

Review Article

High Prevalence of Overweight and Obesity among Turkish Migrant Girls and Women in Vienna, Austria – A Review of the Viennese Obesity and Migration Project

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Abstract

Obesity rates are increasing worldwide at an alarming rate. In Central Europe high obesity rates are described for immigrants originating from Mediterranean countries or the Middle East. This increased prevalence of obesity is mostly attributed to the low socioeconomic position and a lack of integration of immigrants. The Viennese migration and obesity project aimed to determine the prevalence of obesity and overweight among immigrants living in Vienna, Austria. In the present review the situation among Turkish immigrant girls (n=198) and women (n=145) was focused on. Furthermore the impact of socioeconomic factors and the degree of integration on somatometric parameters and weight status was evaluated. Turkish girls showed higher overweight and obesity prevalence rates than their Austrian counterparts. Among adult Turkish immigrant women obesity and overweight rates increase dramatically with increasing age. Concerning the impact of socioeconomic position, educational level and parameters of integration, it could be shown that obesity rates were significantly influenced by sociodemographic factors. We conclude that Turkish immigrants in Vienna are confronted with an obesogenic environment. Further research is absolutely necessary to improve the health situation and decrease health risk factors among this vulnerable population.

Keywords: Migration; Obesity; Overweight; Turkish immigrants; Vienna; Austria

Introduction

Overweight and obesity have recently reached epidemic dimensions but prevalence rates are still increasing worldwide [1, 2, 3]. In 2008 the number of obese people on earth exceeded the number of people who suffer from starvation and malnutrition for the first time in the long history of *Homo sapiens* [4]. At least 1.5 billion adults worldwide are thought to be overweight, and at least 320 million of them are thought to be obese [5]. Across Europe an estimated 150 million adults are obese [6]. Obesity is not only an adult problem, the World Health Organization and the International Obesity Task Force (IOTF), estimated that overweight or obesity affects one in ten children or adolescents worldwide [6] and one in five children in Europe [7]. Nevertheless obesity rates differ dramatically from country to country, from less than one percent of adults in Cambodia, Somalia and Ethiopia to more than sixty percent of adults in Nauru and the Cook Islands [6]. Despite of these regional differences, obesity is a worldwide phenomenon and consequently a worldwide health concern, because overweight and obesity are predisposing factors for the development of metabolic diseases such as type 2 diabetes, hypertension and cardiovascular diseases but also for several forms of cancers [8]. There is no doubt that overweight and especially obesity are major risk factors of premature mortality, morbidity and a markedly reduced health related quality of life. According to the World Health Organization obesity and overweight are one of the five leading global risks for mortality in the world [6]. Thus excess body weight poses one of the most serious public health challenges of the

21st century [2]. Furthermore high rates of overweight and obesity increase health care expenditures of countries and therefore obesity and overweight represent an enormous economic burden for affected societies [3, 8]. As a consequence prevention and effective treatment of obesity are seen as extremely important public health issues today.

In order to prevent or to treat obesity effectively risk factors have to be identified and analyzed. From a physiological viewpoint overweight and obesity are the results of a long term positive energy balance. Since pathological reasons of obesity are found among a relatively small number of obese people only, who suffer from metabolic diseases or genetic predisposition, environmental factors are discussed as the fundamental causes of a long term positive energy balance. With other words an environment which allows a too high energy intake, by the consumption of too much food in relation to a low level of energy expenditure caused by physical inactivity and a sedentary life style causes overweight and obesity [9, 10, 11]. The reasons for a life style enhancing this energy imbalance are complex. Beside intrinsic factors such as genetics, family history, ethnicity, emotional factors, age, socioeconomic parameters, such as education or income and interactions between these factors are discussed [12]. All these factors lead to high energy intake and low energy expenditure, a life style pattern typical of first world countries and affluent societies. An environment promoting this kind of life style is called an obesogenic environment. Obesogenic environments are found worldwide, although distinct differences between high income countries and low income countries are observable: While in

developed countries obesogenic environments are increasingly found in poor neighbourhoods, this is true of high income areas of in many developing countries [2]. Obesogenic environments are promoted by increasing urbanization, mechanization of jobs, labor-saving technologies, improvement of transportation services, the availability of cheap food of high energy density, and reduced physical activity [13, 14]. Although the determinants of overweight and obesity are manifold even in obesogenic environments, some subgroups of people are more at risk. In Western Industrialized countries people with a background of migration are identified as a special risk group.

