of identity. Interventions, therefore, need to encourage the maintenance of the positive characteristics of diet while being sensitive to the value migrants attach to their dietary traditions in handling more negative aspects.

Secondly, a lack of awareness of personal weight status may be a barrier for weight loss among men (with South Asian men forming an exception). Raising awareness, therefore, is an important goal for interventions targeting male migrants. In contrast, overweight perception does not appear to be a barrier for weight loss among migrant women. Rather, it seems that the influence of social norms governing behaviour working in tandem with traditional cultural ideas regarding body weight may have greater influence on women’s body weights.

Thirdly, the high prevalence of overweight despite preference for thinner figures as well as the inconsistent relationships between reported weight loss activity and lifestyle variables (diet and physical activity) implies that migrants just like their ethnic Dutch peers require support in making appropriate changes in lifestyle in order to achieve weight loss. This would ideally involve interventions that account for physical, economic, socio-cultural and political environments at both the macro and micro level.
Samenvatting
Samenvatting

In Westerse landen vormen niet-westerse migranten een steeds groter deel van de bevolking. In Nederland vertegenwoordigen Surinaamse, Turkse en Marokkaanse migranten samen 6% van de bevolking.


De oorzaken van overgewicht en obesitas zijn complex maar in wezen te herleiden tot hogere energie-inname dan verbruik. Het gedrag dat hieraan ten grondslag ligt wordt beïnvloed door genetische, biologische en omgevingsfactoren. Het kan zijn dat genetische factoren een aanzienlijke rol spelen met betrekking tot een hoger voorkomen van overgewicht en obesitas bij migranten. Er zijn evenwel aanwijzingen dat genetische factoren hun effect uitoefenen in samenwerking met de omgeving.


Onderzoek naar deze factoren en hun onderlinge dynamiek beantwoordt de vraag naar concrete informatie over voedingsgewoontes en percepties ten opzichte van overgewicht. De uiteindelijke bedoeling is een bijdrage aan verdere ontwikkeling van effectieve gezondheidsbevorderende programma’s (o.a. voorlichtingscampagne’s) gericht op voeding en gezondheid.

De volgende onderzoeksvragen zijn geformuleerd:

1. Wat zijn belangrijke determinanten van de voedingsgewoontes van migranten?
   Deze vraag richt zich zowel op sociaaleconomische en sociaal-culturele factoren als de invloed van de fysieke omgeving.

2. a Wat wordt gezien als de ideale lichaamsvorm onder migranten en hoe wordt lichaamsgewicht gepercipieerd?
   b Wat is de invloed van migratie, acculturatie, sociaal-economische en sociaal-culturele factoren op deze percepties?
   c Wat is de relatie tussen gewenste lichaamsvorm en perceptie van overgewicht ten opzichte van lijngedrag.

De studies beschreven in dit proefschrift zijn gebaseerd op drie verschillende data bronnen. Kwantitativo data zijn verkregen middels de LASER studie onder Turkse en Marokkaanse
mensen en vrouwen in de leeftijd 18-30 jaar en de SUNSET studie onder Surinaamse en autochtone Nederlanders in de leeftijd 35-60 jaar. Daarnaast hebben we een kwalitatieve studie uitgevoerd onder Turkse en Marokkaanse mannen en vrouwen in Amsterdam en Marokkaanse vrouwen in Marokko.

Deel 1 van het proefschrift (hoofdstukken 2 en 3) richt zich op de voedingsgewoontes van migranten.

