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Socio-economic Position and Obesity among Turkish Migrant Women in Vienna, Austria

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KEYWORDS Obesity. Somatometrics. Socio-economic Position. Integration. Turkish Migrants

ABSTRACT In Central Europe, high obesity rates are described for migrants originating from Mediterranean countries or the Near East. This increased prevalence of obesity is mostly attributed to the low socio-economic position and a lack of integration of migrants. This cross-sectional study was performed to evaluate the impact of socio-economic factors and the degree of integration on somatometric parameters and weight status among Turkish migrant women living in Vienna Austria. The study population consisted of 145 Turkish women aged between 18 and 56 (x=31.1± 10.3). Socio-demographic parameters such as socio-economic position (SEP) and educational level but also indicators of integration in particular knowledge in German and the duration of stay in Vienna were collected by personal interviews using a structured questionnaire. Stature height, body weight and fat percentage were measured. Weight status was determined by means of the BMI categories defined by the WHO. Overweight and obesity rates were extraordinarily high, that is, more than 40 percent of women aged between 20 and 29 years were classified as obese or overweight. Among women older than 30 years nearly 80 percent were overweight or obese. Nevertheless socio-demographic factors such as socio-economic position (SEP) and educational level were significantly negatively related to body weight fat percentage and obesity. Parameters indicating the degree of integration such as German knowledge or duration of stay in Austria were not related significantly to somatometric parameters. Summing up the results of this study demonstrate the impact of socioeconomic factors on obesity rates among migrants in Austria.

INTRODUCTION

The prevalence of obesity is increasing worldwide at an alarming rate (Hossain et al. 2007). At least 1.1 billion adults worldwide are thought to be overweight, and at least 312 million of them are thought to be obese (Ford and Mokdad 2008). This tendency is a matter of concern because obesity has been linked to numerous chronic diseases such as hypertension, diabetes mellitus, dyslipidemia, coronary disease and some cancers such as breast cancer or colon cancer (McGee 2005). Therefore, obesity is costly to societies and the increase in the prevalence of obesity carries potentially serious implications for the future health of populations and health care expenditures of countries (Ford and Mokdad 2008). As a consequence, prevention and effective treatment of obesity are very important public health issues today. In order to prevent or to treat obesity effectively, risk factors have to be identified and analysed. It is well established that the chances of becoming obese are greater for women than men and for those of lower educational level and lower socio-economic position (Ball and Crawford 2005; Moreira and Padrao 2006; Van Hook and Balistreri 2007; Wang and Beydoun 2007; Faskunger et al. 2009; Park et al. 2009; Vernay et al. 2009; Faeh et al. 2011; Kuntz and Lampert 2010). Additionally numerous investigators have demonstrated that migrant status increases the risk of overweight or obesity. This is true of Hispanic immigrants in the United States (Kaplan et al. 2004; Park et al. 2009), as well as of immigrants originating from Mediterranean countries or Middle East in Central and Northern Europe (Brussard et al. 2001; Hoppichler and Lechleitner 2001; Uitewaal et al. 2004a,b; Fredriks et al. 2005; Kirchengast and Schober 2006; Misra and Ganda 2007; Dijkshoorn et al. 2008; Wolin et al. 2009). Since the number of people with a background of migration is steadily rising in industrialized countries and increasing obesity rates represent an enormous economic burden for public health care systems, a profound analysis of factors influencing immigrant obesity seems to be absolutely necessary. Recently some authors claim that immigrant obesity is the result of an unhealthy assimilation and the low socio-economic position of immigrants (Van Hook and Balisteri 2007; Faskunger et al. 2009; Park et al. 2009). Furthermore, a strong association between obesity and the length of residence in the host country was reported (Kaplan et al. 2004).