Migration and Obesity

A large body of literature on migration and health in particular on migration and overweight/obesity suggests that migration represents a major risk of obesity and overweight. Above all people who migrated from low-income countries to high-income countries appear to be more susceptible to overweight and obesity than people who originated from the host country [15]. Several studies find that migrants have a higher prevalence of overweight and obesity in comparison to their local counterparts as well as in comparison to people in the country of origin. This is true of Hispanic immigrants in the United States [16], as well as of immigrants originating from Mediterranean countries or Middle East in Central and Northern Europe [17, 18, 19a, 19b, 20, 21, 22, 23, 24]. An unhealthy weight gain resulting in high overweight and obesity rates among migrants appear mostly in the period of 10 to 15 years after migration [15]. Although postmigration obesity and overweight are observable, specific differences in overweight and obesity among migrants of different ethnicity are documented. In particular obesity rates among migrants vary significantly according to gender, age, ethnicity, socioeconomic status and acculturation [15]. For example, surveys in South Australia and the United States demonstrated that people born in Italy, Greece, Cyprus, Former Yugoslavia, Germany, the Netherlands, Poland and other Eastern European countries exhibited a higher likelihood of overweight and obesity than immigrants from Eastern Asia, such as from China, Malaysia, Vietnam or Cambodia [15]. In Norway overweight and obesity rates were significantly higher among immigrants from Turkey, Pakistan or Somalia than from Vietnam [25]. Concerning Western European countries immigrants from the Eastern Mediterranean area, Northern Africa and the Middle East show the highest rates of obesity and overweight. Among these immigrants the chances of becoming obese are greater for women than men and for those of lower educational level and lower socioeconomic position [26, 27, 28, 29, 16, 30, 31]. Consequently immigrant women of low socioeconomic status originating from Turkey, the Middle East and Northern Africa are at an especially high risk to become overweight or obese. The present review focuses on the situation of female Turkish immigrant in Austria,

Turkish Migrants in Austria

In contrast to countries like Canada, United States or Australia, Austria is not a typical country of immigration, nevertheless Austria has a long tradition as a multicultural society. Although Austria had been one of the largest Empires in Europe up to the end of the First World War, Austria never had any colonies and therefore no tradition of transcontinental immigration. Nevertheless various ethnic minorities lived in Austria, especially in Vienna at the beginning of

the 20th century. These minority people originated from the eastern and southern parts of the Austrian-Hungarian Monarchy. Thus Polish people, Czechs, Croatians, Slovenians, Hungarians, Macedonians, Serbs and Italians lived in Vienna. After the First World War only the very small German speaking western Part of Austria-Hungary remained as Austria and the multicultural population became relatively homogeneous. The situation changed during the sixties. The economic growth, the so called "Wirtschaftswunder" acted as a pull factor and made Austria attractive for immigrants from low-income countries. An increasing number of labour migrants from Former Yugoslavia and Turkey followed by their families migrated to Austria [32]. At the end of the eighties and during the early nineties the Balkan war resulted in a new wave of immigration primarily from political refugees from former Yugoslavia. Political refugees from other parts of world but also labour migrants from Eastern Europe after the fall of the iron curtain represented a new wave of immigration since the nineties. As a consequence Austria has undergone a dramatic change from a relatively homogeneous society to a so called multicultural one. Recent Austrian society is increasingly characterized by many different languages, religions and cultural traditions. Today 18% of the Austrian inhabitants have a background of migration the majority of them originate from Former Yugoslavia and Turkey. About 400000 inhabitants of Vienna have a background of migration, this more than 20% of the Viennese population. In the year 2008, according to National census, 134 299 Turkish immigrants, who did not have Austrian citizenship lived in Austria [33]. About 100000 Turkish people had the Austrian citizenship at this time. The majority of these Turkish migrants live in Vienna.

