

Body weight and healthy diet among elderly Turkish immigrants

Links to income

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Summary

In the Sağlık study, 100 elderly men and women in Germany with a Turkish migrant background were questioned about body weight/body size, their fruit, vegetable and meat consumption and their income, among other things. The results reveal, particularly among women, a lower income and an exceptionally high prevalence of overweight and obesity. There was a significant correlation between lower income and greater body weight. Both men and women consume significantly low amounts of fruit and vegetables, in comparison with recommendations, whereby this consumption increases with higher incomes. There is a clear need for nutritional health promotion measures for the target groups, which to begin with appear more urgent for women than for men.

Keywords: Dietary behaviour, body weight, overweight, obesity, migrants, migrant background, Turkish, income

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Introduction

Migrants in Germany

At present the proportion of people with a migrant background in Germany is still significantly greater in younger age groups than in older age groups. In Hamburg, for example, around 13% of people over 65 have a migrant background, whereas among under 18s the figure is 46%. Most people with a migrant background living in Hamburg come from Turkey (18%) [1].

The already considerable and ever-increasing proportion of elderly people with a migrant background shows that institutions for elderly people, such as retirement homes, outpa-

tient care services and counselling centres, will need to develop a more intercultural openness. There will be a need for research into issues relating to health and a healthy diet. Irrespective of cultural background, a healthy diet with a higher nutrient density and lower energy density is an important preventive goal in this target group. To realise this goal, however, culture-specific factors, such as e. g. traditional dishes and consumption habits, must be taken into account. Furthermore, elderly Turkish migrants are more likely to have a lower socio-economic status (SES) than other population groups. Data from the micro-census of 2005 [2] show that households of elderly people with migrant backgrounds generally have a far lower monthly net income and assets than households of comparable age groups without migrant backgrounds. Calculations made by the Robert Koch-Institut (RKI) [3] also prove that migrants from Turkey have the lowest equivalent household income¹ out of all the migrants questioned. According to the Federal Office for Migration and Refugees [4], the reasons why elderly migrants often have less money on average are that Turkish men have frequently worked in semi-skilled jobs with lower wages

¹Household income dependent on number and age of people

("the low-skill sector") and that Turkish women have only rarely been employed at all.

Socio-economic status (SES) and diet

At a very early stage, German studies showed that a lower SES was accompanied by an unhealthier diet, in particular a lower consumption of fruit and vegetables and a higher consumption of meat [5]. This correlation has also been apparent in more recent studies with considerably larger research groups [6, 7]. Moreover, the National Consumption Survey II (Nationale Verzehrsstudie II; NVS II) showed that a lower SES is accompanied by a higher prevalence of overweight and obesity, whereby this effect is more consistent and considerably more pronounced among women than among men [8]. The correlation between the prevalence of obesity and a lower SES is well documented internationally in more developed countries [9].

The SES is a complex factor, which takes into account education, income and professional status. The SES, e.g. in the NVS II, is therefore illustrated through a class index, which takes into account these three parameters. These often correlate, but can also significantly diverge in individual cases (e.g. a graduate historian, who, as a taxi driver, belongs to the low-paid). There are therefore good grounds for asking whether the frequently-observed unfavourable diet and the higher prevalence of obesity among those with a lower SES can be attributed to the level of education or to income disparities. Based on data from the telephone RKI Health Survey of 2003, KUNTZ and LAMPERT [10] were able to show that the effect of income is significantly greater among women than the effect of education, whereas, among men, the level of education, but not income, has a significant influence.

Research question

The aim of this work is to examine the Body Mass Index (BMI) and the consumption of fruit, vegetables and meat among men and women over 60 with a Turkish migrant background, taking gender and income into account. The hypothesis to be investigated is that a lower income is accompanied by a higher BMI, lower fruit and vegetable consumption and higher meat consumption. Differences on the basis of the level of education cannot be addressed, as the differences in the level of education of the sample considered here were too small (see results), therefore only income and not SES was ascertained.

Methods

This research is based on data, which was collected as part of the interdisciplinary Sağlık Project (in Turkish = health). This project is carried out by the Competence Center Gesundheit at the Hochschule für Angewandte Wissenschaften in Hamburg. As part of the project and based on a comprehensive needs and status analysis, health promotion services focusing on healthy diet, physical activity and social participation were developed for elderly Turkish migrants and were implemented in collaboration with local cooperation partners.

