# Physical Activity Involvement and Perception of Sufficient Physical Activity Among University Students According to Personality Traits

Mehmet Ali Kurçer,<sup>1</sup>
 Işıl Zorlu,<sup>1</sup>
 Zeynep Erdoğan,<sup>2</sup>
 Nehir Aslan Yüksel,<sup>3</sup>
 Gülşah Çolak<sup>4</sup>

<sup>1</sup>Department of Public Health, Zonguldak Bülent Ecevit University, Faculty of Medicine, Zonguldak, Turkey <sup>2</sup>Department of Health Services and Techniques, Zonguldak Bülent Ecevit University Ahmet Erdoğan Vocational School of Health, Zonguldak, Turkey <sup>3</sup>Tekirdağ Ergene District Health Directorate, Tekirdağ, Turkey <sup>4</sup>Department of Family Practice, Ondokuz Mayıs University Faculty of Medicine, Samsun, Turkey

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Correspondence: Işil Zorlu, Zonguldak Bülent Ecevit Üniversitesi Tıp Fakültesi Halk Sağlığı Anabilim Dalı, Zonguldak, Turkey

E-mail: isillzorlu@gmail.com



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Physical activity (PA) has significant health benefits. It has

been demonstrated that regular PA reduces the risk of

coronary heart disease and stroke, diabetes, hypertension,

colon cancer, breast cancer, endometrial cancer, and de-

pression.<sup>[1-5]</sup> Physical inactivity has been identified as the

fourth leading risk factor for global mortality (6% of deaths

globally).<sup>[6]</sup> A World Health Organization (WHO) report

issued in 2002 estimated that physical inactivity was esti-

mated to have led to 1.9 million deaths globally and to have

accounted for 19 million disability-adjusted life years.<sup>[7]</sup> In

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## ABSTRACT

**Objective:** Moderate and vigorous physical activity (PA) has been associated with better cardiometabolic risk factors in adolescents, regardless of the quantity of sedentary time. The aim of this study was to determine the level PA engagement and perception of sufficient PA among students of a faculty of medicine and to investigate a correlation with personality traits.

**Methods:** A questionnaire was used to collect data about the level of PA and factors that might influence participation. A 10-item personality inventory and the short form of the International Physical Activity Questionnaire (IPAQ) were also administered in student interviews.

**Results:** According to the IPAQ scores, 38.7% of the students had a low level of activity or were inactive (LPA), 47.8% had a moderate level of participation (MPA), and 13.4% ranked as highly active (HPA). The results indicated that 10.9% of the students who reported regular PA were classified as LPA, 50.9% were graded as MPA, and 38.2% had an HPA score. Of the students who reported a perception of sufficient PA, 17.5% were scored as LPA. Students who participated in cycling, running, dancing, and team sports had a significantly higher IPAQ measurement (p<0.05). Personality scores, body mass index, some types of PA (walking and swimming), and gender were not correlated with PA level.

**Conclusion:** The findings indicated that 17.5% of the students who thought that they engaged in sufficient PA actually had an LPA score. The IPAQ results revealed that only 13.4% of the students actually had a sufficient level of PA, as defined by the World Health Organization guidelines. The level of PA participation was not affected by personality traits.

INTRODUCTION

2010, the WHO also found that 23% of adults aged 18 and over were not active enough, and that globally, 81% of adolescents aged 11–17 years were insufficiently physically active. Adolescent girls were less active than adolescent boys, with 84% vs. 78% not meeting WHO recommendations.<sup>[8]</sup> The US Centers for Disease Control and Prevention 2015 National Health Interview Survey indicated that only 49.2% of American adults engaged in PA at the recommended level and that 25% were completely sedentary (defined as engaging in no leisure-time aerobic and muscle-strengthening activities).<sup>[9]</sup> Hallal et al.<sup>[10]</sup> performed the largest analysis to date of the WHO dataset and estimated that 31.1% of adults (i.e., aged  $\geq 15$  years) in 122 countries were physically inactive. The International Prevalence Study on Physical Activity used a survey to measure PA in 20 countries and found that the prevalence of physical inactivity ranged from 6.9% (China) to 43.0% (Belgium).<sup>[11]</sup>