Once immigrants have moved to their host country, in this case Austria, they are often a minority with a lower social status than the host population [32]. Since low socioeconomic status is associated with increased health risk factors, health problems of different ethnic groups came into focus. From the viewpoint of public health immigrant people represent an especially vulnerable subgroup of Austrian society. Although the public health system in Austria is highly developed and enables Austrians as well as immigrants, access to health service centres and medical treatments free of charge, morbidity rates are higher and life expectancy is lower among people with a background of migration in comparison to their Austrian counterparts [18, 33]. This is especially true of the Turkish population in Vienna. A special problem represent the high rates of overweight and obesity among Turkish children, adolescents and adult women in Vienna [21, 34, 35].

Viennese Project of Migration and Obesity

The Viennese project of migration and obesity (2004-2010) contains two sub-projects. Subproject one focused on the overweight and obesity rates among Viennese school children with a background of migration. The aim of subproject two was the analysis of overweight and obesity rates among adult women with a background of migration. Both subprojects were conducted in compliance with "Ethical principles for medical research involving human subjects" of Helsinki Declaration. In the present paper the results of the Turkish samples are reviewed.

Subproject One- Turkish Immigrant Girls

This subproject was performed in strong co-operation with the

Viennese school medical authority. Data collection took place in forty six public secondary schools (so-called Hauptschulen) of Vienna (two from each of the 23 districts of Vienna), which were randomly selected from the Viennese school authority. In Austria stature height and body weight of school children are measured obligatory by special educated personal of the medical school authority. The first examination takes place at the age of 6 years before the child starts with school. The second examination takes place four years later, when primary school is finished at the age of 10 years. The third and last examination takes place at the age of fifteen years, short before obligatory school attendance ends. The data file including all information concerning stature and body weight are stored by the Viennese school medical officers. The anonymized data set of the Viennese school medical office was used in this subproject Altogether data sets of 198 girls with a background of migration from Turkey born in 1988 and starting with school in 1994 were included in this subproject. Although the majority of these girls was born in Austria, all of them lived in traditional Turkish immigrant families of the first or second generation. A low socioeconomic position can be assumed for the majority of these families. This assumption is mainly due to the fact that only girls visiting public secondary schools (Hauptschule) in Vienna were included in the project. The attendance to a public secondary school in Vienna is a main indicator for a low socioeconomic status and a low educational level of the parents [21].

In the present project weight status was determined by using the body mass index (BMI) kg/m^2 . The classification of the weight status among subadults is still discussed controversial and up to now there is a lack of European standards [36, 37]. Considering the increasing numbers of children with a background of migration the lack of growth and body mass references for immigrant children represents really a dilemma, although this not only an Austrian problem. It is still a problem in several countries with increasing numbers of immigrant children, such as the Netherlands [38]. In the present project the percentiles of the body mass index published by [39] for central Europe was used. In detail, the 10 percentile was used as cut-off for underweight, the 90 percentile as cut-off for overweight and the 97 percentile as cut-off for obesity [40].

Subproject 2 – Adult Immigrant Women

Data collection for this project took place exclusively in Vienna, Austria. All together 145 women between the ages 18 and 56 years ($\bar{x}=31.1\pm 10.3$) with a background of migration from Turkey, i.e. none of the women was born in Austria, were included. Participant recruitment took place via snowball system. Turkish immigrant women living in Vienna were informed about the study by a personal presentation (E.Kilaf) of the planned project in several Turkish consulting centers in Vienna which are established and financially supported by the Viennese government, but also at religious facilities usually mosques. Furthermore information flyers written in Turkish language were distributed in those facilities. Data collection itself took place mainly at the consulting centres and religious facilities described above, but also in private homes. A trained Turkish interviewer (E.Kilaf) conducted the interviews based on a structured questionnaire written in Turkish language which was designed for the project. After the interview stature height and body weight of the participants were measured. For detailed description of the procedure see [21a, 21b, 40, 34, 35].