Recruitment and interview method

From January 2011 to August 2011, 100 Turkish migrants over 60 not in care, in four selected districts of the city of Hamburg (Wilhelmsburg, Billstedt, Altona-Nord, Altona-Altstadt), were questioned based on a standardised interview guide in the Turkish language.

The proportion of the population with a migrant background is particularly high in these four districts [11]. The interviews were carried out

by native speakers, who were trained in the use of the interview guide. Potential study participants were actively approached at mosques, cafés and on the streets. In addition, participants were acquired thanks to the snowball method (e.g. they knew the Turkish interviewer).

The duration of the interview was 45 minutes on average. In the development of the interview guide it was shown that this duration already placed a significant demand on the interviewees and that a longer interview would not be acceptable. Therefore, limitations in the scope of the questions were accepted to ensure a willingness to provide information.

Contents of the interview

The interviewees provided information on, among other things, the state of their health, their health-related quality of life, their diet overall, their eating and drinking behaviour, and on cooking and shopping and their social contacts. The Turkish men and women were asked to state their weight and size. From this data, BMI was calculated as a ratio of body weight (kg) and body size (m²). As a result normal weight, underweight (BMI < 18.5 kg/m²), overweight (BMI 25 < 29.9 kg/m²) and obesity (BMI > 30 kg/m²) could be determined, according to the definition by the World Health Organisation (WHO) [12]. In addition, they were asked about their daily fruit and vegetable consumption ("How many portions of fruit and vegetables do you normally eat per day?") and were given examples of what constituted a portion. Meat consumption was recorded through the question "How often do you normally eat meat?" and different answer options ranged from "more than once a day" to "never". The use of a comprehensive diet survey method, such as e.g. a diet history or a comprehensive questionnaire on

food frequency, was waived, as the interview duration would have then been too long. An average of 35 minutes additional interview time would have been required for a diet history interview [13].

For this study, income was determined according to the self-reported income per capita. This was asked by the question “What is your monthly net income (after taxes and health and social contributions)?” Income was reduced from an original eleven categories to four categories for better clarity (not specified/unknown, income < € 500, income € 500–1,000 and income > € 1,000) and evaluated according to gender. In addition, questions were asked about available household income. However, the results show that this was misunderstood by the target group, as data provided on household income was to a certain extent lower than data on personal income. For this reason, only data on income per capita was used for the evaluation.

The question on school education (“How many years did you attend school?”: not at all, 1–5 years, 6–8

years, 9–11 years, >12 years) gave no meaningful results and was therefore not taken into account in the evaluation (see below).

The statistical evaluation of the data was carried out with SPSS Version 19 (Superior Performing Software Systems).

Results

Overall, data from 54 women and 46 men, aged between 60 and 77 and between 60 and 79 respectively, was evaluated. The average age was 64.3 years (standard deviation [SD] = 3.92) for women and 66.9 years (SD = 5.14) for men. 20.4 % of women and 4.3 % of men stated that they did not know their age.

Income and school education

The results show that most interviewees had a monthly income of € 500–1 000 (48.1 % of women, 63.0 % of men). ♦Figure 1 illustrates that men have a financial advantage overall. They are more likely to have an income over € 1000 than women (23.9 % vs. 13.0 %). Women, on the

other hand, are ten times more likely than men to have an income under € 500. 16.7 % of all women could not or would not provide any information on their income. This was more common than among men (10.9%).

With regard to school education, there was only a small variation in the sample: only 5 women (9 %) and 10 men (21.7 %) attended school for 9 years or more. A differentiation of the results according to school education was therefore waived.

Overweight and obesity

The results of the Sağlık Study show that Turkish women are more likely to suffer from obesity than men: 40.4 % of women and 16.3 % of men are obese. Another 46.8 % of women and 44.2 % of men are overweight. Men are three times more likely to have a normal weight (39.5 % vs. 12.8 %). Only 6 of the 47 women who responded to this question were of normal weight.

♦Figure 2 illustrates weight groups according to income per capita (net) by gender. From a total of 100 interviewed women and men, 90 data sets (from 47 women and 43 men) were evaluated. Missing information is attributed to the fact that interviewees did not want to provide information on body weight, body size or income, or did not know the information. This data is separately illustrated in ♦Figure 2 under “no information/unknown”.

