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Original article

The association of various social capital indicators and physical activity participation among Turkish adolescents

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Abstract

Background: Physical activity participation (PAP) has been proven to improve health and promote optimal growth among adolescents. However, most adolescents do not meet the current physical activity (PA) recommendations in Turkey. The role of the social environment and social factors on PAP is being increasingly recognized. Although social capital (SC) indicators have been examined in high-income countries, there are few studies on developing countries. The aim of this study was to examine the relationship between SC indicators and PAP among Turkish adolescents.

Methods: A survey was conducted among 19 high schools in 4 different cities in Turkey in 2016. A total of 506 female and 729 male high school students participated in this study. The dependent variable was overall PAP, which was measured using the short form of the International Physical Activity Questionnaire. The independent variables included self-perceived family, neighborhood, and school SC. Self-rated health and obesity status, measured by body mass index, were other study covariates in multiple binary logistic regression models. Chi-square tests were used to assess the differences between genders.

Results: PAP levels were significantly different between males and females. A higher percentage of males reported PAP (77.4%) compared to females (51.0%). Among males, teacher–student interpersonal trust and informal social control were inversely associated with PAP, while high students interpersonal trust was positively associated with increased odds of PAP. For females, students interpersonal trust was inversely associated with PAP.

Conclusion: Various SC indicators are associated with PAP for males and females. These associations are different from findings of studies conducted in developed countries. Therefore, health-promotion interventions and policies should consider gender and different social agents on the social and cultural background to improve PAP among Turkish adolescents.

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1. Introduction

Physical activity participation (PAP) is one of the determining factors for optimal growth and development of children and adolescents.^{1,2} There is also evidence to suggest that physical inactivity during early periods of life may track into adulthood and affect quality of life.³ However, the majority of children and adolescents do not meet the current international guidelines for physical activity (PA), and 4 out of 5 adolescents do not participate in PA at the recommended level.^{4,5} Physical inactivity is

one of the major causes of various non-communicable diseases and premature deaths.⁶

Prevention and control of physical inactivity related non-communicable diseases, such as cardiovascular disease, cancer, and diabetes, are a major challenge in developing countries.⁷ Turkey is a developing country on the verge of a physical inactivity crisis.⁴ The World Health Organization reported that 77.1% of male adolescents and 86.9% of female adolescents in Turkey are inactive.⁸ As a consequence of an inactive lifestyle and in line with global World Health Organization reports, the Turkish Statistical Institution⁹ reported that the majority of deaths in Turkey are caused by cardiovascular diseases and various types of cancers. Therefore, eliminating physical inactivity among Turkish adolescents is vitally important to

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decrease non-communicable diseases and their associated deaths.⁶

Social factors are highlighted as important determinants of individual health along with positive and risky health-related behaviors such as unhealthy diet, smoking, and physical inactivity.¹⁰ Providing a positive social environment is emphasized as a possible mediator of PAP.¹¹ Recent attention has focused on social capital (SC) as a factor contributing to health outcomes such as PA behavior.^{12,13} SC is defined as “social networks and the associated norms of reciprocity and trustworthiness”¹⁴ and it is different from other social determinants of health as it is based on an individual’s direct choices and behaviors.¹⁵ Measures such as cooperation, interpersonal trust and reciprocity, and exchange of social support within a group are determinants of SC.¹⁶ Higher levels of SC perceptions have been linked to higher levels of PA among adults.¹⁷ However little is known about SC and PAP in adolescents. How a SC mechanism may affect PAP in adolescents is explained as (1) informal social control decreases juvenile delinquency, therefore encouraging residents to exercise in outdoors; (2) collective efficacy improves access to PA opportunities, and (3) social norms related to healthy behaviors promote PA.¹⁸

Although PAP is important for the health and development of adolescents,¹⁹ most of the studies exploring the relationship between SC and PAP have focused on adult populations. In addition, most studies examining the associations between SC and health outcomes have been conducted in high-income countries resulting in a lack of information related to populations from middle- and low-income countries and those from different cultures. Exploring these associations may help to reverse the physical inactivity trend among Turkish adolescents and to increase health quality among the Turkish population. The aim of this study was to examine the association between various SC indicators and PAP among high school-aged Turkish adolescents.

