# Relationship between Multidimensional Poverty Indicators and Health Behaviors among Turkish Children

Emre Özcan
Fikriye Yılmaz

**Abstract:** The aim of the study is to investigate the relationship between multidimensional poverty indicators and health behaviors among Turkish children. The sample of the study was determined to include at least one school from each socioeconomic status group in the districts of Ankara, which are classified into four socioeconomic groups, and the data were collected by applying face-to-face questionnaires to a total of 4,276 children, 2145 boys and 2136 girls, between the ages of 10 and 14. The data were analyzed using descriptive statistics, chi-squared test and binary logistic regression in the PASW Statistics program. The most striking results of the analysis showed that the female children, 5th, 6th, and 7th grade students, those who rated their health as good, those with a high or medium family affluence levels, those who were not deprived according to the Child Deprivation Index, those who rated their family income level as high or medium, and those who never suffered from hunger were more likely to be in the group with healthy behaviors (p<0.05). Accordingly, some school-based interventions and policies to be implemented in the family medicine system are recommended to promote the healthy behaviors of children, especially those living in poverty.

**Keywords:** Poverty, health behaviors, adolescence, lifestyle, school-based health.

**Öz:** Bu çalışmanın amacı, Türk çocuklarında çok boyutlu yoksulluk göstergeleri ile sağlık davranışları arasındaki ilişkiyi araştırmaktır. Araştırmanın örneklemi, Türkiye'nin Ankara ilindeki sosyo-ekonomik duruma göre dört grupta sınıflandırılan ilçelerinden her gruptan en az bir okul olacak şekilde belirlenip, veriler 10-14 yaş aralığındaki 2145 erkek 2136 kız çocuğu olmak üzere toplam 4.276 çocuğa anket formları uygulanarak toplanmıştır. Veriler, PASW İstatistiklerinde tanımlayıcı istatistikler, ki-kare testi ve ikili lojistik regresyon ile analiz edilmiştir. Analizlerin en etkileyici sonuçları, kız çocuklarının; 5, 6 ve 7. sınıf öğrencilerinin; sağlıklarını iyi olarak değerlendirenlerin; yüksek ve orta düzeyde aile zenginliği olanların; çocuk yoksunluğu endeksine göre yoksun olmayanların; aile gelir düzeyini yüksek ve orta olarak değerlendirenlerin ve hiç açlık çekmemiş olanların sağlıklı davranışlar sergileyen grupta olma olasılıkları daha yüksektir. Sonuç olarak, özellikle yoksulluk içinde yaşayan çocukların sağlıklı davranışlarını geliştirmek için aile hekimliği sisteminde uygulanacak okul temelli bazı müdahaleler ve politikalar önerilmiştir.

**Anahtar Kelimeler:** Yoksulluk, sağlık davranışı, ergenlik, yaşam tarzı, okul tabanlı sağlık.

@ Dr., Başkent University. eozcan@baskent.edu.tr
Assoc. Prof. Dr., Başkent University. fyilmaz@baskent.edu.tr

https://orcid.org/0000-0002-0877-2457
https://orcid.org/0000-0002-4884-3803

## Introduction

The phenomenon of poverty, based on the inequalities of capitalism originating in the relations of production, continues to be one of the most important social and economic problems even in the first quarter of the 21st century. This problem is experienced not only in underdeveloped and developing countries, but also in developed countries. In developed countries, unless the division and distribution of welfare services are fair, income-raising policies are not enough to prevent poverty. Especially the effect of neoliberal policies after 1980 brought poverty to a central position in the agenda of these countries.

The United Nations (2001) defined poverty as "a human condition characterized by the sustained or chronic deprivation of the resources, capabilities, choices, security, and power necessary for the enjoyment of an adequate standard of living and other civil, cultural, economic, political, and social rights". The United Nations Development Programme, for this very reason, has set a basis for measuring the degree of human development, by adding determinants such as life expectancy, infant mortality rates, rate of literacy, and gender inequality to Human Development Indices.

The fact that poverty can be explained beyond merely economic indicators makes it easy for us to address this problem with its human dimensions. It may be stated that in this context, children are the leading population group affected by poverty the most. Child poverty was defined in the report titled "the State of the World's Children" prepared by UNICEF in 2005. According to this report, child poverty is a situation that hinders children's rights, restricts their potential in their lives as equal members of society, and at the same time, prevents children from benefiting from any material and moral resources they need for their growth, development, and survival (UNICEF, 2005). In this study, based on the "Child Deprivation Index" developed by UNICEF (2012), children who do not meet 2 or more of the 14 items in this index were considered "deprived".

Although it is thought, with a classical economist perspective, that children cannot be considered "poor" because they do not have income, the matter of "child poverty" should be addressed with its lasting effects on children's development and well-being. In this sense, it should be noted that poverty may be temporary for adults, but it can last a lifetime for children (Ortiz et al., 2012). Childhood poverty is closely associated with increased morbidity in adulthood and reduced life expectancy (Lawlor et al., 2006). Besides its effects on children's physical health, language, and cognitive development, academic performance, and educational attainment, the long-term consequences of poverty regarding children's mental, emotional, and

behavioral health are also in question (Powell & Davis, 2018). According to a 2020 study conducted by Save the Children and UNICEF, it is estimated that without urgent action to protect families from the financial hardships caused by the COVID-19 pandemic, the number of children living in poor households across low- and middle-income countries could increase by 15%, reaching 672 million (UNICEF, 2020). The Turkish Statistical Institute's (TURKSTAT) 2019 data revealed that in Turkey, 38% of children (7.5 million children) are in severe material deprivation, while 33.4% are defined as poor children, 40% of children have nutritional problems, and 28% have problems with heating in their houses.