Based on ♦Figure 2 it is clear that, within the study population, overweight and obese women are more frequently found in the lower income groups: 41.7 % of overweight and 50.0 % of obese women have an income per capita of < € 500. 54.2 % of overweight and 33.3% of obese women have an income of € 500–1,000. In the > € 1,000 income group the proportion of women

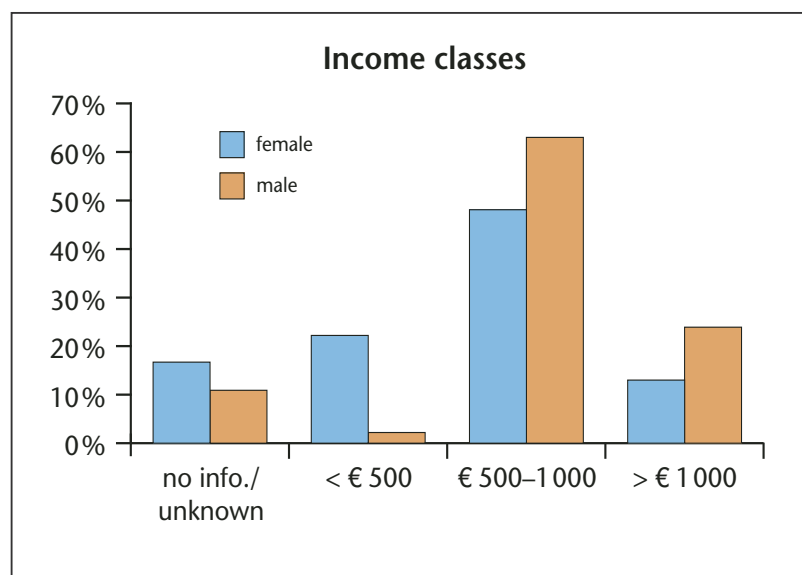


Figure 1: Women and men divided according to income per capita
Men: n = 46, women: n = 54; BMI = Body Mass Index

who are obese or overweight decreases (33.3 % are normal weight, overweight and obese respectively). Additionally, it can be observed that the proportion of normal-weight women increases with income (8.3 % in the < € 500 group, 12.5 % in the € 500–1,000 group and 33.3 % in the > € 1,000 group).

For men, the < € 500 income group was not considered, as it only included one participant with a BMI > 30. Overweight men are, like women, more likely to be found in the lower income groups (53.8 % in the € 500–1,000 group, 36.4 % in the > € 1,000 group). This correlation cannot be confirmed for obese men (3.8 % in the € 500–1,000 group, 36.4 % in the > € 1,000 group). In contrast to women, the situation for normal weight men is the exact opposite. The proportion of normal weight men in the higher income group is smaller than in the lower income groups (42.3 % in the € 500–1,000 group, 27.3 % in the > € 1,000 group).

In addition to this descriptive representation, the correlations between income per capita and BMI, differentiated according to gender, were also analysed by means of Pearson's correlation coefficient. This revealed a statistically significantly lower, more negative correlation for women ($r = -0.312$; $p = 0.044$) and a lower, but

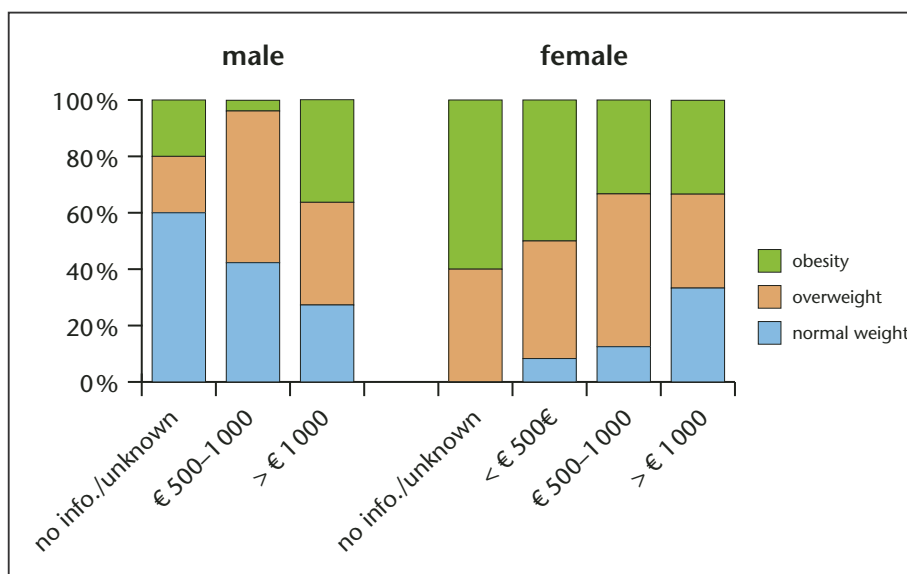


Figure 2: BMI and income per capita
Men: n = 43, women: n = 47; BMI = Body Mass Index