2. Materials and methods

A cross-sectional study design was implemented in 2016 among high school students from urban areas in 4 Turkish cities (Ankara, Eskişehir, İstanbul, and Ordu). İstanbul and Ankara are large size urban cities with a population of 15,000,000 and 5,000,000 people, respectively. Eskişehir with a population of 850,000 people and Ordu with a population of 750,000 people are mid-size urban cities. Schools were randomly selected from a list of all public schools. All participants, school principals, and participants’ parents were informed about the aim, procedure, and the data collection tools of the study. Participants and their parents signed informed consent forms. Only students who volunteered to participate in the study completed the data collection tool. The study was approved by Ethical Board Committee of the Hacettepe University and Turkish Ministry of Education. The data collection tool was administered to 19 high schools out of 1935 high schools in the referenced cities. Researchers selected 20 adolescents from each grade of each school for a total of 1520 adolescents invited to participate in this study. The participation rate was 81.25%. A total of 506 female (54.9 ± 8.5 kg, 163.8 ± 6.5 cm, 20.4 ± 2.8 kg/m²) and

729 male (64.7 ± 11.1 kg, 174.0 ± 7.7 cm, 21.3 ± 3.0 kg/m²) high school students from Grades 9–12 (aged 14–18 years) participated in this study.

The outcome, PAP, was assessed by the short form of International Physical Activity Questionnaire (IPAQ) that provides total PA in the last 7 days as metabolic equivalent hours per week (MET-hours per week).²⁰ The short form of IPAQ was previously adapted into Turkish and validated.²¹ The validation study reported moderate and significant relationship between the short form of the Turkish IPAQ and energy expenditure measured with an accelerometer. The IPAQ consists of 3 PA sections: vigorous-, moderate-, and walking PA. Based on PA recommendations calling for 60 min/day of PA in adolescents,²² the PA score was dichotomized into yes or no for at least 60 min daily participation for overall PAP. Self-reported average PA min/day was multiplied by days/week and divided by 7 to determine the cut-point for dichotomized PAP as active or non-active.²³

In addition to the IPAQ, participants answered survey questions about their perceptions of SC in the school, neighborhood, and family settings.²⁴ The survey consists of 6 questions about SC perceptions (Fig. 1). School SC was composed of 3 indicators: interpersonal trust between teachers and students, interpersonal trust among students, and collaboration between students. Neighborhood SC was composed of 2 indicators: trust in the neighborhood and informal social control. Family SC was assessed by a single indicator. Participants answered questions using a 5-item Likert scale ranging from *strongly agree* (5) to *strongly disagree* (1). Each SC indicator was transformed into dichotomous variables as high (*strongly agree, agree*) and low (*neither agree nor disagree, disagree, and strongly disagree*). The survey was adapted into Turkish according to recommendations related to intercultural inventory adaptations.²⁵ All questions were analyzed as independent variables.

Study covariates were body mass index (BMI) and self-rated health. Self-rated health was assessed by a single question (How do you perceive your overall health?) with responses ranging from *very poor, poor, regular, good, or excellent*. The responses were also dichotomized as poor (*very poor, poor, and regular*) and good (*good, excellent*) health status. BMI was included as a categorical variable in the statistics, calculated as self-reported weight in kilograms divided by self-reported height in meters squared. Overweight cut points ranged from 22.6 to 25.0 in males and from 23.3 to 25.0 in females. Obesity cut points ranged from 27.6 to 30.0 in males and 28.6 to 30.0 in females. Methods used to calculate gender and age-specific cut points are presented elsewhere.²⁶

Before data analyses, multiple imputation analyses were conducted for missing data.²⁷ The variables with the highest missing data were PA variables (22.7%) and BMI (3.8%). The SC indicator with the most missing data was collaboration between students (1.7%). Descriptive statistics were calculated to explain features of the study population. Chi-square (χ^2) tests were used to compare all categorical variables between genders. Finally, multiple binomial logistic regression was used to identify the associations of SC indicators and PAP adjusting for BMI and self-reported health. Models for PAP were first