A sedentary lifestyle has become one of the most important risk factors for the burden of disease and mortality. Strategies to incentivize increased participation in PA in the community, schools, and workplaces would be of great value.<sup>[12]</sup> In recent years, the public health benefits of promoting PA have become increasingly apparent.<sup>[13,14]</sup> WHO Member States have agreed to reduce the prevalence of insufficient PA by 10% by 2025 and related policies are operational in 56% of the Member States.<sup>[8]</sup> The WHO's guidelines define PA as any bodily movement produced by skeletal muscles that requires energy expenditure and can be performed at a variety of intensities in the course of work, household chores, travel (e.g. walking, bicycling), or during leisure time, as well as when participating in exercise or sports activities. A session of aerobic activity should be at least 10 minutes in length to provide beneficial effects.<sup>[1]</sup>

Many factors contribute to an individual's level of PA. For example, personality traits have been shown to influence social cognition and participation in behavior.<sup>[15]</sup> Several studies have examined the impact of personality on PA.<sup>[16-<sup>19]</sup> There is evidence to support associations between participation in PA and traits such as extraversion, conscientiousness, openness, and neuroticism.<sup>[5,16]</sup> The present study was designed to analyze the perception of university students regarding PA and personality traits.</sup>

## MATERIALS AND METHODS

This cross-sectional study was conducted to evaluate factors affecting the PA of students attending a university faculty of medicine. An initial group of 381 individuals was selected from a universe of 856 using the sampling method. Eight students who did not complete the study were excluded, yielding a total of 373 who were evaluated. The Bulent Ecevit University Human Research Ethics Committee granted permission for the study on May 29, 2014 (Decision number: 2014/08-13). A questionnaire inquiring about PA level and factors potentially influencing that activity was administered in face-to-face interviews. The questionnaire consisted of 12 items: 6 related to PA and 6 related to sociodemographic characteristics. The Ten-Item Personality Inventory (TIPI) tool was also used to assess personal characteristics, and the short-version, 7-item International Physical Activity Questionnaire (IPAQ) was employed to record a PA score. The TIPI was developed by Gosling et al.<sup>[20]</sup> and a reliability and validity study for a Turkish population was performed by Atak.<sup>[21]</sup> Each participant was scored on self-reported responses evaluating the personality dimensions of extraversion, agreeableness, conscientiousness, emotional stability, and openness to experiences. The IPAQ, developed by Craig et al.,[22] and validated for a Turkish population by Öztürk,<sup>[23]</sup> was used to assess PA. The IPAQ provides data about time spent sitting, walking, and in moderate and vigorous physical activity over the previous 7 days. The sum of minutes spent walking and in moderate or vigorous physical activity and the time spent sitting are scored separately (total activity and rest). The metabolic equivalent (MET), or the ratio of the rate of energy expended during an activity to the rate of energy expended at rest, was calculated as MET minutes/week. Continuous variable IPAQ scores (MET minutes/week) were calculated using values of 3.3 METS for walking, 4 METS for moderate physical activity, and 8 METS for vigorous physical activity. The PA level of the students was classified as low (LPA, <600 MET minutes/week), moderate (MPA, 600–3000 MET minutes/week) or high (HPA, >3000 MET minutes/week).

The statistical analysis was performed using IBM SPSS Statistics for Windows, Version 19.0 (IBM Corp., Armonk, NY, USA). The mean $\pm$ standard deviation (SD), median (minimum-maximum), chi-squared test, Student's t-test, analysis of variance, and Kruskal-Wallis variance analysis were used to evaluate the data. A value of p<0.05 was considered significant.