not significant, more positive correlation for men ($r = 0.259$; $p = 0.116$).

Consumption of fruit, vegetables and meat

On average the interviewed women consumed 1.6 ± 1.0 portions of fruit and 1.7 ± 1.0 portions of vegetables per day; men consumed 1.6 ± 1.0 portions of fruit and 1.5 ± 1.3 portions of vegetables.

This demonstrates that 80.4 % of women and 84.7 % of men fall below the recommendations given by the German Nutrition Society

(DGE) (2011) [14] for fruit and vegetable consumption (five portions per day overall) (♦ Table 1). Most of the interviewed women and men consume only one or two portions per day. Three women did not answer the question. Two women and two men stated that they ate no fruit or vegetables.

The results on meat consumption show that the male study participants consume more meat than the female study participants. On average men ate meat 3.8 ± 2.4 times per week and women 3.4 ± 2.8 times. The proportion of men who

	Fruit and vegetable consumption (portions per day)				Meat consumption (frequency)				
	0	1–2	3–4	5+	never/less than once per week	once per week	more than once per week	one per day/more than once per day	
women (n = 51)	3,9 % (2)	39,2 % (20)	37,3 % (19)	19,6 % (10)	women (n = 54)	7,4 % (4)	31,5 % (17)	35,2 % (19)	25,9 % (14)
men (n = 46)	4,3 % (2)	47,8 % (22)	32,6 % (15)	15,2 % (7)	men (n = 46)	4,3 % (2)	13,0 % (6)	56,5 % (26)	26,1 % (12)

Table 1: Fruit and vegetable consumption and meat consumption of women and men

eat meat several times per week is 21.3% higher than women (35.2% of women and 56.5% of men). Very few of the interviewees, only 4 of 54 women and 2 of 46 men, eat meat less than once per week or never.

In addition to the representation in ♦Table 1, potential differences in consumption behaviour between women and men were investigated by means of the Mann-Whitney U Test. However, this revealed neither a significant difference in fruit and vegetable consumption ($p = 0.384$) nor in meat consumption ($p = 0.152$) between women and men.

From the descriptive representation in ♦Table 1 regarding the correlation between fruit and vegetable consumption and income per capita, different results were generated with women in comparison with men: whereas the correlation among women is slightly positive ($r = 0.318$, $p = 0.036$), among men there is no correlation ($r = -0.053$, $p = 0.744$) between income and fruit and vegetable consumption. No statistically significant correlation was found between meat consumption and income among both genders: women: $r = 0.026$, $p = 0.866$ and men: $r = 0.287$, $p = 0.069$.

Discussion

This work investigates selected aspects of the diet of elderly people with a Turkish migrant background. It can be assumed that this group will numerically increase in future; at the same time, little is known to date about the diet and nutritional condition of this population group.

Limitations of the study

The following limitations should be taken into account in the interpretation of the study results.

The research sample was a random sample selection; the sample is there-

fore not representative. This could lead to a selection bias, which considerably limits the generalizability of results. Above all, groups, which are not seen in public and in the places visited, could therefore not be included. The active approach through institutions and social contacts was chosen because one aim of the survey, in the context of the above-mentioned research project, was to estimate the need for health promotion measures among elderly women and men with a Turkish migrant background. Therefore, it seemed sensible to ask those people, who could also gain, via these same approaches, from active participation in health promotion measures. In addition, it became apparent from preliminary discussions with members of the Turkish community in Hamburg, that an approach via trusted institutions and people was sensible, as otherwise we could have expected a high level of mistrust and a high refusal rate towards surveys.

