DO SOCIOECONOMIC AND DEMOGRAPHIC INEQUALITY IN BODY MASS INDEX VARY BY NUTRITION BEHAVIORS AND PHYSICAL ACTIVITY? THE CASE OF TURKEY

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Abstract

Differences in body mass index (BMI) is essential for public health policies. In this respect the objective of this paper is on inequalities in BMI across different nutrition behaviors and physical activities along with socioeconomic status and demographic characteristics. Data is from TURKSTAT Turkish Health Survey for the years 2014 and 2016. We control the differences in groups such as age, gender and family characteristics. We use education as the indicator of socio-economic status (SES). To answer how much of gap is due to nutrition and physical activity, we perform Blinder-Oaxaca type decomposition. Descriptive results show that probability of being obese or underweight decreases with level of education, individuals with low level of nutrition are more likely to be underweight, and individuals with high level of physical activity are less likely to become obese. According to decomposition results, physical activity accounts for the greater difference in mean BMI than nutrition when we control for education and demographic characteristics for females.

Keywords: bmi, nutrition, physical activity, education, decomposition

JEL Classification: C31, C34, I12, J10

BESLENME ALIŞKANLIKLARI VE FİZİKSEL AKTİVİTE, SOSYOEKONOMİK VE DEMOGRAFİK DEĞİŞKENLERE GÖRE VÜCUT KİTLE İNDEKSİ EŞİTSİZLİĞİNİ DEĞİŞTİRİYOR MU? TÜRKİYE ÖRNEĞİ

Öz

Vücut kitle indeksindeki (VKİ) farklılıklar halk sağlığı politikaları için önemlidir. Bu bağlamda, bu makalenin amacı, sosyoekonomik durum ve demografik özelliklerin yanı sıra farklı beslenme davranışlarının ve fiziksel aktivitenin VKİ'inde yarattığı eşitsizlikler üzerinedir. Veriler 2014 ve 2016 yıllarına ait TÜİK Türkiye Sağlık Araştırması'ndan alınmıştır. Çalışmada yaş, cinsiyet ve aile özellikleri gibi grup farklılıklarını da kontrol etmekteyiz. Eğitimi sosyo-ekonomik durumun göstergesi olarak kullanmaktayız. VKİ'indeki eşitsizliğin ne kadarının beslenme ve fiziksel aktiviteden kaynaklandığını anlamak için Blinder-Oaxaca tipi ayrıştırma yapmaktayız. Betimsel sonuçlar eğitim düzeyiyle birlikte obez veya düşük kiloda olma olasılığının azaldığını, düşük beslenme düzeyine sahip bireylerin düşük kiloda olma olasılığının daha yüksek olduğunu, yüksek fiziksel aktivite düzeyine sahip bireylerin de obez olma olasılığının daha düşük olduğunu göstermektedir. Ayrıştırma sonuçlarına göre, eğitim ve demografik özellikleri kontrol ettiğimizde, fiziksel aktivite, beslenme alışkanlıklarına göre kadınlarda ortalama VKİ'indeki daha büyük farkı açıklamaktadır.

Anahtar Kelimeler: vücut kitle indeksi, beslenme, fiziksel aktivite, eğitim, ayrıştırma

JEL Sınıflaması: C31, C34, I12, J10

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1. Introduction

In recent years in addition to examination of income and consumption inequalities, studies broadly define inequalities in terms of differences in access to basic needs such as education and health care services. In this respect, the studies on health and nutrition inequalities has started to draw increasing attention in the literature due to the disparities in BMI and increase in obesity rates (Molini et al., 2010; Hajizadeh et al., 2014; Ventosa and Urbanos-Garrido, 2016; Emamian, 2017). The determinants of BMI are widely considered as socio-economic characteristics such as educational attainment, individual income and labor market status along with age and gender (Roy, et al., 2004; Walsh and Cullinan, 2015; Krishna et al.,2015; Bann et al.,2018). Among all these factors, many studies mainly examine relation between education level and obesity (Tansel and Karaoglan, 2014; Karaoglan and Tansel, 2018; Tansel and Karaoğlan, 2019a). However, the relationship between BMI, nutritional behaviors (in terms of vegetable and fruit intake) and physical activities is examined less commonly and studies present diversified results both for developed (Field et al.,2003; Xiaoxing and Baker,2004; Azagba and Sharaf, 2012; Charleton et al.,2014; Dutton and Mclaren, 2016) and developing (Roy et al.,2004; Molini et al.,2010; Keskin-Ozberk,2020) countries. In this sense, the objective of this study is to investigate the association between fruit /vegetable consumption, physical activity and BMI in a large sample of Turkish females and males. We use a pooled data set of Turkish Health Surveys (THS) by Turkish Statistical Institute (Turkstat) for years 2014 and 2016. A secondary objective is to decompose the inequality in BMI with respect to vegetable/fruit intake and physical activity by contemplating educational attainment and demographic characteristics. To our knowledge this is the first study that considers nutritional behaviors and physical activity in assessing inequality in BMI in Turkey.

