EXAMINATION OF THE RELATIONSHIP AMONG HEALTH LITERACY, PHYSICAL ACTIVITY LEVEL, AND EXERCISE SELF-EFFICACY IN UNIVERSITY STUDENTS

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ABSTRACT

EXAMINATION OF THE RELATIONSHIP AMONG HEALTH LITERACY, PHYSICAL ACTIVITY LEVEL, AND EXERCISE SELF-EFFICACY IN UNIVERSITY STUDENTS

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The purpose of the study was to examine the relationship between health literacy, physical activity level, exercise self-efficacy, and physical activity stages of change in university students. Participants were asked to voluntarily fill out four separate surveys regarding health literacy, physical activity level, exercise self-efficacy, and physical activity change stages. A total of 378 university students participated in the study, 41 of whom were excluded because they did not meet the prerequisites of the study. Data analysis was carried out using SPSS version 28. According to the health literacy, 42.13% of the participants were classified as problematic, limited and inadequate. The physical activity level of the participants was moderate at 58.46%. The exercise self-efficacy status of 337 participants was found to be inadequate at 41.83%. Regarding the physical activity stages of change, the participants were classified as inadequate at the comptemplation stage as 44.80%. Another results showed that the physical activity level, exercise self-efficacy, and physical activity stages of change did not predict the health literacy, and non-significant results were obtained. To summarize, university students' health literacy, physical activity level, exercise self-efficacy, and physical activity stages of change scores were found to be insufficient. In addition, physical activity level, exercise self-efficacy, and physical

activity stages of change variables did not predict the health literacy of university students. Considering the findings development of new strategies for the future, conducting multidisciplinary studies and building collaboration between the relevant stakeholders in future initiatives can play important roles in improving public health, especially for the younger generations.

Keywords: health literacy, physical activity, exercise self-efficacy, university students

ÖZ

ÜNİVERSİTE ÖĞRENCİLERİNDE SAĞLIK OKURYAZARLIĞI, FİZİKSEL AKTİVİTE DÜZEYİ VE EGZERSİZ ÖZYETERLİĞİ ARASINDAKİ İLİŞKİNİN İNCELENMESİ

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Araştırmanın amacı üniversite öğrencilerinde sağlık okuryazarlığı, fiziksel aktivite düzeyi, egzersiz öz-yeterliliği ve fiziksel aktivite değişim aşamaları arasındaki ilişkinin incelenmesidir. Katılımcılardan sağlık okuryazarlığı, fiziksel aktivite düzeyi, egzersiz öz yeterliliği ve fiziksel aktivite değişim aşamaları ile ilgili dört ayrı anketi gönüllü olarak doldurmaları istenmiştir. Araştırmaya toplam 378 üniversite öğrencisi katılmış olup, bunlardan 41'i çalışmanın ön gereklerini karşılamadığı için çalışma dışı bırakılmıştır. Katılımcılardan 337 kişinin veri analizi SPSS'in 28. versiyonu kullanılarak gerçekleştirilmiştir. Katılımcıların %42,13'ü sağlık okuryazarlığı değişkenine ilişkin olarak sorunlu-sınırlı olarak sınıflandırılmış ve yetersiz olarak tespit edilmiştir. Ayrıca katılımcıların genel fiziksel aktivite düzeyi %58,46 ile orta düzeyde çıkmıştır. Ayrıca 337 katılımcının egzersiz öz-yeterlik durumları %41,83 olarak yetersiz düzeyde tespit edilmiştir. Son olarak fiziksel aktivite değişim aşamaları ilişkin katılımcılar %44,80 ile eğilim öncesi düzeyinde yetersiz olarak sınıflandırılmıştır. Veri analizinin bir diğer sonucu ise fiziksel aktivite düzeyi, egzersiz öz-yeterliği ve fiziksel aktivite aşamalarının değişiminin sağlık okuryazarlığını yordamadığı ve bu yönde anlamlı olmayan sonuçlar elde edilmiştir. Özetlemek gerekirse, üniversite öğrencilerinin sağlık okuryazarlığı, fiziksel aktivite

düzeyi, egzersiz öz yeterliliği ve fiziksel aktivite değişim aşamaları puanları yetersiz bulunmuştur. Ayrıca fiziksel aktivite düzeyi, egzersiz öz-yeterliği ve fiziksel aktivite değişim aşamaları değişkenlerinin üniversite öğrencilerinin sağlık okuryazarlığını yordamadığı belirlendi. Bulgular dikkate alındığında geleceğe yönelik yeni stratejilerin geliştirilmesi, multidisipliner çalışmaların yapılması ve gelecekteki girişimlerde ilgili paydaşlar arasında iş birliğinin sağlanması, özellikle genç nesiller için halk sağlığının iyileştirilmesinde önemli roller oynayabilir.

Anahtar Kelimeler: sağlık okuryazarlığı, fiziksel aktivite, egzersiz öz-yeterlilik, üniversite öğrencileri

To my family, beloved and the most precious ones

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
ESE	Exercise Self-Efficacy
HL	Health Literacy
IPAQ	International Physical Activity Questionnaire
MET	Metabolic Equivalent of Task
PA	Physical Activity
PAL	Physical Activity Level
PA-SOC	Physical Activity Stages of Change
VIF	Variance Inflation Factor

CHAPTER 1

INTRODUCTION

1.1. Background of the Study

In recent years, technological advances and industrialization significantly increased all over the world have brought about many types of infectious diseases emerging in societies day by day (Woessner et al., 2021). It is not a surprised that rapidly developing and changing technology not only directly affects the daily lifestyles and health-related behaviors of individuals, but also negatively trigger physical inactivity among of young individuals (Bulut, 2013; Huang & Ren, 2020; Leenders et al., 2002). As a result, during adolescence and the transition to adulthood, the individuals may tend to have an inactive lifestyle, unhealthy eating and sleeping habits, high level of stress and many chronic diseases.

In this regard, young individuals must have sufficient health literacy (HL) skills to receive qualified information on critical issues related to their health and to make right decisions in line with the information they receive (Elsborg et al., 2017; Frings et al, 2022). In addition, young individuals need to become aware of the necessity of taking responsibility to make the right decisions regarding their health processes and to manage the process effectively (Gorczynski et al., 2017; Hsu et al., 2014; Sørensen et al., 2012). In other words, they should have a high level of HL skills to protect their heath.

A widely accepted definition of HL is the ability of reading, comprehending, and analyzing health related information from different sources such as books, web sites, or social media platforms (Nutbeam & Muscat, 2021). Health literacy includes skills, motivation and knowledge about health, which is a hot topic in public health area (Squiers et al., 2012). The World Health Organization (WHO) declared that HL is an

imperative factor for health promotion of individuals. It is also seen as a powerful tool for people to take responsibility of their own health improvement and to reduce premature death (Liu et al., 2020). The European Office of WHO published a report about solid facts of HL stating that "weak HL competencies have been shown to result in less healthy choices, riskier behavior, poorer health, less self-management and more hospitalization" (Apfel & Tsouros, 2013, p.1). The increase in hospitalization rates of individuals may bring about problems such as inadequate management of the socioeconomic dimension, increased drug use, and inadequate efficiency from health services (Kutlu & Akbulut, 2019; Ratzan & Parker, 2000).

Strong associations between HL and PA behaviors of adults have been reported in research studies all over the world (Huang et al., 2021). Research findings from a literature review demonstrated that physical activity level (PAL) of university students was not good enough to meet recommended guidelines (Castro et al., 2020). Moreover, university students have serious physical activity (PA) issues such as having low level of exercise self-efficacy (ESE) or sedentary lifestyles (Vella & Nelson, 2023). Those students may have a lack of knowledge about health.

University students with insufficient, problematic, or limited HL levels face difficulties in accessing, understanding, and managing the process of health services (Osborn et al., 2011). It is crucial to enhance awareness among university students with regard to PA, exercise and HL. This will facilitate shift in individual's perspective towards a healthier lifestyle (Dinçer & Kurşun, 2017; Forde, 2018).

Examining the relationship between HL, PA, along with the physical activity stages of change (PA-SOC) may offer insights into developing effective strategies for public health. The current situation of HL, PA and PA-SOC in university students may serve as a foundation for this investigation.

1.2. Purpose of the Study

The purpose of the study was to examine the relationship between HL, PAL, ESE and PA-SOC in university students.

1.3. Research Questions

The following research questions were identified for this study;

1. What are the basic characteristics of university students about HL, PAL, ESE, and PA-SOC?
2. To what extent do PAL, ESE, and PA-SOC predict the HL of university students?

1.4. Significance of the Study

University students may experience with some challenges in their university years. They may have heavy workloads, physical inactivity, unbalanced nutrition, or high level of screen and sitting time, which may trigger the risk of serious problems such as hypertension, cardiovascular diseases, diabetes, cancer, peripheral vascular diseases, and anatomical disorders for their future life. Health literacy knowledge may prevent such issues before arising. However, there is limited evidence regarding the HL level of university students in Türkiye. In addition, limited studies are available to predict the role of PA behaviors on HL, although there are many studies related to PAL, ESE and PA-SOC status of university students. This study has potential to offer critical ideas for future research in terms of examining the interactions regarding the concepts of HL, PAL and ESE within the individual and social contexts. The findings of the study may also provide valuable information for university and public health policies.

1.5. Definition of Terms

The definition of the terms was explained below for a better understanding of the present study.

Literacy: It is defined as the ability of individuals to perceive their reading, writing and counting abilities in relation to the elements in life, to assign meaning and to use and carry out their social lives within the framework of sustainability (Keefe & Copeland, 2011).

Exercise: It is expressed as the activities that the individual does in order to protect his health, to develop and maintain his/her physical capacity (Caspersen et al., 1985). It should be repetitive and structured.

Physical Activity (PA): According to the World Health Organization (WHO) the main concept can be specified as all the movements that an individual does in the context of energy expenditure by activating skeletal muscle groups in a daily context (WHO, 2018).

Health Literacy (HL): It is described as the capacity of the individual to access, comprehend and benefit from the medical information they need in order to maintain their vitality and good health on a sustainable basis (WHO, 2021).

Self-Efficacy: It is characterized as a personal judgment about whether an individual can reflect his life by arranging the components of his ability to control his capacity through his behaviors in order to achieve the power of self-actualization. It represents whether it is successful in any situation and whether its capacity is sufficient to achieve its purpose (Bandura, 1982).

Exercise Self-Efficacy (ESE): It is defined as the power of belief in the ability of the individual to maintain or manage his/her skills and emotions in the best and successful way in relation to increasing PA or exercise processes, and to achieve the desired performance (Miller et al., 2019).

CHAPTER 2

LITERATURE REVIEW

This chapter includes theoretical framework of health literacy and physical activity concepts. Health literacy, dimensions of HL, classification of HL, measurement techniques, PAL, historical background of PA, research findings, ESE and its components were explained in the following sections.

2.1. Health Literacy Definitions

In recent years, HL has tended to be a trending and interesting topic not only in the field of medicine but also in a multidisciplinary sense. Although it was defined differently by scientists many times, a common opinion has not been reached regarding the definition of HL. Table 2.1. shows the definitions of HL from different sources. Similarities and differences among the definitions can be seen in the table.

Although there are different types of definitions regarding HL, it seems that the definitions support each other in many general evaluation dimensions. Being able to evaluate and differentiate information regarding HL and approaching it from a critical perspective is very important in terms of the applicability and development of the term in daily life.

Table 2. 1. Health literacy definitions from different sources

Authors	**Definition of Health Literacy**
Nutbeam (2000)	The ability to access, understand and apply or use the information requested in order to improve and sustain the health of individuals
Institute of Medicine- Kindig et al. (2004)	The capacity to obtain and understand the information necessary to make the best decision about one's health care

Table 2.1. (continued)

Pavlekovic (2008)	The capacity to access, understand and use basic information and services regarding the health process
Rootman & Gordon (2008)	The ability to access, evaluate and apply needed health information
Ishikawa & Yano, (2008)	the process of adaptation, knowledge and skills for interactions with the existing healthcare system.
Mancuso (2008)	The capacity developed by the person in line with the framework, he/she acquires regarding the request for health information
Yost et al. (2009)	The ability and capacity of people to read, understand, define and interpret information in order to make the right decisions regarding health processes
Adams et al. (2009)	The ability to understand and interpret health information in any context
Ross Adkins et al. (2009)	The ability to manage various skills and derive meaning from communication in order to achieve positive health-related gains.
Freedman (2009)	The ability to access, understand, evaluate and manage accurate and necessary information for public health
Massey et al. (2012)	All of the skills of an individual to manage his knowledge, attitude and practices towards the health process
Sørensen et al. (2015)	A person's ability to read and understand health-related terms in order to make the right decisions
Dodson et al. (2015)	The ability to access, understand, evaluate and apply information and services when determining choices regarding the health process
Liu et al. (2020)	The ability to obtain and make sense of information necessary to maintain and improve health
Nutbeam & Muscat (2021)-WHO	The ability to interpret, evaluate and apply the information one acquires in order to improve one's health and provide a sustainable dimension regarding one's daily activities and interactions

2.1.1. Historical Development of Health Literacy

In tracing its historical trajectory, the roots of HL include some cultural elements dating back to ancient Egypt and Greece (Speros, 2005). The concept of HL did not start to significantly shape and impact health care practices until the late 20th century (Speros, 2005). In the last 50 years, HL has gained attention from researchers and public health professionals in multidisciplinary fields. While Western countries have better-developed HL, it remains an important issue globally and has become a guiding component for national and international policies. Various international organizations such as the World Health Organization, the European Union,

UNESCO, and the United Nations have also taken a keen interest in HL in recent years (Heijmans, 2015; Sørensen, 2012; UNESCO, 2005; WHO, 2022).

In the research studies carried out within the framework of education in the 1980s and 1990s, HL became a very popular topic in the literature and gradually revealed its evolution as studies on health education increased over time (Doak et al., 1996; Weiss, 2003). According to these developments, HL was first introduced and used in a research project conducted by Simonds (1974) (Batterham et al., 2017; Nutbeam, 2000; Simonds, 1974).

Regarding the international literature, since the second half of the 20th century, studies on the development and sustainability of health processes have increased significantly under the leadership of Europe and USA. Today the majority of studies are carried out in Europe and USA (Ratzan and Parker, 2000; Vamos & Rootman, 2013). In Türkiye, this issue attracts the attention of many researchers, especially since the early 2000s, and research studies on HL have begun to be carried out in the literature and state-supported policies have begun to be implemented for the purpose of improvement and recovery (Okyay et al., 2016; Özkan et al., 2018; Sezgin, 2013). In summary, HL as a concept in historical development dimensions includes the versatile skills of individuals with a holistic framework (Malloy-Weir et al., 2016; Nguyen et al., 2020).

2.1.2. Classification of the Concept of Health Literacy

Health literacy is classified in three different dimensions as functional, communicative and critical HL. Functional HL represents a person's ability to read, understand and write (Nutbeam, 2000). The communicative HL dimension represents the context in which individuals communicate with health professionals in line with their social and cognitive skills (Nutbeam, 2000). Critical HL is considered the most important element of the classification compared to the previous components and provides a holistic framework. Within the scope of critical HL, the individual's competencies in terms of being able to analyze and interpret all health-related information, exhibiting critical approaches, social and cognitive skills are analyzed (Nutbeam, 2000; Peerson & Saunders, 2009; Sørensen et al., 2012).

2.1.3. The Role of Health Literacy

Individuals' HL is based on the ability of using health services to provide qualified conditions and to manage health resources correctly (Peerson and Saunders, 2009). In this regard, a high level of HL has the potential to support health and welfare of individuals and the society (Liu et al., 2020). In addition, it is stated that HL plays a critical role for the promotion and sustainability of health among individuals (Buja et al., 2020). Starting from this point, the better the level of awareness, competencies and HL skills among individuals, the better results may be achieved in healthy behaviors and achievements towards a healthy lifestyle (Malloy-Weir et al., 2016). In addition, HL level of individuals may be supported by policies regarding health investments, which may provide a potential to reduce socioeconomic expenses regarding common chronic health issues (Geboers et al., 2014; Lynch and Soukup, 2016).

An individual with a low level of HL is prone to contracting many chronic diseases, exhibiting bad habits and behaviors, and as a result, which may affect the welfare level of the society (D'Eath et al., 2012; Huang et al., 2021; Toçi et al., 2014). It has also been proven by research findings that individuals with low HL also experience serious communication problems and have difficulties expressing themselves, especially when they request health services (Frisch et al., 2012; Rudd, 2015). In addition, individuals with low HL levels have a high tendency to encounter negative components regarding their personal, social, psychological, physiological and cultural development (Osborn et al., 2011; WHO, 2022). It was proven that mortality rates are much higher in individuals with low level of HL (Liu et al., 2020; Nguyen et al., 2020). That's why, HL is an essential component of healthy life, and it should be studied in many aspects.

2.1.4. Measurement Tools of Health Literacy

A variety of measurement tools were developed to measure HL level of individuals. These measurement tools were provided in the following sections.

2.1.4.1. Test of Functional Health Literacy in Adults (TOFHLA)

This measurement tool was developed by Parker and his colleagues in (1995). The adaptation study for Turkish population conducted by Üçpunar and Piyal in (2014). The main goal of the scale is to determine the capacity of individuals to understand health-related reading skills, numbers and expressions (Baker et al., 1999). The scale consists of 67 items, and it takes approximately 22-25 minutes to fill out the scale. The evaluation is made out of 100 points. The score range of 0-59 represents insufficient HL, the range of 60-74 represents low HL, and the range of 75-100 points represents high HL (Parker et al., 1995).

2.1.4.2. The Rapid Estimate of Adult Literacy in Medicine (REALM)

This tool was developed by Davis and his colleagues in (1991). Turkish adaptation study was conducted by Ozdemir et al., (2010). The purpose of the scale is to determine the level of health-related vocabulary and pronunciation skills of individuals. It consists of a total of sixty-six items ranging from easy to difficult, and one point is given for each correct pronunciation, and it takes approximately two or three minutes to fill out the scale (Gordon et al., 2002). The range of score between 0 and 44 is considered inadequate, 45 and 65 is considered low, and 61 and 66 is considered sufficient. The biggest disadvantage of the scale is that it does not include numerical skills (Murphy et al., 1993; Ozdemir et al., 2010).