In the present study, the very specific situa-

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tion of Vienna, Austria is considered. Over the last few decades Austria has undergone a change, from a relatively homogeneous society to a so-called multicultural one. Since the 1960s, an increasing number of labour migrants from Former Yugoslavia and Turkey migrated to Austria (Kilaf 2004). At the end of the eighties and during the early nineties of the last century, migration resulted primarily from family reunion on the one hand and from political refugees, especially from former Yugoslavia, on the other hand. Today 17 percent of the Austrian inhabitants have a background of migration. Most of them originate from Former Yugoslavia and Turkey. In the year 2008, according to the National census, 134 299 Turkish migrants, who did not have Austrian citizenship lived in Austria (Statistik Austria 2009). About 100000 Turkish people had the Austrian citizenship at that time. The majority of these Turkish migrants live in Vienna, where more than 20 percent of the inhabitants have a background of migration today. As a consequence, the Austrian society is increasingly characterized by many different languages, religions and cultural traditions. This trend has brought the health and health problems of different ethnic groups into focus. Although the public health system in Austria is highly developed and enables Austrians as well as migrants 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 with their Austrian counterparts (Hoppichler and Lechleitner 2001; Statistik Austria 2009). Additionally some studies have shown a high prevalence of overweight and obesity among Turkish children and adolescents in Vienna (Kirchengast and Schober 2006). These studies, however, had only migrant children and adolescents of low socio-economic status focused on. The association between socio-economic position (SEP) and weight status was never tested among Turkish migrants in Vienna. Thus, the aim of the present study was to evaluate the impact of socio-economic factors on somatometrics, first of all weight status among adult Turkish women living in Vienna for the first time.

MATERIAL AND METHODS

Study Population and Data Collection

Data collection for the present study took place exclusively in Vienna, Austria. A series of 145 Turkish women ageing between 18 and 56 years ($x=31.1\pm10.3$) were enrolled. Participants were recruited via snowball system and therefore not randomly selected. Data collection took place at consulting centres which are established and financially supported by the Viennese government and at religious facilities, usually a mosque, during the morning hours (9 to 12 a.m.). Women were informed about the study by a personal presentation of the planned project and by information flyers written in Turkish language. It was no problem to recruit participants because the majority of women were interested in the study and only few women refused to participate. Initially it was planned to include 150 women in the study. Data were collected from 155 women. However, 10 women had to be excluded from the analyses because they did not meet the recruitment criteria. Recruitment criteria were: migrants of the first generation (born in Turkey), no pregnancy at the time of investigation, no endocrine disorders or medical treatment which might affect body composition or weight status. A trained Turkish interviewer conducted the interviews based on a structured questionnaire which was designed for the present study. This questionnaire was written in Turkish language and analyzed in Turkish language. After the interview stature height and body weight and body fat percentage of the participants were measured. Beside the objectives of the study, the right to withdraw at any time was explained. Strict confidentiality was ensured. The study was conducted in compliance with "Ethical principles for medical research involving human subjects" of Helsinki Declaration.

Socio-economic Position (SEP)

Since the most frequently used Hollingshead four factor index of SEP (Hollingshead 1975) was not useful for the present sample, socio-economic position (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 (Grundy and Holt 2001; Cirino et al. 2002). As an indicator of integration/acculturation, the knowledge of German language (4 levels: ex-

tremely poor, poor, medium and high) and the duration of stay in Austria were used. A selection of socio-demographic parameters is presented in Table 1. As to be seen in Table 1, not only less educated women of exceptionally low socio-economic position were enrolled in the present study. Nearly 25 percent of the women had a University degree and only about 30 percent were of low socio-economic position. There is no reason to assume that only extremely poor, less educated or sick women were included into the present sample.

Table 1: Age groups and socio-economic description of the study population

Socio-demographic variables	*n*	*Percent*
Socio-economic Position (SEP)		
Low	46	31.7
Medium	86	59.3
High	13	9.0
Educational Level		
No school	7	4.8
Primary school	49	33.8
Secondary school	22	15.2
High school degree	32	22.1
University	35	24.1
German Knowledge		
Extremely poor (level 1)	42	28.9
Poor (level 2)	32	22.3
Medium (level 3)	35	23.9
High (level 4)	36	24.9
Marital Status		
Unmarried	40	27.6
Married	97	66.9
Widowed	4	2.8
Divorced	4	2.8
Number of Children		
0	41	28.2
1	50	34.6
2	37	25.6
3	15	10.3
4 and more	2	1.3
Duration of Stay in Vienna		
< 5 years	68	47.2
5-10 years	14	9.0
11- 20 years	44	30.6
> 20 years	19	13.2
Age Groups		
< 21 years	40	27.8
21-29 years	33	22.9
30-40 years	42	29.2
>40 years	30	20.1