Weight status of adult women was determined by using the body mass index (BMI) kg/m^2 and consequently the BMI categories of adults recommended by the [41]

BMI < 18.50: underweight

BMI 18.50- 24.99: normal weight

BMI 25.00-29.99: overweight

BMI 30.00-39.99: obese

BMI > 40.00 morbid obese

Socioeconomic position (SEP) (low/medium/high) was defined by 9 indicators (place of birth, the reason for migration to Vienna, educational level, household size, number of rooms per household, educational level of the husband, income level, occupation, occupation of the husband). This system included the three most commonly employed indicators of SEP in contemporary industrialized societies, income, education and occupation [42, 43]. As an indicator of integration/accluration the knowledge of German language (4 levels: extremely poor, poor, medium and high) and the duration of stay in Austria were used. Not only less educated women of exceptionally low socioeconomic position were enrolled in the project, because more than 40% of the Turkish women had a higher education or University degree. 30.6% of the Turkish women were of low socioeconomic position, 60.3% were belonged to the middle socioeconomic class and 9.2% corresponded to the definition of high socioeconomic position.

Statistical Analyses

Statistical calculations were performed by using SPSS for Windows Program Version 18.0 (Microsoft corp.). After calculation of descriptive statistics (means, SDs), the χ^2 -test, the Kruskal-Wallis-test and the Mann-Whitney-test were used to test frequency differences with respect to their statistical significance. A probability P value of less than 0.05 was considered significant.

Results

Sub-project 1 – Turkish girls

The prevalence rates of obesity and overweight among Turkish immigrant girls were general high. Turkish girls surpassed their Austrian counterparts – girls of comparable age and socioeconomic status - in the prevalence of overweight and obesity. This was true of all age groups with the exception overweight rates among 15 year old girls. No significant differences were found for stature height and body weight at the ages of 6 and 10 years. At the age of 15 years however, Turkish migrant girls were significantly shorter than the Austrian counterparts. Concerning BMI Turkish girls exhibited higher BMIs in each age group [21a, 21b].

Sub-project 2- Turkish immigrant women

Sub project two focused on adult (>18 years) immigrant women in Vienna. Table 1 demonstrates somatometric parameters (stature height, body weight, BMI) for each age group separately. Table 2 shows overweight and obesity rates of Turkish immigrants in comparison to that of Austrian girls and women according to age group. As to be seen in Figure 1 overweight rate did not differ significantly up to age 20 between Turkish and Austrian females.

Table 1: Somatometric parameter among female Turkish immigrants according to age group.

Age group	6 years	10 years	15 years	18-20 years	21-29 years	30-39 years	>40 years
n	128	129	199	40	33	42	30
Stature height (cm)	119.9 (6.7)	141.2 (7.8)	159.7 (6.4)	162.6 (5.6)	160.7 (7.8)	160.4 (4.9)	158.8 (6.9)
Body weight (kg)	23.9 (4.7)	38.4 (9.1)	57.3 (10.8)	59.3 (12.6)	65.7 (12.9)	73.9 (13.4)	72.2 (12.9)
BMI (kg/m ²)	16.54 (2.09)	19.11 (3.46)	22.42 (3.86)	22.39 (4.30)	25.57 (5.36)	28.70 (4.70)	28.74 (4.54)

Table 2: Overweight and obesity rates according to age group Turkish females.

	6 years	10 years	15 years	18-20 years	21-29 years	30-39 years	>40 years
Turkish sample							
n	128	129	199	40	33	42	30
Overweight	12.5%	16.5%	16.4%	10.8%	31.3%	45.0%	50.0%
Obese	12.4%	13.4%	12.5%	7.5%	15.6%	35.0%	32.1%
Austrian sample							
n	268	261	341	184	273	298	284
Overweight	9.3%	15.4%	15.3%	17.2%	16.5%	23.7%	26.8%
Obese	10.8%	10.9%	8.6%	3.4%	3.3%	11.9%	17.4%

Starting with age group 21 to 29 years the overweight rates increase dramatically among Turkish immigrant women with increasing age. Although the overweight rates increase among Austrian women too, both groups differ highly significantly. Considering obesity rates the same pattern occurs Figure 2.

