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Is There A Causal Link?

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Maternal Education and Childhood Obesity in Türkiye: Is There A Causal Link?

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Abstract

This paper examines the causal impact of maternal education on child's probability of being overweight/obese using 2022 Türkiye Child Survey (TCS) micro dataset of the Turkish Statistical Institute (TURKSTAT). We implement Instrumental Variable (IV) estimation methodology for children between 2 and 17 years old. Our results suggest that higher levels of maternal education decrease the child's probability of being overweight/obese, though it is not statistically significant. We further examine the impact of maternal education on dietary and exercise habits of children. The results suggest that higher levels of maternal education do not affect these outcomes either. Hence, we conclude that higher levels of maternal education do not lead to significant improvement in health behaviors among children. Therefore, we conclude that relying solely on maternal education are unlikely to generate substantial reductions in childhood obesity unless complemented by school-level interventions and curriculum reforms.

Keywords: Childhood Obesity, Maternal Education, Instrumental Variable Estimation, Türkiye

JEL Codes: I10, I12, C5

1. Introduction

Childhood health is significantly associated with a child's future health status, labor market outcomes, and socioeconomic status (Case et al., 2005). Children who experience poorer health are more likely to suffer from poorer health in adulthood, have lower educational attainment and poorer employment outcomes. Given the adverse effects of poor childhood health on a child's later-life outcomes, it is evident that policies implemented to improve child health represent one of the most valuable human capital investments for a country. In this study, we consider childhood overweight/obesity as proxy for children's health because childhood overweight is a strong predictor

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of many future diseases, including cardiovascular and metabolic diseases. Childhood overweight is also one of the most important determinants of obesity in adulthood, which in turn results in poor health and early death (WHO, 2020). Therefore, preventing overweight in early childhood will be beneficial for children's health and well-being in both childhood and adulthood, in addition it helps reduce private and public health expenditures (Frederick et al. (2014).

Childhood obesity has substantially increased in both developed and developing countries in recent decades. The prevalence of obesity among children under 5 has increased from 5.3% to 5.6% worldwide between 2000 and 2022. Likewise, the prevalence of obese/overweight children aged above 5 increased from 8% to 20% between 1990 and 2022 (WHO, 2022). Childhood overweight and obesity affect approximately one third of children (29% of boys and 27% of girls) in Europe. Türkiye is among the countries showing the fastest growth in overweight and obesity rates that currently stand at 32.7% and 14.9%, respectively, among children between the ages of 5 to 9. For adolescents, the prevalence of overweight and obesity is slightly lower (27.9% for overweight and 9.8% for obesity), however they are still well-above the Europe averages of 24.9% and 7.1%, respectively (WHO, 2022). Therefore, childhood obesity is rising health issue in Türkiye.

In this study, we examine the causal impact of maternal education on childhood obesity. Our focus on maternal education is due to the fact that it is the most critical factor in a child's development, education, and health outcomes (see Thomas et al. (1991), Assaad et al. (2012), Victora et al. (1992), Chen and Li (2009)). In the context of obesity, research in high-income countries provide mixed evidence on the impact of maternal education on childhood obesity. For instance, Madden (2017) shows that children whose mothers have lower levels of education have higher risks of obesity in Ireland. Ruiz et al. (2016) examine the association between maternal education and childhood obesity in 11 European countries and find that lower levels of education are positively associated with higher odds of obesity among children between 4-7 years of age. In contrast, for the USA, Fertig et al. (2009) find that the child's probability of being overweight increases with maternal working hours when the mother has more than 12 years of schooling but not for the children of less educated working mothers Gibson et al. (2007) do not find a significant association between maternal education and child's BMI levels in Australia.

In developing countries, the evidence is also mixed. For instance, Ali and Elsayed (2017) do not find a significant causal impact of maternal education on child's health indicators, including child's

overweight status in Egypt. Martorell et al. (2000) show that obesity and overweight is more prevalent in urban regions, for girls and for children with higher educated mothers, using national nutritional surveys from 50 developing countries. In contrast, Hsu et al. (2022) show that lower levels of maternal education are associated with higher Body Mass Index (BMI) levels for children in Taiwan..