Somatometrics and Weight Status

Weight status was determined by using the body mass index (BMI) kg/m^2. During the last few years appropriate methods to diagnose overweight and obesity were discussed intensively. Although several authors recommend waist circumference and waist to hip ratio as the best methods to identify obesity and overweight (Mamtani and Kulkarni 2005), we decided to use the body mass index (BMI) and the BMI categories recommended by the WHO (1995):

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

Stature height was measured with a professional Martin anthropometer (Sieber-Hegner Corp.Switzerland) to the nearest millimetres. Body weight was recorded with an electronic scale for health professionals (Tanita corp.) precise to +/- 100g. The scale was calibrated every day before data collection starts.

Body fat percentage was determined using a TBF 310 Body composition analyzer according to BIA-method. In this BIA system, two footpad electrodes are incorporated into a precision electronic scale. Impedance of the lower extremities and body weight are measured simultaneously while the subject is standing on the scale. The electrodes are in contact with soles and heels of both feet. Biological impedance was measured with 4 terminals and used a standard 50kHz-0.8mA sine wave constant current. The voltage drop was compared with the heel electrodes. TBF 310 automatically measures weight and impedance. The computer software in the machine then used the measured resistance, the programmed subjects gender, group (child, adult or adult athlete), and stature height and the measured weight to calculate the body density based on previously derived equations obtained from regression analyses with underwater weighing. This was then applied automatically to the standard densiometric formula according to Brozek to calculate the fat percentage. The coefficient of variation for within day impedance measurement was 0.9 percent and the between days coefficient of variations was 2.1 percent (Nunez et al. 1997). The leg- to-leg pressure contact electrode BIA system has overall performance characteristics for impedance measurement and body composition analysis similar to conventional arm-to-leg electrode BIA and offers the advantage of increased speed and ease of measurement (Nunez et al. 1997). The BIA method using bipolar foot electrodes is described as useful and reliable tech-

nique for measuring body composition by several studies (Nunez et al. 1997; Tsui et al. 1998; Xie et al. 1999). In the present study, the method was especially useful because the body fat analyzer was easy to transport and the participants had only went up on the scale and the determination of body weight and body fat percentage were performed simultaneously.

Anthropometric data of all subjects were collected by the same person. All subjects were measured in underwear without shoes. This procedure (use of professional instruments, always the same investigator, calibration were performed every day) minimizes the effects of potential errors. Anthropometric data collection took place in the morning hours between 9 and 11 a.m.

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 and the Kruskal-Wallis-test were used to test frequency differences with respect to their statistical significance. Odds ratios were performed to evaluate the risk to be overweight or obese according to socioeconomic position (SEP). Multiple regression analyses were used to test the impact of socioeconomic factors on somatometric parameters. Categorical regression analyses were used to assess the impact of socioeconomic factors on weight status. A probability P value of less than 0.05 was considered significant.

RESULTS

Prevalence of Overweight and Obesity among Turkish Women

The prevalence of overweight and obesity was extraordinarily high among Turkish women. Nearly 47 percent of Turkish women aging between 21 and 29 years were overweight or obese. Among women older than 30 more than 80 percent were classified as overweight or obese.

Socio-economic Factors Influencing Obesity and Overweight among Turkish Women

Table 2 shows that age, socio-economic position and educational level were related significantly with weight status (BMI). Body mass index increased with increasing age but with decreasing socio-economic position and educational level (Figs. 1 and 2). Nearly 80 percent of the women with a low socio-economic status were classified as overweight or obese. This was