Table 3 shows a comparison between somatometric parameters of the Turkish immigrant women in Vienna, with Indian immigrants in Vienna [44] and immigrant women of different origin in Norway [45]. As to be seen the Turkish immigrant women in Vienna were significantly taller than immigrant women of different origin in Norway. Concerning body weight Turkish immigrant women in Vienna were significantly lighter than immigrant women from Pakistan and Turkish women in Norway. This was also true of group differences in BMI. The Turkish sample from Austria was taller, lighter and showed significantly lower rates of overweight and obesity than Turkish women in Norway. Prevalence rates of overweight and obesity among Turkish women in Austria were significantly lower than that among all immigrant groups in Norway with the exception of Vietnamese women. Interpreting these findings however we have to consider that the Austrian sample of Turkish migrant women was significantly younger than their counterparts in Norway.

Concerning socioeconomic factors influencing weight status among Turkish adult women it turned out that independent of age group, socioeconomic position and educational level were

significantly related with body weight and BMI. Body weight and body mass index increased significantly with decreasing socioeconomic position and decreasing educational level. No obese Turkish women had a high socioeconomic position. 46.9% of obese women were of low socioeconomic status, 53.1% were of middle socioeconomic class. In contrast, 65.0% of the normal weight women belonged to the middle socioeconomic class and 20% were of high socioeconomic position. Regarding educational level the prevalence of obesity and overweight decreased significantly with increasing educational level in Turkish women. Only 5.7% of obese Turkish women reported a higher education such as college or university. German knowledge and duration of stay, which were used as indicators of integration in the Austrian society, showed no significant association with body weight and body mass index [34].

Discussion

Although migration is nothing new in the history of *Homo sapiens*, the process of globalization including modern transportation, but also increasing social and economic disparities between different countries have enhanced transnational migration during the last decades. Beside typical push factors such as poverty, political instability, war or a general lack of resources some pull factors such as social and political stability, better educational or job opportunities promote transnational migration worldwide. Generally people tend to move from low development and poor areas to high development

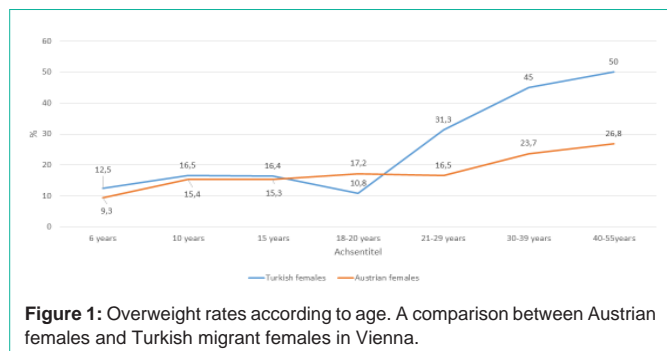


Figure 1: Overweight rates according to age. A comparison between Austrian females and Turkish migrant females in Vienna.

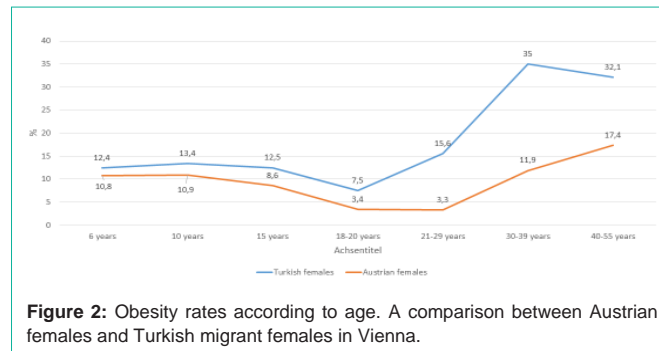


Figure 2: Obesity rates according to age. A comparison between Austrian females and Turkish migrant females in Vienna.

Table 3: Somatometric parameters and weight status of adult Turkish immigrant women in comparison with immigrant women in Norway.