Most of the studies on inequality in BMI for developed and developing countries show that improvement in socioeconomic status causes an enhancement in the inequality in BMI (Sanchez et al., 2009; Hajizadeh et al., 2014; Ventoso and Urnabos-Garrido.,2016; Emamian et. al.,2017; Bann et al.,2018; Al-Hanawi et al.,2020). On the other hand, literature on the assosiation between nutritional behaviors, phyisical activity and inequality in BMI suggests more detailed results on the dispersion of BMI. For instance; Field et al. (2003) try to understand whether nutritional intake is related to the diversification in BMI among a sample of children and adults in the United States. They find that annual changes in BMI are greater among boys than girls to some degree. Moreover, among girls there is no relation between consumption of fruits, or vegetables, while vegetables intake is inversely connected to changes in BMI among boys (Field et al.,2003). Xiaoxing and Baker (2004) investigate the relation between BMI, overall health and physical activity in the US. According to their results regular physical activity significantly lessens the risk of health deterioration and occurance of a new physical complication, even among obese subjects (Xiaoxing and Baker, 2004). Azagba and Sharaf (2012) examine the association between fruit and vegetable consumption and BMI by using quantile regression for Canada. They present negative and significant relation between fruit and vegetable intake whereas the relationship changes across different quantiles of the BMI distribution both for males and females (Azagba and Sharaf, 2012). By also using Canadian data, Dutton and Mclaren (2016) show that demographic and socio-economic variables may be crucial covariates of BMI within geographic regions. However, according to their results, these variables are not appropriate for explaining variation in BMI among regions (Dutton and Mclaren, 2016). Charleton et al. (2014) aim to describe the association between BMI and habitual fruit and vegetable intake for Australian adults. Obese and overweight women have higher probabilites of being in the highest fruit and vegetable consumption quartile whereas, overweight men are less likely to be in high fruit and vegetable consumption quartiles (Charleton et al.,2014).

Studies on developing countries, in fact, are limited. Roy et al. (2004) attempt to comprehend the degree of inequalities existing in health care and in nutrition in India. According to their results, socio-economic conditions slightly cause inequalities in health and nutritional status, but in some states differentials prevail even after controlling for socio- economic indicators (Roy et al., 2004). Molini et al., (2010) investigate the prevalence of health and income inequalities in both at macro level (in developing countries) and at micro level (in Vietnam). On the macro side by using child health measures and adult females' BMI, they find a negative correlation between the well-being and inequality (Molini et al.,2010). On the other hand, by using micro data from Vietnam they find that men benefit more from economic developments than women and adult females show greater propensity than males to undernourishment and are also more likely to have risky health and nutrition statuses (Molini et al.,2010).

Regarding Turkey, earlier studies focus on the socio-economic determinants of BMI (Yumuk, 2005; Ankara, 2016; Karaoglan and Tansel, 2018, Tansel and Karaoğlan, 2009b) and inequality in BMI with respect to education or income (Ergin et al.,2011; Duzgun Oncel and Karaoglan, 2019). Kesin-Ozberk (2020) tries to disentangle relationship between dietary patterns and individual BMI by using quantile regression for Turkey. According to estimation results, fruit and vegetable intake has a negative association with BMI. However, literature on Turkey lacks to assess the impact of nutritional behaviors and physical activity in assessing inequality in BMI. In this respect the objective of this study is to disentangle the socioeconomic and demographic inequality in BMI by considering different nutrition and physical activity groups. The outline of the paper is as follows: second section explains the data and the methodology, third section presents descriptive and decomposition results, fourth section concludes.

2. Data and Methodology

The individual level sample data used in this study come from 2014 and 2016 THS conducted by Turkstat. The surveys have detailed information about the health status of individuals in addition to information on a number of individual characteristics such as age, gender, education, employment and household income. Due to the similarity in covariates of the two data sets for the years 2014 and 2016, we pool the data sets and conduct the empirical analysis of this study by following Tansel and Karaoglan (2014). Surveys used in this study are nationally representative random samples and administrated to 26075 individuals in 2014 and 23606 individuals in 2016. We focus on individuals between 25-64 of whom 6095 (5205) are men in 2014(2016) and 7221 (6620) are women in 2014 (2016).

