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How Does Physical Activity Affect the Quality of Life of University Students?

Fatih GÜR[1] ,Vedat AYAN[2]

[1]Pamukkale University, Faculty of Sport Sciences, Denizli, TÜRKİYE
https://orcid.org/0000-0003-0776-5754
[2]Trabzon University, Faculty of Sport Sciences, Trabzon, TÜRKİYE
https://orcid.org/0000-0003-1887-5334

Email: fatihgur@pau.edu.tr, vayan@trabzon.edu.tr

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Abstract

The concept of quality of life is multifaceted, encompassing various dimensions, including physical health, social relationships, and psychological well-being. Physical activity level is one of the factors that affects quality of life. The objective of this study is to examine the relationship between physical activity levels and quality of life perceptions among young people. The study sample consisted of 360 students, 102 males and 258 females, enrolled at XXX University during the 2023-2024 academic year. The data were collected using a cross-sectional design, with the participants completing the Physical Activity Scale-2, SF-12 Quality of Life Scale, and a personal information form. The data were collected based on self-report. The statistical analyses revealed a significant relationship between moderate and high physical activity levels and both physical and mental health components of quality of life ($p < 0.05$). Additionally, gender differences were observed, indicating that males exhibited higher physical activity and quality of life scores compared to females ($p < 0.05$). The findings indicate that it may be beneficial to promote physical activity to enhance general well-being among young people. Additionally, the study highlights the importance of considering gender as a variable in the perception of physical activity levels and quality of life. Overall, the results suggest that interventions to increase physical activity levels may be an effective approach to improve the quality of life of young people. It is crucial to consider the gender factor in the planning of these strategies.

Keywords: Gender Differences, Physical Activity, Quality of Life, Well-being, Young Individuals

Introduction

The concept of quality of life is multifaceted, encompassing a range of dimensions that collectively contribute to an individual's overall well-being. This concept encompasses a number of interrelated dimensions, including physical health, satisfaction with social relationships, life satisfaction, and psychological well-being (Irtelli & Durbano, 2020). One of the factors known to have an impact on quality of life is the level of physical activity. Physical activity is defined as any bodily movement that results in the contraction of skeletal muscles and causes energy expenditure above the resting metabolic rate (Warren et al., 2010). The level of physical activity is frequently utilized as an indicator of an individual's health status and is associated with various health outcomes. Physical activity is associated with an increased risk of cardiovascular disease (Rai & Thompson, 2010), diabetes (Kim et al., 2022) and cancer (Sun et al., 2012). However, it has been demonstrated to have numerous health benefits, including a reduced risk of chronic diseases such as diabetes.

A correlation was observed between the quality of life and physical activity level in children and young people. It was found that an increased physical activity level was associated with a higher quality of life, whereas a sedentary lifestyle was reported to cause a lower quality of life in this population (Uribe et al., 2021; Vaquero-Solís et al., 2021; Wu et al., 2017). In a study of young people, Valois et al. (2004) found a positive correlation between physical activity and life satisfaction. Similarly, Wray et al, (2022) reported that individuals with adequate levels of physical activity exhibited enhanced body composition, physical fitness, cognitive development, overall quality of life, and a reduced risk of premature death in later life. In addition, Randhawa et al. (2021) demonstrated that physical activity level positively affects health-related quality of life in young people with obesity. Moola et al. (2010) emphasized the psychological benefits of physical activity on quality of life, self-efficacy, and role functioning in young people with congenital heart disease.

While some research indicates that regular physical activity has a positive effect on mental health, social relationships, and overall life satisfaction among young people (M. Pascoe et al., 2020), no studies were identified that examine the relationship between low, moderate, or high physical activity levels and the sub-dimensions of quality of life (Wu et al., 2017).

The primary objective of this study is to investigate the relationship between the low, moderate, and high levels of physical activity among young people and the sub-dimensions of quality of life. The objective of this study is to compare the physical activity and quality of life levels of young people according to gender.

Materials and Methods

Research Design

This study was conducted using a cross-sectional research design with the objective of examining the relationship between the quality of life and physical activity levels of young people (Setia, 2016).

Research Group

The study's participant group consisted of young individuals between the ages of 18 and 29 who were enrolled at Pamukkale University. In order to determine the sample size of the study, a power analysis was conducted using the G-Power program. In this analysis, the expected effect size was determined to be 0.3, the alpha level was set at 0.05%, and the power

value was set at 80% (Kang, 2021). The results of the power analysis indicated that at least 150 participants were required to obtain statistically reliable results from the research.