The phenomenon of poverty at a macro level, more specifically, child poverty, is thought to be a determinant of health behaviors (Lampert & Kuntz, 2019). As mentioned above, while deepening neoliberal policies increase child poverty, children's access to health services and their potential to exhibit healthy behaviors are interrupted with impoverishment (Keddell, 2017; Simpson et al., 2014). Health behaviors are a set of behaviors that an individual believes and performs to protect, promote, and maintain their health and prevent diseases (Pender et al., 2002; Cole, 1997). These behaviors are generally divided into four groups in the literature as tobacco smoking (West, 2017), alcohol consumption (Steptoe et al., 1996), healthy diet (Caburnay et al., 2003), and physical activity (Rhodes et al., 2017). Apart from these, behaviors such as sexual behaviors, physician visits, medication adherence, screening and vaccination, and tooth-brushing fall within such a definition (Conner & Norman, 2017). Although people are generally aware that health-related behaviors play an important role in achieving and maintaining physical well-being in the biopsychosocial sense (as people are continuously reminded of the importance of their behavior for staying healthy by both public health campaigns and medical professionals), one can be held responsible for their own health to some extent (Ridder & Wit, 2006). Macro factors such as socioeconomic status (SES), cultural structure, and family structure should be seen as components that shape the health behaviors of individuals. Although many people are willing/well-intentioned in improving their health behaviors, they have difficulties in consistently performing their behaviors due to these components. At this point, the phenomenon of poverty, especially in underdeveloped and developing countries, has a quite significant place. In the 1990s, in the context of health promotion and its expansion into a movement taking on a social-environmental health perspective, the fact that it is unfair to give individuals the sole responsibility for their health is considered more in relation to poverty, and the emphasis on individual responsibility masks the effects of SES and political factors on the health behavior choices of individuals living in poor families (Williamson & Fast, 1998). Studies in health economics and public health

have revealed that lower SES and poverty are associated with lower health levels and unhealthy behaviors (Aue et al., 2016; Pampel et al., 2010; Contoyannis & Jones, 2004; Lynch et al., 1997; Köktaş et al., 2019; Dinsa et al., 2012; Levine, 2011; Proper et al., 2007; Drewnowski & Specter, 2004; Jarvis & Wadle, 2006; Stalsberg & Pedersen, 2010; Peltzer & Pengpid, 2014; Dye & Thornton-Evans, 2010; Sgan-Cohen & Mann, 2007). In studies discussing health behaviors in poor children, it has been underlined that adolescence is important in the biopsychosocial development of children because many health behaviors are adopted in this period (Inchley et al., 2020). For example, it was emphasized that lower family wealth levels increase smoking rates in adolescents and are associated with physical inactivity and poor dietary habits (Moore & Littlecott, 2015). Similarly, the presence of cigarette smoking in families with lower SES leads children to start smoking, too (Belvin et al., 2015). Researchers have also drawn attention to the relationship between tooth-brushing habits in children and poverty (Fonseca, 2012; Squassi et al., 2008). On the other hand, it was seen that the experience of recurrent household poverty had a significant relationship to children's ill-advised eating behaviors, and subsequently, an increased risk of obesity (Min et al., 2018). In the specific context of secondary school children, risky behaviors in terms of good health are more common in families with low SES (Omotowo et al., 2017). For instance, there is a need to increase physical activity levels among secondary school children living in regions with low SES (Sutherland et al., 2016).

Having all these in mind, although there are data in the literature on the effects of low SES on children's health behaviors, studies investigating the relationship between child poverty and health behaviors, on the basis of the multidimensionality of poverty, are still under development. In Turkey, where the rate of child poverty is increasing rapidly, there are very few studies focusing on this issue. This study, therefore, aims to investigate the relationship between multidimensional poverty indicators and health behaviors among Turkish children. It is thought that this study will provide a strong theoretical contribution to the literature, as it is the only study in Turkey in which the "Child Deprivation Index" was used within the scope of health behaviors. The results of the study are aimed at guiding preventive health services for children and contributing to the strengthening of policy recommendations for the development of health behaviors among poor children. This contribution will be made by sharing the results especially with school-based social work practitioners and personnel providing guidance and psychological counselling services in in primary and secondary education institutions in Ankara. It is also aimed to share these results with the relevant units of the Ministry of National Education working in this direction.

## Hypotheses

The main purpose of this study was to determine how the health behaviors of children aged 10-14 vary based on multiple poverty indicators. In this context, the following hypotheses were tested:

1. Children's health behaviors vary based on the education levels of their families.

2. Children's health behaviors vary based on the socioeconomic statuses of their families.

3. Children's health behaviors vary based on the professions of their parents.

4. Children's health behaviors vary based on the family welfare scale.

5. Children's health behaviors vary based on their Child Deprivation Index scores.

6. Children's health behaviors vary based on the region they live in.

7. Children's health behaviors vary based on gender.

## Methodology

This study was designed with an analytical cross-sectional design to investigate the relationship between multidimensional poverty indicators and health behaviors among children. Since the study was designed with a causal method in terms of examining the relationship between poverty indicators and the health behaviors of children, it was planned to use an analytical method, as well as a cross-sectional method since data were collected only once in a certain period from the children included in the study (Setia, 2016).

### Participants

The population of the study included 489 public secondary schools affiliated to the Ministry of National Education in all districts of Ankara, the capital of Turkey, where children aged 10-14 (5th-8th grades) received education as of 2019. In the study, the sample size adequate for logistic regression analysis was found using the G*Power program as 10 schools with 80% power, 0.3 effect size, and in a 95% confidence interval. The effect size of 0.3 was used based on the HBSC (Health Behaviour in School-Aged Children) study, which had the largest sample and was a comprehensive international project on this topic lasting from 1998 to 2022 (Elgar et al., 2015).