Evidence from Türkiye is limited. A study conducted in Ankara found that higher levels of maternal education is in general positively associated with higher probability of child obesity. Notably, higher maternal education increased obesity risk in low-to-middle SES groups (Yardım et al., 2019). Likewise, Küçükerdönmez et al. (2025) show that higher levels of maternal education raises a child's likelihood of being overweight. The study is conducted for 22 provinces and is not nationally representative. To our knowledge, the only study that investigates the socio-economic determinants of childhood obesity in Türkiye using a nationally representative micro dataset is Düzgün-Öncel and Karaoğlan (2019). The authors find that if the mother has higher years of schooling, the child's likelihood of being overweight/obese decreases, however the association is not statistically significant. These studies fail to establish a causal relationship between childhood obesity and maternal education and therefore, it is not clear whether maternal education helps curb childhood obesity.

Studies that investigate other child health outcomes such as birthweight and mortality generally conclude that higher levels of maternal education significantly improve child health (See for instance, Gunes (2015), Dursun et al. (2022)). Gunes (2015) examines the causal effect of maternal education on child's weight-for-age and height-for-age indicators for children under 5 years old, but not child's overweight/obesity status. There are also a limited number of studies that examine the causal relationship between individual's years of schooling and his/her overweight status in Türkiye (See for instance, Dursun et al.(2018), Tansel and Karaoglan (2019), Baltagi et al. (2019)). Neither of these studies find a significant impact of higher years of education on individual's overweight status.

In this study, we use 2022 Türkiye Child Survey (TCS) micro dataset of the Turkish Statistical Institute (TURKSTAT). We examine the causal impact of maternal education on child's probability of being overweight/obese by implementing Instrumental Variable (IV) estimation methodology for children between 2 and 17 years old. We instrument maternal education using the 1997 compulsory school reform, which has been shown to significantly increase educational attainment. Our results suggest that higher levels of maternal education decrease the child's probability of being

overweight/obese. However, the impact is not statistically significant. In order to understand why maternal education does not play a significant role in reducing children's likelihood of being overweight/obese, we look at dietary and exercise habits of children. In particular, we look at how frequently children consume food with high sugar and fat content such as confectionary, crisps, soda and the like, how often they exercise and the time they spend watching TV, playing on their tablets and using their cell phones. . Our results suggest that higher levels of maternal education do not affect these outcomes either. Hence, we conclude that higher levels of maternal education do not lead to significant improvement in health behaviors among children.

This paper seeks to contribute to literature in three ways. First, it focuses explicitly on the causal relationship between maternal education and the child's probability of being overweight/obese aged 2-17 in Türkiye, a country characterized by high obesity rates among children. Second, , we investigate the causal impact of maternal education on child's overweight status not only for early childhood but also for adolescence years, for which there is very little evidence in Türkiye, and observe whether the education gradient varies by age. Third, by employing an instrumental variable approach, the paper provides a rigorous identification strategy that addresses potential endogeneity concerns. By doing so, the study not only advances the understanding of how maternal education impacts the child's overweight status but also informs policy debates. Identifying the causal role of maternal education in shaping child's overweight status is crucial for designing targeted interventions, particularly in developing country contexts where there is increasing trend in obesity rates among children.

The rest of the paper is organized as follows: Section 2 presents theoretical framework. Section 3 describes the data, identification of the instrument, as well as descriptive statistics. Section 4 presents model and empirical results. Finally, Section 5 concludes.

2. Theoretical Framework

Our theoretical framework builds on the health demand theory originally proposed by Grossman (1972). Grossman conceptualizes health capital as distinct from education: while education enhances an individual's productivity per unit of time, the stock of health determines the total amount of productive time available for use. His model treats health as an endogenous outcome, whereas education is taken as exogenous. The theoretical model suggests that education is positively associated with health capital and negatively related to health care expenditures.

The impact of education on individual's own health outcomes has been examined extensively in the literature. The impact of parental education on children's health outcomes is a well-researched question in the health economics literature as well. The findings suggest that impact of maternal education is especially important in explaining the health outcomes of children. Glewwe (1999) identifies several mechanisms through which maternal education positively influences child health: First, formal education provides future mothers with better access to health knowledge; second, educated mothers are more capable of identifying and addressing child health issues using the literacy and numeracy skills acquired at school; and third mothers with formal schooling tend to be more receptive to modern medical treatments.