2.1.4.3. The European Health Literacy Survey Questionnaire

This questionnaire was developed by Sørensen and his colleagues (2012). Çimen and Bayık (2015) carried out an adaptation study for the Turkish population. The scale consists of forty-seven items and has three subscales. These dimensions include protection from diseases, provision of health services, and health development (Pelikan et al., 2019). The health literacy level of individuals is evaluated by in these different dimensions with fifty points (Pelikan et al., 2019). The range of 0-25 is considered inadequate, 25-33 is considered problematic-limited, 33-42 is considered adequate, and 42-50 is considered excellent level (Sørensen et al., 2015).

2.1.4.4. The Turkish Health Literacy Survey (TSOY-32)

This scale was developed within the scope of the HLS-EU scale. The tool was adapted to the Turkish population in cooperation with the Ministry of Health and Adnan Menderes University. It is a Likert type scale consisting of thirty-two items with two dimensions and four separate processes including eight questions (Abacıgil et al., 2019). The two-dimensional framework represents treatment and service, disease prevention/health promotion, and four separate processes including the skills of accessing information, understanding, evaluating, and applying information (Güven et al., 2018). The 0–25-point range is considered inadequate, the 25–33-point range is considered problematic and limited, the 33–42-point range is sufficient, and the 42-50- point range is considered an excellent HL level (Okyay & Abacıgil, 2016).

2.2. Health Literacy Research Findings

Studies on HL provide extensive information about this issue. One study aimed to identify the HL levels of the university students from Texas, USA and it was found that university students had low level of HL scores categorized as problematic and insufficient (Vamos et al., 2016). In the research conducted in Denmark with the participation of 376 university students between the ages of 15-30, individuals' HL was found to be sufficient and positive correlations were obtained about their personal history, the quality of their education, and the curriculum (Elsborg et al., 2017).

According to the findings of the research conducted with 420 university students in Iran, the HL level of the students was determined as insufficient (Kaboudi et al., 2017). In the study, it was stressed that different types of future planning and the quality of education on HL should be provided to increase the HL level of individuals. Furthermore, researchers indicated that health improvement strategies play a critical role in the HL of individuals (Kaboudi et al., 2017).

The main purpose of the research conducted in Australia with 371 university students was to compare the HL levels of health department students from different

universities before starting their careers (Mullan et al., 2017). The results demonstrated that the verbal literacy levels of students were found as sufficient and insufficient for different groups. In a research study by Schultes (2017) with undergraduate students from different departments in Germany, a partial positive relationship was seen between the variables of HL and health behaviors (Schultes, 2017).

Sukys et al. (2017) examined the relationship between HL and health education in Lithuania. Similarly, university students' HL level was revealed as insufficient. It was concluded in the study that HL education should be integrated into the school curriculum. In this regard, it was underlined that the HL levels of professionals who provide education in the future in line with the needs of student groups may play a critical role (Sukys et al., 2017). A similar study conducted by Santos and Hespanhol (2018) with 485 students in Portugal. An interesting finding showed that university students used the internet as the main source of information on health issues, but their literacy levels were not sufficient (Santos & Hespanhol, 2018).

Another study was conducted in the Turkish context to examine the HL levels of nursing students revealing that the students had problematic and inadequate level of HL skills (Okuyan & Çağlar, 2019). In this context, the researchers concluded that providing students with the required HL skills before starting their careers plays a critical role and developing professional education strategies in this direction would be the right approach (Okuyan and Çağlar, 2019). In another study examining the relationship between electronic HL and nutritional behaviors of 813 students from Taiwan showed that students with higher levels of electronic HL acquired less healthy behaviors (Yang et al., 2019). Additionally, the university students with higher monthly personal expenses had a lower percentage of balanced nutrition (Yang et al., 2019). Uysal and her colleagues (2020) found very similar findings in their research showing HL level of %45 of the participants (n=905) was problematic and insufficient. The researchers suggested that concepts related to HL must be integrated into the higher education curriculum to increase awareness of healthy behaviors (Uysal et al., 2020).

Rababah et al. (2019) aimed to explore the disparities among college students about HL. It was a cross sectional study including high number of students (n=520). University students' HL was determined as insufficient level. The researchers emphasized that this situation had the potential to cause different types of changes on an individual basis and could affect existing health inequalities. In addition to all these, they also stated that more studies were needed to better understand the findings regarding the promotion and improvement of health processes and their effects on education system (Rababah et al., 2019).

According to the findings of a study conducted in Greece, it was determined that the participants' (n=1526, 18-24 aged) HL levels were moderate (Vozikis et al., 2014). Another study focused on the HL of university students in the nursing department in Spain (2020) showing the evidence that students' HL levels were good within the framework of health services (Juvinyà-Canal et al., 2020). In a research project conducted by Ickes and Cottrell (2010) on the HL level of university students, it was determined that individual scores demonstrated sufficient correlations, and the HL level of students was adequate. Researchers in the study stated that further studies aimed at identifying the problems of students and improving their HL levels should not be ignored (Ickes & Cottrell, 2010). In the study conducted in the United Kingdom, it was determined that the general HL levels of 932 participants were sufficient, and it was emphasized that more studies were needed to achieve better health outcomes in the long term (Storey et al., 2020).

In another study conducted in United Kingdom (2017), an interesting concept of mental HL was searched via online survey method. University students from south of England showed high level of mental HL scores and a positive relationship was detected between the level of HL, personal behaviors and well-being, but it was emphasized that further strategies and research were required. In addition, no significant differences were detected regarding gender differences (Gorczynski et al., 2017). Another study conducted by Frings et al. (2022) during the COVID-19 epidemic in England with 691 university students. It was aimed to identify the digital HL and future anxiety between health care and students from 25 universities. Digital HL instrument was used to collect data. The study concluded that the participants

had good digital HL skills, but they had some difficulties with attitudes towards health-related behaviors (Frings et al., 2022).

To sum up, research studies on HL yield mostly similar results and it appears that many university students have lack of knowledge with regard to HL. For this reason, the reasons of low level of HL should be investigated.

2.3. Physical Activity and Historical Background of Physical Activity

Although PA has become a major term of great interest both internationally and nationally in recent years, it is a fact that further studies are needed to investigate the PA situation in different age groups.

2.3.1. Historical Background of Physical Activity

Physical activity was a part of daily life until the industrial revolution (Liebermann, 2015; Tipton, 2014). It is a fact that the agricultural revolution and the awareness in proper nutrition and exercise for the prevention of diseases are based on written evidence in the prescriptions for the prevention of chronic diseases and epidemics, and its foundations date back to ancient times of Greece and Rome (Berryman, 2010; Malina & Little, 2008).

In the evidence of various geographies in the Far East, PA turned into a philosophy of life, especially in Ancient China and India (MacAuley, 1994; Tipton, 2008). Based on cultural codes of these countries, physical fitness and health were associated with yoga philosophy and it was observed in the field of medicine. Many studies were conducted on sub-dimensions of yoga (MacAuley, 1994; Tipton, 2008). In addition, while social components and religious rituals gained ground in civilizations interested in the concept of PA during these periods, physical fitness and sustainability of health also came to the fore as a perspective (MacAuley, 1994). Moreover, according to the remains in African geography, it was determined that PA is based on condition, endurance and religious rituals, and that people associate the power indicator related to the concept of PA with status (Noakes, 1997). In line with

all these developments, it was determined that especially Indians in the American geography see PA as a metaphysical communication tool in line with their beliefs and evaluate it within the framework of various games. used for fighting, hunting, and socializing (Coble and Rhodes, 2006; Duncan et al., 2009).

2.3.2. Physical Activity Level of University Students

Physical activity research is critical to understand the basic facts about PA among different population. In this chapter, some research findings about recent studies on university students' PA was shared. For instance, Bebeley et al. (2017) investigated the role of self-efficacy in students' motivation for PA. In the study, it was found that university students with high self-efficacy scores in Shanghai, China, received high scores on PA (Bebeley et al., 2017). A similar study conducted by Wang and his colleagues (2020) revealed that PAL of the students was sufficient, and the concept of self-efficacy played a partial positive role in the relationship between the PA level and emotional intelligence in university students.

In a research project conducted by Wang and his colleagues under the title of the relationship between ESE and PA emotional intelligence and subjective well-being of university students in the context of university students in China, it was revealed that regular participation of exercise improved the well-being, self-efficacy and emotional skills of university students. It was also determined that exercise participation had a positive impact on students' academic achievement. In addition, researchers concluded that the concepts of happiness and life satisfaction could be positively affected by doing regular activities (Wang et al., 2022).

Leenders et al. (2002) also evaluated PA and ESE in the context of university students and the researchers determined that an increase in a student's ESE indicates a possible increase in the level of PA in the future. In the recommendations of this study, it was emphasized that it would be useful to make efforts to adopt different types of current strategies on university campuses to encourage students to exercise and increase PAL (Leenders et al., 2002).

According to the findings of a research project conducted in USA in 2010, university students who engaged in PA had higher ESE levels (Brannagan, 2011). This study provided the evidence that students' perceived good effort level and their activity participation were sufficient. These findings were consistent with previous studies that suggest increasing PA can improve ESE levels among students. Brannagan (2011) further emphasized the importance of adequate PA for students' overall well-being. The findings of the research conducted in US state of Virginia demonstrated that university students' health behaviors and PAL were high (Barsell et al., 2018).

Wiedenman et al. (2023) pointed out in their research project that the level of participation in PA in the context of first-year university students was sufficient and regular PA participation positively affected the psychological need satisfaction levels of university students during the exercise process, and that the chosen branch may have a different impact on the subjects in the study. Sidman and her colleagues at the University of North Carolina (2009), determined that PA participation in college students was sufficient and which was the potential to draw a framework that may encourage ESE and belief in the level of PA participation (Sidman et al., 2009).

In the USA, a group of researchers found that the level of PA among university students was sufficient and that this was directly related to self-efficacy (Joseph et al., 2014). In line with the findings, it was suggested that developing health education programs to promote sustainable PA and improve quality of life may be good for the young population of university age (Joseph et al., 2014). In another study conducted in USA (2008) on university students, PAL was identified as sufficient and it was determined that students' motivation regarding three variables increased in the findings within the framework of self-efficacy and nutrition (Franko et al., 2008).

According to a study on the PAL among university students conducted in Malaysia in (2015), it was discovered that the PAL of most university students were satisfactory. However, this study found that the female group had lower PAL than the male group. Additionally, the study found that individuals who were obese or severely obese were more likely to report lower levels of PA (Rajappan et al., 2015).

In a study conducted in Iran to investigate the PAL of university students, the findings indicated that the PAL of the students was not sufficient, therefore it would be beneficial to develop new policies to increase the PAL. Additionally, they stated that their lifestyles and healthy behaviors could be improved by providing education on PA (Rejali & Mostajeran, 2013).

According to the findings of the study in which Mulahasanović and his colleagues evaluated the PAL of university students through the International Physical Activity Questionnaire (IPAQ) scale in Tuzla, Bosnia and Herzegovina in (2018), it was determined that the PAL of the students was sufficient. Additionally, in terms of gender, authors concluded that the PAL of female students was lower than that of male students. Moreover, there was a need to take measures to encourage PA within the context of universities in order to raise the health levels of students to a higher level (Mulahasanović et al., 2018).

Bednerek and his colleagues (2016) conducted a study on the PAL of university students in Türkiye and Poland. The study revealed that 11% of the students had low levels of PA. It was found that Polish students had a higher level of PA compared to Turkish students. Male students had high levels of PA in both countries. The study also found that more than half of Turkish students were unable to meet the PA recommendations set by the World Health Organization (Bednerek et al., 2016).

As a conclusion, a variety of research studies conducted in different countries on PAL of university students. The findings showed some variations about the level of PA among university students.

2.4. Exercise Self-Efficacy in the Literature

Self-efficacy is defined as a person's personal judgment and belief in himself in line with the process he carries out to be successful towards a certain goal and it plays a critical role in the continuity of PA and exercise processes (Bandura & Adams, 1977; Locke, 1997; Resnick & Jenkins, 2000). In such a context, where individuals are encouraged to develop and maintain exercise behaviors, it can be said that the

concept of self-efficacy plays an extremely critical role on an individual basis (McAuley et al., 2003).

Exercise self-efficacy is defined as the individual's attitudes and beliefs in his skills covering the exercise process in an organized, determined and systematic framework (Everett et al., 2009; Vidmar & Rubinson, 1994). It represents the resilience of an individual's attitude towards their ability to exercise in a planned, systematic and sustainable manner (Everett et al., 2009). Exercise self-efficacy has a great role in understanding the dynamics of the PA and exercise concepts (Ha et al., 2018; Yeh et al., 2016). Since the dynamics of ESE have the potential to be related to many different types of components, researchers may face some obstacles in approaches to detect people's attitudes and beliefs towards the exercise process (McAuley et al., 2011). In line with another approach, it has a guiding quality for various variables in triggering the promotion of PA processes regarding the prevention of chronic diseases or its role in the treatment processes (Neupert et al., 2009; Oman & King, 1998).

2.4.1. The History of Self-Efficacy

The theory on which the historical dimensions of the concept of self-efficacy are based on Albert Bandura' article titled Toward a Unifying Theory of Behavioral Change (Bandura, 1977). According to Bandura's theory, the basis of the framework regarding the individual's self-efficacy attitudes and perspective emerges from four main sources (Bandura, 1977). First of all, it evaluates the person's performance-related achievements and the dimensions of failure, that is, what he/she strives for and how successful or unsuccessful he/she is (Bandura, 1978; Eastman & Marzillier, 1984). Secondly, it deals with the dimensions that are indirectly displayed, that is, the components that the individual observes from the people around him (Lev, 1997). Thirdly, it includes the individual's behavior towards verbal persuasion by other people about what they will or will not do verbally (Bandura, 1978). Fourthly, it is the extent to which the person dreams and evaluates how well or how badly he did it within his own framework (Bandura, 1986). Bandura's academic study in (1977) played a critical role in the development of many departments today, especially regarding the behavior of individuals (Bandura, 1977).

The term exercise is the execution of planned and systematic movements to ensure the development of the individual's physical condition (Biddle, 2009). According to the findings of studies in the literature, it was proven that the basis of exercising at individual levels is to increase self-confidence, reduce stress level, reduce the risk of stress and depression, protect from chronic diseases or reduce the risk of getting caught, develop self, and socialize (Koruç & Bayar, 2004; Taylor, 2003). As a result, it was proven that it does not provide development in terms of mental and physical components (Hausenblas, 2002).

2.4.2. The History of Exercise

The origin of the historical aspects of exercise, based on the literature of strength, speed and endurance in line with the perspective of improving people's health, date back to Ancient Greece around 600 BC (Golden & Kennell, 1999). Soldiers in the context of Greece and Sparta were the first individuals to practice exercise in the form of construction work, long-distance running and wrestling competitions to stay fit for battles and they increased their muscle strength, speed and endurance levels (Lieberman, 2015).

In general, exercises performed within the framework of military training played a critical role in the expansion of the concept of sports with the contribution of the first Olympic Games held in Ancient Greece (Berryman, 2010; Miller, 2004). In ancient times, people did not consider exercise as an extra routine of their daily lives and did not see it as a goal, because they thought that the physical conditions of their daily lives, apart from their military role, prepared them sufficiently for the flow of life (Tipton, 2014).

According to the examples in the literature, they were walking or running to reach a place, taking responsibility for their shelter and nutrition needs, and since they had reached a physically suitable position and level in this regard, this was a necessity for them, and they did not need additional exercise (Paffenbarger, 2000).

2.4.3. Findings of the Literature

Interventions and cross-sectional studies were analyzed in this section to gain a better understanding about the role of self-efficacy on PA. For example, in the study conducted by Nordgren et al. in (2015), significant changes and indicators were detected regarding the ESE variable for both groups before and after the intervention program. In line with participants' attitudes towards exercise behavior on an individual basis, positive findings were determined in the dimensions of the perceptions of exercise, physical fitness, self-efficacy and health within a one-year period (Nordgren et al., 2015).

Yeh and his colleagues examined the PA and quality of life levels for both intervention and control groups in line with the applied program. Although no significant difference was observed between the groups, an increase in self-efficacy levels was detected within one year when the two groups were compared. It was emphasized that Group 1 had a better quality of life than Group 2. There was no change in physical condition in both groups (Yeh et al., 2016).

In line with the intervention studies conducted by Ligibel and his colleagues (2012), improvements were detected in the concepts of PA and perceived self-efficacy in the weekly reports of cancer patients (Ligibel et al., 2012). In Chinese context (2022), it was determined that university students' regular participation in PA was sufficient for their personal self-efficacy. It was determined that physical exercise had a positive effect on individual well-being (Wang et al., 2022). According to the findings of another study conducted in China, participants' self-efficacy and exercise scores were determined to be inadequate. Contrary to all dimensions, positive relationship was detected between physical fitness, exercise behavior and self-efficacy (Han et al., 2022). Leenders et al. (2002) obtained sufficient and positive findings regarding the PA, exercise and self-efficacy levels of university students within the framework of PA-SOC theory (Leenders et al., 2002). Wallace et al. (2000) based on gender assessment, adequate changes were detected in ESE, PA history and aerobic capacity parameters in both men and women (Wallace et al. 2000). Considering the findings of the study conducted in New Orleans, positive and sufficient findings were found

in the participants' perceived effort level, ESE level and program commitment levels (Brannagan, 2011).

CHAPTER 3

METHODS

The purpose of the current study was to examine the relationship between HL, PAL, ESE and PA-SOC in university students. This chapter respectively covers the research design, participants, data collection instruments, data collection procedures, and data analysis. The limitations of the current study were also provided here.