The phases of the multistage cluster sampling method applied in the study were as follows. First of all, on the basis of the study conducted by Seker et al. (2018), the districts of Ankara were divided into four groups given in Table 1 according to their economic statuses. To determine the schools to be included in the sample, the numbers of schools in the groups were determined by rounding to the nearest whole number, in such a manner including at least one school from each group.

**Table 1**

*Population and Sample of the Study*

| Districts by Economic Status | School Population | School Sample | Student Sample |
|---|---|---|---|
| Very - High: Çankaya | 63 | 1 | 1,170 |
| High: Yenimahalle | 48 | 1 | 891 |
| Middle: Akyurt, Altındağ, Beypazarı, Çubuk, Elmadağ, Etimesgut, Gölbaşı, Kazan, Keçiören, Mamak, Polatlı, Pursaklar, Sincan | 366 | 7 | 1,846 |
| Low: Çamlıdere, Evren, Kalecik, Nallıhan | 12 | 1 | 369 |
| TOTAL | 489 | 10 | 4,276 |

The schools included in the sample were selected from each group using random number tables. The necessary permission was obtained from the Ankara Directorate of National Education to conduct research at the schools selected for the sample. A questionnaire was applied to all students who were studying at the selected schools who did not have mental disabilities and voluntarily agreed to participate in the study. The data of 4,276 students in total, whose questionnaire form responses were valid, were analyzed.

## Data Collection Tools

The questionnaire that was applied in the study consisted of two parts. The first part encompassed questions to determine the demographic and socioeconomic characteristics of the children in the sample and their families, the Family Affluence Scale (FAS), and the UNICEF Child Deprivation Index. The second part included questions to determine the health status, general health evaluations, and health behaviors of the children.

The measurement of multidimensional child poverty was performed in four parts of the questionnaire.

**Socioeconomic status:** First, data on the socioeconomic statuses, educational levels, professions, and income levels of the parents of the children were obtained. The educational levels of the parents were assessed in five categories, ranging from "illiterate" to "university or higher". The professions of the parents were asked to the children using open-ended questions, and they were grouped according to the occupation classification frequently used in the literature. The income levels of the families were self-evaluated in five categories, ranging from "very poor" to "very rich".

**Children's employment status and going to bed or school hungry:** Second, the children's employment statuses and their statuses of going to bed or school hungry were investigated.

**Family Affluence Scale:** The third determinant was the Family Affluence Scale (FAS). The FAS is a four-item index developed for adolescents, to determine their family wealth. The Turkish validity and reliability study of the FAS was performed by Tipirdamaz Sipahi (2008). FAS scores are calculated based on responses to the items questioning the number of cars and computers owned by the family, whether the child has their own room, and whether they have had family vacations in the past year. Accordingly, FAS 1 (score: 0-3) indicates low affluence, while FAS 2 (score: 4,5) indicates medium affluence, and FAS 3 (score: 6,7) indicates high affluence. In this study, the Cronbach's alpha value of the scale was calculated as 0.783.

**UNICEF Child Deprivation Index:** Fourth, the Child Deprivation Index was used. The UNICEF Child Deprivation Index (CDI) is a 14-item index developed by the UNICEF Innocenti Research Centre in 2012 on the basis of the European Union Statistics on Income and Living Conditions (EU-SILC), sampling more than 125,000 households in 29 European countries, including a section on the lives of children aged one to 16. This index can be used in all countries, including those in Africa. According to the index, if a child does not meet the conditions stated in 2 or more of the 14 items, then they are identified as "deprived" (UNICEF 2012). In this study, the version of the UNICEF CDI that was adapted into Turkish by Kahraman and Sallan Gul (2015) was used. In this study, the Cronbach's alpha value of the index was calculated as 0.793.

To assess the health statuses of the children, the children were asked about the presence of a disease, their regular medication use, and their assessment of general health. In the questionnaire, the children were asked about their height and weight, and their Body Mass Index (BMI) and height-for-age values were evaluated using the WHO AnthroPlus software. In this part, as a factor that may affect the health status of children, the smoking statuses of the parents of the children were also asked.

Three health behaviors of the children were evaluated: healthy eating, physical activity, and oral and dental health. To evaluate their healthy eating habits, they were asked about habitual breakfast frequency on weekdays and on weekends, eating three meals per day, and habits of consuming fruits and vegetables every day. Those who had breakfast every day, had a habit of eating three meals per day, and consumed fruits/vegetables every day were regarded as having healthy eating habits. Physical activity habits were evaluated with the question "Do you do regular physical activity?". In terms of oral health, they were asked how often they brushed their teeth, and those who brushed their teeth more than once a day were considered "ideal". Those who showed at least 2 of the aforementioned health behaviors were regarded as having "healthy behaviors".

In the data collection phase, firstly, an informed consent form for scientific research on children was sent to the children and their families through the school administrations. The data were collected by administering the questionnaires in person to students enrolled in schools in the sample on a voluntary basis between 18 February and 1 June 2019, with the approval of the school administrations.