_Hoofdstuk 2_ beschrijft een studie van de voedingsgewoonten van Surinamers van Hindoestaanse en Creoolse afkomst en autochtone Nederlanders. Een aantal aspecten zijn gemeten en de kwaliteit van de voeding is op basis van een aantal kenmerken bepaald. Daarnaast is het verband tussen voedingsgewoonten en etniciteit, acculturatie en opleidingsniveau onderzocht. Vergeleken met autochtonen, scoorden Surinaamse mannen en vrouwen hoger wat betreft de kwaliteit van hun voedingsgewoonten. Surinamers rapporteerden dat ze vaker fruit, groente en vis gebruiken en minder vaak rood vlees eten. Maar zij ontbijten minder vaak en voegen vaker zout en zoutrijke producten aan hun eten toe. Een hoger opleidingsniveau bleek een gunstige invloed te hebben op de voedingsgewoonten van autochtonen, terwijl deze relatie onder Surinamers minder eenduidig bleek. We vonden geen consistente relatie tussen acculturatie (op basis van sociale contacten met autochtonen) en voedingsgewoonten. Tot slot, verblijfsduur in Nederland (gemiddeld 22 jaar) en leeftijd op moment van migratie (gemiddeld 21 jaar) lijken voedingsgewoonten niet te beïnvloeden. We concludeerden hieruit dat etniciteit op zich een belangrijke invloed heeft op voedingsgewoonten en dat per consequentie de ontwikkeling van gezondheidsbevorderende programma’s hiermee rekening dienen te houden.

_Hoofdstuk 3_ rapporteert de bevindingen van een focusgroep studie onder Turkse en Marokkaanse mannen en vrouwen. Het doel van deze studie was inzicht te krijgen in de mechanismen die etnische verschillen in voedingsgewoonten beïnvloeden. De studie verkent de invloed van sociaal-culturele factoren op voedingsgewoonten en hun relevantie gezien veranderingen in de fysieke, sociale en culturele omgeving als gevolg van migratie. Een thema dat tijdens de focusgroepen naar voren kwam is de waarde die gehecht wordt aan gastvrijheid vanuit de cultuur en religie (Islam) van Turken en Marokkanen. In beide culturen speelt eten een belangrijke rol als uitdrukking van gastvrijheid en wederzijds respect tussen gastheer en gast. Verbeterde economische omstandigheden door migratie versterken bestaande tradities; de status van de gastheer/vrouw wordt verhoogd door het (uitbundig) aanbieden van eten. Met name tijdens sociale gelegenheden wordt eten overvloedig aangeboden, terwijl het weigeren van eten ongepast is. De uitdaging die ontstaat door traditionele met nieuwe levensgewoontes te combineren, kwam eveneens ter sprake. Er werd gesuggereerd dat de meest ongezonde voedingsgewoonten (onregelmatig en overdadig) door deze moeilijke combinatie wordt veroorzaakt. Er zijn aanwijzingen dat, zoals redelijkerwijs aangenomen mag worden, een zekere mate van acculturatie plaatsvindt: ‘Nieuw’ eten wordt overgenomen en jonge migranten hebben vaker voorkeur voor het soort eten dat door al hun leeftijdgenoten, ongeacht etnische achtergrond, wordt gegeten. Tegelijkertijd worden tradities die voedingsgewoonten bepalen gewaardeerd, óók door de jongere deelnemers van de bestudeerde groepen. De waarde die
door migranten aan hun eten en eetcultuur wordt gehecht ondersteunt de conclusie dat de sociaal-culturele context van eten en voedingsgewoonten niet buiten beschouwing mag worden gelaten in de ontwikkeling van effectieve gezondheidsbevorderende programma’s.

Hoofdstukken 4 en 5 richten zich op de perceptie van lichaamsge wicht. Het doel van hoofdstuk vier is om de voorkeur voor lichaams vorm onder jonge Turkse en Marokkaanse volwassenen te onderzoeken. Daarnaast wilden we feitelijk gewicht vergelijken met de perceptie van eigen gewicht. Tot slot hebben we gekeken naar de relatie tussen acculturatie (gemeten op basis van sociale contacten met autochtone Nederlanders, culturele oriëntatie en generatie) en voorkeur. We vonden een voorkeur voor ‘slanke’ figuren onder alle groepen. De meerderheid van vrouwen in deze studie lijkt ontevreden te zijn met hun huidige lichaams vorm, met andere woorden hun ideaal was slanker dan hun huidige vorm. De meeste mannen lijken tevreden te zijn met hun lichaams vorm. Onder respondenten met overgewicht (d.w.z. BMI 25-29.9 kg/m²), beschreven twee derde van de mannen en een derde van de vrouwen zichzelf als ‘gemiddeld’. Vrouwen letten op hun gewicht als ze een discrepantie tussen hun ideaal en feitelijke vorm ervaren en mannen letten op hun gewicht als ze zichzelf als te dik beschrijven. We vonden geen associatie tussen de voorkeur voor lichaams vorm en acculturatie. We concludeerden dat er veel overeenkomsten zijn tussen deze groepen en Westerse bevolkingsgroepen; vrouwen willen het liefst slanker zijn. Mannen, in tegendeel, zijn eerder tevreden met hun vorm en lijken vaker zich niet bewust te zijn te zijn van hun overgewicht.