### RESULTS

The mean age of the 373 students enrolled was  $21.0\pm2.2$  years; 59.3% were female and 40.7% were male. The questionnaire responses regarding the frequency of engagement in PA indicated that 14.7% reported regular PA, 67.8% occasional PA, and 17.4% replied that they had participated in no PA during the previous week.

Table I. IPAQ level of PA according to perceived PA frequency (n=372)

| Perception of the PA frequency | IPAQ measurement of PA Level |      |     |      |     |      |       |       |
|--------------------------------|------------------------------|------|-----|------|-----|------|-------|-------|
|                                | LPA                          |      | MPA |      | НРА |      | Total |       |
|                                | n                            | %    | n   | %    | n   | %    | n     | %     |
| Regularly                      | 6                            | 10.9 | 28  | 50.9 | 21  | 38.2 | 55    | 14.8  |
| Occasionally                   | 95                           | 37.7 | 129 | 50.5 | 28  | 10.9 | 252   | 67.7  |
| Inactive                       | 43                           | 66.2 | 21  | 32.3 | I.  | 1.5  | 65    | 17.5  |
| Total                          | 144                          | 38.7 | 178 | 47.8 | 50  | 13.4 | 372   | 100.0 |

P<0.001. IPAQ: International Physical Activity Questionnaire; HPA: High physical activity; LPA: Low physical activity; MPA: Moderate physical activity; PA: Physical activity.

| Perception of adequacy | IPAQ measurement of PA level |         |     |      |    |       |     |       |
|------------------------|------------------------------|---------|-----|------|----|-------|-----|-------|
|                        | L                            | LPA MPA |     | НРА  |    | Total |     |       |
|                        | n                            | %       | n   | %    | n  | %     | n   | %     |
| Sufficient             | П                            | 17.5    | 31  | 49.2 | 21 | 33.3  | 63  | 20.8  |
| Insufficient           | 90                           | 37.7    | 122 | 51.0 | 27 | 11.3  | 239 | 79.2  |
| Total                  | 101                          | 33.4    | 153 | 50.6 | 48 | 16.0  | 302 | 100.0 |

| Table 2. | IPAQ level of PA | according to | perception of PA | adequacy (n=302) |
|----------|------------------|--------------|------------------|------------------|
|----------|------------------|--------------|------------------|------------------|

P<0.001. IPAQ: International Physical Activity Questionnaire; HPA: High physical activity; LPA: Low physical activity; MPA: Moderate physical activity; PA: Physical activity.

| Table 3. | IPAQ level of PA | by type of activit | y* (n=372)** |
|----------|------------------|--------------------|--------------|
|----------|------------------|--------------------|--------------|

| Activities                 |     | IPAQ measurement of PA level |      |     |      |     |      |  |  |
|----------------------------|-----|------------------------------|------|-----|------|-----|------|--|--|
|                            |     | LPA                          |      | MPA |      | HPA |      |  |  |
|                            |     | n                            | %    | n   | %    | n   | %    |  |  |
| Walking                    | Yes | 88                           | 35.9 | 124 | 50.6 | 33  | 13.5 |  |  |
|                            | No  | 56                           | 44.1 | 54  | 42.5 | 17  | 13.4 |  |  |
| Running <sup>*</sup>       | Yes | 12                           | 20.0 | 31  | 51.7 | 17  | 28.3 |  |  |
|                            | No  | 132                          | 42.3 | 147 | 47.1 | 33  | 10.6 |  |  |
| Swimming                   | Yes | 14                           | 26.4 | 32  | 60.4 | 7   | 13.2 |  |  |
|                            | No  | 130                          | 40.8 | 146 | 45.8 | 43  | 13.5 |  |  |
| Riding a bike <sup>*</sup> | Yes | 14                           | 40.0 | 12  | 34.3 | 9   | 25.7 |  |  |
|                            | No  | 130                          | 38.6 | 166 | 49.3 | 41  | 12.2 |  |  |
| Team sports*               | Yes | 20                           | 24.4 | 46  | 56.I | 16  | 19.5 |  |  |
|                            | No  | 124                          | 42.8 | 132 | 45.5 | 34  | 11.7 |  |  |
| Dance*                     | Yes | 5                            | 29.4 | 4   | 23.5 | 8   | 47.1 |  |  |
|                            | No  | 139                          | 39.2 | 174 | 49.0 | 42  | 11.8 |  |  |