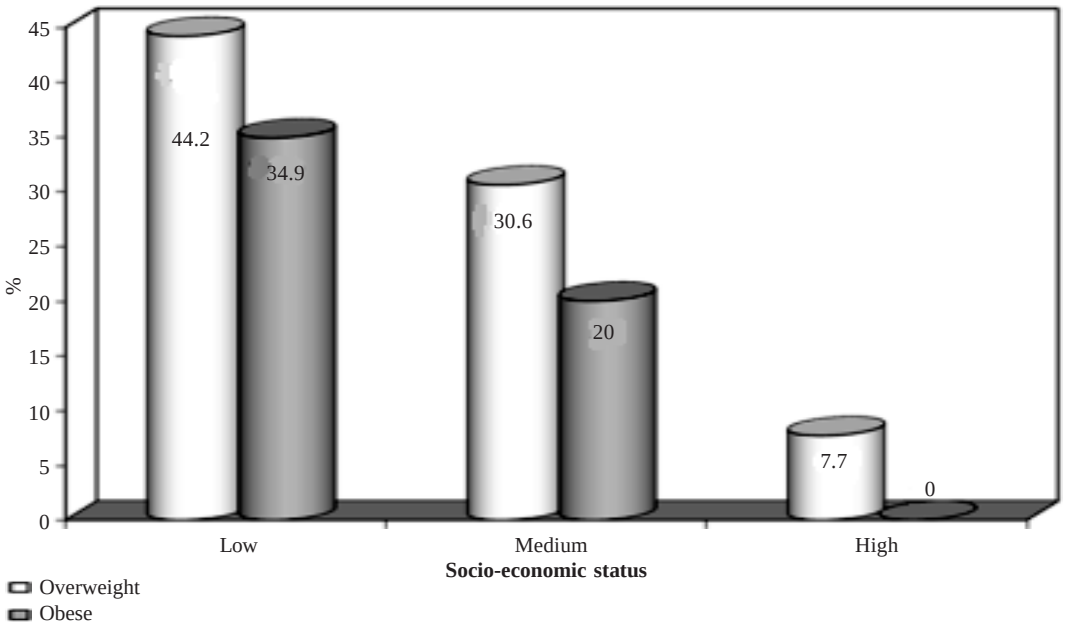

Fig. 1. Prevalence of overweight and obesity according to socio-economic status (SES)

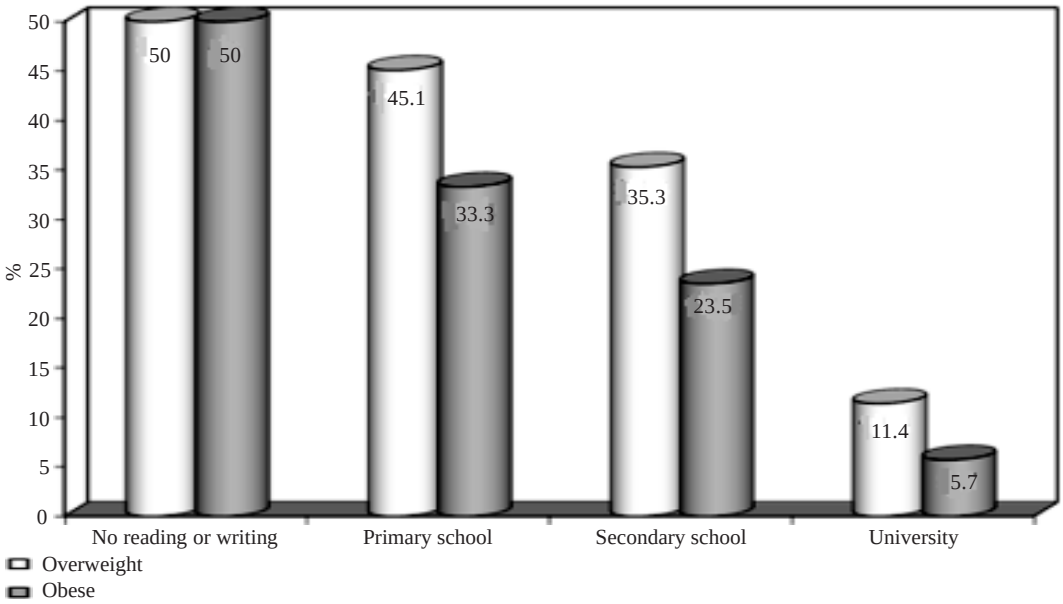

Fig. 2. Prevalence of overweight and obesity according to educational level

only true of about 50 percent of women of medium socio-economic status. Among women with high socio-economic status, only 7.7percent were overweight, none were obese (Fig.1). Regarding educational level, the prevalence of obesity and overweight decreased significantly with increasing educational level (Fig. 2). Low socio-economic position (SEP) increased the risk to be overweight (OR=3.4, 95 percent CI =1.34-8.65) or to be obese (OR=4.2 95 percent CI= 1.52-