Data Collection

Data were collected via an online questionnaire distributed through social media websites, including Facebook, Instagram, and WhatsApp. The questionnaires were created using Google Forms and an online link was generated. The data collection process involved disseminating the online survey link on the relevant platforms and delivering it to the participants. At the beginning of the questionnaires, an informative announcement was included, inviting the participants to the research. This announcement explained the purpose, process, and privacy policy of the research. The data collection process involved the use of three instruments: the Personal Information Form, the Physical Activity Scale 2, and the SF-12 Quality of Life Scale.

Personal Information Form

This form was developed by the authors for the purpose of collecting information pertaining to the socio-demographic characteristics of the participants. The form includes questions on age, gender, income, and education.

SF-12 Quality of Life Scale

The SF-12 Quality of Life Scale, developed by Ware et al. (1996) and subsequently adapted into Turkish by Soylu and Kütük (2021), comprises eight sub-dimensions and 12 items. These include physical functioning, physical role, body pain, general health, energy, social functioning, emotional role and mental health. Items pertaining to physical and emotional role are answered dichotomously (yes or no), whereas other items utilize a Likert-type scale with options ranging from 3 to 6. The physical component (PCS) score is derived from the general health, physical functioning, physical role, and body pain sub-dimensions, while the mental component (MCS) score is calculated from the social functioning, emotional role, mental health, and energy sub-dimensions. Both the FCI and MCI scores range from 0 to 100, with higher scores representing better health. The Cronbach's Alpha coefficient of the Turkish version of the scale was found to be 0.73 and 0.72 for the "FIM" and "MBS" subscales, respectively.

Physical Activity Scale 2

The FAQ-2 was developed by Pedersen et al. (2018) to predict physical activity and sedentary behavior in adults. Gür (2021) subsequently developed the scale, which is a one-page self-report scale adapted into Turkish by the authors of the study. The scale comprises nine items that assess sedentary behavior at work, transportation, and leisure time, as well as physical activity at varying intensities (light, moderate, and high). The metabolic equivalent (MET) value of each item can be employed to estimate the individual's daily and weekly physical activity level. The scale is designed to be completed in a relatively brief period of time. Furthermore, the items are accompanied by illustrative images to enhance their intelligibility. For each item on the scale, the daily or weekly physical activity level of the individual is calculated by multiplying the MET value for that item by the number of times reported by the users.

Statistical Analysis

The SPSS 26.0 package program was employed for the statistical analysis of this study. The conformity of the data to a normal distribution was evaluated by means of the Shapiro-Wilk test and the calculation of skewness and kurtosis values. Pearson correlation analysis was applied to evaluate the relationship between physical activity levels and physical and mental components of quality of life. In addition, the means of the participants' physical activity levels and quality of life components were compared by means of the independent samples t test and the Mann-Whitney U test. All statistical tests were conducted with a significance level of $p<0.05$.

Ethical Values

This study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Pamukkale University Faculty of Medicine Ethics Committee (Ethics approval number: E-60116787-020-521740). Prior to the commencement of the study, all participants were informed in detail about the aims and procedures of the study and provided written consent. Participants were assured that their personal information would be kept confidential and that they could withdraw from the study at any time. All participants were volunteers and did not receive any compensation for their participation.

Findings

Descriptive Data

The study's participant group consisted of 360 students, 102 males and 258 females, who were enrolled at Pamukkale University during the 2023-2024 academic year. The mean age of the participants was 21.33 ± 3.81. The relationship between the physical component sub-dimensions of the SF-12 and physical activity scores is presented in Table 1.

Table 1. Association between physical activity levels and physical components of quality of life

		Physical Functionality	Physical Role	Body Pain	General Health	Physical Component Summary Score
Low Physical Activity Level	Pearson r	0.067	-0.027	-0.072	0.047	-0.007
	p	0.204	0.609	0.172	0.373	0.898
	n	360	360	360	360	360
Moderate Physical Activity Level	Pearson r	0.137*	0.053	0.002	0.210*	0.122*
	p	0.009	0.313	0.966	0.000	0.021
	n	360	360	360	360	360
High Physical Activity Level	Pearson r	0.133*	0.025	-0.023	0.254*	0.109*
	p	0.011	0.639	0.658	0.000	0.039
	n	360	360	360	360	360

*Correlation is significant at $p<0.05$ level.