\*P<0.05; \*Students could select more than one activity. IPAQ: International Physical Activity Questionnaire; HPA: High physical activity; LPA: Low physical activity; MPA: Moderate physical activity; PA: Physical activity.

| (n=372)             |                              |           |           |  |  |  |  |
|---------------------|------------------------------|-----------|-----------|--|--|--|--|
| Personality domains | IPAQ measurement of PA level |           |           |  |  |  |  |
|                     | LPA                          | MPA       | HPA       |  |  |  |  |
|                     | Mean±SD                      | Mean±SD   | Mean±SD   |  |  |  |  |
| Extraversion        | 9.9±2.94                     | 9.7±3.20  | 10.6±2.94 |  |  |  |  |
| Agreeableness       | 10.3±2.25                    | 10.6±2.52 | 9.9±2.33  |  |  |  |  |
| Conscientiousness   | . ±2.54                      | 11.4±2.32 | 11.9±2.06 |  |  |  |  |
| Emotional stability | 8.7±2.94                     | 9.2±2.82  | 9.3±3.26  |  |  |  |  |
| Openness to         | 9.9±2.57                     | 10.3±2.48 | 10.7±2.62 |  |  |  |  |
| experiences         |                              |           |           |  |  |  |  |

 
 Table 4.
 IPAQ level of PA according to personality traits (n=372)

P>0.05. IPAQ: International Physical Activity Questionnaire; HPA: High physical activity; LPA: Low physical activity; MPA: Moderate physical activity; PA: Physical activity.

The students' self-reported level of PA engagement is shown in Table I. The IPAQ results classified 38.7% of the students as LPA, 47.8% MPA, and 13.4% HPA. The responses also revealed that 10.9% of the students who indicated regular PA participation were scored as LPA, 50.9% as MPA, and 38.2% as HPA (Table 1).

There was no significant difference between genders or according to the type of living arrangements (with family or in student housing) in terms of the level of PA (p>0.05).

The results of the students perception of the adequacy of their PA level are presented in Table 2. Among those who thought that their PA was sufficient, the IPAQ score of 17.5% of the students was scored as LPA, 49.2% reflected a moderate level of PA, and 33.3% were grouped as HPA. In contrast, 11.3% of the students who reported insufficient PA had an IPAQ score that indicated HPA, 37.7% were classified as LPA, and 51.0% as MPA (p<0.001).

The PA group representation by activity is presented in Table 3. Students who participated in cycling, running, dancing, and team sports had a significantly higher PA level than those who did not (p<0.05) (Table 3).

A comparison of the personality scores and the IPAQ results yielded no significant differences in the IPAQ score according to personality traits (p>0.05) (Table 4).

| Body Mass Index       | IPAQ measurement of PA level |      |     |      |    |       |     |       |
|-----------------------|------------------------------|------|-----|------|----|-------|-----|-------|
|                       | LPA MPA                      |      | IPA | HPA  |    | Total |     |       |
|                       | n                            | %    | n   | %    | n  | %     | n   | %     |
| Underweight           | 14                           | 50.0 | 13  | 46.4 | I  | 4.6   | 28  | 7.8   |
| Healthy               | 92                           | 35.2 | 131 | 50.2 | 38 | 14.6  | 261 | 74.1  |
| Over weight and obese | 25                           | 39.7 | 28  | 44.4 | 10 | 15.9  | 63  | 24.1  |
| Total                 | 131                          | 37.2 | 172 | 48.8 | 49 | 14.0  | 352 | 100.0 |

Table 5. IPAQ level of PA according to body mass index groups (n=352)

P>0.05 PA: IPAQ: International Physical Activity Questionnaire; HPA: High physical activity; LPA: Low physical activity; MPA: Moderate physical activity; PA: Physical activity.