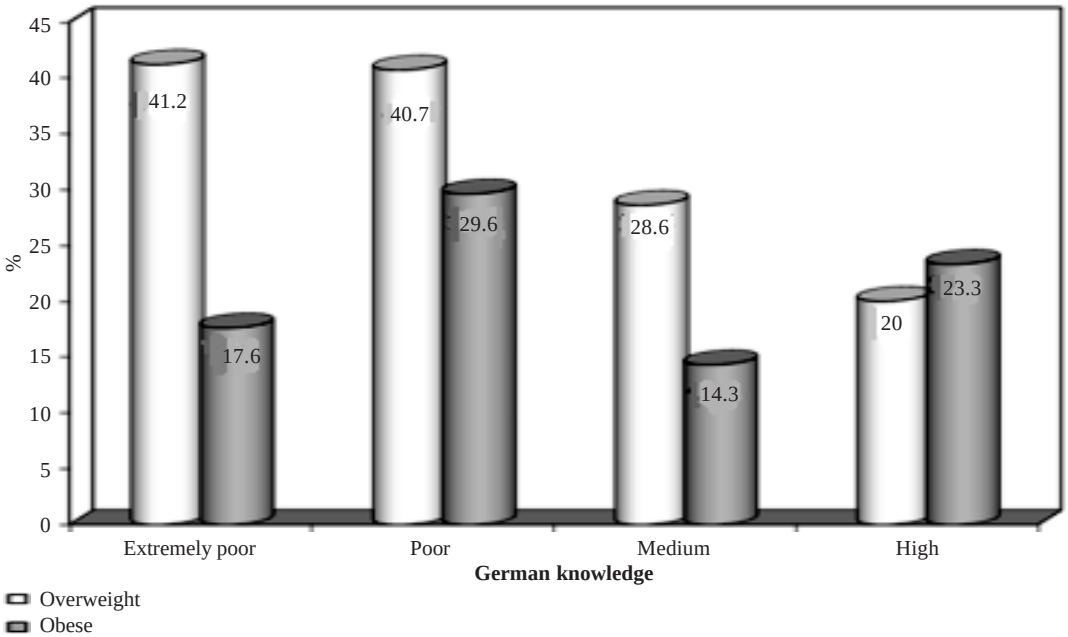

Fig. 3. Prevalence of overweight and obesity according to German knowledge

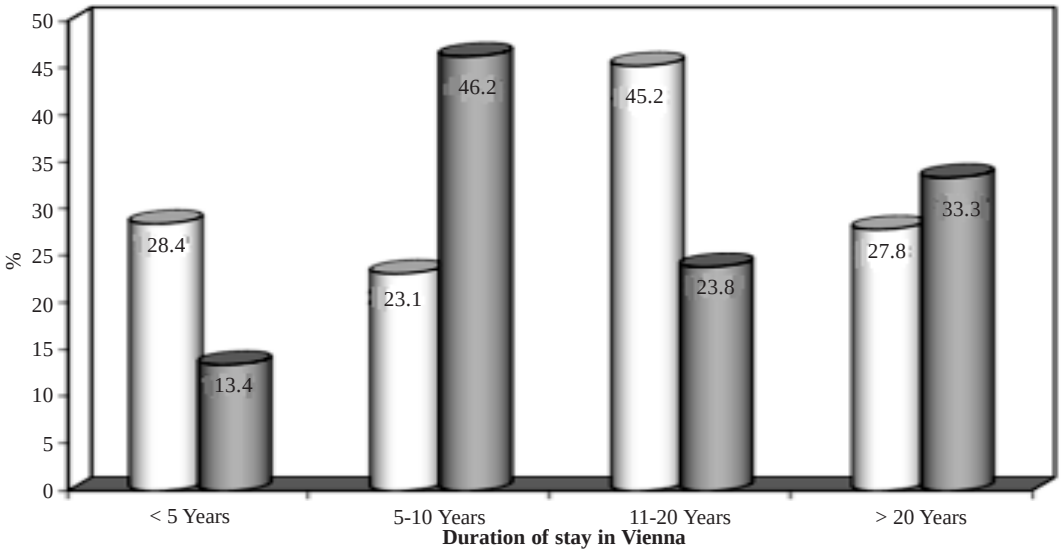

Fig. 4. Prevalence of overweight and obesity according to duration of stay in Vienna

11.19) in comparison to medium SEP as well as to high SEP (OR =25.3. 95 percent CI = 2.83-226.07). In contrast to socio-economic factors, the indicators of integration, that is, level of German knowledge and the duration of stay in Vienna were not related significantly with weight status (Table 2, Figs. 3 and 4).

Table 2: The impact of socioeconomic factors on weight status (Categorical regression analysis)

Dependent variable	*Multiple R*	*Coefficient*	*Significance*
Dependent Variable: Weight Status			
Age group	0.635	0.41	<0.001
SEP		-0.12	<0.005
Educational level		-0.34	<0.003
German knowledge		0.14	n.s.
Duration of stay in Vienna		-0.16	n.s.

Legend: n.s. = not significant

Socio-economic Factors and Somatometrics

As presented in Table 3 besides age group, socio-economic position, educational level and the duration of stay in Vienna are significantly related with body weight, BMI and fat percentage. With increasing socio-economic position and increasing educational level body weight, BMI and fat percentage decreased significantly. No significant association between somatometrics and the indicators of integration that is, German knowledge and duration of stay in Vienna was found.

Regarding body height, an increase with increasing socio-economic position and educational level was found, the group differences however were not of statistical significance.

These results of the Kruskal-Wallis Test are corroborated by those of the multiple regression analyses (Table 4). Age, socio-economic position and educational level are independently significantly related to body weight, BMI and fat percentage. Parameters of integration such as German knowledge and duration of stay in Vienna in contrast were not significantly related to somatometric factors.

DISCUSSION

Migration is nothing new in the history of Homo sapiens. In contrast, migration of individuals and whole populations is an ancient phenomenon among *Homo sapiens* and his ancestors. Recently several push factors such as a lack of resources, poverty or war but also pull factors such as better educational or job opportunities but also marriage promote residential mobility and transnational migration worldwide. Migration and increased mobility, however, are not only of growing social, political and demographic

Table 3: Somatometrics and socio-economic factors (Kruskal-Wallis-test)