In hoofdstuk 5 hebben we Surinamers (van Creoolse of Hindoestaanse origine) en autochtone Nederlanders onderzocht. Het doel was etnische verschillen in de perceptie van overgewicht en de relatie met voedingsgedrag te onderzoeken. We vonden dat, vergeleken met autochtonen, Creoolse mannen en vrouwen met overgewicht minder geneigd zijn om zich als te zwaar te beschrijven. Hoewel statistisch niet significant was deze trend ook te zien onder Hindoestaanse mannen met overgewicht. Hindoestaanse vrouwen zijn de uitzondering, ze lijken zich wel bewust te zijn van hun overgewicht. Desalniettemin rapporteerden Creoolse en Hindoestaanse respondenten vaker dan de autochtone groep dat ze lijnen, en dan door meer te bewegen in plaats van hun voedingsgewoonten aan te passen. In alle drie de groepen zagen we weinig associatie tussen gerapporteerd lijngedrag en voedingsinname of beweging. Dus, tegen onze verwachting in, was het gegeven dat Surinaamse mannen en vrouwen minder geneigd zijn om zichzelf als te zwaar te ervaren, geen barrière voor het willen afvallen. Onder degenen die willen afvallen, impliceren de etnische verschillen in strategie dat gezondheidsbevorderende programma’s rekening moeten houden met verschillen in voorkeur. Tot slot, de bevinding dat leefstijlfactoren en gerapporteerd lijngedrag weinig overeenkwam toont aan dat er verschillen zijn tussen de groepen, benadrukt de noodzaak voor gespecialiseerde programma’s zodat individuen (inclusief autochtonen) hun intenties kunnen realiseren.

Hoofdstuk 6 rapporteert de bevindingen van een exploratieve focusgroep studie onder Marokkaanse vrouwen in Marokko en Nederland. Door deze twee groepen te vergelijken wilden we de sociaal-culturele context en de invloed daarvan op Marokkaanse vrouwen beter begrijpen. Het contrast tussen Marokko en Nederland vormt een rode draad in deze discussies. De vrouwen in beide situaties waren het grotendeels met elkaar eens wat
betreft de invloed van de fysieke omgeving op de leefstijl van migranten; de overvolled van eten in combinatie met beperkte mogelijkheden voor bekende en geaccepteerde vormen van lichamelijke activiteit werden genoemd als belangrijke oorzaken van overgewicht. Deelnemers beschreven dat, in hun gemeenschappen, gewichtsverlies wordt gezien als teken van psychologische, economische en sociale problemen. In de discussies werd er gezegd dat deze traditionele ideeën geleidelijk aan het veranderen zijn maar dat ze nog bestaan. Vrouwen in Nederland rapporteren dat dit zo is onder ouderen en in Marokko. In Marokko zeggen de vrouwen in de stad dit over de vrouwen op het plattenland en in de dorpen. Deelnemers aan de focusgroepen rapporteren dat ze beïnvloed worden door traditionele normen, omdat ze liever geen negatieve reacties willen welken binnen hun sociale omgeving. Het lijkt dus dat migratie naar een westere, 'obesogene' omgeving invloed heeft op migranten en in tandem lijkt te werken met bestaande culturele normen. Het feit dat migranten sterke banden met hun thuisland onderhouden (zomervakanties, televisie uit Marokko via de satelliet en een voorkeur voor partners uit de land van afkomst) zorgt ervoor dat deze normen relevant blijven voor Marokkanen in Nederland.