Taken together, these theoretical and empirical insights underscore the central role of education, particularly maternal education, in shaping child's health outcomes. Grossman's framework highlights how education contributes to the accumulation of health capital, while the empirical literature demonstrates that mothers' educational attainment operates through multiple channels that directly influence child well-being. By linking these perspectives, it becomes evident that investments in education not only enhance individual productivity but also generate far-reaching health benefits within families. This integrated understanding provides the foundation for examining the mechanisms through which maternal education affects children's probability of being overweight in our empirical analysis.

3. Data Set and Identification of the Instrument

Our empirical analyses are based on the 2022 Türkiye Child Survey (TCS). TCS is a rich nationally representative micro-data set, gathered by the Turkish Statistical Institute (TURKSTAT). The survey includes a rich set of questions regarding children, parents and household characteristics. TCS contains four modules. The first module involves questions on household members' demographic and socio-economic characteristics, such as age, gender, marital status, completed education level, and labor market status. The second module includes questions related to household characteristics, for instance, household income and dwelling characteristics. The third module comprises questions on child's (aged 0-17) demographic characteristics, education level, health status and development indicators. This module is answered by the primary caretakers of children. Finally, the fourth module includes questions that are directly addressed to 13-17-year- olds and mainly include questions on their perceptions about a variety of issues that concern their relationship with their parents and friends, self-worth, future aspirations and abstract concepts such as children's rights. For the

purposes of this study, the TCS offers two main advantages over other datasets that provide information on children's health such as the Demographic Health Survey (DHS) Türkiye or the Turkish Health Survey (THS) of TURKSTAT. First, neither DHS Türkiye nor THS provide information on the weight or the height of adolescents. THS provide this information for 15-17-year-olds only, whereas DHS Türkiye provides health indicators from which overweight status can be computed for children less than 5 years of age. Second, TCS provides information on the birthdate of children and their mothers so it becomes possible to use the IV methodology.

For the empirical analysis, we merge the first and second modules matching children to their mothers. This is made possible through a mother identifier in the dataset. Although our key variable, the weight status of the child, is available for all children, we drop children under 2 years of age since the measure of overweight/obesity we use is not a suitable for this age group. In the dataset, a mother may have more than one child in the target group. To have unique observations of mothers, we have matched the eldest child in the target group to their mothers. Our operational sample consists of 7,192 mother-child matched pairs.

3.1. Outcomes and Control Variables

Our dependent variable of interest is whether the child is overweight (alternatively obese) or not. We determine the weight status of a child by calculating his/her Body Mass Index (BMI) by dividing the child's reported weight (in kilograms) by the square of child's reported height (in meters). Following Cole et al. (2000), we use threshold values of BMI to categorize children by weight status based on their gender, age and calculated BMI level. For instance, if the child's BMI is greater than or equal to 30, then the child is referred as obese. The child is defined as overweight if his/her BMI is greater than 25 and smaller than 30[3]. Because being overweight is a strong predictor of obesity in both childhood and adulthood, we combine overweight and obese individuals into a single category. Table 1 shows the percentage distribution of children aged 2–17 across three weight categories by age group.

Table 1. Distribution of Children by Age Group and Weight Status (%)

	Age Group:2-17	Age Group:2-5	Age Group:6-12	Age Group:13-17
Underweight	14.60	27.15	12.45	11.73
Normal Weight	56.05	41.60	51.77	64.94

[3] We use the user written STATA command "zbmicat" in categorizing children as underweight, normal weight, overweight and obese (See Vidmar et al. (2013))).

Overweight/Obese	29.35	31.24	35.78	23.33
N	7,192	1,177	2,777	3,238

Source: TCS 2022. Authors' calculations. Sampling weights are applied.

The results indicate that nearly 30% of 2-17-year-olds are either overweight or obese. This figure rises to 31.2% among 2-to-5-year-olds and further to 35.8% among 6-to-12-year-olds. During adolescent years, this prevalence falls to 23.3%. The proportion of normal weight children increases as children get older from 41.6% among 2-to-5-year-olds to 51.8% among 6-to-12-year-olds to 64.9% among 13-to-17-year-olds. The overall proportion of children who are of normal weight is 56.1%. There are also underweight children. Overall, they constitute 14.6% of 2-to-17-year-olds. Underweight prevalence is substantially higher among the youngest age group at 27.15% compared to older ages. Among 13–17-year-olds the proportion who are underweight is 11.73%. In addition, we check our results against THS where self-reported height and weight information for 15-17-year-olds is available. Using the 2022 round of THS we find that 19.96% of adolescents are obese, and the overweight/obesity rate is calculated as 21.84%, closely matching the TCS estimate of 21.70% for the same age group.