Similarly, the body mass index (BMI) of the students also revealed no significant correlation with the IPAQ score (p>0.05) (Table 5).

## DISCUSSION

In this study, 13.4% of the IPAQ results met the definition of HPA, 47.8% were MPA, and 38.7% were LPA. A 2005 meta-analysis of US college student behavior found that 40% to 50% were physically inactive.<sup>[24]</sup> Of the students who participated in our study, 17.5% reported that they were inactive. However, 10.9% of the students who responded that they engaged in regular physical activity had a low IPAQ score. Among those in our study who said they participated in PA occasionally, 37.7% had an LPA score, and 66.2% of those who responded that they were inactive were classed as LPA. The students' replies suggest that their perception of their level of PA was better than it actually was. This is an important problem that needs further examination.

Another significant finding was that the students thought their level of activity was adequate. In our study, one in five physically active students thought that their level of activity was sufficient. In fact, 33.3% of the students who thought that their PA was adequate had an HPA IPAQ score, while 49.2% had an MPA score, and 17.5% had an LPA score. Perception was also proven to be inaccurate in the 11.3% of students who thought that they had an insufficient level of PA but reported activity that generated an HPA score. Many psychological factors, such as perceived enjoyment, self-discipline, values, norms and beliefs, and time management, have been found to influence PA and sedentary behavior.<sup>[24]</sup> These elements may be helpful in addressing the validity of students' perceptions of their level of PA revealed in our findings.

Deliens et.al. found that 54.3% of the university students studied reported little to no PA.<sup>[25]</sup> A significant portion of our study group acknowledged that they were not sufficiently active: 37.7% of those who reported insufficient PA had an LPA score, and 51.0% had an MPA score. The imprecision of the perceived level of activity and the appropriate level may be due to inadequate understanding. Strategic efforts to enhance awareness would be beneficial.<sup>[26]</sup>

Students who participated in cycling, running, dancing and team sports had a significantly higher level of PA (p<0.001). Promoting greater participation in such activities could benefit student health and well-being.

Our findings revealed no significant difference between genders in terms of PA level (p=0.068). A study conducted among university students in 23 countries reported that 45.8% of women and 33.0% of men were physically active (p<0.001). In Turkey, the study results indicated no significant difference between men and women (male: 25.3%, female: 24.0%; p=0.687).<sup>[27]</sup>

We found no significant difference in the level of PA according to the students' living arrangements. However, Şimşek et al.<sup>[28]</sup> and Ünalan et al.<sup>[29]</sup> observed that the level of PA of students living with family members was greater than that of students living in student housing. This may be related to the fact that the city where our study was conducted is smaller and has fewer facilities than the locations of the other studies mentioned.

A relationship between extraversion and PA has previously been suggested in the literature. In contrast to some other research, we did not find a correlation between personality traits and PA level. The relatively homogenous personality characteristics of a cohort of medical students may have had an effect.

In addition, BMI did not influence the level of PA recorded in our group. Similarly, Savcı et al.<sup>[30]</sup> and Arslan et al.<sup>[31]</sup> also reported no significant difference based on BMI. However, in a study conducted by Vural et al.<sup>[32]</sup> in 2010, those with a BMI of  $\geq 25 \text{ kg/m}^2$  had a higher PA than those with a BMI <25 kg/m<sup>2</sup>. While Savcı and Arslan also studied students, Vural et al. analyzed civil servants, which may have been a relevant factor.<sup>[30-32]</sup>

Insufficient time and inadequate opportunity were reported as the most common obstacles to PA by our study participants. In 2010, Korkmaz<sup>[33]</sup> found that 32.8% of students surveyed responded that they didn't have enough time, and 12.2% cited a lack of opportunity in their district. Koparan and Öztürk<sup>[34]</sup> found that the most common barrier to PA was long work hours (37%).