3.1. Research Design

The current study was a cross-sectional correlational design study conducted based on the survey method. For the purpose of this study, quantitative research method was used (Creswell, 2005). Quantitative research is a type of research that allows the researcher to collect numerical data from a large number of participants using tools relevant to the research questions and corresponding answers (Fraenkel & Wallen, 2012). Correlational research design was used to examine the relationship between two or more variables and predict possible outcomes (Creswell, 2005). In addition, ecological model was the basis of this research and individual factors such as PAL, ESE and PA-SOC may be helpful to interpret the HL of university students for descriptive research (Sallis & Owen, 2015).

3.2. Research Participants

In this study, purposeful sampling methodology was utilized. A total of 337 university students, 216 female and 121 male participated in the study. The participants were selected from two major cities of Anatolia, Ankara and Eskişehir. The reason of selecting these cities is that Ankara and Eskişehir are very close to each other and have a variety of public universities including university students from different regions of Türkiye. It was taken into consideration that the student

profiles of these two provinces were similar and that they represented university students in Anatolia. Forty-one participants were excluded from the study because they were either graduates or participated from outside Ankara and Eskişehir provinces and did not meet the inclusion criteria. Table 3.1. exhibits the demographic characteristics of participants.

Table 3. 1. Demographic Characteristics of Participants

Baseline characteristics	N	%
Gender		
Female	216	64.1
Male	121	35.9
University		
Anadolu University	111	32.9
Ankara University	13	3.9
Eskişehir Technical University	13	3.9
Gazi University	27	8.0
Hacettepe University	24	7.1
Middle East Technical University	139	41.2
Other	3	10
Grade level		
Preparatory grade	40	11.9
1st grade	48	14.2
2nd grade	9	2.7
3rd grade	27	8.0
4th grade	37	37
Graduate level	176	52.2

Note. N=337 and other refers to Başkent University, Bilkent University, Economics and Technology University.

3.3. Data Collection Instruments

For the data collection instruments, author permissions were obtained via e-mail for all instruments used in the current study. Four valid and reliable instruments were identified for the research purpose. The Turkish Health Literacy Scale 32 (TSOY-32), International Physical Activity Questionnaire Short Form (IPAQ Short-Form), The Exercise Self-Efficacy Questionnaire and The Physical Activity Stages of Change Questionnaire were the data collection instruments (Okyay & Abacıgil, 2016; Marcus et al., 1992; Nigg & Courneya, 1998; Sağlam et al., 2010).

3.3.1. The Turkish Health-Literacy Scale 32 (TSOY-32)

The Turkish Health Literacy Scale (TSOY-32) developed by Okyay and Abacıgil (2016) was used to assess the status of HL in literate individuals over the age of fifteen. The scale has two basic dimensions (treat and four factors (2x4) with 32 questions. Two main dimensions of the scale are "treatment and service" and "disease prevention/health promotion and development". Four factors for each component have the dimensions of accessing, understanding, appraising and applying of health-related information. Each item of the scale is answered by options very easy, easy, difficult, very difficult and no idea.

The first part of the current scale covers variables such as socio-demographic age, gender, marital status, educational status, occupation, and social security, the second part comprises of items related to the HL questionnaire structured on the basis of a similar European Scale of Health Literacy (HLS-EU) (Sørensen et al., 2015). TSOY-32 scale was theoretically structured according to the viewpoint of the European Health Literacy Research Consortium. According to the HLS-EU basis, the evaluation of the current scale should be standardized as 0 as the lowest score in the personal answers dimension, 50 as the highest score, on the basis of the index=(arithmetic mean-1) x (50/3) formula. As a prerequisite for the components, %80 of the questions must be answered at a minimal level in order to be able to calculate the index score.

The index of scoring system in the scale depends on the four categories. Those categories in the scale are as follows;

- (0-25) score: insufficient health literacy level
- (>25-33): problematic-limited health literacy level
- (>33-42): adequate health literacy level
- (>42-50): excellent health literacy level

The reliability of the current scale in the Turkish context was analyzed within the framework of internal consistency (Cronbach Alpha value) by Okyay et al. 2016). Regarding the reliability findings of the scale in the Turkish context, the internal

consistency coefficient was determined as 0.927 and it was conclusively proven that the accepted value was above 0.80 (Okyay et al., 2016). Cronbach's Alpha coefficient was found as 0.88 in the first dimension of the scale and as 0.86 in the second dimension of the scale (Okyay et al., 2016).

3.3.2. International Physical Activity Questionnaire

International Physical Activity Questionnaire was used to measure university students' PAL. This questionnaire is a standardized measurement tool to evaluate individual's PAL for the last seven days. This tool including short and long versions can be applied for individuals aged 15 and over. The first study of the measurement tool was carried in Geneva, Switzerland in (1998). The research process was continued in 12 different countries with the contributions of the World Health Organization (WHO, 2018). Then, it was formed for the different kinds of cultures and contexts to measure PAL of individuals (Craig et al., 2003). The main purpose of the IPAQ measurement tool is to collect information about the PA levels of individuals in different types of activities and to obtain a comparable and evaluable framework in line with the results (Craig et al., 2017). The adaptation of the current measurement scale in Türkiye with all its dimensions was carried out and successfully completed by the researchers from Hacettepe University (Sağlam et. al, 2010). Furthermore, the validity and reliability process of the IPAQ short form in the context of Türkiye was conducted by Öztürk (2005). Regarding the Turkish adaptation process of the IPAQ short form, it was proven to be reliable and valid in terms of construct validity, criterion validity, concurrent and test-retest reliability. The test-retest reliability of the IPAQ short form was determined as (r=0.69) and long form as (r=0.64). In addition, the process of IPAQ short form criterion validity was determined as (r=0.30) and long form as (r=0.29) (Öztürk, 2005).

The short form of the questionnaire consists of seven open-ended questions covering the behavior of each individual regarding PA in the last seven days. This questionnaire can be applied through paper-pencil or oral method and offers a broad perspective as a language pool (Wolin et al., 2008). The questionnaire provides information on the time individuals spend on walking, moderate and vigorous

activities. For the assessment of the scale, the time and day scores are multiplied by the metabolic equivalent of task (MET) values assigned for each item and included in the total PA time. If the calculation process is to be summarized, it refers to the sum of periods and days (Lee et al., 2011). According to the MET values given in the subsections of the tool by means of the PA value acquired, individuals are categorized according to low, medium or high PAL. According to the formula for calculating the short form of the scale, a value is reached on the basis of MET-minutes/week (Craig et al., 2017; Forde, 2018). The following MET scores were provided for the scoring system.

- Walking Score: 3.3 MET-minutes/week.
- Moderate PA Score: 4.0 MET-minutes/week.
- Vigorous PA Score: 8.0 MET-minutes/week.
- Sitting Score: 1.5 MET-minutes/week.

Specific examples can be found below for the calculations of MET scores in the tool.

- **1st example:** The MET-min/week score of an individual who walks for thirty minutes five days a week may be calculated as follows. (3.3x30x5=495)
- **2nd example:** The MET-min/week score of an individual who does forty minutes of moderate-intensity PA four days a week can be calculated as follows. (4.0x40x4=640)

According to the MET score calculations, low, moderate and high activity groups are categorized. The low PA group (inactive or sedentary) is categorized into group sizes with less than < 600 MET-min exercise participation. The moderate PA group is categorized in group sizes with exercise participation in the range of ≥600 MET-min. As well as the very active group represents individuals who meet a minimum of ≥1500 MET-min and do vigorous PA three days a week, or individuals who meet at least ≥3000 MET-min and have a minimum of seven days of walking, moderate-intensity PA, or vigorous PA (Hagströmer et al., 2006).

3.3.3. The Physical Activity Stages of Change Questionnaire

The Physical Activity Stages of Change Questionnaire (PA-SOC) is a measurement tool developed by Marcus and Lewis (2003) to investigate the individual's exercise

behavior changes. Turkish adaptation study was performed by Cengiz et al. (2009). The researchers obtained validity information of the test and test-retest scores confirmed the reliability of the test showing strong and acceptable correlation data (ICC=.80) (Cengiz et al., 2010). In addition, the Kappa index validity was determined as 0.81 and the reliability value was determined as 0.79 by Ay and Temel (2015) within the scope of the Turkish adaptation of the current tool. This instrument is an appropriate tool to gather data about PA-SOC among individuals. The measurement tool includes four questions; q1:I am currently physically active, q2:I intend to become more physically active in the next six months, q3: I currently engage in regular PA, q4: I have been regularly physically active for the past six months. Based on the yes and no responds to the questions, the stages of change among PA are determined. Table 3.2 shows the details of scoring system in the tool (Ay & Temel, 2015).

This tool has five distinct stages. Based on the scoring index, individuals are divided into different categories in terms of PA behaviors. These stages are pre-contemplation, contemplation, preparation, action, and maintenance stages. The precontemplation stage refers to an unplanned phase for exercise behaviors in the following six-month period without exercise. The contemplation stage refers to a planned phase in which individuals do not exercise but they tend to exercise in the following six-month period. The preparation stage is the inclination stage in which individuals start exercising in the following 30 days, regardless of whether it is a regular or irregular phase. The action stage represents the individuals who perform regular exercise shorter than six months. The maintenance stage refers to the phase in which individuals exercise on a regular basis for more than six months.

Table 3. 2. Physical Activity Stages of Change

Ranking	Stages of Change	Questions
1	Precontemplation	Q1 = No; Q2 = No
2	Contemplation	Q1 = No; Q2 = Yes
3	Preparation	Q1 = Yes; Q3=No
4	Action	Q1 = Yes; Q3 = Yes; and Q4 = No
5	Maintenance	Q1 = Yes; Q3 = Yes; Q4 = Yes

Note. Q refers to question.

3.3.4. The Exercise Self-Efficacy Questionnaire

The Exercise Self-Efficacy Questionnaire was developed by Nigg and Courneya (1998). The main purpose of this questionnaire is to examine the ability of individuals to maintain exercise behavior in independent positions. The original questionnaire consists of 18 items and 6 sub-dimensions. The components of the six sub-dimensions include the factors of negative impact, making excuses, being able to exercise individually, choosing equipment, psychological pressure felt by other individuals, and bad weather conditions. The score index of the instrument is evaluated on a 5-point Likert type scale for each item (Nigg & Courneya, 1998). The coefficients for internal consistency (Cronbach's Alpha values) in the sub-dimensions vary between .77 and .87. Cronbach's Alpha value for all the items in the questionnaire was determined as .94.

Turkish adaptation of the questionnaire was conducted by Miçooğulları et al. (2010). For the Turkish adaptation study, 247 individuals participated in the study and the six-factor structure of the original scale was taken as a basis in the process. The internal consistency values were revealed for the sub-dimensions ranged between .78 and .93.

3.4. Data Collection Procedures

At the beginning of the study, required approval was obtained from the Middle East Technical University Human Research Ethics Committee. Before the data collection procedures, all aspects of the research process were clearly explained to the study participants and then their consent forms were obtained. The study was based on the voluntary participation of the participants, and they were informed that they had the right to leave any time if they did not want to continue filling out the survey. Participants were asked to fill out demographic information and surveys regarding the research process honestly and completely. Participants were also informed with a secure process so that the online survey was in an anonymous frame and could not be traced back to the identity of the participants. The data collection process for the online survey started on 01 May 2023 and lasted six months and, ended on 31

November 2023. At the end of the data collection procedures, data were analyzed and evaluated regarding the HL, PA levels and ESE of university students.

3.5. Data Analysis

Data analysis was performed via SPSS version 28 for this study. In the data analysis, only participants who completed all sections of the survey were included and others (n=41) were excluded from the study. Descriptive statistics were performed for the first research question of the study. Mean, standard deviations, percentile scores for both genders and total participants were analyzed. For the second research question, a multiple linear regression analysis was conducted to predict the HL of university students based on the PAL, ESE and PA-SOC. Regarding the assumptions of multiple linear regression analyses, the assumption of normality was checked in line with the P-P Plot, Histogram and Scatter Plots and no violations were found. An alpha level was used as .05.

CHAPTER 4

RESULTS

In this chapter, the descriptive findings of the first research question and the multiple regression analysis for the second research question were explained respectively. Analysis of assumptions were also provided in this section.

4.1. Results of Research Question 1

The first question of this study was “What are the basic characteristics of university students with regard to HL, PAL, ESE and PA-SOC?”

Physical Activity

According to the International Physical Activity Questionnaire Short-Form evaluation criteria, PAL of the university students participating in this study was identified as "moderate level” (MET mean = 1820.09). Table 4.1. demonstrates to university students' PA IPAQ MET scores.

Table 4. 1. Physical Activity MET Scores

IPAQ MET	n	%	*M*	SD
Walking MET	103	30.56	246.96	193.33
Moderate MET	197	58.46	1505.62	654.28
Vigorous MET	37	10.97	3707.68	465.01
Total PA MET	337	100.00	1820.09	1132.85

Note: Metabolic Equivalent of Task refers to (MET) and International Physical Activity Questionnaire refers to (IPAQ).

Specifically, the results indicated that out of the 337 participants, 37 individuals had a "vigorous" level of PA, 197 individuals had a "moderate" level of PA, and 103 individuals had a "walking" level of PA. Although the overall PAL of

216 female participants was moderate, women were slightly more active and have achieved better scores compared to 121 male participants (MET mean = 1837.49). Furthermore, 121 male participants were categorized as "moderate" in terms of PAL and indicated slightly lower scores than the female group (MET mean = 1792.06).

Out of total 216 female participants, 26 participants were classified as "vigorous" PAL, 123 participants were categorized as "moderate" PAL, and 67 participants were categorized as "walking" PAL. Out of the total 121 male participants, 11 individuals were classified as having a "vigorous" PAL, which is equivalent to %9.09. Meanwhile, 74 participants were considered to have a "moderate" PAL, which accounts for %61.15 of the total. Ultimately, 36 participants were classified as having a "walking" PAL, which makes up %29.75 of the total.

Health Literacy

Data analysis showed that HL levels of the 337 university students participating in the study was identified as "problematic-limited" level (HL mean = 33.22). Based on the categorization in the scale that applies to the entire population, 73 participants (%21.66) were classified as "insufficient", 142 participants (%42.13) were identified as "problematic-limited", 91 participants (%27.00) were categorized as "adequate", and 31 participants (%10.18) were classified as "excellent" for their HL level.

Out of a total of 216 female participants, 42 participants (%19.44) were categorized as "excellent", 92 participants (%42.59) were categorized as "problematic-limited", 60 participants (%27.77) were classified as "adequate", and 22 participants (%10.18) were classified as "excellent" for their HL level as shown in the Table 4.2.

For the male participants, 31 students (%25.62) were categorized as "insufficient", 50 participants (%41.32) were classified as "problematic-limited", and 31 participants (%25.62) were categorized as "adequate" and 9 participants (%7.43) were classified as excellent in their HL situation. The detailed information about the scores can be found in Table 4.2.

Table 4. 2. Total Health Literacy Scores of University Students

TSOY-32 Levels	Female Students		Male Students		Total for All	
	M	SD	*M*	SD	*M*	SD
Insufficient	21.01	3.33	21.51	2.87	21.22	3.13
Problematic or Limited	29.56	2.01	29.29	2.31	29.47	2.11
Adequate	36.77	2.51	35.93	2.54	36.49	2.54
Excellent	45.85	2.74	45.31	1.87	45.69	2.50
Total HL	33.30	10.55	33.01	10.09	33.22	10.39

Note: Health Literacy refers to (HL).

Exercise Self-Efficacy

The results showed that ESE scores of the 337 university students participating in the study was determined as the average of mean score of 2.70 showing low level of ESE scores. Based on the total scores of both populations, the mean scores of 46 participants out of 337 were classified in the range of 1 to 2, representing a population of %13.65. Additionally, 141 participants had scores ranging from 2 to 3, with %41.83 classified as the largest dimension. Additionally, 119 individuals were identified in the range of 3 to 4, accounting for %35.31 of the population. In the lowest dimension, 31 participants scored %9.19 in the range of 4 to 5 points. Table 4.3. refers to scores on university students' ESE scores. Self-efficacy scores for each gender can be seen in the table.

Table 4. 3. Total Exercise Self-Efficacy Scores (ESE) of University Students

	Female Students		Male Students		Total for All	
ESEQ Factors	*M*	SD	*M*	SD	*M*	SD
Negative Effect	2.31	1.22	2.28	1.20	2.30	1.21
Making Excuses	2.20	1.14	2.22	1.10	2.20	1.13
Individual Exercise	3.52	1.23	3.47	1.18	3.50	1.21
Material Selection	2.25	1.16	2.12	1.17	2.20	1.17
Felt Pressure	3.21	1.26	3.20	1.20	3.21	1.25
Bad Weather Con.	2.79	1.33	2.74	1.316	2.77	1.32
Total ESE	2.71	1.22	2.67	1.119	2.70	1.22

Note: Exercise Self-Efficacy refers to (ESE) and Condition refers to (Con).

Physical Activity Stages of Change

Data analysis presented that 40 (%11.86) students were in the first stage named as "pre-contemplation" stage. This is the stage where individuals do not think about changing their behavior and are determined to carry out the process passively. Majority of students in the study (151, %44.80) were placed in the "contemplation" stage. This stage represents the stage where individuals are inactive with a tendency to exercise but would like to be active in the next six months. For the "preparation" stage, 36 students (%10.68) were placed in it. At this stage, it can be said that individuals tend to develop behavior to carry out the process of being active within 30 days in a healthy way, step by step. In the action stage, 69 students (%20.47) students were identified. This stage as stated before refers to the stage where individuals were active for more than six months. Only 41 (%12.16) students were found in the last stage of maintenance stage which individuals maintain behavioral changes for more than six months and try not to return to previous stages ‘’relapse’’. Table 4.4. represents the results of PA-SOC for the total scores. Gender information can be obtained for this variable as well in the table.