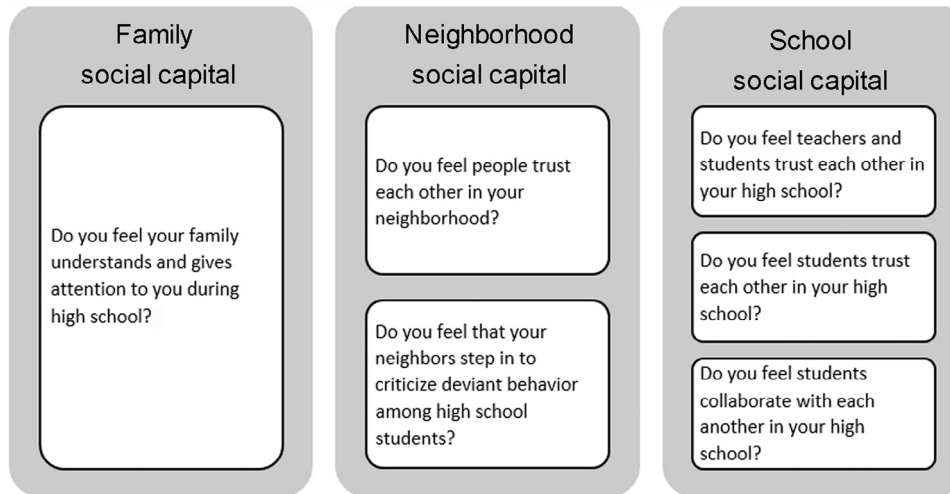


Fig. 1. Social capital indicators.

analyzed for the total sample then separately by gender. Ninety-five percent confidence interval were calculated for the odds ratios. The data were analyzed using SPSS Statistics Version 20.0 (IBM Corp., Armonk, NY, USA) and the significance level was set as $p < 0.05$.

3. Results

Descriptive percentages of the SC indicators, covariates, and PAP scores by gender are shown in Table 1. The majority of

students reported high family support in school and low informal social control. Most had a normal BMI and were classified as active. Compared with females, χ^2 tests indicated that male high school students reported higher levels of students' interpersonal trust, good self-rated health, an overweight condition or obesity, and PAP.

The odds of PAP for SC perceptions and covariates are shown in Table 2. Overall PAP was significantly associated with gender ($p < 0.05$). Informal social control ($p < 0.05$) and

Table 1
Comparison of perception of social capital indicators and covariates by gender in Turkish high school students, 2016 (n (%)).

Variable	Total ($n = 1235$)	Female ($n = 506$)	Male ($n = 729$)	p^a
Family support in school				
High	865 (70.0)	340 (67.2)	525 (72.0)	0.76
Low	370 (30.0)	166 (33.8)	204 (28.0)	
Neighborhood trust				
High	495 (41.1)	179 (35.4)	316 (43.3)	0.06
Low	740 (59.9)	327 (64.6)	413 (56.7)	
Informal social control				
High	318 (25.7)	150 (29.6)	168 (23.0)	0.09
Low	917 (74.3)	356 (70.4)	561 (77.0)	
Teacher–student interpersonal trust				
High	381 (30.8)	213 (42.1)	168 (23.0)	0.76
Low	854 (69.2)	293 (57.9)	561 (77.0)	
Students interpersonal trust				
High	505 (40.8)	171 (33.8)	334 (45.8)	0.00
Low	730 (59.2)	335 (66.2)	395 (54.2)	
Students' collaboration in school				
High	678 (54.9)	266 (52.6)	412 (42.5)	0.15
Low	557 (45.1)	240 (47.4)	317 (57.5)	
Self-rated health				
Good	692 (56.0)	223 (44.1)	469 (64.3)	0.00
Poor	543 (44.0)	283 (55.9)	260 (35.7)	
Body mass index				
Normal	1060 (85.8)	458 (90.5)	602 (82.6)	0.00
Overweight or obese	175 (14.2)	48 (9.5)	127 (17.4)	
Physical activity participation ^b				
Active	822 (66.5)	258 (51.0)	564 (77.4)	0.00
Non-active	413 (33.5)	248 (49.0)	165 (22.6)	

^a Chi-square analysis reflects comparison of the dichotomous scores by gender.

^b Active: ≥ 60 min/day in moderate, vigorous, and walking PA; non-active: < 60 min/day.

Table 2
Odds ratios for overall physical activity participation by social capital indicators, self-rated health, and body mass index among Turkish high school students, 2016.

Variable	Odds ratio (95%CI)		
	Total	Females	Males
Gender (male)	3.11 (2.4–4.04)*	–	–
Family support in school	1.08 (0.82–1.44)	1.40 (0.94–2.08)	1.04 (0.68–1.58)
Neighborhood trust	0.98 (0.75–1.27)	1.32 (0.90–1.95)	0.90 (0.62–1.30)
Informal social control	0.95 (0.71–1.27)	1.11 (0.75–1.65)	0.64 (0.42–0.97)*
Teacher–student interpersonal trust	0.74 (0.56–0.97)*	1.05 (0.70–1.58)	0.45 (0.30–0.68)**
Students interpersonal trust	1.01 (0.75–1.35)	0.53 (0.34–0.84)**	1.65 (1.11–2.47)**
Students' collaboration in school	0.79 (0.60–1.03)	0.93 (0.63–1.37)	0.95 (0.65–1.39)
Self-rated health	1.53 (1.17–2.00)*	1.41 (0.96–2.08)	1.80 (1.23–2.64)**
Body mass index	0.85 (0.60–1.24)	0.73 (0.39–1.36)	0.81 (0.51–1.28)

* $p < 0.05$; ** $p < 0.001$.