## CONCLUSION

We observed that 17.5% of the students thought that they engaged in an adequate level of PA; however, the IPAQ scores indicated that only 13.4% participated in sufficient PA. The most common forms of PA regularly performed by the students were biking, walking, running, and playing team sports. Personality traits were not correlated with the level of PA. A lack of time was the most frequent reason given for not participating in more PA. This may reflect the intensity of the medical school program. It is also noteworthy that the students reported insufficient opportunity to engage in PA on campus and in the district. Additional facilities and incentives, as well as greater awareness of the benefits of PA, could greatly improve student health.

#### **Ethics Committee Approval**

The Bulent Ecevit University Human Research Ethics Committee granted permission for the study on May 29, 2014 (Decision number: 2014/08-13).

#### Peer-review

Internally peer-reviewed.

#### Authorship Contributions

Concept: I.Z., M.A.K., Z.E.; Design: I.Z., N.A.Y., M.A.K., G.Ç.; Supervision: I.Z., M.A.K., Z.E.; Data: I.Z., G.Ç., N.A.Y.; Analysis: I.Z., N.A.Y., M.A.K.; Literature search: I.Z., N.A.Y., G.Ç.; Writing: I.Z., M.A.K., Z.E., G.Ç., N.A.Y.; Critical revision: I.Z., M.A.K., N.A.Y., Z.E.

#### **Conflict of Interest**

None declared.

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## Üniversite Öğrencilerinin Kişilik Tiplerine Göre Fiziksel Aktivite Düzeyleri ve Fiziksel Aktivite Yeterlilik Algıları

**Amaç:** Orta şiddette veya şiddetli fiziksel aktivite; sedanter geçirilen zamana bakılmaksızın daha iyi kardiyometabolik risk faktörleriyle ilişkilendirilmiştir. Bu araştırmada tıp fakültesi öğrencilerinin kişiliklerine göre fiziksel aktivite düzeylerinin belirlenmesi amaçlanmıştır.

**Gereç ve Yöntem:** Araştırma verilerinin toplanmasında fiziksel aktivite düzeyi ve etkileyen faktörleri içeren sorulardan oluşan bir anket kullanılmıştır. Ayrıca 10 Maddelik Kişilik Ölçeği ve Uluslararası Fiziksel Aktivite Anketi'nin (UFAA) Kısa Formu kullanılmıştır.

**Bulgular:** UFAA'ya göre, tüm öğrencilerin %38.7'si düşük veya inaktif, %47.8'i orta ve %13.4'ü yüksek fiziksel aktif idi. Normal fiziksel aktif idi. tiviteye sahip olduğunu düşünen öğrencilerin %10.9'u inaktif, %50.9'u orta düzeyde fiziksel aktif ve %38.2'si yüksek düzeyde fiziksel aktif idi. Algılarına göre yeterli fiziksel aktif olduğunu düşünen öğrencilerin %17.5'i inaktifti. Bisiklete binme, koşma, dans etme ve takım oyunlarına katılan öğrencilerin UFAA ile ölçülen fiziksel aktivte düzeyleri, bu aktiviteleri yapmayanlara göre anlamlı derecede yüksek bulundu (p<0.05). Öğrencilerin kişilik puanlarına, beden kitle indeksi gruplarına, bazı fiziksel aktivite tiplerine (yürüme ve yüzme) ve cinsiyete göre fiziksel aktivite düzeyleri arasında anlamlı fark yoktu.

**Sonuç:** Yeterli fiziksel aktif olduğunu düşünen öğrencilerin %17.5'i UFAA'ya göre inaktifti. UFAA'ya göre öğrencilerin yalnızca %13.4'ü yeterli fiziksel aktifti. Fiziksel aktivite düzeyi, kişilik özelliklerinden etkilenmemekteydi.

Anahtar Sözcükler: Fiziksel aktivite; kişilik; öğrenci.