Table 4. 4. Physical Activity Stages of Change Scores

	Female Students		Male Students		Total for All	
Stages	*n*	%	*n*	%	*n*	%
Precontemplation	22	6.52	18	5.34	40	11.86
Contemplation	98	29.08	53	15.72	151	44.80
Preparation	24	7.12	12	3.56	36	10.68
Action	47	13.94	22	6.52	69	20.47
Maintenance	25	7.41	16	4.74	41	12.16

4.2. Results of Research Question 2

The second research question of this study was “To what extent do PAL, ESE, and PA-SOC predict the HL of university students? For the data analysis, assumptions were checked first. Then, multiple linear regression was applied.

4.2.1. Assumptions for Multiple Linear Regression

Regarding the data analysis process, it was important to complete the prerequisites of the assumptions in order to provide reliable and clear results (Zou et al., 2003). The assumptions of the regression analysis need to be considered to determine the validity of the study's findings (Tabachnick et al., 2013). During the analysis process, it is essential that the data is collected and reported in a meticulous framework, meets the requirements of the assumptions and is not affected by any factors (Pallant, 2020).

4.2.1.1. Sample Size

To obtain accurate and reliable results in data analysis using regression models, it is crucial to have an adequate sample size in order generalize the findings. (Cevahir, 2020). Green's (1991) for the sample size in multiple linear regression analysis (MLR) suggests that $n \geq 50+8m^*$ or $n \geq 104+m$ when considering three independent variables, which equals the number of independent variables (Green, 1991). M* refers to number of predictors in the study.

In this study, the number of independent variables was 3 which were PAL, ESE and PA-SOC. So, the sample size should be higher than 74 or 107 in this study. In addition, Stevens (2009) and Green (1991) suggested that the minimum sample size should be calculated was determined as α:0.05, and the power should be determined as 0.80 (Green, 1991; Stevens, 2009).

4.2.1.2. Power Analysis

Since determining the sample size is a fundamental component of any study, it affects the strength of the data and plays an important role in the efficiency of the study (Faul et al., 2009). In accordance with the multiple linear regression analysis, the population of the study was determined as 119 people through G*Power 3.1.9.7 software, with the effect size being 0.15, $\alpha = 0.05$, power $(1-\beta) = 0.95$, and three predictive variables in line with the 95% confidence level. The sample size of this study (n=337) was higher than 119. The minimum target number of this study was 119 based on the analysis.

4.2.1.3. Linearity and Homoscedasticity

To check the linearity of the first assumption in the analysis process, it is required to examine p-p graphs and distribution (Tranmer & Elliot, 2008). After analyzing the data outputs and graphs it was found that the prerequisites of the assumption were met, thereby confirming its validity (Pallant, 2020). Therefore, the linearity assumption was not violated.

To validate the assumption of homoscedasticity, it is required to examine the final graph of the data analysis output (Olive & Olive, 2017). Homoscedasticity refers to whether the different types of apparent components in the residuals are similar in the model and the equal distribution of variance is crucial in this regard. If this assumption is not met, the reliability of the analysis may be compromised (Pallant, 2020; Tabachnick et al., 2013). The graph of standardized residuals versus standardized predicted values is a suitable indicator to validate this assumption (Tranmer et al., 2008). The scatter plots also demonstrated consistent and appropriate values. Therefore, the assumption of homoscedasticity was valid. Figure 1 shows "Scatterplot for Health Literacy Linearity and Homoscedasticity Assumption".

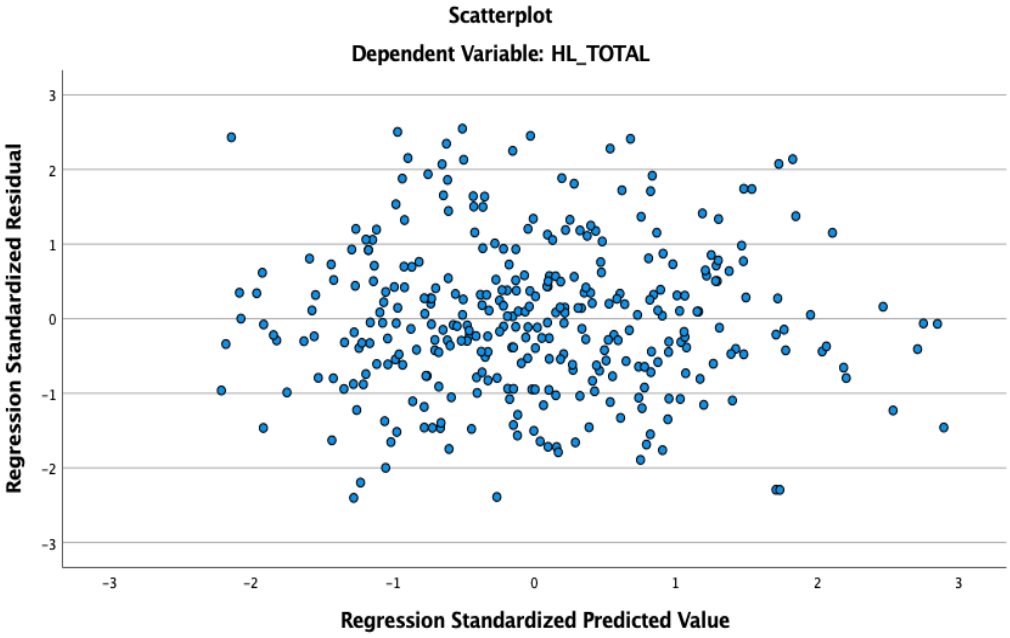


Figure 4. 1. Scatterplot for Health Literacy Linearity and Homoscedasticity Assumption

After examining the graphic, it was determined that there was no evidence of any situation that violates the linearity assumption. Therefore, it may be concluded that the linearity assumption was met as per the indicators presented in Figure 1. This implies that the relationship between the studied variables was linear, on this basis, further analysis may proceed. In addition, it highlights how the points were distributed randomly and evenly throughout the drawing, according to indications that the homoscedasticity assumption was met, and since there were no violations, the homoscedasticity assumption was valid. Figure 2 presents the "Scatterplot for Health Literacy and Physical Activity Level Variables Linearity and Homoscedasticity Assumption".

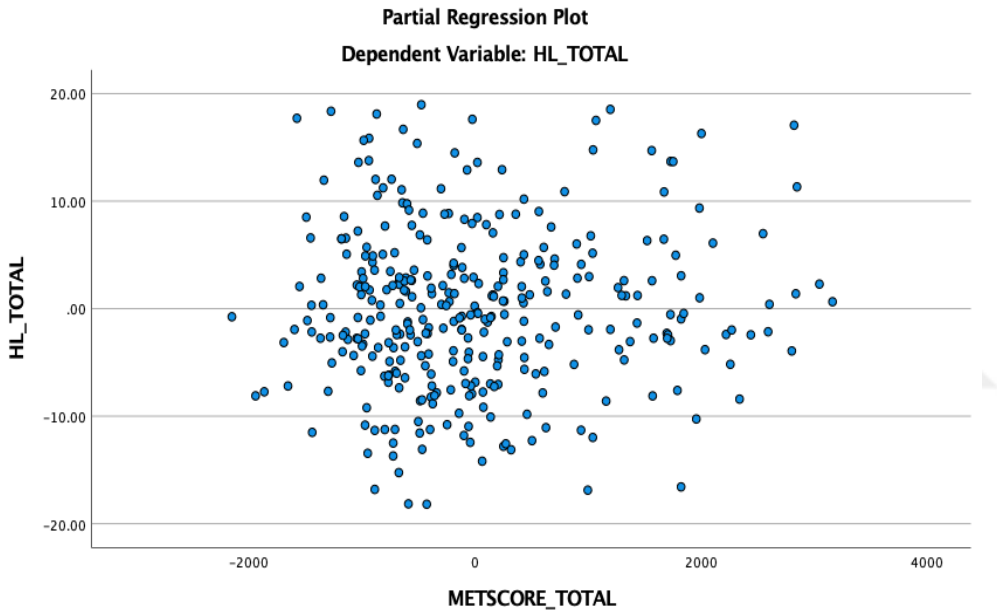


Figure 4. 2. Scatterplot for Health Literacy and Physical Activity Level Variables Linearity and Homoscedasticity Assumption

The graphic showed that there were no instances where this assumption was violated. Additionally, the indicators in Figure 2 confirmed that the assumption of linearity was met by the data. This may suggest that there was a linear relationship between the independent and dependent variables under consideration. Furthermore, it emphasizes that the data points were scattered uniformly and without any discernible pattern across the entire plot, indicating that the assumption of homoscedasticity was satisfied. Since no anomalies or discrepancies were detected, this assumption can be deemed valid.

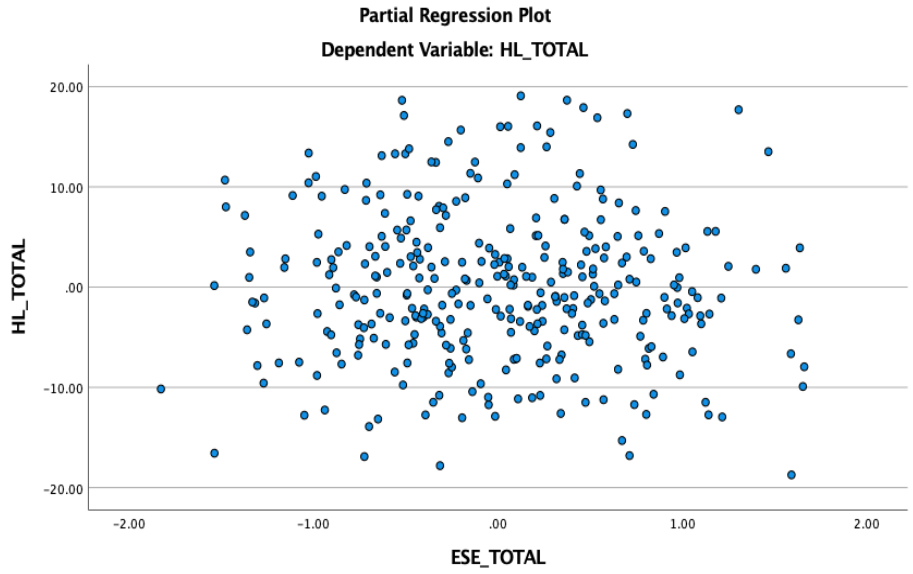


Figure 4. 3. Scatterplot for Health Literacy and Exercise Self-Efficacy Variables Linearity and Homoscedasticity Assumption

The graphic indicates that there were no instances found where the linearity and homoscedasticity assumptions were violated. Additionally, based on the indicators provided in Figure 3, it may be concluded that the linearity and homoscedasticity assumption were met. This implies that the relationship between the variables being analyzed was linear, and any conclusions drawn from the analysis should be taken this into consideration.

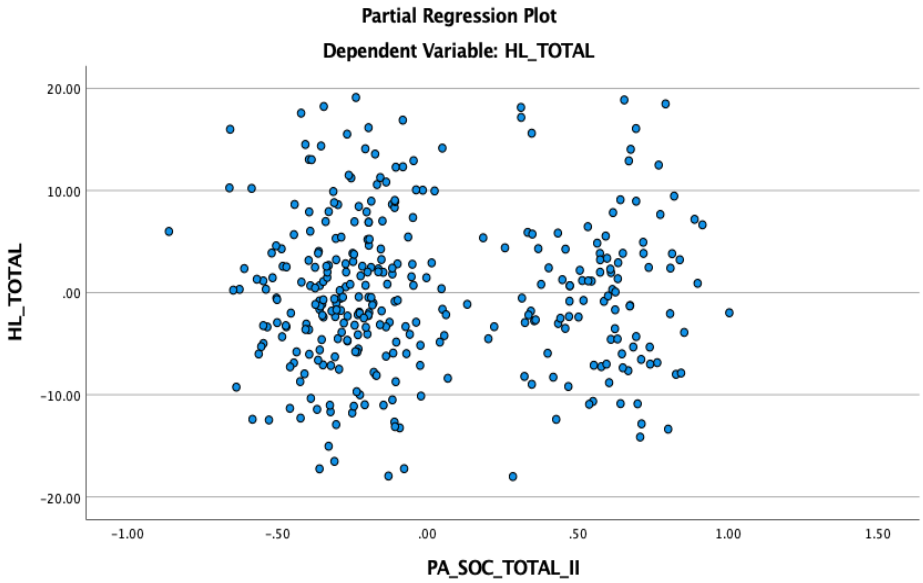


Figure 4. 4. Scatterplot for Health Literacy and Physical Activity Stages of Change Variables Linearity and Homoscedasticity Assumption

The results from the graphic provided evidence that there were no deviations from the linearity and homoscedasticity assumptions. The assumption was well-supported, as indicated by the comprehensive analysis of Figure 4. These findings suggest that the data was consistent with a linear relationship further strengthening the validity of the results. Moreover, it is important to note that the data points were uniformly scattered across the entire plot without any discernible pattern. This was a crucial indicator that the assumption of homoscedasticity, which postulates that the variance of the residuals was constant across all levels of the independent variable, was satisfied. Therefore, it may confidently conclude that there were no anomalies or discrepancies found in the data, and the assumption of homoscedasticity is valid.

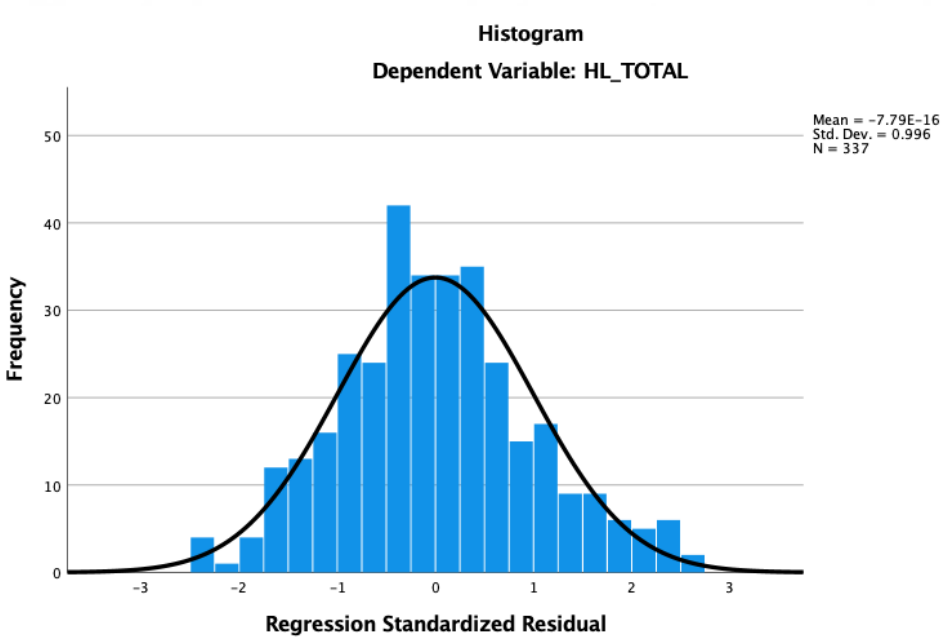


Figure 4. 5. Histogram Chart for Linearity and Homoscedasticity Assumption

The histogram indicated that there were no deviations from the linearity and homoscedasticity assumptions. The analysis of Figure 5 supported this assumption comprehensively, which suggests that the data was consistent with a linear relationship. Furthermore, it is worth noting that the data points were evenly distributed across the entire plot without any identifiable pattern. This was a crucial indicator that the assumption of homoscedasticity was satisfied, which means that the variance of the residuals was constant across all levels of the independent variable.

Therefore, it may be confidently said that there were no anomalies or discrepancies found in the data, and the assumption of homoscedasticity was valid.

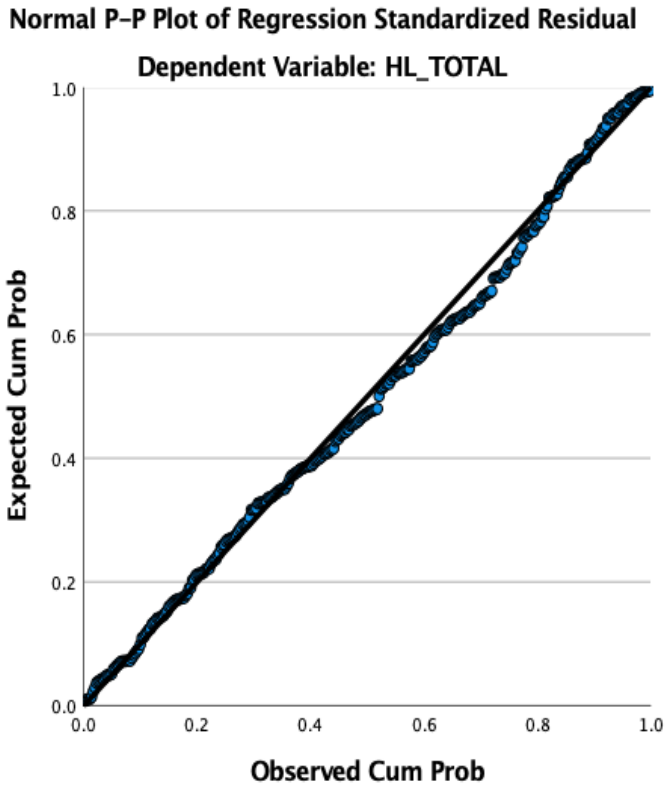


Figure 4. 6. P-P Plot of Regression Standardized Residual Table for Linearity and Homoscedasticity Assumption

The analysis results of the regression standardized residual indicated that the linearity and homoscedasticity assumptions were valid. This was due to the detection of a suitable straight line when examining the values in the normal p-p plot (see Figure 6). The straight line confirmed to the expected pattern for this type of analysis, providing additional support for the validity of the regression model. These findings suggest that the model was reliable and may be used with confidence to make predictions or draw conclusions based on the data.