We calculate BMI by dividing self-reported weight in kilograms by self-reported height in squared meters (Tansel and Karaoglan, 2014; Ventosa and Urbanos-Garrido, 2016; Emamian, 2017; Duzgun Oncel and Karaoglan, 2019). Individuals with BMI greater than 30 are classified as obese and individuals with BMI between 30 and 25 are considered as overweight (Duzgun-Oncel and Karaoglan, 2019). Individuals with BMI between 18.5 and 25 are classified as normal and individuals with BMI lower than 18.5 considered as underweighted (Duzgun-Oncel and Karaoglan, 2019). Nutrition behaviors of individuals are covered by looking at the vegetable and fruit intake. We define high nutrition group as the individuals who consume vegetables and fruits more than once a day and define low nutrition group otherwise. We define low physical activity group as the individuals who report that they are inactive in their daily lives and define high activity group otherwise. In the related literature, SES is generally defined according to the individual's education level. Educational attainment is a categorical variable with categories of illiterate, primary school, secondary school, high school and university or higher degree. We do not use income as a SES indicator since individual income is not available in the data set.

Age is a categorial variable which is defined in four categories; 25-34, 35-44, 45-54, 55-64. Marital status is also a categorical variable of which categories are single, married and separated. We consider three labor market statuses such as employed, unemployed and out of labor force.

The individuals who have a regular job are referred to as employed, whereas the individuals who are not working but are looking for a job are grouped as unemployed. On the other hand, seasonal workers, students, housewives, pensioners, and unable to work are classified as out of labor force. Oaxaca (1973) presented a regression based decomposition in order to clarify the gap in an outcome variable between two groups into an "explained" and an "unexplained" samples. The "explained" part of the gap is the difference in the outcome due to group differences in levels of a set of measured explanatory variables between so-called "advantaged" and the "disadvantaged" groups (Sen, 2014). The explained part can be also regarded as the covariate effect. Elseways, the "unexplained" part arises from differentials in how the explanatory variables are connected with the outcomes for the two groups and unexplained part can be regarded as structural effect (Sen, 2014). This unexplained part would prevail even if the disadvantaged group were to gain the similar levels of measured explanatory variables as the advantaged group (Oaxaca, 1983; Sen, 2014). We consider the inequality in BMI between low nutrition (low physical activity) samples and high nutrition (high physical avtivity) samples. By following Oaxaca (1983) and Sen (2014), we start with the assumption that mean BMI depends on individual characteristics such as demopraphic and socio-economic indicators, and can be evaluated using multiple linear regression models. The average BMI for the two groups can be expressed as:

$$BMI^{L}_{mean} = \beta^{L}_{0} + \sum^{i}_{i=1} \beta^{L}_{i} X^{L}_{i\,mean} \quad (1)$$

$$BMI^{H}_{mean} = \beta^{H}_{0} + \sum^{i}_{i=1} \beta^{H}_{i} X^{H}_{i\,mean} \quad (2)$$

In the equations 1 and 2 X_i represents a set of i observed characteristics (explanatory variables) such as educational attainment and demographic characteristics. The superscript L is for the low nutrition (low physical activity) group and the superscript H corresponds to the high nutrition (high physical activity) group. BMI_{mean} is the mean value of the dependent variable. β is a column vector of coefficients representing the associations between the explanatory variables included in X_i $and\ BMI$, obtained from estimating independent regressions for the two groups (Jann, 2008). BMI for two different groups is assumed to change on average and this difference is disclosed as the following:

$$BMI^{L}_{mean} - BMI^{H}_{mean} = (\beta^{L}_{0} - \beta^{H}_{0}) + \sum^{i}_{i=1} (\beta^{L}_{i} X^{L}_{i\,mean} - \beta^{H}_{i} X^{H}_{i\,mean}) \quad (3)$$

According to equation 3 differences in BMI due to nutrition and physicial activity may arise from disparities in the average values of explanatory variables (education, age, labor force status, marital status etc.), but also from differences in the values of β (Hruby and Hu, 2015). The Blinder-Oaxaca approach decomposes the total gap into those two elements–difference in mean values of explanatory variables versus differences in values (Hruby and Hu, 2015). In order to decompose this difference, we from a hypothetical term with the average values of the low nutrition (physical activity) group, but the β of the high nutrition (physical activity) group, and including it in equation 3 yields Blinder-Oaxaca decomposition:

$$BMI^{L}_{mean} - BMI^{H}_{mean} = [\sum^{i}_{i=1} (X^{L}_{i\,mean} - X^{H}_{i\,mean})\, \beta^{L}_{i}] + [\, (\beta^{L}_{0} - \beta^{H}_{0}) + \sum^{i}_{i=1} (\beta^{L}_{i} - \beta^{H}_{i}) X^{H}_{i\,mean}] \quad (4)$$