The data in the table indicate a correlation between different physical activity levels and physical health indicators. In individuals with low physical activity levels, no significant correlation was observed between physical functioning, physical role, body pain, general health, and physical component summary score (Pearson r: 0.067,-0.027, -0.072, 0.047, -0.007; $p > 0.05$, respectively). This suggests that low physical activity is not directly associated with other physical health indicators. However, stronger associations were observed at moderate and high physical activity levels. At the moderate physical activity level, there was a positive and statistically significant relationship between physical

functioning, general health, and the physical component summary score (Pearson r: 0.137, 0.210, 0.122; p <0.05, respectively). Similarly, positive correlations were observed in individuals with high physical activity levels (Pearson r: 0.133, 0.254, 0.109; p <0.05, respectively). These findings suggest that moderate and high physical activity levels are positively correlated with physical health indicators and that general health and physical functioning levels increase with increasing physical activity.

The evaluation of the relationship between the mental component sub-dimensions of SF-12 and physical activity scores is shown in Table 2.

Table 2. Association between physical activity levels and mental components of quality of life

		Energy	Social Functioning	Emotional Role	Mental Health	Mental Component Summary Score
Low Physical Activity Level	Pearson r	0.106*	0.068	-0.107*	-0.010	-0.012
	p	0.044	0.199	0.043	0.845	0.825
	n	360	360	360	360	360
Moderate Physical Activity Level	Pearson r	0.194**	0.090	0.027	0.105*	0.123*
	p	0.000	0.087	0.615	0.047	0.020
	n	360	360	360	360	360
High Physical Activity Level	Pearson r	0.157**	0.128*	0.057	0.153**	0.155**
	p	0.003	0.015	0.279	0.004	0.003
	n	360	360	360	360	360

According to the data in the table, the relationship of different physical activity levels with mental health indicators was examined. In individuals with low physical activity levels, significant correlations were observed between energy and emotional role (Pearson r: 0.106, -0.107, p < 0.05, respectively). At a moderate level of physical activity, a stronger relationship was observed between energy and mental health (Pearson r: 0.194, 0.105; p < 0.05). Associations with other indicators were limited (p > 0.05). Similarly, positive and statistically significant associations were found between energy, social functioning, emotional role and mental health in individuals with high physical activity levels (Pearson r: 0.157, 0.128, 0.153, 0.155, respectively; p < 0.05). These findings suggest that moderate and high physical activity levels are positively correlated with mental health indicators and mental health levels increase with increasing physical activity. The comparison of the participants' quality of life summary scores according to gender is shown in Table 3.

Table 3. Comparison of participants' quality of life summary scores according to gender

Measurement	Group	n	X ± SD	t	df	p^
Physical Component Summary Score	Male	102	72.43±17.38	3.78	358	0.000*
	Woman	258	63.76±20.38			
Mental Component Summary Score	Male	102	55.87 ±18.72	3.951	358	0.000*
	Woman	258	47.16 ±18.91			

^Independent samples t test, *p<0.05

A significant difference was found between male and female participants in physical component summary scores (t=3.78, df=358, p<0.001). Similarly, a significant difference was

observed between male and female participants in mental component summary scores (t=3.951, df=358, p<0.001). The comparison of participants' physical activity scores according to gender is shown in Table 4.

Table 4. Comparison of participants' Physical Activity scores according to gender

Measurement	Group	n	Rank Mean	Queue Total	U	p^
Low Physical Activity Level	Male	102	181.56	185119	13049.50	0.902
	Woman	258	180.08	46460		
Moderate Physical Activity Level	Male	102	207.11	21125.00	10444.00	0.002*
	Woman	258	169.98	43855.00		
High Physical Activity Level	Male	102	241.72	24655.50	6913.50	0.000*
	Woman	258	156.30	40324.50		

^Mann-Whitney U test, *p<0.05

There was no significant difference between male and female participants with low physical activity level in terms of rank sum (U=13049.50, p=0.902). A significant difference was found between male and female participants with moderate physical activity level in terms of rank sum (U=10444.00, p=0.002). A significant difference was found between male and female participants with high physical activity level in terms of rank sum (U=6913.50, p<0.001).

Discussion and Conclusions

The objective of this study was to examine the relationship between different physical activity levels and quality of life among young people and to investigate differences according to gender. When the relationship between physical activity level and the sub-dimensions of quality of life was examined, no significant correlation was observed between low physical activity level and the physical components of quality of life. Nevertheless, stronger correlations were observed between moderate and high physical activity scores and physical and mental health sub-dimensions of QoL. In contrast, comparisons by gender revealed that men exhibited higher physical activity and quality of life scores than women, with a statistically significant difference between the two groups.