The second key variable for this study is mother's completed education level. The TCS data set has questions regarding each individual's highest schooling level attended and whether they have completed that level. Using these two questions, we classify mothers into four education categories as follows: "Primary School or less", "Middle School (lower secondary education)", "High School (upper secondary education)", and "University or a higher degree". Table 2 examines how children's weight status varies according to their mothers' educational attainment.

Table 2. Distribution of Children's Weight Status by Mother's Education Level (%)

Mother's Completed Education Level	Underweight	Normal Weight	Overweight/Obese	p-value
Primary School or Less	13.50	59.09	27.41	0.4560
Middle School	15.03	50.80	34.17	0.0511
High School	14.84	53.80	31.35	0.5784
University+	16.75	55.37	27.87	0.1552

Source: TCS 2022. Authors' calculations. Sampling weights are applied.

Table 2 suggests a modest but noticeable relationship between maternal education and children's BMI status. The proportion of children who are overweight or obese increases first with mother's schooling but then declines. The highest proportion of overweight (including obese) children are

found for mothers with middle school education. The lowest proportions are noted for the least educated mothers. The proportion of underweight children seem to increase with maternal education. However, these differences are not statistically significant, except for mothers with middle school degree. As a result of these patterns for overweight and underweight children. We observe a non-linear relationship between maternal education and children's BMI status: the proportion of normal weight children reduces first with maternal education and then increases. While the proportion of normal weight children among mothers with primary or less than primary education is 59%, this figure drops to 50.8% among mothers with middle school education but increases to 55.3% for mothers with at least university education.

We eliminate the observations of underweight children from the estimation sample since being underweight indicates other health problems for children, such as stunting or wasting, which is not the scope of this study. In addition, we exclude a small number of children whose BMI estimates appear to be outliers.

In the empirical analysis, we also examine whether maternal education has an impact on children's health behaviors that encompass dietary and exercise habits. First, we examine whether the child frequently consumes food that includes high sugar or fat content. For high-sugar, high-fat food consumption, we define a dummy variable that is equal to 1, if the child consumes such foods food more than once a week. Second, we examine whether the child exercises frequently or not. Regarding child's exercise behavior, we define a dummy variable which equals to 1 if the child has not exercised at least one hour in the past seven days. Finally, for children over 6, we examine the duration the child spends watching TV, playing on his/her tablet or cellular phone during a week (in terms of hours) as a proxy for leading a more sedentary life style. Table 3 compares the health behaviors of normal weight and overweight/obese children.

Table 3. Child's Health Behaviors by Weight Status (%)

	Normal Weight	Overweight/Obese	p-value
Food/drink with high sugar or fat content	76.28	78.18	0.0838
Not exercising	57.50	57.96	0.6883

Time spend with electronic devices (in logarithms)	12.53	13.40	0.1070
Number of Observations	4,031	2,110	

Source: TCS 2022. Authors' calculations. Sampling weights are applied.

Table 3 indicates that the prevalence of consuming high-sugar or high-fat food and drinks is slightly higher among overweight/obese children compared to those of normal weight, while the share of children who do not exercise is nearly identical across the two groups. Overweight/obese children also display marginally higher levels of screen time, though the difference is not statistically significant. Overall, these results indicate that unhealthy dietary habits and greater sedentary time are somewhat more common among heavier children, whereas physical inactivity appears widespread regardless of weight status.

3.2. Identification of the Instrument

Identifying the causal effect of maternal education on child health is complicated by endogeneity issues. Maternal education and child obesity may be endogenous due to several underlying factors. Unobserved maternal characteristics, such as dietary preferences, lifestyle habits, or access to healthy foods, can simultaneously influence a mother's educational attainment and her child's risk of obesity. Moreover, genetic factors may affect both maternal education choices and children's weight outcomes. Therefore, ordinary least squares may give biased estimates for the relationship between mother's education level and child's probability of being overweight/obese. Hence, to identify the causal impact of mother's education on childhood obesity, we use an Instrumental Variable (IV) methodology. An external shock that can be an instrument for mother's years of schooling is the 1997 education reform that increased the duration of compulsory schooling from five to eight years. This reform aimed not only to increase the duration of schooling but also to reduce early school leaving and improve literacy and numeracy skills among children. The policy had a direct impact on cohorts born after its implementation, i.e. individuals born after January 1997 was subject to 8 years of compulsory schooling, while those born earlier were subject to 5 years of compulsory schooling, effectively raising the minimum educational attainment for these individuals.