$\sum^{i}_{i=1} (X^{L}_{i\,mean} - X^{H}_{i\,mean})\, \beta^{L}_{i}$ in equation (4) is the “explained” part which partitions the aggregate group differences in BMI that can be due to disparities in the mean values of the explanatory variables (Sen, 2014). To put differently, the first term on the right-side of equation (4) exhibits the difference in BMI due to nutrition and physical activity that would reduce hypotecially if low nutrition (low phyisical activity) subjects had the same average levels of individual characteristics as the high nutrition (high physical activity) subjects. The next term, which is $(\beta_0^L - \beta_0^H) + \sum_{i=1}^{i}(\beta_i^L - \beta_i^H)X_{i\,mean}^H$, shows the "unexplained" part of the gap in equation (4) which is due to the difference in the coefficient estimates, including the intercepts, β_0 (Sen, 2014). Essentially, this is the disparity due to nutrition or physical activity in BMI that would remain even if low nutrition (low physical activity) subjects had the mean levels of individual characteristics as the high nutrition (high physical activity) subjects.

3. Results

3.1. Descriptive Results

Table 1 contains summary statistics about the sample pooled from THS 2014 and 2016. We observe that mean and standard deviation of BMI of females are greater than males; average BMI of females is 27.13, whereas it is 26.82 for males. Females consume more vegetables and fruits, while males are physically more active. Age groups are distributed almost equally in the sample and shares in marital status are also similar for males and females. On the other hand, in terms of education and labor indicators, the picture is different for females and males. We observe that average education of males is greater than females. For instance, 13 (14) percent of females have graduated from high school (university) while this number is 21 (20) percent for males. Additionally, labor force participation is higher for males. For example, 73 percent of males are employed whereas this number is only 26 percent for females.

Figure 1 shows cumulative distribution of females and males's BMI. In line with the statististics in Table 1, average BMI of females is higher. In the literature education is considered to be one of the main factors affecting BMI (Ventosa and Urbanos-Garrido, 2016; Emamian, 2017; Karaoglan and Tansel, 2018). Thus, when we look at the distribution of BMI according to education, we observe that the change in the distribution is more profound for females. Highly education (high school or higher) leads distribution to skew left leading a decline in BMI.

Figure 2a,b present the distribution of fruit and vegetable consumption patterns for females and males. Although females consume slightly more vegetables than males, patterns by intake patterns are not remarkably different by BMI category for either gender. Overweighted and obese females and males consume more vegetables and fruits than underweighted counterparts. For example, almost 65 percent (62 percent) of obese females (males) report that they consume vegetables more than once a day, whereas this share is almost 50 percent (40 percent) for under-weighted females (males).

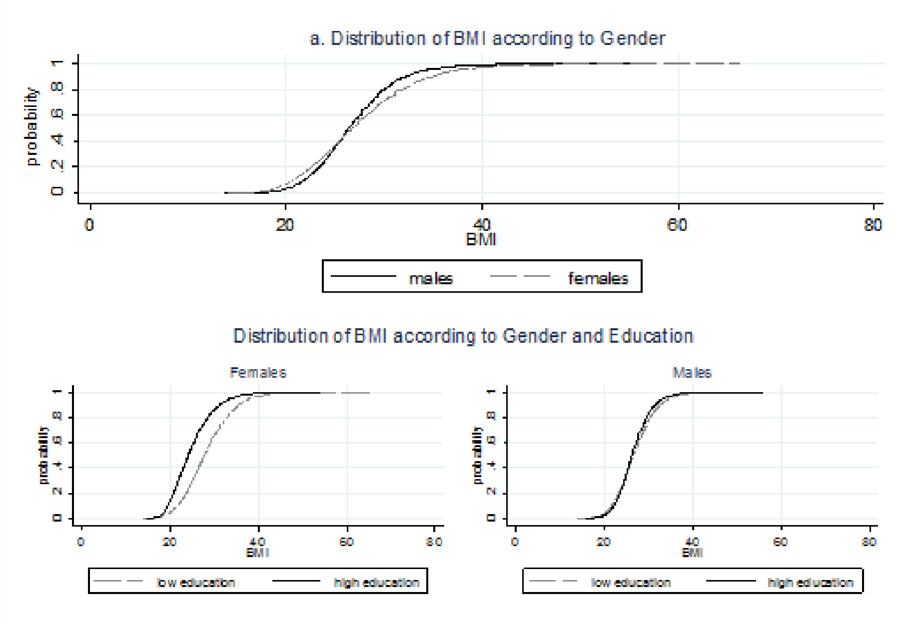
On the other hand, Figure 3 show the distribution of physical activity with respect to BMI categories. We categorize individuals who report that they are active and or moderately active in their daily lives as highly active individuals and individuals who report they are inactive as inactive individuals. According to Figure 3, males are considerably more active than females in every BMI category. Under-weighted and obese males are more inactive than normal-weighted males. For instance, almost 38 percent of under-weighted and obese males are inactive while this ratio is 22 percent for normal-weighted males.