Socio-economic factors	*Body height (cm)*	*Body weight(kg)*	*BMI(kg/m²)*	*Fat percent*
Socio-economic Position				
Low	160.6 (5.9)	74.3 (12.9)	28.83 (4.91)	36.5 (6.7)
Medium	160.5 (6.5)	66.1 (14.3)	25.68 (5.43)	29.7 (9.7)
High	162.9 (6.0)	57.4 (8.4)	21.56 (2.41)	23.5 (6.9)
Significance	n.s.	P<0.0001	P<0.0001	P<0.0001
Educational Level				
No school	157.9 (3.6)	70.1 (7.3)	28.17 (3.26)	35.9 (5.8)
Primary school	160.2 (5.7)	74.4 (13.6)	29.01 (4.94)	36.6 (7.6)
Secondary school	160.1 (8.5)	73.8 (12.6)	28.86 (5.14)	36.3 (5.8)
High school degree	160.9 (6.9)	64.1 (13.5)	24.81 (5.21)	28.5 (8.6)
University	162.1 (5.7)	59.4 (12.7)	22.54 (4.03)	23.3 (7.9)
Significance	n.s.	P<0.0001	P<0.0001	P<0.0001
Age Group				
< 21 years	162.6 (5.6)	59.3 (12.6)	22.39 (4.30)	22.8 (8.6)
21-29 years	160.7 (7.8)	65.7 (12.9)	25.57 (5.36)	30.5 (8.2)
30-39 years	160.4 (4.9)	73.9 (13.4)	28.70 (4.70)	36.1 (6.7)
≥ 40 years	158.8 (6.9)	72.2 (12.9)	28.74 (4.54)	36.4 (6.3)
Significance	n.s.	P<0.0001	P<0.0001	P<0.0001
Duration of Stay in Vienna				
<5 years	161.3 (6.5)	63.5 (12.5)	24.46 (4.74)	27.7 (9.3)
5-10 years	161.0 (8.7)	75.7 (13.5)	29.02 (5.74)	35.2 (8.7)
11-19 years	161.0 (4.9)	70.6 (13.7)	27.21 (5.12)	33.9 (8.6)
≥ 20 years	157.9 (6.8)	69.9 (13.9)	28.22 (6.29)	33.8 (8.4)
Significance	n.s.	n.s.	n.s.	n.s
German Knowledge				
Extremely poor	160.6 (6.7)	66.4 (12.8)	25.72 (4.75)	31.1 (9.6)
Poor	158.2 (5.1)	69.8 (13.4)	27.99 (5.64)	33.3 (8.4)
Medium	161.0 (5.7)	64.5 (13.4)	24.86 (4.76)	28.6 (9.4)
High	163.2 (6.7)	68.1 (16.4)	25.57 (5.95)	29.9 (10.3)
Significance	n.s	n.s.	n.s.	n.s.

Legend: n.s. = not significant

Table 4: The impact of socio-demographic factors on somatometric parameters (Multiple regression analyses)

	Multiple R	*coefficient*	*Sig*	*95percent confidence interval*
Dependent Variable: Body Height				
Age	0.28	-0.09	n.s	-0.24 – 0.05
SEP		-1.15	n.s.	-4.05 – 1.74
Educational level		0.07	n.s.	-1.28 – 1.43
German knowledge		1.00	n.s.	-0.28 – 2.29
Years in Vienna		-0.10	n.s.	-0.29 – 0.09
Dependent Variable: Body Weight				
Age	0.49	0.38	<0.01	0.08 – 0.67
SEP		-7.44	<0.01	-13.20 – -1.68
Educational level		-2.17	n.s.	-4.85 – 0.52
German knowledge		3.19	<0.02	0.64 – 5.74
Years in Vienna		-0.15	n.s.	-0.54 – 0.23
Dependent Variable: BMI				
Age	0.57	0.18	<0.001	0.07 – 0.28
SEP		-2.26	<0.03	-4.31 – -0.21
Educational level		-0.90	<0.05	-1.86 – 0.06
German knowledge		0.79	n.s.	-0.11 – 1.71
Years in Vienna		-0.02	n.s.	-0.15 – 0.12
Dependent Variable: Fat percent				
Age	0.65	0.36	<0.001	0.18 – 0.53
SEP		-3.18	<0.05	-6.54 – 0.18
Educational level		-2.43	<0.003	-3.99 – -0.86
German knowledge		1.45	<0.05	-0.01 – 2.96
Years in Vienna		-0.08	n.s.	-0.30 – 0.15