4.2.1.4. Multicollinearity

To test the multicollinearity assumption, Collinearity Tolerance and VIF statistical values should be checked in the table containing the coefficients regarding the output

of the data analysis (Pallant, 2020). To ensure the accuracy of statistical models, it is important to check the Variance Inflation Factor (VIF) of each independent variable (Field, 2013). According to some sources, the VIF of each independent variable should be less than 10 (or sometimes less than 12) (Tranmer et al., 2008). Additionally, tolerance values should be greater than 0.2 (or sometimes greater than 0.1). These checks help to ensure that the independent variables are not highly correlated and that the model is reliable (Pallant, 2020). Moreover, condition index scores below 30 are a requirement for reliability (Sen & Srivastava 2012; Pallant, 2020).

Table 4. 5. Table of Coefficients for the Multicollienarity Assumption

Coefficients[a]

Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Tolerance	Statistics VIF
1	(Constant)	31.738	1.502		21.124	<.001		
	PAL_TOTAL	.000	.000	.054	.891	.374	.830	1.205
	ESE_TOTAL	-.435	.586	-.045	-.742	.459	.814	1.229
	PA_SOC_TOTAL	.096	.951	.006	.101	.920	.843	1.187

a. Dependent Variable: HL_TOTAL

b. Note: Physical Activity Level refers to (PAL), Exercise Self-Efficacy refers to (ESE) and Physical Activity Stages of Change refers to (PA-SOC).

The results of Figure 7 demonstrate that the Variance Inflation Factor (VIF) scores for all predictor variables were below 10, and the tolerance scores were above 0.2. Specifically, the PAL predictor variable had a VIF score of 1.21 and a tolerance score of 0.83; the PA-SOC predictor variable had a VIF score of 1.19 and a tolerance score of 0.84; and the ESE predictor variable had a VIF score of 0.81 and a tolerance score of 1.23. Therefore, none of the predictor variables indicated a high level of correlation and did not cause any violations so multicollinearity was found to be valid. Therefore, none of the predictor variables showed a high level of correlation and did not cause any violations. Based on these findings, it may be concluded that the data satisfies the assumption of multicollinearity, and the predictor variables may be safely included in the regression analysis.

Table 4. 6. Table of Collinearity Diagnostics for the Multicollienarity Assumption

Collinearity Diagnostics[a]

				Variance Proportions			
Model	Dimension	Eigenvalue	Condition Index	Constant	Met_Score_ Total	Ese_Total	Pa_Soc_Total
1	1	3.186	1.000	.01	.03	.01	.03
	2	.514	2.491	.02	.01	.01	.88
	3	.265	3.467	.04	.94	.02	.04
	4	.035	9.511	.93	.03	.97	.05

a. Dependent Variable: HL_TOTAL

b. Note: Health Literacy refers to (HL), Metabolic Equivalent of Task refers to (MET), Exercise Self-Efficacy refers to (ESE) and Physical Activity Stages of Change refers to (PA-SOC).

The validity of the multicollinearity assumption was supported by the fact that all the values were providing appropriate indicators as per the condition index scores (Field, 2013). Multicollinearity is a statistical phenomenon that occurs when two or more predictor variables in a regression model are highly correlated (Pallant, 2020). This assumption is important as it ensures that the predictors in the model are independent of each other, and thus, their effects on the response variable can be estimated accurately (Field, 2013). When the condition index scores are within acceptable limits, it indicates that the predictors are not highly correlated with each other, and the multicollinearity assumption can be considered valid (Pallant, 2020).

4.2.1.5. Independence of Residuals

Regarding the validity of the fifth assumption, it should be examined whether the Durbin-Watson value is between 1 and 3 (Field, 2013).

Table 4. 7. Model Summary for Assuming Independent or Uncorrelated Residuals

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.057[a]	.003	-.006	7.51164	1.878

a. Predictors: (Constant), PA_SOC_TOTAL, MET_SCORE_TOTAL, ESE_TOTAL

b. Dependent Variable: HL_TOTAL

c. Note: Health Literacy refers to (HL), Metabolic Equivalent of Task refers to (MET), Exercise Self-Efficacy refers to (ESE) and Physical Activity Stages of Change refers to (PA-SOC).

In this study, there were no violations regarding the Durbin-Watson value, which was found to be 1.878. Therefore, this assumption was met.

4.2.1.6. Normality

The normality assumption may only be tested by examining the p-p plot graph to determine whether any residual violates the assumption or meets the validity (Pallant, 2020).

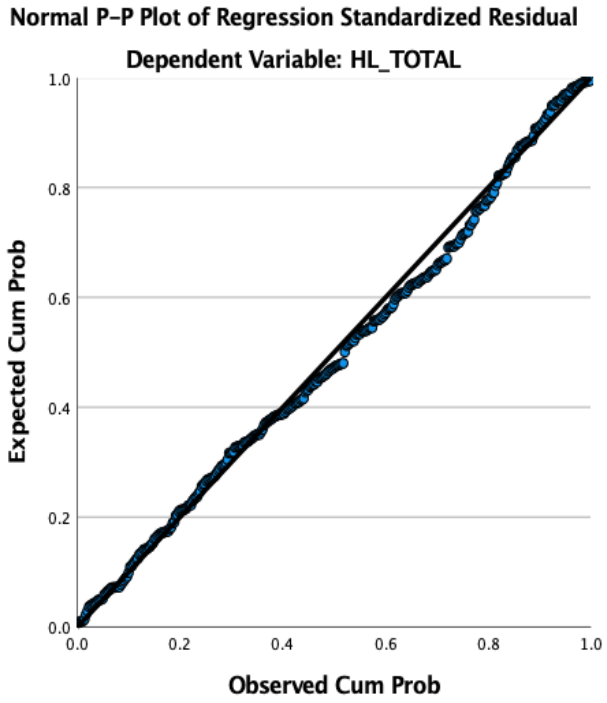


Figure 4. 7. P-P Plot of Regression Standardized Residual Table for Normality Assumption

Based on the graphic presented in Figure 7, a thorough analysis was conducted to determine the validity of the residuals. After careful consideration, it was established

that the residuals were following the assumption, indicating that the data was reliable, and the results were accurate.

4.2.1.7. Outliers

During the multiple regression analysis process, extremely high or low values may be observed in one of the independent variables of a study (Field, 2013). In this regard, in order to test outliers, Z-scores and Cook's Distance values must be calculated and be able to provide the required values (Pallant, 2020). Any of the outliers may directly affect the analysis results of the process on the dependent or independent variables (Tranmer et al., 2008). In such a case, the analysis may need to be reviewed and re-done (Pallant, 2020). From the point of view of the statistical literature, Z-score values should not be 3 or higher (Field, 2013). The value of Cook's Distance is expected to be below 1. Additionally, such an indicator is not considered suitable for assumption and constitutes a violation (Field, 2013). If a value exceeds the value, the analysis process must be carried out again (Pallant, 2020).

Table 4. 8. Residual Statistics Table for Outliers Assumption

	Minimum	Maximum	*M*	SD
Predicted Value	30.14	32.30	31.08	.42461
Std. Predicted Value	-2.211	2.89	.000	1.000
Standard Error of Predicted Value	.500	1.52	.793	.203
Adjusted Predicted Value	29.83	32.69	31.07	.43570
Residual	-18.03	19.14	.00000	7.48
Std. Residual	-2.40	2.55	.000	.996
Stud. Residual	-2.43	2.56	.000	1.002
Deleted Residual	-18.49	19.24	.00043	7.57
Stud. Deleted Residual	-2.45	2.58	.000	1.005
Mahal. Distance	.494	12.80	2.99	2.13
Cook's Distance	.000	.037	.003	.005
Centered Leverage Value	.001	.038	.009	.006

This research study has examined the validity of Cook's Distance by determining its maximum value to be 0.037. During the analysis of the z-score values, it was found that the highest value of HL was 2.53, while the maximum value of ESE was 2.97,

and the maximum value of PAL was 2.67. Additionally, the maximum value of stage of change was found to be 1.43. These results confirm that the current assumption was validated and contribute to a more comprehensive understanding of the variables under examination.

4.2.2. Multiple Linear Regression Analysis Results

Multiple Linear Regression Analysis was conducted to determine to what extent PAL, ESE and PA-SOC predicted the HL of University Students.

Field (2013) emphasized that while data analysis of a multiple linear regression modeling is being carried out, the giving of the model summary table is important for the model type and formula to be able to display it (Field, 2013). In short, the appearance of the model's summary provides a perspective to the model and the model (Field, 2013).

Table 4. 9. Model Summary Table

R	R Square	Adj. R Square	St. Error of the Estimate	Durbin Watson
0.057	0.003	-0.006	7.51164	1.878

According to Pallant (2020), an Analysis of Variance (ANOVA) table must be given regarding the calculations in multiple linear regression analysis (Pallant, 2020). Analysis of Variance table is used to evaluate the overall effect of one, two or more predictors on the result (Pallant, 2020). Analysis of Variance consists of four parts: sums of squares, degrees of freedom, mean squares, and the F statistic (Williams, 2015).

Table 4. 10. Analysis of Variance Table (ANOVA)

	Sum of Squares	df	Mean Square	F	*P*
Regression	60.58	3	20.19	.358	.783
Residual	18789.42	333	56.43		
Total	18849.99	336			

Multiple linear regression analysis was conducted to test to what extent PAL, ESE and PA-SOC predict the HL of university students. In this regard, PAL, ESE and PA-SOC were entered as predictor variables in the multiple linear regression analysis, and HL was entered as the outcome variable. According to the results, the model was nonsignificant, F (3,333) = .358, p > .05. Physical activity level, ESE and PA-SOC accounted for %00.3 variance in HL of university students, R^2 = .003. Physical activity level was a nonsignificant predictor, β = .054, t = .891, p >.05. Exercise self-efficacy was also a nonsignificant predictor, β = -.045, t = -.742, p >. 05. Ultimately, statistical data for the PA-SOC predictor variable indicators β = .006, t = .101, p > .05 were determined as a nonsignificant.

Table 4. 11. Multiple Linear Regression Analysis

	B	Coeff. Std. Error	β	t	p	%95 CI	Tolerance	VIF
Constant (HL)	31.783	1.502		21.124	<.001	28.782		
PA Level Total	.000	.000	.054	.891	.374	.000	.830	1.205
ESE Total	.435	.586	.045	.742	.459	1.589	.814	1.229
PA-SOC Total	.096	.951	.006	.101	.920	1.774	.843	1.187

a. p > .05

b. Note: Health Literacy refers to (HL), Metabolic Equivalent of Task refers to (MET), Exercise Self-Efficacy refers to (ESE) and Physical Activity Stages of Change refers to (PA-SOC).

CHAPTER 5

DISCUSSION, CONCLUSION AND IMPLICATIONS

This study examined the relationship between HL, PAL, ESE, and PA-SOC among university students. In this section, the findings of the research questions were discussed in detail and suggestions that may guide further studies in line with the implications of the study were also included.

5.1. Health Literacy Levels of University Students

The first question was about the general status of university students' HL and PA behaviors. The results indicated that the total score of university students' HL level was identified as a "problematic-limited" level. Unfortunately, the HL level of a large part of the university students was found insufficient in our study. The reason for this might be related to inadequacy knowledge about health among students.

Prior studies had similar findings about HL. For instance, a recent scientific study conducted on university students in Türkiye showed that 45% of the students had a problematic-limited level of HL (Uysal et al., 2020). The researchers attributed the primary reason for the insufficient level of HL being the inadequacy of education curriculum at schools and universities. Similar results were also obtained in a recent study completed in Spain showing that the HL skills and behaviors of university students studying in health sciences were not sufficient. It was emphasized that the reason for the findings providing an indicator was due to deficiencies in the education system and for this reason creating new strategies was needed based on the research findings (Rueda-Medina et al., 2020). Additionally, Elsborg and his colleagues (2017) claimed that school curricula and educational activities should be reconsidered in order to support the HL knowledge of university students (Elsborg et al., 2017).

Rababah and his colleagues (2019) investigated university students' HL in Jordan. According to the research findings, their HL was insufficient. Researchers suggested that demographic components, general education level, and inequalities in society may be the main reasons for this situation. In the dimension of recommendations, the researchers emphasized the inequality in HL based on the field of study and the need to optimize the health outcomes of university students (Rababah et al., 2019).

In light of the findings of previous studies, it should be emphasized that the development and scope of the number of studies based on university students in the literature have a critical role (Torres & Nichols, 2014). Increasing the level of awareness regarding HL and designing studies that may highlight health concepts may be a good approach for this area (McCleary-Jones, 2016). For this reason, qualified and sustainable projects for university students are needed to developed health knowledge (Rudd, 2015). Multidisciplinary studies on HL should be included in the university curriculum of different departments to improve the health knowledge, skill level, and healthy behaviors for university students (Osborn et al., 2011).

Particularly stakeholders from education and health departments may also consult, carry out forward-looking studies, and raise funds for HL of individuals (Kickbusch et al., 2013). Increasing the number of sports areas might be another effective approach so that students might regularly engage in PA on university campuses, which may positively trigger the awareness level of university students about HL (Hsu et al., 2014).

Considering all these suggestions and prior research findings, implementing policies to ensure that healthy lifestyle behaviors are attainable and sustainable among HL university students through collaborating with government institutions and all stakeholders, and making the coverage widespread could provide significant outcomes for public health (Juvinyà-Canal et al., 2020; Uysal et al., 2020).

5.2. Physical Activity Levels of University Students

In this study, the PAL of university students was also examined. According to the findings, the PAL of university students was determined as moderate level

(minimum active category) based on IPAQ MET scores. Although this study did not focus on gender differences, it might be crucial to provide the PAL of university students for different genders. Female students (n=216) were found to be slightly more active than male students (n=121).

Regarding previous national and international studies conducted in the PA literature, different findings were revealed. For example, in a research project conducted on the PAL of university students in Malaysia, the overall PAL of 100 participants was found to be very satisfactory. Regarding gender comparisons, it was determined that men's PAL was much higher than women's PA The main reason for low PAL was moderate and severe obesity problems (Rajappan et al., 2015). In another research study carried out at Tuzla University in Bosnia and Herzegovina, the PAL of university students were found as sufficient. However, the authors stated that even if the PAL of the students was sufficient, there was a need to constantly take measures to promote sports on campuses regarding the development of their health status (Mulahasanović et al., 2018).

In another research about university students from Poland and Tütkiye, it was found that Polish university students were more active than students in Türkiye. Additionally, students in Türkiye did not reach the weekly exercise amount recommended by WHO (Bednerek et al., 2016). Similar findings were reported that 79.8% of the university students in Slovenia did not report adequate PAL (Lipošek et al., 2018). The researchers in this study emphasized that there was a need for adequate sports facilities and equipment so that each faculty student could use actively in their spare time. This was the underlying reason for physical inadequacy among university students (Lipošek et al., 2018).

Similarly, a study conducted in the USA found that the PAL of most university students was not sufficient. It was suggested that more productive strategies be developed at both societal and university levels, especially on university campuses, to encourage students to engage in PA (Leenders et al., 2002).

Based on the key statistics of the World Health Organization, one in four adults does not meet the recommended guidelines. Our research study and previous studies

support these facts. For this reason, effective strategies or programs might be created for university campuses to increase the awareness of university students in terms of PAL. It is also imperative to increase the number of activities on university campuses that might encourage university students to participate in different types of sports (Huang et al., 2021; Sukys et al., 2017). Moreover, increasing the number of such activities may also contribute to the awareness level of university students regarding PA and healthy processes that might positively trigger their level of health knowledge and skills (Keating et al., 2005).

As a result, the development of programs to encourage PA on university campuses and the generation of new ideas to increase their number have the potential to contribute to the PAL of university students (Archer & Blair, 2011). Physical activity and exercise programs among university students should be supported within a sustainable framework in campus policies. It should be also noted that the information about the PAL of university students was gathered by self-reporting via a questionnaire. Objective measurement tools probably provide more accurate information on PAL of university students.

5.3. Exercise Self-Efficacy Levels of University Students

This study also focused on the ESE of university students. According to the data analysis results, there was a partial difference between the ESE levels of the participants (Han et al., 2022). The average value of the general ESE scores of the university students was found as 2.70 showing a low level of self-efficacy. One possible explanation for this result might be the prevalence of physical inactivity among university students in our population.

Exercise self-efficacy is a good indicator of participating in regular exercise among individuals. A research project conducted in China reported that the ESE level of university students (n=500) provided adequate indicators and demonstrated students' commitment to the sustainability of exercise behavior. The researchers recommended that a mandatory course or program in health and physical education or literacy should be instituted in schools/colleges to educate students about the self-efficacy

barriers to PA and the public health benefits associated with PA (Bebeley et al., 2017).

In another exemplary research project conducted in the national literature, ESE levels of university students were investigated. The exercise self-efficacy levels of active students were higher than the inactive group (Miçooğulları et al., 2010). It seems that more physically active individuals tend to have higher ESE levels compared to inactive individuals (Bray, 2007). It might be discussed that the ESE levels of university students and their perception of the concept of exercise might be affected by the level of PA (Şahan et al., 2012). Not surprisingly that, Oral and Aktop (2014) found the ESE level of students in a Physical Education and Sports department was higher than in other faculties. Even though the levels of Physical Education and Sports students were found to be higher, it was determined that they were not sufficient in terms of continuity (Oral & Aktop, 2014).

It is clear that further studies are needed to understand the underlying mechanisms of ESE (Joseph et al., 2014). In this regard, to help move the ESE perceptions of university students to a more positive level, strategic policies should be devised for this field of study. These policies should include improvements in the campus sports policies and providing high-quality PA areas should be increased on university campuses to encourage students to be active (Chiu, 2009; Wang et al., 2020). Furthermore, conducting different types of research on using current theoretical models may contribute to the literature in understanding the underlying mechanisms of ESE (Franko et al., 2008; Zhang, 2022).