Table 1: Summary Statistics

Variables	Mean		Standard Deviation	
	Females	*Males*	*Females*	*Males*
BMI	27.13	26.82	5.61	4.14
Nutrition				
Fruits	0.53	0.49	0.49	0.49
Vegetables	0.65	0.60	0.47	0.48
Physical Activity				
Inactive	0.42	0.29	0.49	0.45
Moderate	0.55	0.56	0.49	0.49
Active	0.02	0.14	0.15	0.34
Age				
Age 25-34	0.27	0.25	0.44	0.43
Age 35-44	0.29	0.28	0.45	0.44
Age 45-54	0.24	0.25	0.43	0.43
Age 55-64	0.19	0.20	0.39	0.40
Marital Status				
Single	0.07	0.11	0.25	0.32
Married	0.83	0.84	0.37	0.35
Separated	0.09	0.03	0.29	0.17
Education				
illiterate	0.17	0.03	0.38	0.18
primary	0.47	0.43	0.49	0.49
secondary	0.06	0.10	0.24	0.31
high	0.13	0.21	0.34	0.41
university	0.14	0.20	0.34	0.40
Labor Status				
employed	0.26	0.73	0.43	0.44
unemployed	0.03	0.07	0.17	0.25
out of labor force	0.70	0.19	0.45	0.39
N	*13,841*	*11,300*		

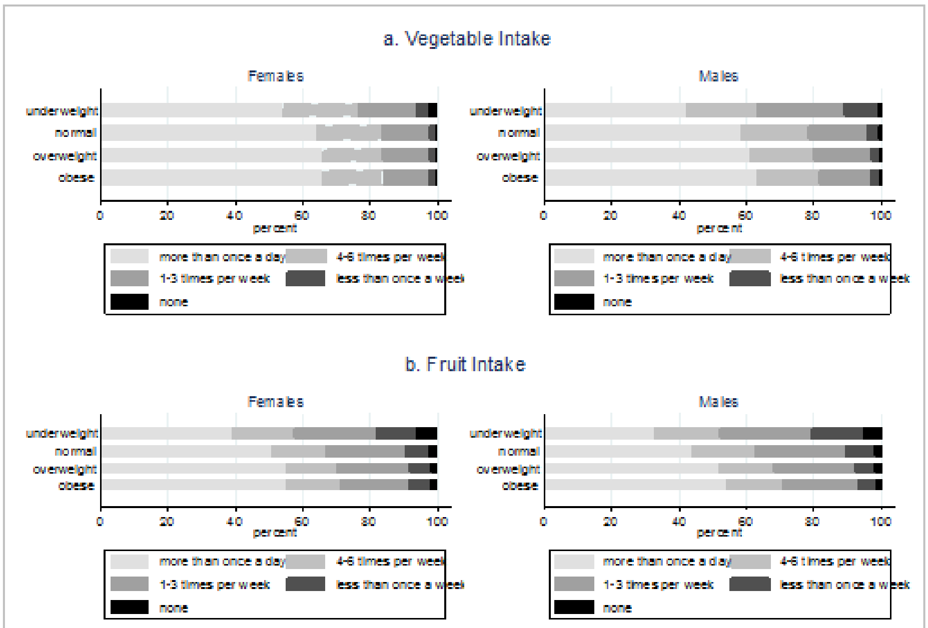
Source: THS 2014-2016 and author’s calculations. Sample weights applied.

Figure 1: Cumulative Distribution of Females and Males's BMI



Source: THS 2014-2016 and author's calculations. Sample weights applied.

Figure 2: Distribution of Vegetable and Fruit Intake



Source: THS 2014-2016 and authors calculations. Sample weights applied.