Country of origin	Austrian project		Norwegian project**				
	Turkey	India*	Turkey	Sri Lanka	Iran	Pakistan	Vietnam
n	145	72	101	130	141	105	124
Age	31.1 ^a (10.3)	38.2 (10.8)	40.5 (7.2)	39.5 (8.0)	41.7 (7.6)	42.3 (8.7)	43.5 (7.5)
Stature height (cm)	160.8 ^a (6.3)	160.1 (5.2)	157	156	158	157	153
Body weight	67.7 ^b (14.3)	65.6 (9.9)	73.7	64.3	65.0	71.3	54.5
BMI	26.27 ^c (5.45)	25.62 (3.89)	30.1 (6.0)	26.7 (4.1)	26.2 (4.3)	29.1 (5.0)	23.3 (3.3)
Overweight	32.6% ^d	26.0%	76%	64%	57%	82%	27%
obese	22.7% ^e	54.0%	47%	19%	11%	35%	4%

Legend: * [44], ** [45]

a: significantly different from all subsamples of the Norwegian project ($p < 0.01$)

b: significantly different from the Turkish sample, the Pakistani sample and the Vietnamese sample of the Norwegian project ($p < 0.01$)

c: significantly different from the Turkish sample, the Pakistani sample and the Vietnamese sample of the Norwegian project ($p < 0.01$)

d: significantly different from all subsamples of the Norwegian project ($p < 0.01$)

e: significantly different from all subsamples of the Norwegian project ($p < 0.01$)

areas in Industrialised countries. Migration and increased mobility are connected with the confrontation of different cultural traditions the so called acculturation [46]. Acculturation is associated with dramatic changes in life style, in particular changes in dietary habits, physical activity and daily workload. These changes in lifestyle in combination with the mainly low socioeconomic status of immigrants and several psychic as well as somatic stress factors associated with migration make the process of migration to an important factor of health and disease [47,19a,19b, 48, 22]. Especially low socioeconomic position and minority status of immigrants seem to be associated with increased chronic distress, higher morbidity and increased mortality [49, 17, 50]. Main health problems among migrant populations are non communicable diseases such as cardiovascular diseases, type 2 diabetes or cancer [51, 52]. Studies consistently show that overweight and obesity enhance the risk of suffering from various non-communicable diseases [12]. Although overweight and obesity are becoming increasingly prevalent nearly all over the Industrialised world at the beginning of the third millennium [53, 54, 55] and the reasons of overweight and obesity are complex and interrelated, several studies find typical patterns of risk factors: beside low educational level, low socioeconomic status and ethnicity increase the risk of becoming overweight or obese [12]. Among migrants high prevalence rates of overweight and obesity were documented. This is especially true of women and children or adolescents [56, 17, 18, 38, 57, 58, 32, 21a, 21b, 34, 35]. In European Union a high prevalence overweight or obesity during childhood and adolescence was mainly found among migrants originating from African and Middle East countries, such as Turkey, Morocco, Pakistan, and India [17, 38, 58].

In the present project Turkish immigrant girls and women in Vienna Austria were focused on. The majority of Turkish immigrants are poorly integrated in the Austrian society and belong to the lower social strata of Vienna. Before the results of the present project are discussed in detail we have to mention the limitations of the present project. The adult participants were not randomly selected because they were recruited via snowball systems and the sample size was very small consisting only of 145 Turkish women, i.e. 30 to 40 subjects in each subgroup. Consequently the comparison with the Austrian sample allows only restrictive interpretations. This was also true of

the subadult sample. Although randomly selected the sample size of Turkish girls was also quite small. Nevertheless the results of the present study are in accordance with those mentioned above. A high prevalence of overweight and obesity was found among Turkish women as well as girls. More than 30% of the adult women were classified as overweight more than 22% as obese. Among immigrant girls about 15% were obese and 15% overweight.

These prevalence rates of overweight and obesity seem high, recent studies, however, report comparable high or even higher prevalence rates of obesity and overweight among Turkish immigrants in other European countries [23, 45, 22]. For example more than 80% among adult Turkish immigrants were classified as overweight or obese in the Netherlands [23]. In general obesity rates up to 50% are reported for Turkish people in European countries but also in Turkey [59, 60, 61, 62, 23, 63, 64, 65, 66]. Nearly all authors reported higher obesity rates for among women than for men.