In their meta-analysis, Janssen and LeBlanc (2010) demonstrated that physical activity has a positive dose-response relationship with numerous aspects of health in young people. The authors underscored that while low levels of physical activity may confer benefits for chronic conditions such as obesity, the primary health benefits are likely to be derived from moderate and high levels of physical activity (Janssen & LeBlanc, 2010). Similarly, Gu et al. (2016) demonstrated that the physical components of quality of life can be enhanced by increasing physical activity levels. In their study, Uribe et al. (2021) found a significant relationship between moderate physical activity level and quality of life. Their regression analysis demonstrated that physical activity level explained 14% of quality of life. Upon examination of the research findings, it was determined that there were positive and statistically significant relationships between moderate physical activity scores and three key areas: physical functioning, general health, and physical component summary score of quality of life.

Similarly, positive and statistically significant associations were observed between high physical activity level scores and the same components. The above findings, which demonstrate that general health and physical functioning levels can be positively influenced by increased physical activity among young people, are consistent with the existing literature. The findings indicate that an increase in the level of moderate or high-intensity physical activity may have a positive impact on the overall health and well-being of young people. Consequently, the promotion of physical activity can be regarded as an efficacious strategy for enhancing the quality of life of young people.

A bidirectional linear relationship exists between physical activity level and youth mental health. Increasing physical activity levels may protect against the development of depressive symptoms in young people (M. C. Pascoe & Parker, 2018). Bustamante et al. (2023) conducted a meta-analysis, which revealed that the intervention had a moderate to large effect on adolescents and young people with diagnosed depression. The results of this study support the view that university students with higher levels of physical activity have better perceptions of quality of life in the psychological and social domains. In this study, the relationship between different physical activity levels and the mental component indicators of quality of life was examined. No statistically significant correlations were observed between low physical activity level scores and energy and emotional role. Conversely, a positive correlation was observed between moderate and high physical activity level scores and energy, social functioning, mental health, and mental component summary score. These findings indicate that an increase in physical activity levels among young people may have a positive effect on their mental health. It can be concluded that physical activity is a significant factor influencing both physical and mental health among young people. The extant literature tends to emphasise the positive relationship between physical activity and mental health among young people (Bustamante et al., 2023; Janssen & LeBlanc, 2010; M. C. Pascoe & Parker, 2018). Regular physical activity has been linked to enhanced mental well-being, diminished symptoms of depression, and an improved overall quality of life in young people. Promoting physical activity among young people can play a significant role in promoting mental health and well-being.

One of the variables that affects the relationship between physical activity and quality of life is gender (Nowak et al., 2019). The majority of studies indicate that men engage in greater physical activity than women, which is associated with a higher perception of quality of life (Bonsaksen, 2012; Özcan & Saraç, 2021). For instance, Louzado et al. (2021) conducted a cross-sectional study of 1,270 workers with the objective of identifying the factors associated with the quality of life of young workers. The mean quality of life for men was 31.1, while that for women was 29.4. Furthermore, it was demonstrated that the quality of life of individuals who engage in regular physical activity is 30% higher than that of individuals who are physically inactive. In our study, we found statistically significant differences between male and female participants in favor of men in both the physical component summary scores and the mental component summary scores, in line with the existing literature. However, the results indicated that men exhibited higher levels of moderate and high physical activity than women, with these differences being statistically significant. This discrepancy may be attributed to the fact that men tend to associate physical activity with a higher quality of life than women, whereas women perceive moderate physical activity as more beneficial for quality of life (Begdache et al., 2022). Conversely, this phenomenon may also be attributed to social factors, such as educational attainment and income level (Ellina et al., 2021; Mielke et

al., 2022; Román et al., 2017). An understanding of these gender-specific differences may prove to be an invaluable asset in the development of interventions designed to enhance physical activity and quality of life in both male and female populations.