Figure3: Distribution of Physical Activity

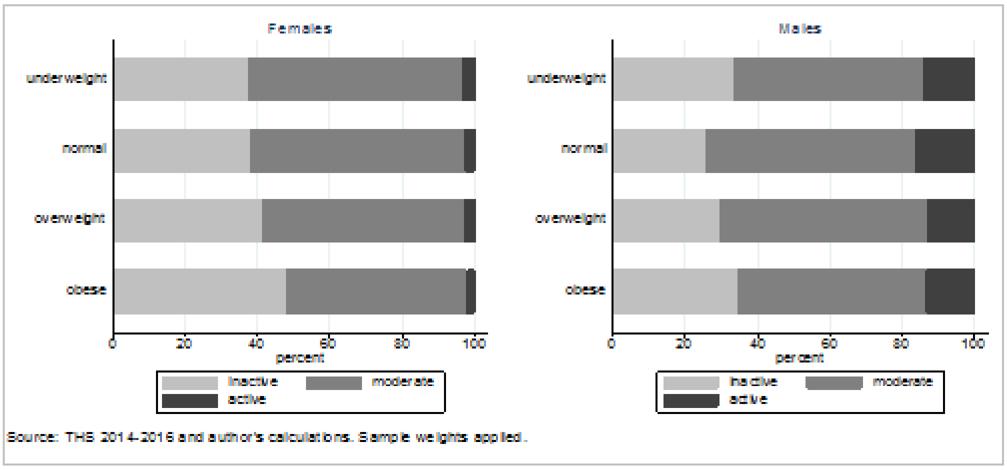
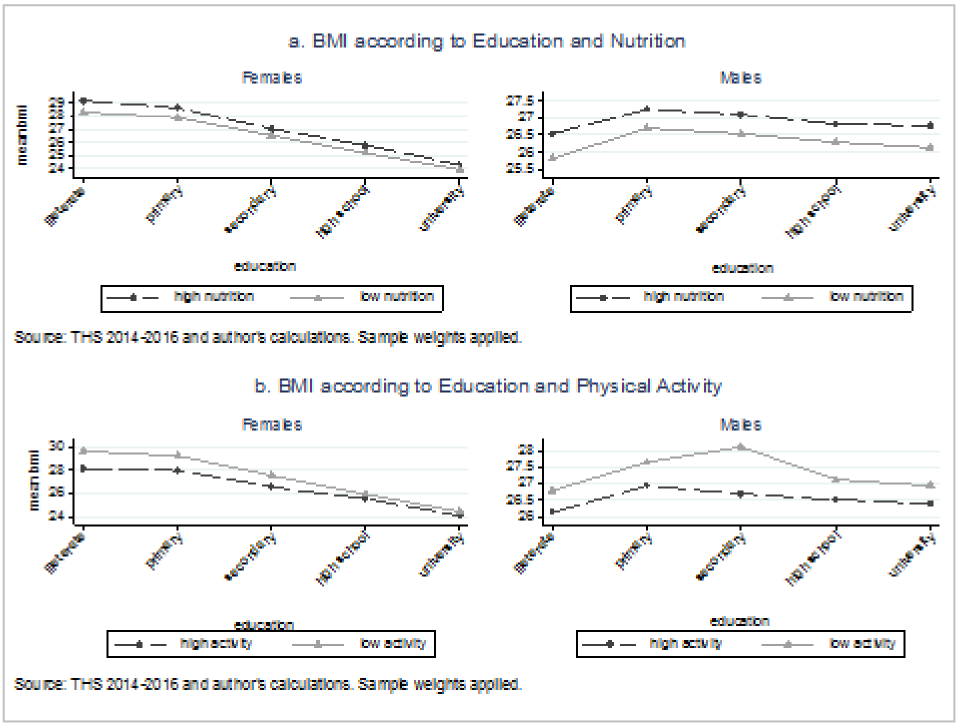


Figure 4: Education Gradient in Nutrition and Physical Activity



As mentioned above, education is considered to be one of the most important factors affecting the distribution of BMI. Thus, we present education gradients with respect to nutrition and physical activity in Figure 4a,b. We group individuals who consume vegetables and fruits more than once a day as high nutrition group and the rest as low nutrition sample. Mean BMI decreases with education and is higher for high nutrition groups for both males and females. For instance, mean BMI of females (males) with university education for high nutrition sample is about 25 (26.5), where as mean BMI of females (males) with primary school education is 29 (27). When we examine the gradients according to physical activity, the picture is similar; for example, mean BMI of females (males) with university education for high activity group is about 24 (27) where as mean BMI of females (males) with primary school education is 28 (27). However behaviour of the gradients for females and males are different. Education gradients in nutrition and physical activity are more profound for males, widening in the middle education group and then narrowing. On the other hand, gradients of females narrow when education level increases according to both nutrition and physical activity.