Totally 39% of mothers with children in the target group are found to be affect by the reform in our operational sample. Table 4 compares children's weight status and demographic characteristics, as well as maternal education based on whether the mother was affected by 1997 compulsory schooling law change.

Table 4. Descriptive Statistics by Maternal Reform Exposure

	Reform Exposure (Yes)	Reform Exposure (No)
Child's Weight Category (%)		
Normal Weight (%)	60.32	69.04
Overweight/Obese (%)	39.68	30.96
Child's Control Variables		
Age (Mean)	7.87	13.15
Female (%)	49.50	47.93
Mother's Education Level		
Primary School or Less	27.98	57.66
Middle School	28.51	8.76
High School	24.63	16.45
University+	18.88	17.14
Number of Observations	2,217	3,891

Source: TCS 2022. Authors' calculations. Sampling weights are applied.

Table 4 shows that children whose mothers were affected by the reform are younger (mean age 7.87) compared to those whose mothers are not affected (13.15). In terms of BMI outcomes, children of affected mothers show a higher prevalence of overweight/obesity (39.68 %) than those whose mothers were not affected (30.96 %). Maternal completed education level differs dramatically: The mothers who are affected by the change in compulsory schooling have higher proportion holding middle school (28.51%) or university degrees (18.88%) compared to unaffected mothers (8.76% and 17.14%, respectively).

Previously, both Aydemir and Kırdar (2017) and Torun (2018) show that the reform increases the ratio of children who complete middle school. These studies also indicate that the reform has spillover effects on obtaining high school degree. However, neither of these studies conclude that the reform improves university graduation. Therefore, in order to identify the local average treatment effect (LATE) correctly, we exclude the mothers who have university or higher degree from our estimation sample. We also exclude the observations of mothers who were born starting from

January 1999, since the individuals who were born after this date were exposed to another education reform, which expanded compulsory education to twelve years, corresponding to the completion of upper secondary education. Therefore, we end up with 3,812 observations in the estimation sample.

4. Model and Empirical Results

We examine the causal impact of maternal education on children's likelihood of being overweight/obese by implementing IV estimation methodology. We use 1997 compulsory schooling reform as instrument for mother's completed level of education. Previous studies show that the change in the compulsory schooling law has had positive and substantial effects on women's schooling (see for instance Kırdar et al. (2016) and Kırdar et al. (2018)). Therefore, in this paper the change in compulsory schooling law is taken as a natural experiment and used as an instrument. The fact that the reform was unexpected and was politically motivated (Kırdar et al. (2016)) supports it as a valid instrument (Angrist and Krueger, 1991).

Our two-stage least squares estimation is as follows:

First Stage Regression:

$$E_i = \alpha_0 + X'\alpha_1 + \alpha_2 R97 + \varepsilon_i \qquad (1)$$

In equation (1), i indexes the mother of the child. E is a dummy variable, indicating whether the mother has completed 8 years of schooling and the dummy variable $R97$ indicates whether the mother is affected by the compulsory schooling law change in 1997. If the mother is affected by the reform, which is determined on the basis of her year of birth, the dummy variable is 1 (namely the mothers who were born starting from January 1987), and if not, it is 0. The X vector contains child's gender, age (defined as age dummies), and mother's year and month of birth.

Second Stage Regression:

$$O_i = \delta + \beta_1 \hat{E}_i + X'\beta_2 + u_i \qquad (2)$$

In equation (2), the dependent variable O is whether the child is overweight/obese or not, determined by his/her calculated BMI, which is adjusted by gender and age. The variable $\hat{E}_i$ is the estimated value of maternal education in the regression equation (1). The vector X is defined as in equation (1).

Next, we estimate equations (1) and (2) by redefining the dependent variable in (2) to be whether the child consumes food with high sugar or fat content such as confectionary, crisps, soda and the like, how often they exercise and the time they spend watching TV, playing on their tablets and using their cellphones.