## Statistical Analysis

The collected data were analyzed using the PASW 18.0 Statistics program (SPSS Inc., Chicago, 2009). In the study, the health behaviors of the children were determined as the dependent variable, while their demographic characteristics, health status indicators, and determinants of multidimensional poverty constituted the independent variables. Chi-squared analysis was conducted to determine the relationships between the children's health behaviors and their demographic characteristics, health status indicators, and determinants of multidimensional poverty. To determine the relationships between multidimensional poverty indicators and health behaviors, a model was developed using the binary logistic regression analysis technique with retrospective likelihood-based methods. Accordingly, in the model developed to determine the factors that affected health behaviors, health behaviors were analyzed as the dependent variable, while demographic characteristics associated with health behaviors, health status indicators, and determinants of multidimensional poverty were analyzed as the explanatory variables. In the analyses, the statistical significance level was accepted as $p < 0.05$.

## Results

### Sociodemographic Characteristics

The mean age of the children who participated in the study was 12.94±1.17 years, 50.2% of the children were female, and 37.8% were 7th-grade students. While 43.1% of the children lived in a district with an economic level in the "middle" category, 83.2% of the children had nuclear families.

### Multidimensional Poverty Indicators

According to the examinations of the distributions of the children participating in the study based on the determinants of multidimensional poverty, the mothers of 48.3% of the children and the fathers of 59.9% had at least high school degrees. The fathers of 60.9% of the children were employed in manual labor, and the mothers of 62.1% were housewifes. Moreover, 86.1% of the children evaluated the income levels of their families as medium. However, based on their FAS scores, 37.7% of the children were found to be on low welfare levels. According to the Child Deprivation Index, 48.1% of the children were deprived, and 2.2% of the children worked in different jobs to earn money. It was stated by 13.8% of the children that they, albeit rarely, sometimes went to bed or school hungry.

### Assessment of Health Status

The BMI-for-age values of 60.4% of the children were normal, but the high rate of overweight and obese children (21.5%) was striking. The height of 18.9% of the children were short for their ages, 16.3% of the children stated that they had a disease, and only 7.3% stated that they used medication. It was found that 39.2% of the children evaluated their health as "excellent", 25.9% evaluated it as "very good", and 19.7% evaluated it as "good". The mothers of 26.5% of the children and the fathers of 49.7% were cigarette smokers.

### Health Behaviors

The health behaviors of the children are shown in Table 2. As seen in Table 2, 55.2% (n=2,362) of the participants had regular physical activity habits, 53.1% (n=2,270) had healthy dietary habits, and 41.5% (n=1,773) brushed their teeth regularly. Overall, it may be stated that 49.7% (n=2,127) of the participants had at least 2 healthy behaviors.

**Table 2**

*Distribution of Children's Health Behaviors*

|  | Frequency (n) | Percentage (%) |
|---|---|---|
| Those with healthy dietary habits | 2,270 | 53.1 |
| Those who brush teeth more than once a day | 1,773 | 41.5 |
| Those who perform physical activities regularly | 2,362 | 55.2 |
| Those who have healthy behaviors (at least 2 behaviors) | 2,127 | 49.7 |

Table 3 shows the distributions of the health behaviors of the participants based on their sociodemographic characteristics. As seen in Table 3, the female children, those who were at the 5th and 6th grade levels, those who had higher economic statuses, those who lived in economically very high-status districts, and those who had nuclear families had higher rates of showing healthy behaviors (p<0.05).

**Table 3**

*Distribution of Children's Health Behaviors Based on Their Sociodemographic Characteristics*

|  | Total | Healthy diet | | Brushing teeth | | Physical activity | | Healthy behaviors | |
|---|---|---|---|---|---|---|---|---|---|
|  | n | n | % | n | % | n | % | n | % |
| **Sex** | | | | | | | | | |
| Male | 2145 | 1082 | 50.4 | 682 | 31.8 | 1092 | 59.2 | 981 | 45.7 |
| Female | 2131 | 1188 | 55.7 | 1091 | 51.2 | 1270 | 51.2 | 1146 | 53.8 |
| p | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |
| **Grade** | | | | | | | | | |
| 5th | 758 | 410 | 54.1 | 326 | 43.0 | 455 | 60.0 | 411 | 54.2 |
| 6th | 769 | 432 | 56.2 | 323 | 43.0 | 461 | 59.9 | 421 | 54.7 |
| 7th | 1617 | 880 | 54.4 | 658 | 40.7 | 901 | 55.7 | 809 | 50.0 |
| 8th | 1125 | 547 | 48.6 | 462 | 41.1 | 540 | 48.0 | 483 | 42.9 |
| p | | 0.004* | | 0.728 | | 0.000* | | 0.000* | |
| **District by economic status** | | | | | | | | | |
| Very High | 1170 | 703 | 60.1 | 530 | 45.3 | 718 | 61.4 | 671 | 57.4 |
| High | 891 | 552 | 62.0 | 403 | 45.2 | 572 | 64.2 | 515 | 57.8 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Middle | 1846 | 822 | 44.5 | 675 | 36.6 | 832 | 45.1 | 743 | 40.2 |
| Low | 369 | 193 | 52.3 | 165 | 44.7 | 240 | 65.0 | 198 | 53.7 |
| p | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |
| Family type | | | | | | | | | |
| Nuclear family | 3559 | 1939 | 54.5 | 1491 | 41.9 | 1992 | 56.0 | 1803 | 50.7 |
| Extended family | 464 | 217 | 46.8 | 174 | 37.5 | 234 | 50.4 | 203 | 43.8 |
| Single parent family | 252 | 114 | 45.2 | 108 | 42.9 | 136 | 54.0 | 121 | 48.0 |
| p | | 0.000* | | 0.176 | | 0.072 | | 0.017* | |

**\*p<0.05**

Table 4 shows the health behaviors of the children and their parents based on some health indicators. As seen in Table 4, the rates of children with healthy behaviors were higher among those whose height for age was normal, those who rated their general health as good, and those whose fathers did not smoke cigarettes (p<0.05).