3.2. Decomposition Results

Table 2 and Table 3 present decomposition results for different nutrition and physical activity groups respectively. Explanatory variables are the vectors of age, marital status, educational attainment, and labor force status. We apply separate decompositions for females and males. According to results in Table 2, we observe that mean BMI for high nutrition groups are higher than low nutrition groups and the difference is significant at $p<0.01$ both for females and males. On the other hand the difference is higher for males which is 0.32 for females and 0.55 for males. Almost one third of the difference was explained by the covariate effect for males, but covariate effect is insignificant for females. To put differently, one third of the difference in mean BMI with respect to nutrition for males is explained by the covariates.[2] Additionally structural effect is significant both for males and females.

[2] Please refer to Table A-1 in the appendix for detailed decompotion results with decomposition of explained (covariate) and unexplained(structural)effects.

Table 2: Blinder-Oaxaca Decomposition Results according to Nutrition

Overall Decomposition	*Females*	*Males*
Low nutrition	27.20***	26.45***
	(0.08)	(0.06)
High nutrition	27.52***	27.00***
	(0.05)	(0.04)
Difference	-0.32***	-0.55***
	(0.10)	(0.08)
Explained (covariate effect)	-0.01	-0.18***
	(0.05)	(0.03)
Unexplained (structural effect)	-0.31***	-0.36***
	(0.09)	(0.08)
N	*13,841*	*11,300*

Notes: *p<0.10, **p<0.05, ***p<0.01. Standard errors in the parenthesis. Sample weights applied.

Table 3 shows the decomposition results with respect to physical activity. We find that mean BMI of high activity group is lower than low activity group and the difference is significant at p<0.01 both for females and males. Different than the decompotion results with respect to nutrition, the difference for females (1.12) is higher than the difference for males (0.70). We observe that physical activity leads greater difference in mean BMI than nutrition both for males and females. 0.44 of the difference for females is explained by the covariates and 0.68 of the difference is explained by the structural effects both of which are significant at p<0.01. On the other hand, much of the difference for males is explained by the structural effect and covariate effect is insignificant. The decomposition results imply that association between nutrition and mean BMI is more profound for males whereas the relationship between physical activity and mean BMI is stronger for females.

Table 3: Blinder-Oaxaca Decomposition Results according to Physical Activity

Overall Decomposition	*Females*	*Males*
Low activity	28.08***	27.32***
	(0.07)	(0.07)
High activity	26.95***	26.62***
	(0.05)	(0.04)
Difference	1.12***	0.70***
	(0.09)	(0.08)
Explained (covariate effect)	0.44***	-0.02
	(0.05)	(0.05)
Unexplained (structural effect)	0.68***	0.72***
	(0.09)	(0.09)
N	*13,841*	*11,300*

Notes: *p<0.10, ***p<0.01. Standard errors in the parenthesis. Sample weights applied.

4. Conclusion

The present study examines inequalities in BMI across different nutrition behaviors and physical activities along with socioeconomic status and demographic characteristics. First we investigate how distribution of BMI across genders differs with respect to different nutrition and physical activity types. Further, we apply Blinder-Oaxaca decomposition according to nutrition and physical activity to disantange inequality in mean BMI. Descriptive results suggest that mean BMI of females is higher than males and probability of being obese or overweight decreases with education. Almost 50 percent of individuals (both females and males) report that they consume fruits more than once a day, while this ratio is about 60 percent for the individuals who say that they consume vegetables more than once a day. On the other hand, only 29 percent of females report that they are physically active in their daily lives, whereas this ratio is 42 percent for males. These results show that vegetable and fruit intake do not vary considerably across gender, while physical activity changes remarkable among females and males. We also observe that obese or overweight individuals consume vegatables and fruits more often and are physically more inactive in their daily lives. When we look at education gradients in BMI with respect to nutrition and physical activity, we observe that gradients with respect to physical activity is wider both for females and males. Additionally results present that gradients are more profound for males.

According to decomposition results, mean BMI for high nutrition groups are significantly higher than low nutrition groups both for females and males. Furthermore, this difference is greater for males. Similarly, we find that mean BMI of low activity group is significantly higher than high activity group. However the difference is higher for females, indicating that physical activity is more effective in explaining the inequality in mean BMI for females.

This study has some limitations: first we lack to talk about causal effects of the variables considered on BMI due to the usage of cross-sectional data. Second, we use self-reported BMI and physical activity. Self reported BMI can be biased when we compare to measured BMI when we calculate obesity prevalence (Xiaoxing and Baker, 2004). For insatance, previous studies suggested that respondents have a tendency to under-report their weight and over-report their height and physical activity (Bostrom and Diderichsen, 1997; Sallis and Saelans, 2000; Norman et al., 2001; Xiaoxing and Baker, 2004). Third, we examine the impact of fruit and vegetable consumption on BMI inequality by ignoring other nutritional statuses. A fourth limitation is that any unobserved variables in our decomposition analysis would come out to be part of the unexplained portion of the difference in decomposition. Thus, better indicators of nutrition and physical activity, objective measures of BMI and more detailed indicators of SES would provide more confidence to reveal unbiased variation in those individual-level variables.