We first implement a Linear Probability Model (LPM) to see the association between mother's education level and the child's probability of being overweight/obese (See Table 6). Our estimation results show that if mother has completed 8 years of schooling, then the child's probability of being overweight/obese increases by 0.3 to 1.5 percentage points, however the effect is not statistically significant at conventional levels.

Next, we implement IV estimation, where we use exposure to compulsory schooling reform as an instrument for maternal education. We start with a 10-year time window, where we consider birth cohorts of mothers born between 1977 and 1997. We then gradually reduce to time window to 8 and then to 7 years. When we use smaller time windows than 7 years on either side of the policy cutoff, the number of observations drop and our instrument fails to pass the critical value of 10. Table 5 presents first stage regression results and the relevant test statistics for the validity of the instrument. We observe that if the mother is exposed to the policy, then her probability of completing 8 years of schooling increases by 13.5 percentage points. We also observe that although the magnitude of the policy effect decreases, the direction and the significance of the effect is still valid, when replicate the estimations for narrower birth cohort intervals. The test statistics indicate that the instrument is strongly valid, specifically F-statistics varies from 19.43 to 10.47.

Table 5. First Stage Regression Results (Dependent Variable: Mother has at least 8 years of education)

VARIABLES	(1) IV-2SLS (Bandwith:10 years)	(2) IV-2SLS (Bandwith:8 years)	(3) IV-2SLS (Bandwith: 7 years)
Policy	0.135***	0.119***	0.111***
F- Statistic	19.43	12.98	10.47
Child's Gender (1: Female)	YES	YES	YES
Child's Age Dummies	YES	YES	YES
Mother's year of birth	YES	YES	YES
Mother's month of birth	YES	YES	YES
Number of Observations	3,812	3,274	2,640

Notes: Robust standard errors are shown in paranthesis. In all regressions, error terms are clustered by mother's birth year and sample weights are applied. *** indicates 1% level of significance,**indicates 5% level of significance, * indicates 10% level of significance

Next, Table 6 presents both LPM and second stage results obtained from IV estimation. Column (1) of the table shows that if mother has completed 8 years of schooling, the child's likelihood of being overweight or obese increases by 0.3 percentage points, however the association is not statistically significant. In contrast, IV estimation results suggest that higher levels of maternal education have a negative impact on child's probability of being overweight/obese, however the impact is not statistically significant. In addition, boys are more likely to be overweight/obese compared to girls. Regarding the age of child, we observe that as the child gets older, especially in late adolescent period, his/her probability of being overweight/obese significantly decreases. This result can be attributed to a number of factors. As the child gets older, she/he may become more aware of the benefits of a healthy lifestyle. Another plausible explanation is the fact that during adolescence, children tend to pay greater attention to their physical appearance as they strive to feel better about themselves and enhance their self-perception.

Table 6. LPM and Second Stage Regression Results (Dependent Variable: The Child is Overweight/Obese)

VARIABLES	(1) LPM (Bandwith: 10 years)	(2) IV-2SLS (Bandwith:10 years)	(3) LPM (Bandwith:8 years)	(4) IV-2SLS (Bandwith:8 years)	(5) LPM (Bandwith:7 years)	(6) IV-2SLS (Bandwith:7 years)
Mother has at least 8 years of education	0.003	-0.226	0.015	-0.201	0.004	-0.112
Child's Gender (1: Female)	-0.079***	-0.079***	-0.085***	-0.086***	-0.077***	-0.078***
Child's Age Dummies	YES	YES	YES	YES	YES	YES
Mother's month of birth	YES	YES	YES	YES	YES	YES
Mother's year of birth	YES	YES	YES	YES	YES	YES
Observations	3,812	3,812	3,274	3,274	2,640	2,640

Notes: Robust standard errors are shown in paranthesis. In all regressions, error terms are clustered by birth year and sample weights are applied. *** indicates 1% level of significance,**indicates 5% level of significance, * indicates 10% level of significance