5.4. Physical Activity Stages of Change Levels of University Students

The model of PA-SOC is a common method to understand the health behaviors of individuals. In the present study, university students' PA-SOC were also analyzed. The findings indicated that the majority of university students in our study were at the contemplation and pre-contemplation stages (n=191). In line with the findings obtained, it may be said that the PAL of university students is not sufficient according to their PA-SOC information and is even one of the lowest compared to

the populations of the European Union countries (Miçooğulları et al., 2010; Oral & Aktop, 2014).

The findings were aligned with some previous studies. In a research project carried out in Iran, the PAL of the participants were examined with regard to the PA-SOC (Sharifirad et al., 2011). It was revealed that approximately 74% of the participants were in the early stages and were not inclined to be active. It means that the majority of the students had a sedentary lifestyle and could not meet the World Health Organization recommendations for exercise behaviors. The authors suggested that future intervention studies should be carried out to encourage university students to increase their PAL (Sharifirad et al., 2011). Similar findings were also obtained from a study in Türkiye. Cengiz and his colleagues (2009) identified that 72% of 954 university students were unable to demonstrate proficiency in the PA-SOC and they were not active enough. For this reason, further studies on longitudinal changes in exercise activity during college years were recommended and the need to develop strategies to encourage PA among all students was emphasized in the study (Cengiz et al., 2009).

The obstacles that individuals face regarding their participation in PA must be analyzed thoroughly (Patterson et al., 2006). It is also predicted that if such approaches are taken into consideration, individuals' HL and ESE levels may increase (Jeon et al., 2014). For the future, it is important to analyze the reasons why individuals' PAL decrease, especially with industrialization, in a holistic way, to reduce the obstacles as much as possible and to develop strategies accordingly (İmamoğlu, 2020).

5.5. Relationship Between Health Literacy, Physical Activity Level, Exercise Self-Efficacy, Physical Activity Stages of Change in University Students

The second main research question of this study was " To what extent do PAL, ESE, and PA-SOC predict the HL of university students?". The results showed that the independent variables (PAL, ESE, and PA-SOC) of the multiple linear regression model did not provide sufficient indicators regarding the prediction of the dependent

variable of the study (HL). One possible explanation of these findings might be that other important factors (i.e. fitness level) not examined in the study may have a strong influence on predicting the HL of university students. Another explanation might be that university students may not be aware of their PAL and ESE situation. In addition, self-reported PA scores, ESE and PA-SOC might not sensitive predictors for our study participants. Obviously, more research is needed to investigate the role of different factors on the HL of university students.

Our study results were supported by a current study conducted in USA, which revealed that there was no significant relationship between HL and PA in individuals aged 18 and over (Lee et al., 2015). In contrast to these findings, Guntzviller and his colleagues (2017) revealed that there was positive relationship between the concepts of ESE and PA in adult individuals with HL levels of 75% and above (Guntzviller et al., 2017). Moreover, a study conducted among university students in Taiwan found a positive association between HL, exercise, and positive health behaviors. This study implied that individuals with higher HL levels were more likely to engage in physical exercise and other positive health behaviors that promote overall health and well-being (Hsu et al., 2014). According to the findings of a study conducted in Australia on the relationship between PA and HL variables in individuals over the age of 15, it was proven that the HL level of individuals who were physically active enough is sufficient (Adams et al., 2009).

A similar study conducted at the University of Groningen in the Netherlands found positive correlations between HL, PA, and ESE in mutually supportive dimensions (Geboers et al., 2014). Furthermore, in another study conducted in Sydney within the context of PA and HL variables in individuals over the age of 18, it was determined that individuals with insufficient HL tended to be physically inactive (Ho et al., 2018). Exercise self-efficacy and perceived healthy life behaviors were also found associated in many studies (Sidman et al., 2009; Chiu, 2009).

In light of these findings, it can be argued that HL is a critical factor in individuals' health behaviors. Related research in the national and international context should be increased (Cengiz et al., 2009; Leenders et al., 2002; McCleary-Jones, 2016).

5.6. Limitations of the Study

This study has several limitations. The first limitation was that data was only collected from the Anatolian Region of Türkiye. A comprehensive data might be collected from the seven regions of Türkiye for the future studies. The second limitation was the limitations of survey design such as the results might be affected by the participants' motivation, knowledge and behaviors. Qualitative information might be gathered from university students to deeply analyze their PA behaviors and HL. Another limitation might be related to grade level and gender of university students. Majority of students participated in the study were female and graduate level students which may influence the results of the study.

5.7. Implications of the Study

This study has several implications. University policies might be developed to examine the HL of university students on campuses and to improve university students' knowledge about having a healthy lifestyle (Juvinyà-Canal et al., 2020; Wang et al., 2020). Revising or modifying university PA policies to improve HL may be the right approach for this population (Buja et al., 2020). It might be insightful to increase the number of activities on university campuses that might encourage university students to participate in a variety of sports (Huang et al., 2021; Sukys et al., 2017). This might positively trigger their level of knowledge and motor skills of university students (Keating et al., 2005). The development of such programs to encourage PA on university campuses and the generation of new ideas to increase their number have the potential to contribute to the PAL of university students (Archer & Blair, 2011).

Policymakers should conduct multidisciplinary studies on HL of university students in order to get a better understanding of interaction between HL and related factors. Furthermore, university administrators might collaborate with government institutions and stakeholders to consider the role of HL on university students' health and public health (Juvinyà-Canal et al., 2020; Uysal et al., 2020).

5.8. Conclusion and Recommendations for Future Research

This study demonstrated that most of the university students participated in this study had low level of HL and ESE. Their activity level was minimum active and most of them did not tend to maintain an active lifestyle for the next six months. In addition, PA behaviors did not tend to explain the perceived HL among university students in this study. This study may be a stepping stone to examine the actual HL among university students for future studies. Health literacy is considered as an essential component for health promotion. Individuals with limited knowledge of HL tend to have problems related to understanding general health information and health services. In addition, they may tend to develop unhealthy behaviors. Investigating the role of PA participation on HL may provide valuable insights for health promotion of university students. The following recommendations were made for future research studies. Future research should;

a) Examine the HL of university students from different regions of Türkiye to gain a deep understanding of HL status of university students in Türkiye. Conducting research in different regions can have a positive impact on the awareness level of university students and contribute to the generalizability of the results.
b) Include qualitative data collection procedures to analyze the underlying mechanisms of HL knowledge and its applications. In this regard, university students may understand the terms more deeply and improve their knowledge and abilities.
c) Examine the gender and grade level differences in university students' HL, PA behaviors, ESE and PA-SOC. Considering these two components regarding the participants can make significant contributions to the results of the studies.
d) Conduct intervention studies to examine the effects of different types of PA programs on university students' PA behaviors and HL levels. Increasing intervention studies may contribute to more detailed and qualified results about cause-effect relationships regarding the research process.

e) Include objective measurement tools such as accelerometers to measure the real status of PAL of university students. In this direction, the research process can be deepened and more qualified results can be obtained.
f) Develop the knowledge tests of HL for university students to make correct interpretations from the HL-level university students. Testing priority knowledge levels to make better evaluations of the terms of the studies may affect the results.
g) Examine the relationship between physical fitness, diet habits, PA, ESE in university students. These factors have had an impact on the results in previous studies and may be important to consider.
h) Arrange longitudinal studies to track the changes in PA, ESE and PA-SOC and HL among university students. The number of longitudinal studies can be increased in order to observe the participants' behaviors and attitudes in more detail and to reveal the relationship between variables in detail.

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APPENDICES

A. RESEARCH VOLUNTARY PARTICIPATION FORM

Bu çalışma Orta Doğu Teknik Üniversitesi Beden Eğitimi ve Spor Bölümü Yüksek Lisans Öğrencilerinden Mert Oğul Karakuş tarafından tez kapsamında yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Çalışmanın Amacı Nedir?

Bu çalışmanın amacı, üniversite öğrencilerinde fiziksel aktivite seviyesi, egzersiz öz-yeterliliği ve sağlık okuryazarlığı değişkenleri arasındaki ilişkileri değerlendirmektir.

Bize Nasıl Yardımcı Olmanızı İsteyeceğiz?

Çalışmada uygulanacak anketleri fiziksel aktiviteye katılımınızı, sağlık okuryazarlığınızı düşünerek doldurmanızı bekliyoruz.

Sizden Topladığımız Bilgileri Nasıl Kullanacağız?

Araştırmaya katılımınız tamamen gönüllülük temelinde olmalıdır. Cevaplarınız tamamıyla gizli tutulacak, sadece araştırmacı tarafından değerlendirilecektir. Katılımcılardan elde edilecek bilgiler toplu halde değerlendirilecek ve bilimsel yayımlarda kullanılacaktır. Sağladığınız veriler gönüllü katılım formlarında toplanan kimlik bilgileri ile eşleştirilmeyecektir.

Katılımınızla ilgili bilmeniz gerekenler:

Çalışmada 4 anketi ve demografik bilgi formunu doldurmanız istenmektedir ve bu çalışma herhangi risk içermemektedir. Katılım sırasında sorulardan ya da herhangi başka bir nedenden ötürü kendinizi rahatsız hissederseniz cevaplama işini yarıda bırakıp çıkmakta serbestsiniz. Böyle bir durumda çalışmayı uygulayan kişiye, çalışmadan çıkmak istediğinizi söylemek yeterli olacaktır. Çalışma sonunda, bu araştırmayla ilgili sorularınız cevaplanacaktır.

Araştırmayla ilgili daha fazla bilgi almak isterseniz: Bu çalışmaya katıldığınız için şimdiden teşekkür ederiz. Çalışma hakkında daha fazla bilgi almak için Beden Eğitimi ve Spor Bölümü yüksek lisans öğrencilerinden Mert Oğul Karakuş ile (karakuş.mert@metu.edu.tr) iletişim kurabilirsiniz. Bu çalışmaya katılımınız için şimdiden teşekkür ederiz.

Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum.

(Formu doldurup imzaladıktan sonra uygulayıcıya geri veriniz).

İsim Soyad	Tarih	İmza
	----/----/-----	

B. DEMOGRAPHIC INFORMATION FORM

Sayın Katılımcı,

Bu çalışmanın temel amacı, üniversite öğrencilerinde fiziksel aktivite düzeyi, egzersiz öz-yeterliliği ve sağlık okuryazarlığı değişkenleri arasındaki ilişkiyi incelemektir. Kişisel bilgileriniz kesinlikle gizli tutulacaktır; kimliğinizi belirtecek bilgiler vermeniz istenmemektedir. Sizden istenen sorulara içten ve eksiksiz yanıtlar vermenizdir.

Katılımınız için teşekkür ederiz.

1. Doğum yılınız:

2. Cinsiyetiniz: □ Kadın □ Erkek

3. Boyunuz (cm):

4. Kilonuz (kg):

5. Bölümünüz:

6. Sınıfınız: □ Hazırlık □ 1. Sınıf □ 2. Sınıf □ 3. Sınıf □ 4. Sınıf □ 5. Sınıf □ Lisansüstü

7. Bir spor topluluğuna üye misiniz? □Evet □Hayır

7-A) Üye iseniz, üye olduğunuz spor topluluklarını belirtiniz:

8. Düzenli egzersiz yapıyor musunuz? □Evet □Hayır

8) Cevabınız EVET ise **haftada** kaç saat? □ 2.5 saatin altında □ 2.5 saatinin üstünde

9. **Günlük** egzersize ayırdığınız ortalama süre (**dk**):

10. Yaptığınız sporlar (egzersiz & fiziksel aktivite):

11. Günlük ekran (bilgisayar/tablet/televizyon/telefon vb.) başında geçirilen süre (**dk**):

C. THE TURKISH HEALTH LITERACY QUESTIONNAIRE

Madde No	Çok kolaydan zora değerlendirecek olursanız <u>aşağıdakileri yapmak</u> sizin için ne derece kolay/zordur?	1. Çok kolay	2. Kolay	3. Zor	4. Çok zor	5. Fikrim yok
1	Sağlığınızla ilgili bir şikâyetiniz olduğunda, bunun bir hastalık olup olmadığını araştırıp bulmak					
2	Sağlığınızla ilgili bir şikâyetiniz olduğunda, bu konudaki herhangi bir yazıyı (broşür, kitapçık, afiş gibi) okuyup anlamak					
3	Sağlığınızla ilgili bir şikâyetiniz olduğunda, bu konuda ailenizin ya da arkadaşlarınızın tavsiyelerinin güvenilir olup olmadığını değerlendirmek					
4	Bir sağlık kuruluşuna gitmek istediğinizde, hangi doktora başvurmanız gerektiğini araştırıp bulmak					
5	Bir sağlık kuruluşuna gitmek istediğinizde başvurunuzu (randevu almak gibi) nasıl yapacağınızı araştırıp bulmak					
6	Bir sağlık kuruluşuna gitmek istediğinizde, telefon ya da internet aracılığı ile randevu almak					
7	Sizi ilgilendiren hastalıkların tedavileri ile ilgili bilgileri araştırıp bulmak					
8	Doktorunuzun hastalığınızla ilgili açıklamalarını anlamak					
9	Doktorunuzun önerdiği farklı tedavi seçeneklerinin avantaj ve dezavantajlarını değerlendirmek					
10	Sağlıkçıların (doktor, eczacı gibi) önerdikleri biçimde ilaçlarınızı kullanmak					
11	İlaç kutusundaki ilacı kullanmanıza yönelik talimatları anlamak					
12	Farklı bir doktordan ikinci bir görüş almaya ihtiyaç duyup duymadığınıza karar vermek					
13	Tahlil/tetkik öncesi hazırlıklarla (diyet uygulamak gibi) ilgili bilgileri anlamak					

14	Hastanede ulaşmak istediğiniz birimin (laboratuvar, poliklinik gibi) yerini arayıp bulmak					
15	Acil bir durumda (kaza, ani sağlık sorunu gibi) ne yapabileceğine karar vermek					
16	Gerekli olduğu durumlarda ambulans çağırmak					
17	Doktorunuzun size önerdiği şekilde, düzenli aralıklarla sağlık takip ve kontrollerinizi yaptırmak					
18	Fazla kilolu olma, yüksek tansiyon gibi sağlığınız için zararlı olabilecek durumlarla ilgili bilgiye araştırıp bulmak					
19	Fazla kilolu olma, yüksek tansiyon gibi sağlığınız için zararlı olabilecek durumlarla ilgili sağlık uyarılarını anlamak					
20	Sigara içme, yetersiz fiziksel aktivite gibi sağlıksız davranışlarla nasıl başa çıkacağıyla ilgili bilgiyi araştırıp bulmak					
21	Sigara içme, yetersiz fiziksel aktivite gibi sağlıksız davranışlarla nasıl başa çıkacağıyla ilgili sağlık uyarılarını anlamak					
22	Yaşınız, cinsiyetiniz ve sağlık durumunuzla ilişkili olarak yaptırmanız gereken sağlık taramaları (kadınlar için meme, erkekler için prostat kaynaklı hastalıklara yönelik taramalar gibi) ile ilgili bilgiyi araştırıp bulmak					
23	İnternet, gazete, televizyon, radyo gibi kaynaklarda daha sağlıklı olmak için yapılması gereken önerilen bilgileri anlamak					
24	İnternet, gazete, televizyon, radyo gibi kaynaklarda daha sağlıklı olmak için yapılması gereken önerilen bilgilerin güvenilir olup olmadığına karar vermek					
25	Gıda ambalajları üzerinde sağlığınızı etkileyebileceğinizi düşündüğünüz bilgileri anlamak					
26	Yaşadığınız çevrenin (ev, sokak, mahalle gibi) sağlığı etkileyen olumlu ve olumsuz özelliklerini değerlendirmek					
27	Yaşadığınız çevrenin (ev, sokak, mahalle gibi) daha sağlıklı olması için neler yapılabileceği ile ilgili bilgileri bulmak					
28	Gündelik davranışlarınızdan hangilerinin (spor yapmak, sağlıklı beslenmek, sigara kullanmamak gibi) sağlığınızı etkilediğini değerlendirmek					
29	Sağlığınız için yaşam tarzınızı (spor yapmak, sağlıklı beslenmek, sigara kullanmamak gibi) sağlığınızı etkilediğini değerlendirmek					
30	Diyetisyen tarafından yazılı olarak verilen diyet listesini uygulayabilmek					

31	Ailenize ya da arkadaşlarınıza daha sağlıklı olmaları konusunda önerilerde bulunmak					
32	Sağlıkla ilgili politika değişikliklerini yorumlamak					

D. EXERCISE SELF-EFFICACY SCALE

Aşağıdaki cümlede boşluk bırakılan yeri, alt satırlardaki ifadelerle tamamlayarak okuyup değerlendiriniz. *Düzenli fiziksel etkinliklere/egzersize, _____ katılabileceğimden eminim.*	Hiç emin değilim	Emin değilim	Kararsızım	Eminim	Çok eminim
Çok stres altında olduğumda	1	2	3	4	5
Depresyonda olduğumda	1	2	3	4	5
Kaygılı olduğumda	1	2	3	4	5
Zamanımın olmadığını hissettiğimde	1	2	3	4	5
Canım istemiyorsa	1	2	3	4	5
Meşgul olduğumda	1	2	3	4	5
Yalnız olduğumda	1	2	3	4	5
Yalnız egzersiz yapmam gerektiğinde	1	2	3	4	5
Birlikte egzersiz yaptığım arkadaşım o gün egzersiz yapmak istemediğinde	1	2	3	4	5
Egzersiz araçlarına ulaşım imkânım olmadığında	1	2	3	4	5
Seyahatte olduğumda	1	2	3	4	5
Spor yaptığım salon kapalı olduğunda	1	2	3	4	5
Arkadaşlarım egzersiz yapmamı istemediklerinde	1	2	3	4	5
Benim için önemli kişiler egzersiz yapmamı istemediğinde	1	2	3	4	5
Zamanımı spor yapmayan arkadaşlarım veya ailem/yakınlarım ile geçirdiğimde	1	2	3	4	5
Hava yağmurlu veya karlı olduğunda	1	2	3	4	5
Dışarısı soğuk olduğunda	1	2	3	4	5
Yollar veya kaldırımlar karlı olduğunda	1	2	3	4	5

E. INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

İnsanların günlük hayatlarının bir parçası olarak yaptıkları fiziksel aktivite tiplerini bulmayla ilgileniyoruz. Sorular son 7 gün içerisinde fiziksel olarak harcanan zamanla ilgili olarak sorulacaktır. Lütfen yaptığınız aktiviteleri düşünün; işte, evde, bir yerden bir yere giderken, boş zamanlarınızda yaptığınız spor, egzersiz veya eğlence aktiviteleri. Son 7 günde yaptığınız şiddetli aktiviteleri düşünün. Şiddetli fiziksel aktiviteler zor fiziksel efor yapıldığını ve nefes almanın normalden çok daha fazla olduğu aktiviteleri ifade eder. Sadece herhangi bir zamanda en az 10 dakika yaptığınız bu aktiviteleri düşünün.