Efficacy of these findings may grasp beyond the distinct case of Turkey which would imply further analysis for other developing countries. From the public policy perspective, results of this paper suggest that policies aimed at increasing educational attainment would increase the tendency of individuals to eat healthy food and to exercise regularly. Further, public health messages on physical activity through exercising may help to control weight and lessen the risk of becoming obese, and thus other health risks arising from obesity.

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Appendix

Table A.1: Detailed decomposition of explained covariate effect across distribution (According to Nutrition)

Explanatory variables	Coefficients	Standard errors	Coefficients	Standard errors
	Females		*Males*	
Explained				
primary	0.000028	0.00091	0.036166	0.016211
secondary	0.010733	0.006083	-0.00464	0.005256
high school	0.053764	0.014319	-0.01864	0.010239
university	0.083884	0.019212	-0.03848	0.015556
age 35-44	0.033977	0.019583	0.019223	0.010411
age 45-54	-0.07044	0.0306	-0.04656	0.015702
age 55-64	-0.14316	0.032308	-0.0885	0.018887
married	-0.0313	0.01505	-0.04449	0.012011
separated	0.012388	0.008653	0.005341	0.004008
Employed	0.03716	0.011757	0.000164	0.002295
unemployed	-0.00154	0.002977	-0.00921	0.005741
2016 year dummy	0.00204	0.002515	-0.0003262	0.0022161
total	-0.01451	0.052008	-0.18963	0.028173
Unexplained				
primary	0.029715	0.123618	0.041813	0.180486
secondary	0.021716	0.030485	0.00839	0.053046
high school	0.068061	0.053756	0.047385	0.101038
university	0.110011	0.061272	0.04854	0.09905
Age 35-44	0.109885	0.074322	-0.01959	0.062899
Age 45-54	0.03706	0.070676	-0.02456	0.066146
Age 55-64	0.066042	0.063427	-0.00317	0.066655
married	0.298172	0.33389	-0.11868	0.236823
separated	0.02106	0.047473	0.013119	0.015668
employed	0.033799	0.067494	-0.02533	0.182733
unemployed	-0.00672	0.017791	0.007083	0.025249
2016 year dummy	-0.04877	0.093247	0.000583	0.076573
constant	-1.10334	0.45996	-0.34276	0.514504
total	-0.31453	0.100733	-0.36775	0.084466
Sample size	13,841		11,300	

Notes: Sample weights applied.

Table A.2: Detailed decomposition of explained covariate effect across distribution (According to Physical Activity)

Explanatory variables	Coefficients	Standard errors	Coefficients	Standard errors
	Females		*Males*	
Explained				
primary	-0.00339	0.007295	-0.06795	0.045765
secondary	0.015108	0.006522	-0.03547	0.0161
high school	0.02221	0.011519	0.001932	0.003713
university	0.003081	0.013766	0.047417	0.054984
age 35-44	-0.14358	0.021576	-0.05888	0.015511
age 45-54	0.083336	0.031632	0.020329	0.016277
age 55-64	0.357408	0.036187	0.121059	0.025519
married	-0.0409	0.012876	-0.02147	0.010308
separated	0.025392	0.009706	0.002647	0.003229
employed	0.123343	0.033405	-0.03068	0.038856
unemployed	0.005635	0.003881	-0.00481	0.004187
2016 year dummy	-0.007125	0.004303	0.001085	0.002931
total	0.44764	0.057039	-0.02588	0.05349
Unexplained				
primary	-0.09773	0.12267	-0.19827	0.217286
secondary	-0.02375	0.02886	0.032944	0.061816
high school	-0.05072	0.047331	-0.13871	0.103898
university	-0.0215	0.051169	-0.11785	0.079164
Age 35-44	0.123566	0.079129	0.005037	0.075925
Age 45-54	0.216831	0.062339	0.003641	0.068722
Age 55-64	0.152789	0.045498	-0.01565	0.054967
married	-0.22098	0.311411	0.040524	0.251859
separated	0.011413	0.041407	0.011721	0.017388
employed	-0.05659	0.081097	0.240008	0.197408
unemployed	-0.02072	0.01847	0.011723	0.026561
2016 year dummy	-0.121742	0.083271	0.028792	0.078352
constant	0.668672	0.434876	0.851573	0.532868
total	0.681294	0.095909	0.726697	0.099026
Sample size	13,841		11,300	

Notes: Sample weights applied.