Legend: n.s. = not significant

importance, the process of migration is also an important factor of health and disease (Uitewaal et al. 2004 a,b; Daryani et al. 2005; Abate and Chandalia 2007; Misra and Ganda 2007). Once migrants have moved to their host country, they are a minority often with a lower socio-economic position (SEP) than the host population. Minority status but also a low SEP is associated with increased chronic distress and as a consequence higher morbidity rates (Dotevall et al. 2000; Landman and Cruishank 2001; Bongard et al. 2002; Ujcic-Voortman et al. 2009). A special health problem among immigrants is the high prevalence rates of overweight and obesity, especially among women, children and adolescents (Brussard et al. 2001; Hoppichler and Lechleitner 2001; Kirchengast and Schober 2006). In many Central and Northern European countries immigrants from Mediterranean countries and Near East are described as extremely vulnerable to becoming overweight or obese (Fredriks et al. 2005; Dijkshoorn et al. 2008; Bongard et al. 2002; Uitewaal et al. 2004; Kirchengast and Schober 2006; Faskunger et al. 2009). The results of the present study are consistent with those mentioned above. Nevertheless before the results are discussed in detail ,we have to mention the limitations of the present study. The participants were not randomly selected because they were recruited via snowball systems and the sample was very small consisting only of 145 women. This very small sample allows only restrictive interpretations of the results. Nevertheless, a dramatically high prevalence of overweight and obesity among Turkish women is noticeable. More than 80 percent of women aging 30 years and above were classified as overweight or obese. At a first glance these obesity rates seem extremely high, but several recent studies report comparable high prevalence rates of obesity and overweight among adults in Turkey as well as among Turkish immigrants in European countries (Dijkshoorn et al. 2008; Papandreou et al. 2008; Oguz et al. 2008; Dinc et al. 2006; Erem et al. 2001, 2004; Tanyolac et al. 2008; Gültekin et al. 2009): According to Iseri and Arslan (2008), 56 percent of the adult Turkish population is overweight or obese. Oguz et al. (2008) showed a prevalence of overweight of 36 percent and a prevalence of obesity of 30.4 percent for the adult Turkish population. 41.4 percent of the adult population of Trabzon was classified as overweight and 19.2 percent as obese (Erem et al. 2004). Nearly all authors reported higher obesity rates for women than for men. All these studies mentioned above described the situation in Turkey. Among Turkish immigrants in European countries overweight/obesity rates increased further. Dijkshorn et al. (2008) found a prevalence of overweight/obesity of more than 80 percent among Turkish immigrants in the Netherlands. These findings are comparable with those of the present study.

The main findings of the present study, however, are not the high obesity rates among Turkish immigrant women, it is the significant impact of socio-demographic factors, first of all socio-economic position (SEP) and educational level on obesity rates among Turkish women living in Vienna. Independent of age body weight, BMI and the fat percentage increased significantly with decreasing socio-economic position and decreasing educational level. In general, weight status and the prevalence of overweight and obesity are higher, the lower socio-economic position and educational level are. This inverse association between socio-economic factors and obesity has been observed consistently with both European and US populations since as early as 1933 (Diehl 1933). Up to now the strong social gradients in obesity rates with higher rates among people with low-level education and low socio-economic status have been proved in numerous studies (Moreira and Padrao 2006; Wang and Beydoun 2007; Faskunger et al. 2009; Vernay et al. 2009). The impact of socio-economic factors on obesity rates among immigrant populations in Europe, however, were only focused on by few studies. Dijkshoorn et al. (2008) described a strong association between educational level and increased obesity rates among Turkish immigrant women in the Netherlands. These results are comparable to those of the present study. Additionally, Dijkshoorn et al. (2008) found no association between indicators of integration or acculturation such as length of residence and obesity rates. This observation is consistent with the findings of our study. Neither German knowledge nor duration of stay in Austria was related significantly to obesity rates. Low socio-economic position and a low educational level, however, are important risk factors to become overweight or obese (Bongard et al. 2002; Kirchengast and Schober 2006). On the one hand, causes for this trend are economic ones because food characterised by high energy density, such as

sweets or fats, is much cheaper than vegetables or fresh fruits. Therefore, in the modern world poverty is associated with overweight and obesity (Lawrence et al. 2002; Drewnowski and Specter 2004; Shahar et al. 2005). On the other hand, physical activity is reduced among women of low socio-economic position especially among women with a background of migration (Dowler 2001; Green et al. 2003; Hosper et al. 2007). Activity patterns as well as nutritional habits are highly influenced by cultural and social factors (Green et al. 2003; Hosper et al. 2007; Shatenstein and Ghadirian 1998; Dowler 2001). The majority of Turkish women in Vienna underlie strict cultural pressures, characterised by extremely low physical activity during leisure time (Kilaf 2004). Obesity among Turkish immigrant women is therefore not only a medical problem it is also a socio-economic and cultural one (Ulijaszek and Lofink 2006). The results of the present study plead for an intensive research concerning obesity and overweight promoting factors among Turkish migrants in Austria.

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