**Table 4**

*Distribution of Children's Health Behaviors According to the Health Indicators of Children and Their Family*

| | Total | Healthy diet | | Brushing teeth | | Physical activity | | Healthy behaviors | |
|---|---|---|---|---|---|---|---|---|---|
| | n | n | % | n | % | % | n | % | n |
| BMI for age | | | | | | | | | |
| Underweight | 276 | 150 | 54.3 | 119 | 43.1 | 153 | 55.4 | 135 | 48.9 |
| Normal | 2581 | 1411 | 54.7 | 1120 | 43.4 | 1495 | 57.9 | 1357 | 52.6 |
| Overweight | 921 | 502 | 54.5 | 354 | 38.4 | 496 | 53.9 | 447 | 48.5 |
| p | | 0.992 | | 0.031* | | 0.091 | | 0.077 | |
| Height for age | | | | | | | | | |
| Normal | 3468 | 1920 | 55.4 | 1480 | 42.7 | 1976 | 57.0 | 1794 | 51.7 |
| Stunted | 808 | 350 | 43.3 | 293 | 36.2 | 386 | 47.7 | 333 | 41.2 |
| p | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |
| Has a disease | | | | | | | | | |
| No | 3579 | 1917 | 53.6 | 1474 | 41.2 | 1982 | 55.4 | 1775 | 49.6 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Yes | 697 | 353 | 50.6 | 299 | 42.9 | 380 | 54.5 | 352 | 50.5 |
| p | | 0.085 | | 0.212 | | 0.353 | | 0.346 | |
| Medication use | | | | | | | | | |
| No | 3964 | 2105 | 53.1 | 1640 | 41.4 | 2191 | 55.3 | 1966 | 49.6 |
| Yes | 312 | 165 | 52.9 | 133 | 42.6 | 171 | 54.8 | 161 | 51.6 |
| p | | 0.493 | | 0.353 | | 0.460 | | 0.266 | |
| Self-rated health | | | | | | | | | |
| Not good | 649 | 224 | 34.5 | 235 | 36.2 | 286 | 44.1 | 216 | 33.3 |
| Good | 3627 | 2046 | 56.4 | 1538 | 42.4 | 2076 | 57.2 | 1911 | 52.7 |
| p | | 0.000* | | 0.002* | | 0.000* | | 0.000* | |
| Mother smokes | | | | | | | | | |
| No | 3143 | 1605 | 53.4 | 1258 | 41.8 | 1659 | 55.2 | 1506 | 50.1 |
| Yes | 1133 | 598 | 52.7 | 463 | 40.8 | 637 | 56.2 | 560 | 49.4 |
| P | | 0.369 | | 0.291 | | 0.294 | | 0.357 | |
| Father smokes | | | | | | | | | |
| No | 2151 | 1089 | 57.6 | 826 | 43.7 | 1066 | 56.4 | 989 | 52.3 |
| Yes | 2125 | 1062 | 50.0 | 849 | 39.9 | 1169 | 55.0 | 1021 | 48.0 |
| p | | 0.000* | | 0.009* | | 0.192 | | 0.004* | |

**\*p<0.05**

Table 5 shows the health behaviors of the children based on their determinants of multidimensional poverty. As seen in Table 5, the rates of children with healthy behaviors were higher among those whose parents had at least high school degrees, those whose parents were employed in jobs other than manual labor, those who did not work at any job for earning money, those who had a high level of welfare according to their FAS scores, those who were not deprived according to their Child Deprivation Index scores, those who had no hunger problem, and those who evaluated their family economic statuses as good (p<0.05).

**Table 5**

*Distribution of Children's Health Behaviors Based on Multidimensional Poverty Indicators*