Further limitations arise from the interview guide used. As explained in the methods section, a comprehensive diet history had to be dispensed with for time reasons (see: Methods). Instead, the consumption frequency of selected food groups (fruit, vegetables, meat) was asked retrospectively. Each retrospective recording of food intake involves the risk of errors in memory and the possibility of distortion through a response bias towards social desirability. These restrictions would also be applicable in a comprehensive diet history. By surveying the consumption of fruit, vegetables and meat, we are recording three particularly important food groups, which are also often the focus of health promotion efforts.

Finally, we cannot discount the fact that, in spite of a native interviewer, some questions may have been difficult to understand. In the data eval-

uation, for example, it became apparent that the question on household income was not correctly understood, as many test persons named a lower figure for household income than in response to the question on their personal income. This work therefore only considers personal income.

In spite of these limitations, the authors are of the opinion that the results provide the first indications for assessing the nutritional condition of elderly people with a Turkish migrant background.

Body weight

The elderly Turkish women examined here are clearly more frequently overweight and obese than the elderly Turkish men. In comparison to the results of the NVS II [6] (♦Table 2), both overweight and obesity appear significantly more frequently among Turkish women than in the German population overall. In the case of the Turkish men examined, the reverse is true: overweight and, above all, obesity are significantly rarer than in the comparable age groups in the NVS II. Different types of living situation and way of life are probably not the cause of these differences: both in this case and for the NVS II, those people were investigated, who still lived independently and continued to support themselves and, if applicable, the partner/spouse. With regard to body weight, there would appear to be a complex interdependence between gender and migration effects. This research can provide no answers with regard to the reasons for this; follow-up studies would be necessary in this case.

One cause for the lower prevalence of overweight and obesity among elderly Turkish men could be because they have frequently had jobs in the "low-paid sector" during their working lives. Such jobs could be

linked to a higher degree of physical work than higher-paid professions. The economic situation could also play a role. There appears to be a low, although not statistically significant trend that BMI increases among men with a rising income and that the proportion of normal-weight men decreases with a rising income.

One reason for the pronounced trait of overweight and obesity among elderly Turkish women could be that they have frequently been less physically active in the past. However, culturally-determined dietary patterns and traditional standards and values, even with regard to body image, probably also play a role [15]. For example, food and the overabundant provision of dishes are important as a sign of economic well-being [15]. The results of the study point to the economic situation as a causal factor among women. There is a significant negative correlation between available income and BMI: the lower the income, the higher the BMI and the frequency of overweight and obesity. Differences in the level of education can hardly be held responsible for this correlation, as the women examined almost uni-

formly had a low level of education. Moreover, this negative correlation between income and body weight, above all among women, is often observed, as explained in the introduction [9, 10]. The question of why low income is associated with greater body weight must be investigated in further studies.

Fruit and vegetable consumption and income

The "5 a day" campaign, which is reflected in the recommendations by the DGE (2011) [14], promotes a daily intake of three portions of vegetables and two portions of fruit. In the NVS II [6] it can be said that both genders in the 65–80 year-old group meet the recommendations for fruit consumption (250g/day). Men of this age group eat an average of 298g of fruit and fruit products; women have a higher fruit consumption with 317g. For vegetable consumption, however, the recommended amount (400g/day) is not met by either gender. On average, 65–80 year-old men eat 232g of vegetables and vegetable-based dishes and women eat 234g. Converted into portions, that equals

around 2.5 portions of fruit and 1.8 portions of vegetables for women, and 2.3 portions of fruit and 1.7 portions of vegetables for men.

In the Sağlık Study both genders did not meet the recommendations for fruit and vegetables. Whereas vegetable consumption, with 1.7 portions for women and 1.5 portions for men, is somewhat lower than, but still approximately the same as, in the NVS II, fruit consumption, with 1.6 portions for men and women, is significantly lower in our sample than in the NVS II. This result is surprising, as it was assumed that fruit and vegetables played a greater role in traditional Turkish cuisine and diet than in the German. However, we cannot rule out the possibility that, in response to the question about the number of portions, a different understanding of portion size could have had an effect.