1.Geçen 7 gün içerisinde kaç gün ağır kaldırma, kazma, aerobik, basketbol, futbol veya hızlı bisiklet çevirme gibi şiddetli fiziksel aktivitelerden yaptınız?

Haftada___gün

□ Şiddetli fiziksel aktivite yapmadım. → (3.soruya gidin.)

2.Bu günlerin birinde şiddetli fiziksel aktivite yaparak genellikle ne kadar zaman harcadınız?

Günde ___ saat

Günde ___ dakika

□ Bilmiyorum/Emin değilim

Geçen 7 günde yaptığınız orta dereceli fiziksel aktiviteleri düşünün. Orta dereceli aktivite orta derece fiziksel güç gerektiren ve normalden biraz sık nefes almaya neden olan aktivitelerdir. Yalnız bir seferde en az 10 dakika boyunca yaptığınız fiziksel aktiviteleri düşünün.

3.Geçen 7 gün içerisinde kaç gün hafif yük taşıma, normal hızda bisiklet çevirme, halk oyunları, dans, bowling veya çiftler tenis oyunu gibi orta dereceli fiziksel aktivitelerden yaptınız? Yürüme hariç.

Haftada___gün

□Orta dereceli fiziksel aktivite yapmadım. → (5.soruya gidin.)

4.Bu günlerin birinde orta dereceli fiziksel aktivite yaparak genellikle ne kadar zaman harcadınız?

Günde ___ saat

Günde ___ dakika

□ Bilmiyorum/Emin değilim

Geçen 7 günde yürüyerek geçirdiğiniz zamanı düşünün. Bu işyerinde, evde, bir yerden bir yere ulaşım amacıyla veya sadece dinlenme, spor, egzersiz veya hobi amacıyla yaptığınız yürüyüş olabilir.

5.Geçen 7 gün, bir seferde en az 10 dakika yürüdüğünüz gün sayısı kaçtır?

Haftada___gün

□ Yürümedim. → (7.soruya gidin.)

6.Bu günlerden birinde yürüyerek genellikle ne kadar zaman geçirdiniz?

Günde ___ saat

Günde ___ dakika

□ Bilmiyorum/Emin değilim

Son soru, geçen 7 günde hafta içinde oturarak geçirdiğiniz zamanlarla ilgilidir. İşte, evde, çalışırken ya da dinlenirken geçirdiğiniz zamanlar dahildir. Bu masanızda, arkadaşınızı ziyaret ederken, okurken, otururken veya yatarak televizyon seyrettiğinizde oturarak geçirdiğiniz zamanları kapsamaktadır.

7.Geçen 7 gün içerisinde, günde oturarak ne kadar zaman harcadınız?

Günde ___ saat

Günde ___ dakika

 Bilmiyorum/Emin değilim

F. EXERCISE STAGES OF CHANGE QUESTIONNAIRE

Her soru için **evet** veya **hayır** seçeneğini işaretleyiniz. Lütfen soruları dikkatli okuyunuz.

Orta düzeyde fiziksel aktiviteler nefes alımında ve kalp atımında biraz artış gösteren aktivitelerdir. Ritimli yürüyüş, dans, bahçe işleri, düşük şiddette yüzme veya arazide bisiklet sürme gibi aktiviteler orta düzeyde aktivite olarak değerlendirilir.

1) Şu anda orta düzeyde fiziksel aktiviteye katılmaktayım.

HAYIR EVET

2) Gelecek 6 ayda orta düzeyde fiziksel aktiviteye katılımımı arttırmak niyetindeyim. HAYIR EVET

Orta düzeyde fiziksel aktivitenin düzenli sayılabilmesi için, aktivitenin haftada 5 veya daha fazla günde 30 dakika veya daha fazla olması gerekir.

Örneğin, 30 dakika süreyle yürüyüş yapabilir veya 10 dakikalık 3 farklı aktivite ile 30 dakikayı doldurabilirsiniz.

3) Şu anda düzenli olarak orta düzeyde fiziksel aktivite yapmaktayım.

HAYIR EVET

4) Son 6 aydır düzenli olarak fiziksel aktiviteye katılmamaktayım.

HAYIR EVET

APPENDICES

G. APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
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07 NİSAN 2023

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç. Dr. Irmak Hürmeriç Altunsöz

Danışmanlığını yürüttüğünüz Mert Oğul Karakuş'un **"Üniversite Öğrencilerinde Sağlık Okuryazarlığı, Fiziksel Aktivite, ve Egzersiz Öz-Yeterlik değişkenleri Arasındaki İlişkinin İncelenmesi"** başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek **0195-ODTUİAEK-2023** protokol numarası ile onaylanmıştır

Bilgilerinize saygılarımla sunarım

Prof. Dr. Ş. Halil [illegible]
Başkan

Prof.Dr. İ.Semih Akçomak
Üye

[illegible] Ali Emre Turgut
Üye

Doç.Dr. Şerife SEVİNÇ
Üye

Dr. Öğretim [illegible] Perit ÇAKIR

Dr. Öğretim Üyesi Süreyya ÖZCAN KABASAKAL
Üye

Dr. Öğretim Üyesi Müge GÜNDÜZ
Üye

H. TURKISH SUMMARY / TÜRKÇE ÖZET

Giriş

Son yıllarda önemli ölçüde artan teknolojik gelişmeler ve sanayileşme, toplumlarda her geçen gün birçok türde bulaşıcı hastalığın ortaya çıkmasına neden olmuştur (Woessner et al., 2021). Hızla gelişen ve değişen teknolojinin, bireylerin günlük yaşam tarzlarını ve sağlıkla ilgili davranışlarını doğrudan etkilemesinin yanı sıra, gençler arasında fiziksel hareketsizliği de olumsuz yönde etkilemektedir (Bulut, 2013; Huang & Ren, 2020; Leenders ve ark., 2002). Özelikle, ergenlik ve yetişkinliğe geçiş döneminde bireyler hareketsiz bir yaşam tarzına, sağlıksız beslenme ve uyku alışkanlıklarına, yüksek düzeyde strese ve birçok kronik hastalığa yatkın olabiliyor.

Bu bakımdan gençlerin sağlıklarıyla ilgili kritik konularda nitelikli bilgi alabilmeleri ve aldıkları bilgiler doğrultusunda doğru kararlar verebilmeleri için sağlık okuryazarlığı becerisine sahip olmaları gerekmektedir (Elsborg ve ark., 2017; Frings ve ark., 2022). Ayrıca gençlerin sağlık süreçleriyle ilgili doğru kararlar alabilmeleri ve süreci etkin yönetebilmeleri için sorumluluk almaları gerekmektedir (Gorczynski ve ark., 2017; Hsu ve ark., 2014; Sørensen et al., 2012). Başka bir deyişle sağlıklarını koruyabilmeleri için sağlık okuryazarlığı becerilerinin üst düzeyde olması gerekmektedir.

Sağlık okuryazarlığının yaygın olarak kabul edilen tanımı; kitaplar, web siteleri veya sosyal medya platformları gibi farklı kaynaklardan sağlıkla ilgili bilgileri okuma, anlama ve analiz etme yeteneğidir (Nutbeam ve Muscat, 2021). Sağlık okuryazarlığı, halk sağlığı alanında güncel bir konu olan sağlıkla ilgili beceri, motivasyon ve bilgiyi içermektedir (Squiers ve ark., 2012). Dünya Sağlık Örgütü, sağlık okuryazarlığının bireylerin sağlığının geliştirilmesi için vazgeçilmez bir faktör olduğunu belirtmeketdir. Yapılan araştırmalarda yetişkinlik dönemine adım atan bireylerin

sağlık okuryazarlığı ile fiziksel aktivite davranışları arasında pozitif yönde ilişki olduğu bulunmuştur (Huang ve ark., 2021). Ancak, araştırma bulguları, üniversite öğrencilerinin fiziksel aktivite düzeylerinin önerilen yönergeleri karşılayacak kadar iyi olmadığını göstermektedir (Castro ve ark., 2020). Bu durum öğrencilerin sağlık konusunda bilgi eksikliklerinden kaynaklanıyor olabilir. Yetersiz, sorunlu veya sınırlı sağlık okuryazarlığı düzeyine sahip üniversite öğrencileri, sağlık hizmetlerine erişim, anlama ve sürecini yönetme konusunda zorluklarla karşılaşmaktadır (Osborn ve ark., 2011). Üniversite öğrencilerinin fiziksel aktivite, egzersiz ve sağlık okuryazarlığı konusunda farkındalığının arttırılması büyük önem taşımaktadır. Bu, bireyin daha sağlıklı bir yaşam tarzına bakış açısının değişmesini kolaylaştıracaktır (Dinçer ve Kurşun, 2017; Forde, 2018).

Sağlık okuryazarlığı, fiziksel aktivite ve değişimin fiziksel aktivite aşamaları arasındaki ilişkinin incelenmesi, halk sağlığı için etkili stratejilerin geliştirilmesine yönelik fikir verebilir.

Çalışmanın Amacı

Bu araştırmanın amacı üniversite öğrencilerinde sağlık okuryazarlığı, fiziksel aktivite düzeyi, egzersiz öz yeterliliği ve fiziksel aktivite değişim aşamaları arasındaki ilişkinin incelenmesidir.

Çalışmanın Önemi

Teknolojinin günden güne gelişmesiyle birlikte ağır iş yükü, ekran karşısında geçirilen zamanın artması, yorgunluk, dengesiz beslenme, hareketsiz yaşam tarzını benimseme, sosyokültürel ve sosyoekonomik sorunlar, zihinsel ve fiziksel baskının yüksek olması gibi olumsuz bileşenler de beraberinde geliyor. Tüm bu nedenler göz önüne alındığında, bireylerin özellikle sağlıkla ilgili bilgi talepleri çerçevesinde nitelikli bilgiye erişme ihtiyacı, bilgiyi ne ölçüde anlamlandırdıkları ve bu bilgiyi yaşam tarzlarına ne ölçüde yansıtabildikleri ön plana çıkmıştır.

Küresel bağlamda bireylerin fiziksel aktiviteden yoksun bir yaşam sürmesi, egzersize yeterli zaman ayırmaması veya hareketsiz kalması ülkelerin sağlık sistemlerini ciddi

şekilde tehdit etmekte ve hipertansiyon, kalp-damar hastalıkları, diyabet, kanser, periferik damar hastalıkları, anatomik bozukluklar gibi ciddi sorunların görülme riskini tetiklemektedir. Bu nedenler doğrultusunda mevcut çalışma, sağlık okuryazarlığı kavramlarının bireylerin fiziksel aktivite düzeyi, egzersiz öz-yeterliği ve fiziksel aktiivte değişim basamakalrı arasındaki ilşkini incelenmesi açısından önemli bilgiler sağlayacaktır.

ARAŞTIRMA SORULARI

Bu çalışmanın araştırma soruları şunlardır;

1. Üniversite öğrencilerinin sağlık okuryazarlığı, fiziksel aktivite düzeyi, egzersiz öz yeterliliği ve fiziksel aktivite değişim aşamalarına ilişkin genel özellikleri nelerdir?
2. Üniversite öğrencilerinin sağlık okuryazarlığını fiziksel aktivite düzeyleri, egzersiz öz yeterliliği ve fiziksel aktivite değişim aşamaları ne ölçüde yordamaktadır?

Araştırmanın Yöntemi

Bu çalışmada nicel araştırma yöntemi kullanılmıştır (Creswell, 2005). Ekolojik model bu araştırmanın temelini oluşturmuştur ve fiziksel aktivite düzeyi, egzersiz öz-yeterliliği ve fiziksel aktivite değişim aşamaları gibi bireysel faktörler, tanımlayıcı araştırmalar için üniversite öğrencilerinin sağlık okuryazarlığının yorumlanmasında yardımcı olabilir (Sallis & Owen, 2015).

Evren ve Örneklem

Bu çalışmada amaçlı örnekleme yöntemi kullanılmıştır. Araştırmanın örneklemini farklı sınıf ve bölümlerde okuyan 216'i kadın, 121'si erkek toplam 337 üniversite öğrencisi oluşturmuştur. Katılımcılar Anadolu'nun iki büyük ili olan Ankara ve Eskişehir'den seçilmiştir. Bu şehirlerin seçilmesinin nedeni Ankara ve Eskişehir'in birbirine çok yakın olması ve Türkiye'nin farklı bölgelerinden gelen üniversite öğrencilerinin de aralarında bulunduğu çok sayıda büyük devlet üniversitesinin bulunmasıdır.

Veri Toplama Araçları

Araştırmada kullanılan tüm araçlar için e-posta yoluyla yazarlardan izin alınmıştır. Veri toplama araçları olarak Türkiye Sağlık Okuryazarlığı Ölçeği 32, Uluslararası Fiziksel Aktivite Anketi Kısa-Form, Egzersiz Öz-Yeterlilik Anketi ve Fiziksel Aktivite Değişim Aşamaları Anketleri kullanılmıştır.

Veri Toplama Süreci

Araştırmanın başlangıcında Orta Doğu Teknik Üniversitesi İnsan Araştırmaları Etik Kurulu'ndan gerekli onay alınmıştır. Veri toplama işlemlerinden önce katılımcılara araştırma sürecinin tüm yönleri açık bir şekilde anlatılmış ve onam formları alınmıştır. Araştırma katılımcıların gönüllü katılımı esas alınarak yapılmış, anketi doldurmaya devam etmek istememeleri halinde diledikleri zaman ayrılma haklarının olduğu bilgisi verilmiştir. Katılımcılardan demografik bilgileri ve araştırma sürecine ilişkin anketleri dürüst ve eksiksiz doldurmaları istenmiştir.

Verilerin Analizi

Veri analizi SPSS versiyon 28 kullanılarak yapılmıştır. Verilerin analizine sadece anketin tüm bölümlerini dolduran katılımcılar dahil edilmiş, diğerleri (n=41) çalışma dışı bırakılmıştır. İlk soru için tanımlayıcı istatistikler yapıldı. İkinci araştırma sorusu için çoklu doğrusal regresyon analizi yapılmıştır. Çoklu doğrusal regresyon analizlerinin varsayımlarına ilişkin olarak P-P Grafiği, Histogram ve Dağılım Grafikleri doğrultusunda normallik varsayımı kontrol edilmiş ve herhangi bir ihlale rastlanmamıştır. Alfa düzeyi 0,05 olarak kullanıldı.

BULGULAR

Birinci Araştırma Sorusuna İlişkin Bulgular

Bu çalışmanın ilk sorusu "Üniversite öğrencilerinin sağlık okuryazarlığı, fiziksel aktivite düzeyi, egzersiz öz yeterliliği ve fiziksel aktivite değişim aşamalarına ilişkin temel özellikleri nelerdir?"

Fiziksel Aktivite Düzeyi

Uluslararası Fiziksel Aktivite Anketi Kısa Form değerlendirme kriterlerine göre bu çalışmaya katılan üniversite öğrencilerinin fiziksel aktivite düzeyi "minimal aktif düzey" (MET ortalaması = 1820,09) olarak belirlenmiştir. Veri analizine göre, 216 kadın katılımcının genel fiziksel aktivite düzeyi minimal aktif düzeyde olmasına rağmen, kadınlar 121 erkek katılımcıya kıyasla biraz daha aktifti ve daha iyi puanlar elde ettiler (MET ortalaması = 1837,49). Ayrıca 121 erkek katılımcı fiziksel aktivite düzeyi açısından "minimal aktif düzey" olarak sınıflandırılmış ve kadın gruba göre biraz daha düşük puanlar göstermiştir (MET ortalaması = 1792,06).

Toplam 216 kadın katılımcının 26'sı %12,03 "kuvvetli" fiziksel aktivite düzeyi, 123 katılımcı %56,94 "orta" fiziksel aktivite düzeyi ve 67 katılımcı %31,01 "düşük" fiziksel aktivite düzeyi olarak sınıflandırıldı. Toplam 121 erkek katılımcıdan 11'i %9,09'a denk gelen "yüksek" fiziksel aktivite seviyesine sahip olarak sınıflandırılırken, 74 katılımcı ise toplamın %61,15'ini oluşturan "orta" fiziksel aktivite seviyesine sahip olarak değerlendirildi. Sonuçta 36 katılımcı, toplamın %29,75'ini oluşturan "düşük" fiziksel aktivite düzeyine sahip olarak sınıflandırıldı.
Genel olarak, çalışma, 337 katılımcıdan 37 kişinin veya %10,97'sinin "yüksek" düzeyde fiziksel aktiviteye sahip olduğunu, 197 kişinin veya %58,46'nın "orta" düzeyde fiziksel aktiviteye sahip olduğunu ve 103 kişinin veya %30,56'nın "düşük" düzeyde fiziksel aktiviteye sahip olduğunu bulunmuştur.