| | Total | Healthy diet | | Brushing teeth | | Physical activity | | Healthy behaviors | |
|---|---|---|---|---|---|---|---|---|---|
| | n | n | % | n | % | n | n | % | n |
| **Fathers' education level** | | | | | | | | | |
| Secondary school and below | 1713 | 636 | 42.7 | 536 | 36.0 | 683 | 45.9 | 584 | 39.2 |
| At least high school | 2563 | 1536 | 59.9 | 1150 | 44.9 | 1578 | 61.6 | 1449 | 56.5 |
| p | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |
| **Mothers' education level** | | | | | | | | | |
| Secondary school and below | 2209 | 893 | 43.8 | 744 | 36.5 | 963 | 47.3 | 821 | 40.3 |
| At least high school | 2067 | 1298 | 62.8 | 955 | 46.2 | 1310 | 63.4 | 1229 | 59.5 |
| p | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |
| **Fathers' occupation** | | | | | | | | | |
| Non-manual | 2832 | 676 | 64.9 | 477 | 45.8 | 672 | 64.6 | 636 | 61.1 |
| Manual | 1246 | 1295 | 49.7 | 1055 | 40.5 | 1378 | 52.9 | 1208 | 46.4 |
| Unemployed | 198 | 101 | 51.0 | 82 | 41.4 | 103 | 52.0 | 96 | 48.5 |
| p | | 0.000* | | 0.013* | | 0.000* | | 0.000* | |
| **Mothers' occupation** | | | | | | | | | |
| Non-manual | 1209 | 358 | 63.9 | 279 | 49.8 | 366 | 65.4 | 347 | 62.0 |
| Manual | 451 | 352 | 51.9 | 270 | 39.8 | 411 | 60.6 | 349 | 50.1 |
| Housewifes | 2616 | 1383 | 52.1 | 1091 | 41.1 | 1406 | 52.9 | 1283 | 48.3 |
| P | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |
| **Slept hungry or went to school hungry** | | | | | | | | | |
| Yes | 591 | 150 | 25.7 | 170 | 29.2 | 257 | 44.1 | 160 | 27.4 |
| No | 3685 | 2120 | 57.5 | 1602 | 43.5 | 2104 | 57.1 | 1967 | 53.4 |
| P | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |
| **Self-rated family economic status** | | | | | | | | | |
| Poor | 172 | 19 | 10.6 | 46 | 25.6 | 43 | 23.9 | 21 | 11.7 |
| Moderate | 3677 | 1951 | 53.1 | 1507 | 41.0 | 2021 | 55.0 | 1802 | 49.0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rich | 419 | 300 | 71.6 | 220 | 52.5 | 298 | 71.1 | 304 | 72.6 |
| p | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |
| Child labor | | | | | | | | | |
| Yes | 92 | 30 | 32.6 | 27 | 29.3 | 47 | 51.1 | 33 | 35.9 |
| No | 4184 | 2240 | 53.5 | 1746 | 41.7 | 2315 | 55.3 | 2094 | 50.0 |
| p | | 0.000* | | 0.010* | | 0.240 | | 0.005* | |
| Family affluence scale | | | | | | | | | |
| Low | 1612 | 589 | 36.5 | 528 | 32.8 | 669 | 41.5 | 521 | 32.3 |
| Middle | 1526 | 885 | 58.0 | 655 | 42.9 | 885 | 58.0 | 820 | 53.7 |
| High | 1138 | 796 | 69.9 | 590 | 51.8 | 808 | 71.0 | 786 | 69.1 |
| p | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |
| Child deprivation | | | | | | | | | |
| Not deprived | 2219 | 1676 | 75.5 | 1121 | 50.5 | 1519 | 68.5 | 1550 | 69.9 |
| Deprived | 2057 | 594 | 28.9 | 652 | 31.7 | 843 | 41.0 | 577 | 28.1 |
| p | | 0.000* | | 0.000* | | 0.000* | | 0.000* | |

**\*p<0.05**

The binary logistic regression models that were developed to determine the independent variables that affected health behaviors are given in Table 6. As seen in Table 6, only the sociodemographic characteristics that affected the health behaviors of the participants were added to the first model, while health-related variables, as well as sociodemographic characteristics, were added to the second model, and the determinants of multidimensional poverty were added to the last model. The results of the Nagelkerke test in the table indicate to what extent the independent variables included in the model explained the variation in the dependent variable, health behaviors. The last column of the table shows the probability of the correct classification of the variables with the models that were developed.

In this sense, it was determined that in the 3rd model created with the determinants of multidimensional poverty, the independent variables explained about 26.8% of the total variance in health behaviors, and the probability of the correct classification of the variables was 70.7%. According to model 3, as shown in Table 6, higher likelihood levels of showing healthy behaviors were observed among the female students compared to the male students (OR=1.757), among the 5th-graders (OR=1.769), 6th-graders (OR=1.589), and 7th-graders (OR=1.245) compared to the 8th-graders, among those who rated their general health as good compared

to those who rated it as poor (OR=1.574),among those with high (OR=1.656) or medium family wealth (OR=1.478) levels compared to those with low family wealth levels, among those who were not deprived according to their Child Deprivation Index scores compared to those who were deprived (OR=1.260), among those with high (OR=1.595) or medium (OR=1.279) family income levels compared to those with low family income levels, and among those who never suffered from hunger compared to those who had sometimes experienced hunger, albeit rarely (OR=1.658) (p<0.05).

**Table 6**

*Results of Binary Logistic Regression Analysis of Independent Variables Associated with Health Behaviors in Children*

| Health behaviors | OR | 95% CI | p | Nagelkerke $R^2$ | Correct Classification |
|---|---|---|---|---|---|
| Model 1: Sociodemographic Indicators | | | | | |
| Sex (Female) | 1.698 | 1.617-1.789 | 0.000* | 5.5 | 59.5 |
| Grade (5) | 1.434 | 1.181-1.741 | 0.000* | | |
| Grade (6) | 1.493 | 1.234-1.806 | 0.000* | | |
| Grade (7) | 1.293 | 1.106-1.512 | 0.001* | | |
| District (1) | 1.160 | .914-1.473 | 0.223 | | |
| District (2) | 1.266 | 0.987-1.623 | 0.063 | | |
| District (3) | 0.612 | 0.487-0.769 | 0.000* | | |
| Family type (nuclear) | 1.162 | 0.894-1.510 | 0.262 | | |
| Family type (extended) | 0.885 | 0.646-1.213 | 0.448 | | |
| Model 2: Sociodemographic and Health Indicators | | | | .646 | .019 |
| Sex (Female) | 1.698 | 1.613-1.794 | 0.000* | 8.3 | 59.8 |
| Grade (5) | 1.499 | 1.222-1.837 | 0.000* | | |
| Grade (6) | 1.520 | 1.245-1.855 | 0.000* | | |
| Grade (7) | 1.286 | 1.092-1.513 | 0.002* | | |
| District (1) | 1.173 | 0.911-1.511 | 0.216 | | |
| District (2) | 1.298 | .998-1.688 | .0.052 | | |
| District (3) | 0.638 | 0.501-0.813 | 0.000* | | |
| Height for age (normal) | 1.730 | 1.617-1.865 | 0.000* | | |