It should be noted that this study is subject to certain limitations. Firstly, the sampling method employed may not have yielded a representative sample of the population, which may limit the generalizability of the results. The unequal number of male and female participants made it challenging to fully reflect gender-based differences. Additionally, the data collection tools utilized self-report scales, which may not have fully reflected the participants' physical activity levels and quality of life. Finally, it should be noted that the findings were limited to a specific geographical region or cultural context, and there may be uncertainty about how the study can be generalized to other groups. Further research involving larger sample sizes, the analysis of diverse forms of physical activity, and the investigation of long-term effects on health outcomes may assist in a more comprehensive understanding of the relationship between quality of life and physical activity. Conclusion

In conclusion, this study contributes to our understanding of the relationship between different levels of physical activity and quality of life among young people. It can be posited that moderate and high levels of physical activity may have a positive effect on general health, physical functioning, and mental health. It was demonstrated that gender should be regarded as a crucial factor in the perception of quality of life and physical activity level. These findings underscore the necessity of incorporating gender-specific considerations into the design of physical activity incentives to enhance the quality of life of young people.

REFERENCES

Begdache, L., Danesharasteh, A., & Ertem, Z. (2022). The Impact of the Different Stages of COVID-19, Time of the Week and Exercise Frequency on Mental Distress in Men and Women. *Nutrients*, *14*(13), 2572. https://doi.org/10.3390/nu14132572

Bonsaksen, T. (2012). Exploring gender differences in quality of life. *Mental Health Review Journal*, *17*(1). https://doi.org/10.1108/13619321211231815

Bustamante, E. E., Santiago-Rodríguez, M. E., & Ramer, J. D. (2023). Unlocking the Promise of Physical Activity for Mental Health Promotion. *JAMA Pediatrics*, *177*(2). https://doi.org/10.1001/jamapediatrics.2022.5096

Ellina, P., Middleton, N., Lambrinou, E., & Kouta, C. (2021). Social gradient in health-related quality of life among urban middle-age residents in Limassol, Cyprus: Research article. *BMC Public Health*, *21*(1). https://doi.org/10.1186/s12889-020-10027-6

Gu, X., Chang, M. M., & Solmon, M. A. (2016). Physical Activity, Physical Fitness, and Health-Related Quality of Life in School-Aged Children. *Journal of Teaching in Physical Education*, *35*(2). https://doi.org/10.1123/jtpe.2015-0110

Gür, F. (2021). Fiziksel Aktivite Ölçeği-2'nin Türkçe Geçerlilik ve Güvenilirlik Çalışması. *Spor ve Performans Araştırmaları Dergisi*, *12*(3), 252–263.

Irtelli, F., & Durbano, F. (2020). *Quality of Life and Biopsychosocial Paradigm: A Narrative Review of the Concept and Specific Insights*. https://doi.org/10.5772/intechopen.91877

Janssen, I., & LeBlanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International Journal of Behavioral Nutrition and Physical Activity*, *7*(1), 40. https://doi.org/10.1186/1479-5868-7-40

Kim, D., Seo, J., Ha, K. H., & Kim, D. J. (2022). Maintaining Physical Activity Is Associated With Reduced Major Adverse Cardiovascular Events in People Newly Diagnosed With Diabetes. *Journal of Obesity & Metabolic Syndrome*. https://doi.org/10.7570/jomes22007

Louzado, J. A., Cortes, M. L., Oliveira, M. G., Bezerra, V. M., Mistro, S., Medeiros, D. S. de, Soares, D. A., Silva, K. O., Kochergin, C. N., Carvalho, V. C. H. dos S. de, Amorim, W. W., & Mengue, S. S. (2021). Quality of Life and Associated Factors in Young Workers. *International Journal of Environmental Research and Public Health*, *18*(4). https://doi.org/10.3390/ijerph18042153

Mielke, G. I., Malta, D. C., Nunes, B. P., & Cairney, J. (2022). All are equal, but some are more equal than others: Social determinants of leisure time physical activity through the lens of intersectionality. *BMC Public Health*, *22*(1). https://doi.org/10.1186/s12889-021-12428-7

Moola, F., Fusco, C., & Kirsh, J. A. (2010). The Perceptions of Caregivers Toward Physical Activity and Health in Youth With Congenital Heart Disease. *Qualitative Health Research*. https://doi.org/10.1177/1049732310384119

Nowak, P. F., Bożek, A., & Blukacz, M. (2019). Physical Activity, Sedentary Behavior, and Quality of Life Among University Students. *Biomed Research International*, *2019*, 1–10. https://doi.org/10.1155/2019/9791281

Özcan, B. E., & Saraç, L. (2021). The Relationship between Physical Activity and Quality of life during the COVID-19 Pandemic: A Case of Female and Male Physical Education Teachers. *Pamukkale Journal of Sport Sciences*, *12*(3). https://doi.org/10.54141/psbd.979254