Abbreviation: CI = confidence interval.

teacher–student interpersonal trust ($p < 0.001$) were inversely associated with PAP among male high school students. Students interpersonal trust was positively associated with PAP among male high school students and inversely associated with PAP among female high school students ($p < 0.001$). Good self-rated health was also positively associated with PAP among male high school students ($p < 0.001$).

4. Discussion

This study reports the association between various SC indicators and PAP among Turkish high school-aged adolescents. Males reported significantly higher student interpersonal trust in school than females. PAP was 3 times higher in males than in females. Only a few SC perceptions were associated with PAP among Turkish adolescents. Males with higher student interpersonal trust were 65% more likely to report higher PAP than males with low interpersonal trust. On the other hand, males with higher teacher–student interpersonal trust and higher informal social control and females with higher student interpersonal trust were less likely to report PAP than those with lower ratings.

Higher teacher–student interpersonal trust was associated with 55% lower odds for PAP among males while no association was observed in females. Similar to our findings, Novak et al.²³ demonstrated an inverse association between teacher–student trust and PAP among Croatian male high school students. The low percentage of Croatian male students with high trust (32.6%) was similar to values observed in our study (23.0%). Hamid and Lok²⁸ demonstrated that male adolescents were less trusting of authority figures such as teachers and they also indicated that male adolescent relationships were less satisfying in terms of trust. Trust is a necessary component of a teacher–student relationship and it increases with teacher assertiveness and responsiveness to students.²⁹ Encouragement and perceived support from teachers are thought to be important mediators of PA.³⁰ Accordingly, perceived support from teachers has the potential to increase PAP among male adolescents, especially if teachers are assertive and responsive in promoting PA.

The positive link between SC, measured by teacher–student interpersonal trust, school belonging, and PAP was demon-

strated in a study among Canadian adolescents.³¹ The authors showed that the average weekly volume of moderate-to-vigorous PA performed by students with the highest school SC was about 40 min/week higher than for students with the lowest school SC score. As well, teacher–student relationships characterized by trust is an important factor for the social and emotional competence needed by students to achieve various outcomes in school.³² In this context, teachers are role models for positive health behaviors in schools.^{33,34} For example, physical education teachers with more favorable role modeling attitudes are themselves more active and have lower BMIs.³⁵ Given the inverse association between teacher–student interpersonal trust and PAP among males and the absence of an association among females suggests a need to better understand teachers' role modeling behaviors, motivational approaches, and aspirations as well as the school environment related to PA. It is also important to understand how male and female high school students perceive trust toward teachers and translate that trust into positive health-related behaviors.

Interpersonal trust among students was positively associated with PAP in males, yet inversely associated with PAP among females. This finding is consistent with Laird et al.³⁶ who reported peer social support was not a strong predictor of PAP among female adolescents. Instead, they suggested that being supported by various people in diverse ways was important for PAP. Stevens et al.³⁷ explicated that the sense of trust between youth may promote health by encouraging feelings of acceptance, support, and safety. They observed that attending a school with a high quality environment and where youths perceive school as a safe place was associated with fewer behavioral, emotional, and mental problems. Several studies worldwide also support the findings about interpersonal trust observed in our study. For example, studies conducted in Balkan countries reported no significant associations between students interpersonal trust with PAP²³ nor with self-rated health after adjustment for PAP among high-school-aged adolescents.^{38,39} A study among Swedish adults reported significantly higher odds ratios for low PA and with low trust, but only in the group who felt that they needed support to participate in PA.⁴⁰ Another Swedish study suggested low levels of PA may be partly due to a lack of generalized trust of other people

in social networks.⁴¹ In the current study, a high proportion of female adolescents rated interpersonal trust among students as low (66.2%). Reasons for this are unknown. Additional studies are needed to understand how interpersonal trust among students is related to PAP.