| | OR | CI | p | | |
|---|---|---|---|---|---|
| Self-rated health (good) | 1.474 | 1.392-1.572 | 0.000* | | |
| Father smokes (No) | 1.156 | 1.016-1.314 | 0.028* | | |
| Model 3: Sociodemographic, Health and Poverty Indicators | | | | | |
| Sex (Female) | 1.757 | 1.650-1.881 | .000* | 26.8 | 70.7 |
| Grade (5) | 1.769 | 1.397-2.239 | .000* | | |
| Grade (6) | 1.589 | 1.260-2.004 | .000* | | |
| Grade (7) | 1.245 | 1.030-1.505 | .024* | | |
| Self-rated health (good) | 1.574 | 1.457-1.720 | .000* | | |
| Family affluence (high) | 1.656 | 1.540-1.797 | .000* | | |
| Family affluence (middle) | 1.478 | 1.386-1.591 | .000* | | |
| Child deprivation (not deprived) | 1.260 | 1.221-1.307 | .000* | | |
| Family economic status (moderate) | 1.279 | 1.152-1.512 | .000* | | |
| Family economic status (rich) | 1.595 | 1.450-1.787 | .000* | | |
| Slept hungry or went to school hungry (No) | 1.658 | 1.512-1.845 | .001* | | |

**\*p<0.05, OR: Odds Ratio, CI: Confidence Interval**

## Discussion

In this study investigating the relationship between multidimensional poverty indicators and health behaviors among children, a total of 4,276 students who were aged between 10 and 14 years and lived in the Ankara province of Turkey were interviewed. In this context, the most significant results of the study may be summarized as follows. In the study, first of all, the effects of sociodemographic characteristics on the children's health behaviors were examined. Then, four indicators were examined to reveal the relationships between multidimensional poverty variables and health behaviors. These indicators were the socioeconomic statuses

of the parents of the children, the working statuses of the children, the statuses of sleeping hungry or going to school hungry, their Family Affluence Scale (FAS) scores, and their UNICEF CDI scores.

One of the most important findings of the study was that 49.7% of the children were found to have healthy behaviors (showing at least 2 of the health behaviors questioned in the study). According to the results of the analyses of the sociodemographic characteristics of the children, their health behaviors could be evaluated under three categories. First, examining the health behaviors of the children in terms of gender, it was seen that especially healthy dietary habits and tooth-brushing habits were less frequently observed in the male students compared to the female students. In the studies conducted by Levin and Currie (2010) and Dorri et al. (2010) related to tooth-brushing habits, it was revealed that girls brushed their teeth two times or more per day at higher rates compared to boys. In terms of physical activity, similar to the results of this study, Sanchez et al. (2007) found that boys performed more physical activity than girls did. It may be argued that the inequality of opportunities between the sexes causes this difference. Second, in this study, it was determined that the health behaviors of the children with nuclear families and single-parent families were better than those with extended families. Similarly, Liu et al. (2020) and Kovacks and Nagy (2017) reported that the health behaviors of children with nuclear families were better than those of children with other family types. It may be thought that caregivers in a nuclear family can take care of their children better than those in other types of families can. Especially in single-parent families, parents may not be able to provide sufficient support for their children to improve their health behaviors due to the problems they experience. Third, in this study, the tendencies of the obese children (according to their BMI) to display health behaviors were lower than the children with normal BMI values. Hoare et al. (2019) and Borodulin et al. (2012) revealed that physical activity rates were quite low in obese children in particular. It may be considered that the intensive use of digital tools by children in this age group increases their physical inactivity rates.

The characteristics of the children who participated in this study regarding their health behaviors based on the multidimensional poverty indicators that were examined in this study may be evaluated as follows. The education levels of parents can positively affect children's health behaviors. This study revealed that having parents with at least high school degrees increased the tendencies of the children to have healthy behaviors. Marttila-Tornio et al. (2020) reported that as the educational levels of parents increased, adolescents' rates of having health behaviors increased accordingly. On the other hand, the professional statuses of parents can also have an impact on children's health behaviors. For example, when a child's parents do

not work, this affects the child's health behaviors negatively. Marttila-Tornio et al. (2020) determined that when parents did not work, this led adolescents to have lower rates of showing healthy behaviors.

As we mentioned earlier, the relevant literature has revealed that health behaviors are associated with SES and poverty, and we emphasized that when families have low SES, the positive health behavior levels of children decrease (Peltzer & Pengpid 2014; Dye & Thornton-Evans, 2010; Sgan-Cohen & Mann, 2007). As in this study, according to Petersen et al. (2008), when the family has a low income level, regular tooth-brushing rates decrease. In the literature, there are also studies showing that low income levels may cause malnutrition and obesity. This study revealed that the families' low income levels negatively affected the healthy eating habits of their children. There are many studies that have observed that children of low-income families have low rates of healthy eating behaviors (Köktaş et al., 2019; Basha et al., 2015; Dinsa et al., 2012; Levine, 2011; Proper et al., 2007; Drewnowski & Specter, 2004). In terms of participating in physical activity, studies similar to this study have suggested that the rate of taking part in regular physical activity is lower in the children of individuals with low income levels (Stalsberg & Pedersen, 2010; Petersen et al., 2008).

In the "Health Behaviour in School-Aged Children (HSBC) (2009/2010) Report", which was published with the participation of 39 countries (WHO, 2012), it is stated that oral health in children varies based on family income status, and as income levels increase, the quality of oral health increases. As family income levels increase, physical activity rates also increase in the same way, too, and boys perform more physical activities compared to girls. Based on education levels and occupational statuses, it may be difficult for parents with low socioeconomic statuses to adopt and implement a healthy lifestyle and meet the financial burden caused by a healthy lifestyle. Therefore, parents may have difficulty in providing their children with opportunities for healthy lifestyles. Additionally, parents with low socioeconomic statuses may be prone to unhealthy lifestyles, and their children may adopt these behaviors by taking their parents as role models.