A little bit different is the situation among children and adolescents: instead of, While some authors report low rates (0.9% to 3.8%) [67, 68] or 3.7% to 12.2% [69] of overweight and obesity among children and adolescents in Turkey, extremely high rates are reported for Turkish immigrant children in European countries [70], such as 23.4 -30.2% for Turkish children in the Netherlands [20]. These percentages are comparable to those of the present sample. But what are the reasons for this high prevalence of overweight and obesity among Turkish immigrant girls and women in various European countries?

On the one hand the general low socioeconomic status of Turkish immigrants in various countries of the European Union may lead to an unhealthy lifestyle and as a consequence to high obesity and overweight rates. Migrants represent a minority group in the host country, often with a lower socioeconomic position (SEP) than the host population. It is well documented that minority status but also a low SEP are associated with increased chronic distress and as a consequence higher morbidity rates [71, 47, 50, 72]. A low socioeconomic status and/or discrimination by ethnicity may also result in increased stress, which has a direct effect on the hypothalamic-pituitary-adrenal axis. The consequence is an elevated cortisol level, which may promote the

development of obesity [73]. As early as 1933 an inverse association between socioeconomic factors and obesity has been observed with both European and US populations [74]. Recently the strong social gradients in obesity rates with higher rates among people with low-level education and low socioeconomic status have been proved in numerous studies [75, 28, 27, 23, 16, 29, 30]. A negative association between socioeconomic position and overweight/obesity rates were also found in the Viennese project.

Recently some authors claim that immigrant obesity may be the result of the process of acculturation [76, 46]. Once migrants have moved to their host country, they are confronted with new cultural patterns, different eating and life style habits. In combination with low socioeconomic status and low income migrants tend very fast to adopt adverse eating habits [77, 78, 46]. Healthy food such as vegetables and fresh fruits or organic food is much more expensive than food characterised by high energy density, such as sweets or fats. Consequently poverty and a low socioeconomic position are associated with overweight and obesity in First world countries [78, 79, 80, 81]. Acculturation in combination with low socioeconomic status has also a profound impact on physical activity patterns. Physical activity is reduced among women of low socioeconomic position especially among women with a background of migration [82, 83, 84, 85]. Therefore Turkish immigrants live in a typical obesogenic environment. Both, activity patterns as well as nutritional habits are highly influenced by cultural and social factors [83, 84, 86, 82]. The majority of Turkish women in Vienna underlie economic as well as cultural pressures, characterised by high energy intake and an extremely low physical activity during leisure time [32]. Obesity among Turkish immigrant women is therefore not only a medical problem it is also a socioeconomic and cultural one [87]. This is also true of children and adolescents [88, 89]. Physical activity is reduced among children of low socioeconomic status, especially among children with a background of migration [83, 79, 84]. Even during childhood and adolescence activity patterns as well as nutritional habits are highly influenced by economic and cultural components [86, 82, 90, 83, 84]. Culture influences preferences for and opportunities to engage physical activity, but also child-feeding patterns and nutritional preferences [73]. High energy diet on the one hand and reduced physical activity characterised by long time watching TV [91] on the other hand seemed to be the main reason for the high levels of overweight and obesity among migrant children, especially originating from Turkey, observed in several European countries [17, 58, 38]. On the other hand culture can influence the perception of health risks associated with obesity [92]. Low income mothers, but also mothers with a background of migration are seldom worried about the overweight of their offspring [93]. These women interpret their overweight or obese offspring as healthy and well-nourished. This may be due to the fact that up to now overweight or obesity during childhood in Turkey is phenomenon predominantly found in social middle and high income class [94]. Therefore overweight is culturally positively interpreted and not seen as an important long time health risk. Although overweight and obesity reduce health related quality of life dramatically among obese Turkish children and adult women [61], affected women are not worried about being obese or about obesity of their offspring. This is especially true of women with a low educational level and low degree

of acculturation or integration in the Austrian society.

We can conclude that Turkish immigrants in Vienna are confronted with an obesogenic environment. High obesity rates are therefore a socioeconomic and cultural problem.

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