In this study, the odds for PAP were nearly 40% lower among male adolescents with higher informal social control in the neighborhood context than their peers with opposite ratings. Informal social control describes the role of adults stepping in to prevent the occurrence of crime, vandalism, litter in the streets, and deviant health behaviors such as drug abuse and smoking within a community. Studies conducted in the USA, Western Europe, and Eastern Europe have demonstrated that informal social control was associated with higher self-perceived health and PA.^{23,39,42} A Japanese study indicated that informal social control promoted neighborhood safety by preventing juvenile delinquency and was associated with outdoor PA.¹⁸ Moreover, neighborhood informal social control can affect parents' perceptions of safety and allow them to encourage their youth to be physically active outdoors.⁴³ A Dutch study noted that correcting deviant behaviors in an early stage of childhood development may be related directly to adolescents refraining from acting up badly and indirectly by providing them with self-confidence.⁴⁴

Our results were consistent with other studies that measured informal social control with the same question and that also reported no association between informal social control and higher levels of health-related behaviors.^{38,45} Although informal social control promotes outdoor PA in the neighborhood context by providing a sense of safety, strict maintenance of social order also may be interpreted as a regulation of adolescent behavior. Novak and Kawachi⁴⁵ suggest that strict maintenance of social order may have a downside of having too strong SC. For example, restrictions on individual freedom and downward leveling of norms are identified as negative consequences of too strong SC.⁴⁶ A comparison of informal social control in neighborhoods in Turkish and Dutch cities showed informal social control was higher in Turkish cities than in Dutch cities.⁴⁷ Therefore, it would be expected that in Turkish adolescents, informal social control would be positively associated with PAP. However, this was not observed in the current study. Therefore, PA related social norms may be a possible cofounder of SC and the downside of having too strong SC in Turkey. This possibility should be researched in future studies within a Turkish context.

Results of present study revealed no association between perceived family support and PAP, despite the fact that role modeling, providing psychological support, and logistical support are considered to be important examples of social support provided by parents and are associated with PAP among adolescents.⁴⁸ Although family involvement in PA is important for creating a supportive environment, parental participation in PA is not the most important factor in promoting PA among youth.⁴⁹ In the Turkish context, Kelecioğlu and Bilge⁵⁰ reported that families may actually interfere their adolescent's life and expose their expectations on adolescents in the context of supporting their needs. For example, families often send their chil-

dren to extra classes and hire private tutors to advance their school performance. This may lead to an excessive school workload and depression. While this possibility may explain the absence of a relationship between family SC and PAP among Turkish adolescents, more studies are needed to fully understand this association.

Self-rated health was associated with PAP for males and females in the current study. Studies have shown that perceived health is positively associated with PA regardless of physical health status.^{51,52} Active Canadian adolescents reported higher self-rated physical and mental health as compared with less active peers.⁵³ Swedish adolescents reported that participation in PA was important to maintain optimal body weight and self-rated health.⁵⁴ PA also was positively associated with very good self-rated health in high school-aged Finnish adolescents.⁵⁵ Moreover, in Spanish adolescents, increasing frequency of PA was associated with better self-rated health.⁵⁶ These findings are plausible as PA engenders reduced depression levels, improved hormonal response to stress, and increased positive physical self-concept, which may be a possible explanation for the association between perceived health and PAP.^{57,58}

While the results present significant associations between SC and PAP, this study has some methodological limitations. Reverse causation cannot be ruled out due to the cross-sectional design used in the study. Although the assessment of PAP with the IPAQ has the advantage of collecting data easily, self-administered instruments produce data with a validity and reliability that varies in different populations.⁵⁹ Finally, the school site was not included in this study as a cofounder, but it might influence the SC perceptions among students, and future studies should consider this variable.

5. Conclusion

Our study presents findings between perceptions of SC indicators and PAP among adolescent male and female high-school students in a developing country. The perceived SC indicator of students' interpersonal trust was positively related with PAP in males but inversely related to PAP in females. Teacher-student interpersonal trust and informal social control were inversely associated with PAP among male adolescents. Other SC indicators were not related to PAP. Additional studies are recommended to understand the influences of perceptions of SC and PAP participation in Turkish adolescents.

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Authors' contributions

GY, EB, and ENK were responsible for collecting data; GY and DN conducted statistical analyses; GD was responsible for all legal permissions; all authors drafted the paper. All authors have read and approved the final version of the manuscript, and agree with the order of presentation of the authors.

Competing interests

The authors declare that they have no competing interests.

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