Based on the above results, we conclude that there is no significant causal relationship between maternal education and child's probability of being overweight/obese. This result is consistent with other findings in the literature from developing countries. For instance, Ali and Elsayed (2017) use

compulsory schooling reform in Egypt as a natural experiment as we do but do not find a significant causal impact of either maternal or paternal education on child's likelihood of being obese. The authors attribute this result to the lack of health-related education in the Egyptian education system. This explanation can be valid for Türkiye as well. Neither lower nor upper secondary school curriculum include classes that specifically focus on health-related behaviors. In fact, according to the official curriculum published by the Ministry of National Education (MoNE), health education in the Turkish upper-secondary schools is delivered primarily through the course on *Health Knowledge and Traffic Culture* (MoNE, Health Knowledge and Traffic Culture Curriculum). Although this course introduces core topics such as personal health, preventive behaviors, and first aid, its overall scope remains limited, with an emphasis on risk avoidance rather than comprehensive health promotion. Overall, the MoNE curriculum indicates that health education exists within the system but is not provided as an extensive or stand-alone component in general secondary education.

Next, we examine whether mother's policy exposure has significant impact on the child's health behaviors. Table 7 presents the second stage results from a series of IV estimations. First stage test statistics confirm that the instrument is strongly valid, namely the F statistics are around 19 for all the dependent variables.

Table 7. Second Stage Regression Results (Dependent Variable: Child's Health Behaviors)

VARIABLES	(1) Food/drink with high sugar or fat content Consumption	(2) Not Exercising	(3) Time Spend with electronic devices(in logs)
Mother has at least 8 years of education	-0.094	-0.063	0.485
Child's Gender (1: Female)	YES	YES	YES
Child's Age Dummies	YES	YES	YES
Mother's year of birth	YES	YES	YES
Mother's month of birth	YES	YES	YES
Number of Observations	3,823	3,823	2,640

Notes: Robust standard errors are shown in paranthesis. In all regressions, error terms are clustered by mother's birth year and sample weights are applied. *** indicates 1% level of significance,**indicates 5% level of significance, *

indicates 10% level of significance

The IV estimation results suggest mother's lower secondary school completion has no significant causal impact on the child's health related behaviors. Although mother's lower secondary school completion decreases the probability of high-sugar, high-fat food consumption and exercising, the impact is not statistically significant. Table 8 also suggest that higher levels of maternal education increases the time spend with electronic devices, however the impact is not significant either. Hence, we conclude that maternal education does not significantly affect child's health related behaviors. Therefore, higher maternal education does not have significant impact on child's probability of being overweight/obese.

5. Conclusion

This study provides the first causal evidence on the relationship between maternal education and the likelihood of childhood overweight and obesity in Türkiye using a nationally representative data set. Although higher levels of maternal education are associated with a lower probability of a child being overweight or obese, the estimated effects are not statistically significant. Additional analyses indicate that maternal education does not significantly affect children's dietary habits, physical activity, or screen-time behaviors. These findings suggest that, in the Turkish context, increased maternal schooling alone may not translate into meaningful improvements in children's daily health behaviors or their overweight status.

Taken together with the rapidly rising childhood obesity rates in Türkiye, these results highlight the fact that school-based health education remains insufficient in scope and depth. According to the Ministry of National Education (MoNE), health content is delivered primarily through a single course, *Health Knowledge and Traffic Culture*, in the upper-secondary curriculum. While this course introduces basic topics such as personal health and first aid, it offers neither a comprehensive nor a sustained health education framework. Compared to countries where structured health education and health-promotion curricula are integrated across grades—such as Finland, the Netherlands, or the United Kingdom—Türkiye lacks continuous, evidence-based school programs that target nutrition, physical activity, and lifestyle behaviors during childhood and adolescence. This

institutional deficiency may help us to explain why maternal schooling does not have significant causal impact on child health behaviors.

The findings of this study therefore underline the need for a broader public health approach. Policies relying solely on parental education, particularly maternal education, are unlikely to generate substantial reductions in childhood obesity unless complemented by school-level interventions and curriculum reforms. Strengthening Türkiye's health education infrastructure, for example by expanding the breadth of health-related content within the national curriculum and adopting practices aligned with international standards, may provide a more effective strategy for improving long-term child health outcomes.

Overall, this study contributes to the literature by offering causal evidence from a developing-country setting with rapidly increasing childhood obesity rates and by highlighting the importance of integrating educational and health policy. Future research could examine the effectiveness of school-based health programs, nutrition curricula, or community-based interventions in Türkiye, thereby supporting more comprehensive policy design aimed at combating childhood obesity.

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