A minor positive correlation between income and fruit and vegetable consumption was documented among the interviewed women, yet not however among the interviewed men. This correlation among women deserves a particular mention in

BMI (nach WHO 2000)	Sağlık-Study (2012)		Nationale Verzehrsstudie II (2008)			
	Women	Men	Women		Men	
	60–77 years n = 47 % (abs.)	60–79 years n = 46 % (abs.)	60–69 years n = 1 312	70–80 years n = 713	60–69 years n = 1 277	70–80 years n = 669
18,5–24,9	12,8 % (6)	39,5 % (17)	30,2 %	25,3 %	17,3 %	15,7 %
25–29,9	46,8 % (22)	44,2 % (19)	38,0 %	39,8 %	51,8 %	56,3 %
≥ 30	40,4 % (19)	16,3 % (7)	31,2 %	34,3 %	30,7 %	27,9 %
MW	29,7	26,3	27,9	28,3	28,6	28,4
SE	0,71	0,52	0,14	0,18	0,12	0,15

Tab. 2: BMI of elderly women and men. Results from the Sağlık Study (2012) in comparison to the National Consumption Study II (2008) [6].

BMI = Body Mass Index, MW = mean value, SE = standard error, WHO = World Health Organisation

view of the overall low fruit consumption and finds parallels in the results of the study entitled "Health in Germany in 2009" by the RKI (GEDA-Study) [7] and in the NVS II [6]. In the GEDA-Study a higher consumption of fruit and vegetables was found among men and women of 65 years and over in the higher education group in comparison to the lower education group. Similarly, in the NVS II, a higher fruit and vegetable consumption was also found, for both genders, with the rising class index, which takes into account education, income and occupational position. However, the GEDA-Study and the NVS II do not provide results on fruit and vegetable consumption distinguished by migrant background. Both studies did also not differentiate on income, rather on level of education (GEDA) or class index (NVS II).

Meat consumption

The NVS II [6] showed that men, irrespective of age, consume around twice as much meat, sausage products, meat products and meat-based dishes as women. For 65–80 year-olds, there is an average consumption of 46g/day for women and 79g/day for men. Furthermore, a decrease in meat consumption coincided with an increase in class index, for both genders.

In the Sağlık Study, no significant difference in meat consumption was established between men and women. Likewise, no statistically significant correlation between meat consumption and income was recognised. However, we cannot rule out the possibility that these missing correlations are due to the comparatively crude data collection method or the relatively small sample. Assuming that a meat portion comprises around 125g, which is possibly unrealistically low, then the male participants of the Sağlık Study

would have a somewhat higher meat consumption than the elderly male study participants of the NVS II, and the Turkish women, with around 60g per day, would have a significantly higher meat consumption than the study group of elderly women in the NVS II. The issue of meat consumption among people of a Turkish migrant background is worth being examined in further studies.

Conclusions

The above-mentioned results indicate that there is a high prevalence of overweight and obesity among elderly women with a Turkish migrant background. Fruit and vegetable consumption does not meet the recommendations among the large majority. Among women, there is a correlation between low income, lower fruit and vegetable consumption and higher frequency of overweight and obesity. There is thus a greater need for health promotion measures, which must show consideration of the economic situation of those concerned.

Among elderly Turkish men, there is a lower frequency of weight problems, but there is still a too low consumption of fruit and vegetables. The need for nutrition-related health promotion is thus apparently less urgent among men than women, but is still evident.

The differences found between women and men show that it is sensible and necessary to consider gender-specific factors in prevention and health promotion. Our experience with data collection also makes it clear that suggestions for health promotion measures should take place in the Turkish language or at least in two languages, in order to reach the target group.

As the results reported here are based

on a comparably small and unsystematically-gathered sample of a total of 100 test subjects, the results indicated here should be investigated in other, more systematic and larger studies. In particular, the gender-specific differing relationships between income and body weight should be further addressed and clarified. Judging from the study results, the probability is rather small that these differences are caused by educational status. If, however, education and therefore knowledge actually appear not to be that significant as the main determinants, the question of mediators between low income and higher body weight among women must be urgently addressed.

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Conflict of Interest

The authors declare no conflict of interest according to the guidelines of the International Committee of Medical Journal Editors.