## Implications

On the basis of the biopsychosocial approach, interventions can be developed on some topics based on the results of this study that revealed the relationship between multidimensional poverty indicators and the health behaviors of children.

First of all, the point where child poverty has reached is the proof that the issue cannot be limited to extents such as marginal, minority, and rural extents. In other words, it points to a major social problem. Therefore, to prevent the development of more perilous consequences in the future, social policies aiming at eliminating child poverty are urgently needed. This is especially true in Turkey. The most significant dimension of child poverty is the fact that the inequality of opportunity that is suffered in childhood is transferred into the adulthood stage. The problems faced by children who grow up impoverished do not allow them to prepare for their adulthood in a healthy manner in the biopsychosocial context. When these children marry and start a family in their adulthood, they are usually unable to work in regular jobs, cannot benefit from social welfare services adequately, and are in need of social assistance. In the end, the risk of growing up in poverty emerges for their own children, and this situation becomes settled by going round in a vicious cycle (UNICEF, 2011). Hence, preventing child poverty in light of practices that strengthen family affluence is of great importance for breaking the cycle of poverty. Secondly, efforts to reduce child poverty are a part of efforts to improve health behaviors as well. Social policies, which bring children together with social welfare services on an egalitarian and fair platform with a focus on fundamental rights and freedoms and aim at increasing family welfare, can pave the way for healthy behaviors in children, while ill-advised approaches can lead to unhealthy behaviors.

Based on these results, especially regarding poor children preparing for adolescence, it is very important to put into action interventions aimed at improving physical activity levels (Finkelstein et al., 2017; Cottrell et al., 2015), informative studies about tooth-brushing (Asaka et al., 2020; Northridge et al., 2020), and awareness-raising practices about healthy dietary habits (Pastor & Tur, 2020; Buonomo et al., 2020) into effect. Conducting studies related to these issues will enable poor children to perform the health behaviors required by their developmental characteristics and may pave the way for these behaviors to be reinforced in other developmental periods. Focusing on these policies primarily relies on strengthening school-based health programs. The importance of school-based interventions in developing healthy behaviors in children and adolescents is clear (Álvarez-Fariña et al., 2020; Weri et al., 2019; Okuyan and Alkaya, 2018; Sprigg et al., 2017). The most important point here is to make schools fit for the definition of health-promoting schools. Turkey has continued to implement the "health-promoting schools network" since 1995 with the financial and technical support of the WHO Regional Office for Europe and the Council of Europe. A health-promoting school functions as a healthy environment fit for the development processes of students during their education period (Lee et al., 2020). This function can be made possible with common efforts of

all stakeholders in the school system. When global standards for health-promoting schools are realized, it will be possible to ensure equality in health and increase the rates of healthy behaviors among children and adolescents suffering from inequalities based on race, ethnicity, and SES. School social workers contribute to strengthening health-promoting schools by working in collaboration and interaction with other professionals. This contribution undoubtedly includes the development of healthy behaviors in impoverished children. However, the practice of school social work has not yet been implemented in Turkey. Social workers are not posted in schools. In such a case, it is one of the biggest obstacles as well as the development of social work in Turkey and reaching universal education standards on the levels of elementary, secondary, and high schools.

Another issue in terms of preventing unhealthy behaviors among impoverished children is the strengthening of policies in the family medicine system. To improve basic health services, increase their effectiveness, and make them accessible, focusing on the organization and the provision of primary health care services, Turkey has created a unique family medicine model in 2005 as a way to achieve the goals of the "Health Transformation Programme". Monitoring and evaluating the general health status and health behavior of impoverished children is an important part of the family medicine system. It is the responsibility of family physicians to identify and change the unhealthy behaviors of both parents and children on the one hand, and promote health behaviors on the other hand. This, of course, does not mean laying the sole burden on family physicians. Efforts to promote healthy behaviors in impoverished children are closely related to the development of social policies that address healthcare programs in family medicine centers. Developing such policies may bring protective and preventive services to the forefront in terms of health behaviors.

## Strengths and Limitations

The results of this study should be evaluated along with its strengths and limitations. The main strength of this study was the presence of a large sample that made it possible to examine in detail the relationship between poverty indicators and the health behaviors of secondary school children. Determining this sample size using G*Power was also an important advantage. Another strength of the study was discussing the phenomenon of poverty in a multi-dimensional manner.

This study also had some limitations. First, since the study was conducted in Ankara, generalizing the results to the entire country may lead to misleading evaluations. Second, considering that the cross-sectional design of the study reveals

the relationship between poverty and health behaviors in children, it is clear that longitudinal studies are also required to determine causality between the dependent and independent variables. Third, since the questionnaire method was used as a data collection method in the study, the accuracy of the data relied on the correct and sincere answers of the children who participated in the study. The responses of the children about their height and weight, in particular, were their own statements. It is thought that taking anthropometric measurements during research in further studies can increase objectivity. Finally, any question about children's smoking, alcohol, and substance use could not be included in the data collection process because the Ankara Directorate of National Education did not find them appropriate.

## Conclusion

Understanding the relationship between poverty and children's health behaviors is of great importance for poverty reduction strategies and healthcare intervention programs to focus on their goals. With the perspective provided by the biopsychosocial model, the results of this study revealed that the primary indicators of health behaviors among children are determinants of multidimensional poverty rather than sociodemographic characteristics and general health status indicators.

## Human Subjects Approval Statement

This study was approved by the Medical and Health Sciences Research Board and Ethics Committee of Baskent University (Project No: KA18/402).

## Competing interests

The authors declare that they have no competing interests.

## Funding

No funding was received for this study.

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