Pascoe, M., Bailey, A. P., Craike, M., Carter, T., Patten, R., Stepto, N., & Parker, A. (2020). Physical activity and exercise in youth mental health promotion: A scoping review. *BMJ Open Sport & Exercise Medicine*, *6*(1), e000677. https://doi.org/10.1136/bmjsem-2019-000677

Pascoe, M. C., & Parker, A. G. (2018). Physical activity and exercise as a universal depression prevention in young people: A narrative review. *Early Intervention in Psychiatry*, *13*(4). https://doi.org/10.1111/eip.12737

Pedersen, E. S. L., Mortensen, L., Brage, S., Bjerregaard, A., & Aadahl, M. (2018). Criterion validity of the physical activity scale (PAS2) in Danish adults. *Scandinavian Journal of Public Health*, *46*(7), 726–734. https://doi.org/10.1177/1403494817738470

Rai, M., & Thompson, P. D. (2010). The Definition of Exertion-Related Cardiac Events. *British Journal of Sports Medicine*. https://doi.org/10.1136/bjsm.2009.057653

Randhawa, S., Randhawa, N., Hassanin, E.-H., Yi-Frazier, J. P., & Early, K. B. (2021). Pilot Evaluation of Obesity-specific Health-related Quality of Life Following a 12-week Non-randomized Lifestyle Intervention in Youth. *Obesity Science & Practice*. https://doi.org/10.1002/osp4.535

Román, X. A. S., Toffoletto, M. C., Oyanedel, J. C., Salfate, S. V., & Grandón, K. L. R. (2017). Factors Associated to Subjective Wellbeing in Older Adults. *Texto &Amp; Contexto - Enfermagem*, *26*(2). https://doi.org/10.1590/0104-07072017005460015

Soylu, C., & Kütük, B. (2021). SF-12 Yaşam Kalitesi Ölçeği'nin Türkçe formunun güvenirlik ve geçerlik çalışması. *Türk Psikiyatri Dergisi*, 1–9. https://doi.org/10.5080/u25700

Sun, J., Shi, L., Gao, X., & Xu, S. (2012). Physical Activity and Risk of Lung Cancer: A Meta-Analysis of Prospective Cohort Studies. *Asian Pacific Journal of Cancer Prevention*. https://doi.org/10.7314/apjcp.2012.13.7.3143

Uribe, S. C., Arista-Huaco, M. J., Encalada-Díaz, I. A., & Isla-Alcoser, S. D. (2021). *Physical Activity, Physical Condition and Quality of Life in Schoolchildren*. https://doi.org/10.14198/jhse.2021.16.proc3.14

Valois, R. F., Zullig, K. J., Huebner, E. S., & Drane, J. W. (2004). Physical Activity Behaviors

and Perceived Life Satisfaction Among Public High School Adolescents. *Journal of School Health*. https://doi.org/10.1111/j.1746-1561.2004.tb04201.x

Vaquero-Solís, M., Tapia-Serrano, M. Á., Hortigüela-Alcalá, D., Jacob-Sierra, M., & Sánchez-Miguel, P. A. (2021). Health Promotion Through Movement Behaviors and Its Relationship With Quality of Life in Spanish High School Adolescents: A Predictive Study. *International Journal of Environmental Research and Public Health*. https://doi.org/10.3390/ijerph18147550

Ware, J. E., Kosinski, M., & Keller, S. D. (1996). A 12-Item Short-Form Health Survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care*, *34*(3), 220–233.

Warren, J., Ekelund, U., Besson, H., Mezzani, A., Geladas, N. D., & Vanhees, L. (2010). Assessment of Physical Activity – A Review of Methodologies With Reference to Epidemiological Research: A Report of the Exercise Physiology Section of the European Association of Cardiovascular Prevention and Rehabilitation. *European Journal of Cardiovascular Prevention & Rehabilitation*. https://doi.org/10.1097/hjr.0b013e32832ed875

Wray, B., Grimes, A., Eighmy, K., & Lightner, J. S. (2022). The Relationship Between Social Integration and Physical Activity, Diet, and Sleep Among Youths: Cross-Sectional Survey Study. *Jmir Pediatrics and Parenting*. https://doi.org/10.2196/40354

Wu, X., Han, L., Zhang, J. H., Luo, S., Hu, J. W., & Sun, K. (2017). The influence of physical activity, sedentary behavior on health-related quality of life among the general population of children and adolescents: A systematic review. *Plos One*, *12*(11). https://doi.org/10.1371/journal.pone.0187668