Hoofdstuk 7 beschrijft de hoofd bevindingen van de studies, inclusief de methodologische beperkingen. De relevantie van de bevindingen voor de praktijk en aanbevelingen voor meer onderzoek worden beargumenteerd. De studies in dit proefschrift leiden tot de volgende conclusies:

Ten eerste voedingsgewoonten van migranten veranderen minder snel dan verwacht en hebben zowel gezondheidsbevorderende als gezondheidsbedreigende elementen. Dit is het gevolg van een complexe interactie tussen factoren die voedingsgewoonten beïnvloeden (zoals culturele, sociale, economische en omgevingsfactoren) en het verband tussen voedingsgewoonten en culturele identiteit. Programma’s dienen daarom zowel het behoud van gezondheidsbevorderende elementen te stimuleren terwijl men in de aanpak van negatieve aspecten rekening dient te houden met de waarde die migranten hechten aan traditionele eetgewoonten.

Ten tweede lijkt het dat een gebrek aan inzicht in het eigen overgewicht een barrière is voor lijngedrag onder mannen (met uitzondering van Hindoeostenen). Bewustzijn stimuleren is daarom een belangrijk doel voor gezondheidsbevorderende programma’s gericht op mannelijke migranten. Dit in tegenstelling tot migrantenvrouwen, die zich juist wél bewust lijken te zijn van hun overgewicht. In vrouwen lijkt de invloed van sociale normen op hun gedrag in combinatie met traditionele culturele normen ten opzichte van lichaamsgewicht een belangrijke invloed op het krijgen van overgewicht.

Ten derde impliceert de hoge prevalentie van overgewicht, ondanks een voorkeur voor een slankere lichaamsvorm en een zwak verband tussen leefstijlfactoren en gerapporteerd lijngedrag, dat zowel migranten als autochtonen ondersteunt dienen te worden bij het maken van geschikte veranderingen in leefpatroon, om zo duurzaam gewichtsverlies te realiseren. Idealiter zouden gezondheidsbevorderende programma’s rekening houden met zowel de fysieke, economische, sociaal-culturele en politieke omgevingen op macro- en microniveaus.
Publications
Publications


Dankwoord
Dankwoord

The past few years have been an adventure in learning. It’s been a stimulating and exciting time and there are many to thank for their contribution during this journey.

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Curriculum Vitae

Mary Nicolaou was born in Limassol Cyprus in November 1965. At the age of 9, together with her parents and younger sister, she migrated to New Zealand. Like many immigrants they were searching for a better future, more favourable economic circumstances and education opportunities. Integrating into New Zealand society wasn’t too difficult for a 9 year old. It didn’t take long to learn English, make friends and develop a preference for fish and chips on a Friday night. Four years of study at Otago University completed the process of integration. Upon finishing her study of Human Nutrition and Dietetics, Mary worked for a couple of years as a junior dietitian and then did what is considered normal and desirable among young New Zealanders: she embarked on her big “OE” (overseas experience). This involved extensive travel through Asia before settling for two years in the UK. There she practised as a dietitian in different hospital settings. When her working holiday visa for the UK expired she headed to Cyprus to spend time with her parents, who had re-migrated back home. Her own intention was to head back down under as soon as possible; after all, New Zealand was home. While working to save money for the flight, however, she met a Dutch guy called Tony and decided to postpone this return for the time being. Together they travelled to the Cayman Islands where they lived for 3 years before looking to settle down…in Amsterdam. Of course, there was a minor problem; dietitians need to communicate with their patients in their own language. Dutch is not easy to pick up. Luckily, the city of Amsterdam offered Mary a free Dutch language course to help with her integration. After completing her NT2 exam Mary came into contact with researchers at the department of Social Medicine at the AMC. Initially, she was involved in the data gathering of two studies being conducted: one among Surinamese and the other among Turkish and Moroccan migrants. Thanks to a growing need for information about the diets of migrant origin groups, the AMC and the department of Health Sciences at the VU University of Amsterdam bundled their forces to finance a PhD position to look further into this topic. Mary stepped in and this thesis is the result. Future plans involve expanding and building on the work already done.