References

1. Statistisches Amt für Hamburg und Schleswig Holstein (2011) Bevölkerung mit Migrationshintergrund in den Hamburger Stadtteilen Ende 2010. Statistik informiert ...SPEZIAL VII. URL: www.statistik-nord.de/uploads/tx_standocuments/SI_SPEZIAL_VII_2011.pdf Zugriff 01.04.12
2. Statistisches Bundesamt. Bevölkerung und Erwerbstätigkeit. Bevölkerung mit Migrationshintergrund – Ergebnisse des Mikrozensus 2005 – Fachserie 1, Reihe 2.2. Wiesbaden (2007)
3. Robert-Koch-Institut (RKI) (Hg). Gesundheitsberichterstattung des Bundes (2008) Schwerpunktbericht der Gesundheitsberichterstattung des Bundes. Migration und Gesundheit. URL: www.gbe-bund.de/gbe/10/owards.prc_show_pdf?p_id=11713&p_sprache=D Zugriff 15.06.12
4. Bundesamt für Migration und Flüchtlinge (Hg) (2011) Working paper 36 – Migranten am Arbeitsmarkt in Deutschland. URL: www.bamf.de/SharedDocs/Anlagen/DE/Publikationen/WorkingPapers/wp36-migranten-am-arbeitsmarkt-in-deutschland.pdf?__blob=publicationFile. Zugriff 01.04.12
5. Möhr M, Pose G (1972) Lebensmittelverbrauch sowie Kalorien- und Nährstoffaufnahme in Rentnerhaushalten der DDR 3. Mitt. Abhängigkeit vom Haushaltstyp. Die Nahrung 16: 715–724
6. Max Rubner-Institut, Bundesforschungsinstitut für Ernährung und Lebensmittel (Hg) (2008) Nationale Verzehrstudie II. Ergebnisbericht, Teil 2. Die bundesweite Befragung zur Ernährung von Jugendlichen und Erwachsenen. URL: http://www.was-esse-ich.de/uploads/media/NVSIII_Abschlussbericht_Teil_2.pdf Zugriff 01.04.12
7. Robert Koch-Institut (RKI) (Hg). Gesundheitsberichterstattung des Bundes (2011) Beiträge zur Gesundheitsberichterstattung des Bundes. Daten und Fakten: Ergebnisse der Studie » Gesundheit in Deutschland aktuell 2009«. URL: www.rki.de/DE/Content/Gesundheitsmonitoring/Gesundheitsbericht/erstattung/GBEDownloadsB/GEDA09.pdf;jsessionid=8572D1DF5055CB1E9E026D6DAE63F79B.2_cid230?__blob=publicationFile Zugriff 01.04.12
8. Max Rubner-Institut, Bundesforschungsinstitut für Ernährung und Lebensmittel (Hg) (2008) Nationale Verzehrsstudie II – Ergänzungsband zum Ergebnisbericht. Ausgewählte Ergebnisse nach Schichtindex. URL: www.was-esse-ich.de/uploads/media/NVSIII_Abschlussbericht_Teil_1_mit_Ergaenzungsbericht.pdf Zugriff 25.10.12
9. McLaren L (2007) Socioeconomic status and obesity. *Epidemiologic reviews* 29: 29–48
10. Kuntz B, Lampert T (2010) Socioeconomic factors and obesity. *Deutsches Ärzteblatt international* 107: 517–522
11. Statistisches Amt für Hamburg und Schleswig-Holstein (2010) Bevölkerung mit Migrationshintergrund in den Hamburger Stadtteilen. Statistik informiert ... URL: www.statistik-nord.de/uploads/tx_standocuments/SI_SPEZIAL_V_2010_01.pdf Zugriff 15.04.12
12. World Health Organization (WHO). Obesity: preventing and managing the global epidemic. Report of a WHO Consultation. WHO Technical Report Series 894. Geneva (2000)
13. Mensink GBM, Thamm M, Haas K (1999) Die Ernährung in Deutschland 1998. *Gesundheitswesen* 61. Sonderheft 2: S200–S206. URL: www.thieme.de/SID-AA43E460-27096598/local_pdf/fz/s200-s206.pdf Zugriff 28.10.12
14. Deutsche Gesellschaft für Ernährung e. V. (Hg). Vollwertig essen und trinken nach den 10 Regeln der DGE. 8. Aufl., Bonn (2011) URL: www.dge.de/pdf/10-Regeln-der-DGE.pdf Zugriff 20.05.11
15. Zwick M (2007) Migration, Ernährung und Körper – das Beispiel türkischer MigrantenInnen in Deutschland. *SIETAR Journal* 7: 13–17
16. Hauner H, Berg A (2000) Körperliche Bewegung zur Prävention und Behandlung der Adipositas. *Dt Ärztebl* 97: A-768–A-774

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