Sağlık Okuryazarlığı Düzeyi

Verilerin analizi, araştırmaya katılan 337 üniversite öğrencisinin sağlık okuryazarlığı düzeylerinin “sorunlu-sınırlı” düzeyde (sağlık okuryazarlığı ortalaması = 33,22) olarak tanımlandığını gösterdi. Ölçekte evrenin tamamına uygulanan sınıflandırmaya göre 73 katılımcı (%21,66) “yetersiz”, 142 katılımcı (%42,13) “sorunlu-sınırlı”, 91 katılımcı (%27,00) kategorize edildi. sağlık okuryazarlığı düzeyine göre “yeterli”, 31 katılımcı (%10,18) ise “mükemmel” olarak sınıflandırıldı. Toplam 216 kadın katılımcının 42'si (%19,44) “mükemmel”, 92 katılımcısı (%42,59) “sorunlu-sınırlı”, 60 katılımcısı (%27,77) “sorunlu-sınırlı” olarak sınıflandırıldı. “yeterli” olup, 22 katılımcı (%10,18) sağlık okuryazarlığı düzeyine göre “mükemmel” olarak

sınıflandırılmıştır. Erkek katılımcılardan 31 öğrenci (%25,62) “yetersiz”, 50 katılımcı (%41,32) “sorunlu-sınırlı”, 31 katılımcı (%25,62) “yeterli” olarak sınıflandırılmış olup, 9 katılımcı (%7,43) sağlık okuryazarlığı açısından mükemmel olarak sınıflandırıldı.

Egzersiz Öz-Yeterlilği

Araştırmaya katılan 337 üniversite öğrencisinin egzersiz öz-yeterlik puanlarının ortalamasının 2,70 (düşük düzey) olarak bulunmuştur. Her iki popülasyonun toplam puanlarına göre 337 katılımcıdan 46'sının ortalama puanları 1 ile 2 aralığında sınıflandırıldı ve bu da %13,65'lik bir popülasyonu temsil ediyordu. Ayrıca 141 katılımcının 2 ile 3 arasında değişen puanları vardı ve %41,83 en büyük boyut olarak sınıflandırıldı. Ayrıca popülasyonun %35,31'ini oluşturan 3 ila 4 aralığında 119 birey tespit edilmiştir. En düşük boyutta ise 31 katılımcı 4-5 puan aralığında %9,19 puan aldı.

Fiziksel Aktivite Değişim Aşamaları

Verilerin analizinde 40 (%11,86) öğrencinin “eğilim öncesi basamağı olarak adlandırılan birinci aşamada olduğu ortaya çıkmıştır. Bireylerin davranışlarını değiştirmeyi düşünmedikleri ve süreci pasif olarak yürütmeye kararlı oldukları aşamadır. Araştırmaya katılan öğrencilerin büyük çoğunluğu (151, %44,80) "eğilim" aşamasındadır. Bu aşama bireylerin hareketsiz olduğu ve egzersiz yapma eğiliminde olduğu ancak önümüzdeki altı ay içinde aktif olmak istediğini temsil etmektedir. "Hazırlık" basamağında 36 öğrenci (%10,68) vardır. Bu aşamada bireylerin 30 gün içerisinde aktif olma sürecini sağlıklı bir şekilde adım adım yürütebilecek davranışlar geliştirme eğilimindedirler. Hareket basamağında 69 (%20,47) öğrenci belirlendi. Bu aşama bireylerin altı aydan uzun süredir aktif olduğunu ifade etmektedir. Davranış değişikliklerini altı aydan fazla sürdüren ve önceki aşamalara dönmemeye çalışan “devamlılık” evresinin son basamağında sadece 41 (%12,16) öğrenci tespit edildi.

İkinci Araştırma Sorusuna İlişkin Bulgular

Çalışmanın ikinci araştırma sorusu “Üniversite öğrencilerinin sağlık okuryazarlığını fiziksel aktivite düzeyi, egzersiz öz yeterliliği ve fiziksel aktivite değişim aşamaları ne ölçüde yordamaktadır?

Çoklu Doğrusal Regresyon Varsayımları

Veri analizi ilişkin olarak, güvenilir ve net sonuçların sağlanabilmesi için varsayımların ön koşullarının tamamlanması gerekir (Zou ve ark., 2003). Araştırma bulgularının geçerliliğinin için regresyon analizinin varsayımlarının dikkate alınması gerekmektedir (Tabachnick et al., 2013). Analiz sürecinde verilerin titizlikle toplanması, raporlanması, varsayımların gereklerini karşılaması ve hiçbir faktörden etkilenmemesi esastır (Pallant, 2020). Sample Size, G*Power Analysis, Linearity, Homoscedasticity, Multicollinearity, Independence of Residuals, Normality and Outliers'a ilişkin olarak sırasıyla tüm testler yapılmıştır.

Çoklu Doğrusal Regresyon Analizi Bulguları

Üniversite öğrencilerinin sağlık okuryazarlığını fiziksel aktivite düzeyi, egzersiz öz yeterliliği ve fiziksel aktivite değişim aşamalarının ne ölçüde yordadığını test etmek amacıyla çoklu doğrusal regresyon analizi yapılmıştır. Bu bağlamda çoklu doğrusal regresyon analizinde fiziksel aktivite düzeyi, egzersiz öz yeterliliği ve fiziksel aktivite değişim aşamaları yordayıcı değişkenler olarak, sağlık okuryazarlığı ise sonuç değişkeni olarak girilmiştir. Üniversite öğrencilerinin sağlık okuryazarlığındaki fiziksel aktivite düzeyi, egzersiz öz-yeterliği ve fiziksel aktivite aşamalarındaki değişimini %00,3 varyansı açıklamaktadır, R2 = .003. Fiziksel aktivite düzeyi anlamlı olmayan bir belirleyiciydi $\beta = .054$, $t = .891$, $p > .05$. Egzersiz öz-yeterliği değişkeni de anlamlı olmayan bir yordayıcıydı $\beta = -.045$, $t = -.742$, $p > .05$. Sonuçta, Fiziksel Aktivite Değişim Aşamaları yordayıcı değişken göstergelerine ilişkin istatistiksel veriler $\beta = .006$, $t = .101$, $p > .05$'in anlamlı olmadığı belirlendi.

TARTIŞMA

Üniversite Öğrencilerinin Sağlık Okuryazarlık Düzeyleri

Araştırma sonuçları, üniversite öğrencilerinin sağlık okuryazarlığı düzeyi toplam puanının "sorunlu-sınırlı" düzey olduğunu göstermiştir. Çalışmada üniversite

öğrencilerinin büyük bir kısmının sağlık okuryazarlık düzeyi yetersiz bulunmuştur. Bunun nedeni öğrencilerin sağlık konusundaki bilgilerinin yetersiz düzeyde olmasından kaynaklanabilir.

Önceki çalışmalarda sağlık okuryazarlığı ile ilgili çok benzer bulgular bulunmuştur. Örneğin, yakın zamanda Türkiye'deki üniversite öğrencileri üzerinde yapılan bir bilimsel çalışma, öğrencilerin %45'inin problemli-sınırlı düzeyde sağlık okuryazarlığına sahip olduğunu göstermiştir (Uysal ve ark., 2020).

İspanya'da yapılan ve sağlık bilimlerinde öğrenim gören üniversite öğrencilerinin sağlık okuryazalık beceri ve davranışlarının yeterli olmadığını gösteren bir çalışmada da benzer sonuçlar elde edilmiştir. Bulguların eğitim sistemindeki eksikliklerden kaynaklandığı ve bu nedenle yeni stratejilerin oluşturulmasına ihtiyaç duyulduğu vurgulanmıştır (Rueda-Medina ve ark., 2020). Ayrıca Elsborg ve arkadaşları (2017), üniversite öğrencilerinin sağlık okuryazarlığı bilgilerini desteklemek için okul müfredatlarının ve eğitim faaliyetlerinin yeniden gözden geçirilmesi gerektiğini önermişlerdir (Elsborg ark., 2017). Öneriler boyutunda araştırmacılar, çalışma alanına bağlı olarak sağlık okuryazarlığına ilişkin olarak eşitsizliği ve üniversite öğrencilerinin sağlık çıktılarının optimize edilmesini vurgulamışlardır (Rababah ve ark., 2019). Sağlık okuryazarlığı konusunda farkındalık düzeyinin arttırılması ve sağlık kavramlarını öne çıkarabilecek çalışmaların tasarlanması bu alan için iyi bir yaklaşım olabilir (McCleary-Jones, 2016). Üniversite öğrencilerinin sağlık bilgisi, beceri düzeyi ve sağlıklı davranışlarını geliştirmek için farklı bölümlerin üniversite müfredatlarında sağlık okuryazarlığına ilişkin multidisipliner çalışmalara yer verilmelidir (Osborn ve ark., 2011). Eğitim ve sağlık departmanlarından paydaşlar bireylerin sağlık okuryazarlığı için danışmanlık yapabilir, ileriye dönük çalışmalar yürütebilir ve fon kaynağı yaratabilir (Kickbusch ve ark., 2013). Spor alanlarının sayısının arttırılması, öğrencilerin üniversite kampüslerinde düzenli olarak fiziksel aktivite sporu yapabilmeleri için etkili bir yaklaşım olabilir ve bu da üniversite öğrencilerinin sağlık okuryazarlığı konusundaki farkındalık düzeyini olumlu yönde tetikleyebilir (Hsu ve ark., 2014). Tüm bu öneriler ve önceki araştırma bulguları göz önüne alındığında, HL üniversite öğrencileri arasında sağlıklı yaşam tarzı davranışlarının ulaşılabilir ve sürdürülebilir olmasını sağlayacak politikaların devlet

kurumları ve tüm paydaşlarla iş birliği yapılarak uygulanması ve kapsamın yaygınlaştırılması halk sağlığı açısından önemli sonuçlar sağlayabilir (Juvinyà-Canal ve ark., 2020; Uysal ve ark., 2020).

Üniversite Öğrencilerinin Fiziksel Aktivite Düzeyleri

Bu çalışmada üniversite öğrencilerinin fiziksel aktivite düzeyleri de incelenmiştir. Bulgulara göre üniversite öğrencilerinin fiziksel aktivite düzeyleri MET puanlarına göre orta düzeyde (minimum aktif düzey) olarak belirlendi. Bu çalışma cinsiyet farklılıklarına odaklanmamış olsa da, üniversite öğrencilerinin fiziksel aktivite düzeylerinin farklı cinsiyetler için sağlanması önemli olabilir. Kız öğrencilerin (n=216) erkek öğrencilere (n=121) göre biraz daha aktif olduğu belirlendi.

Fiziksel aktivite literatüründe farklı bulgular ortaya çıkmıştır. Örneğin Malezya'daki üniversite öğrencilerinin fiziksel aktivite düzeyleri üzerine yürütülen bir araştırmada 100 katılımcının fiziksel aktivite düzeyleri yüksek bulunmuştur. Cinsiyet karşılaştırmalarına bakıldığında erkeklerin fiziksel aktivite düzeyleri kadınların fiziksel aktivite düzeylerinden çok daha yüksek olduğu belirlendi. Düşük fiziksel aktivite seviyesinin temel nedeni orta ve ileri derecede obeziteydi (Rajappan ve ark. 2015). Polonya ve Türkiye'deki üniversite öğrencileri üzerinde yapılan bir başka araştırmada ise Polonyalı üniversite öğrencilerinin Türkiye'deki öğrencilere göre daha aktif olduğu ortaya çıktı. Türkiye'deki öğrenciler DSÖ'nün önerdiği haftalık egzersiz miktarına ulaşamamaktadırr (Bednerek ve ark., 2016). Benzer şekilde ABD'de yapılan bir araştırmada çoğu üniversite öğrencisinin fiziksel aktivite düzeylerinin yeterli olmadığı bulunmuştur. Öğrencileri fiziksel aktiviteye katılmaya teşvik etmek için üniversite kampüslerinde daha verimli stratejilerin geliştirilmesi önerildi (Leenders ve ark., 2002). Dünya Sağlık Örgütü'nün istatistiklerine göre dört yetişkinden biri önerilen yönergeleri karşılamıyor.

Sonuç olarak, üniversite kampüslerinde fiziksel aktiviteyi teşvik edecek programların geliştirilmesi ve sayılarının artırılmasına yönelik yeni fikirlerin üretilmesi, üniversite öğrencilerinin fiziksel aktivite düzeylerine katkıda bulunabilir (Archer ve Blair,

2011). Kampüs politikalarında üniversite öğrencilerine yönelik fiziksel aktivite ve egzersiz programları artırılmalıdır.

Üniversite Öğrencilerinin Egzersiz Öz-Yeterlilik Düzeyleri

Bu çalışmada üniversite öğrencilerinin egzersiz öz-yeterlilik puanlarının ortalama değeri 2,70 olarak (düşük düzeyde) bulunmuştur. Bunun nedeni, üniversite öğrencilerinin fiziksel hareketsizliğinden olabilir. Egzersiz öz-yeterliliği bireyler arasında düzenli egzersize katılmanın iyi bir göstergesidir. Çin'de yürütülen bir araştırmada, üniversite öğrencilerinin (n=500) egzersiz öz-yeterlilik seviyesinin iyi olduğu ve öğrencilerin egzersiz davranışının sürdürülebilirliğine etkisi bulunmuştur. Araştırmacılar, öğrencileri fiziksel aktivite'ye yönelik öz yeterlik ve halk sağlığı konusunda eğitmek için okullarda/kolejlerde sağlık ve beden eğitimi veya okuryazarlık alanında zorunlu bir ders veya programın kurulması gerektiğini önermektedir (Bebeley ve ark, 2017) .

Ulusal literatürde yürütülen bir araştırmada aktif öğrencilerin egzersiz öz-yeterlilik düzeyleri araştırılmıştır. Aktif öğrencilerin egzersiz öz-yeterlik düzeyleri aktif olmayan gruba göre daha yüksek bulunmuştur (Miçooğulları ve ark., 2010). Fiziksel olarak daha aktif bireylerin, aktif olmayan bireylere kıyasla daha yüksek egzersiz öz-yeterlilik düzeylerine sahip olma eğiliminde olduğu görülmektedir (Bray, 2007). Üniversite öğrencilerinin egzersiz öz-yeterlilik düzeylerinin ve egzersiz kavramına ilişkin algılarının fiziksel aktivite düzeyinden etkilenebileceği tartışılabilir (Şahan ve ark., 2012). Egzersiz öz-yeterliliğin altında yatan mekanizmaları anlamak için daha fazla çalışmalara ihtiyaç vardır (Joseph ve ark., 2014).

Bu bağlamda üniversite öğrencilerinin egzersiz öz-yeterliliğine ilişkin algılarını daha olumlu bir düzeye taşımak için politika yapıcıların stratejik yaklaşımlar üretmesi gerekmektedir. Bu yaklaşımlar kampüs spor politikalarına dahil edilmeli ve öğrencileri aktif olmaya teşvik etmek için üniversite kampüslerinde kaliteli fiziksel aktivite alanları artırılmalıdır (Chiu, 2009; Wang ve ark., 2020). Ayrıca teorik modeller üzerinde farklı türde araştırmaların yapılması egzersiz öz-yeterliliğin

altında yatan mekanizmaların anlaşılmasına katkı sağlayabilir (Franko ve ark., 2008; Zhang, 2022).

Üniversite Öğrencilerinin Fiziksel Aktivite Değişim Aşamaları Düzeyleri

Fiziksel aktivite değişim aşamaları modeli bireylerin sağlık davranışlarını anlamak için yaygın olarak kullanılan bir yöntemdir. Bu çalışmada üniversite öğrencilerinin fiziksel aktivite değişim aşamalarını da analiz edilmiştir. Bulgular, çalışmamızdaki üniversite öğrencilerinin çoğunluğunun düşünme öncesi ve düşünme basamağında olduğunu göstermiştir (n=191). Elde edilen bulgular doğrultusunda üniversite öğrencilerinin fiziksel aktivite değişim aşamaları düzeyleri yeterli olmadığı, hatta Avrupa Birliği ülkeleri nüfuslarıyla karşılaştırıldığında en düşüklerden biri olduğu söylenebilir (Miçooğulları ve ark., 2010; Oral ve Aktop, 2014). Cengiz ve meslektaşları (2009) 954 üniversite öğrencisinin %72'sinin fiziksel aktivite değişim aşamalarında yeterlilik gösteremediklerini ve aktif olmadıklarını bulmuştur. Bu nedenle üniversite yıllarında egzersizin boylamsal değişikliklere ilişkin daha fazla araştırma yapılması önerilmiş ve çalışmada fiziksel aktiviteyi teşvik edecek stratejiler geliştirilmesi gerektiği vurgulanmıştır (Cengiz ve ark., 2009). Bireylerin fiziksel aktiviteye katılımlarında karşılaştıkları engellerin iyice analiz edilmesi gerekmektedir (Patterson ve ark., 2006). Bu tür yaklaşımların ile bireylerin sağlık okuryazarlığı ve egzersiz öz-yeterlilik düzeylerinin artabileceği öngörülmektedir (Jeon ve ark., 2014). Özellikle sanayileşmeyle birlikte bireylerin fiziksel aktivite düzeyinlerinin azalmasının nedenlerinin bütüncül bir şekilde analiz edilmesi, engellerin mümkün olduğunca azaltılması ve buna göre stratejiler geliştirilmesi önemlidir (İmamoğlu, 2020).

Üniversite Öğrencilerinde Sağlık Okuryazarlığı, Fiziksel Aktivite Düzeyi, Egzersiz Öz-Yeterliliği ve Fiziksel Aktivite Değişim Aşamaları Arasındaki İlişki

Sonuçlar, çoklu doğrusal regresyon modelinin bağımsız değişkenlerinin, çalışmanın bağımlı değişkeninin yordamasına ilişkin yeterli olmadığını gösterdi. Bu bulguların olası bir açıklaması, çalışmada incelenmeyen diğer önemli faktörlerin (örn. fiziksel uygunluk) üniversite öğrencilerinin sağlık okuryazarlığını tahmin etmede güçlü bir

etkiye sahip olabilir. Bu bulgular ışığında sağlık okuryazarlığının bireylerin sağlıklı davranışlar edinmesinde kritik bir faktör olduğu ileri sürülebilir. Ulusal ve uluslararası bağlamda araştırmaların arttırılması gerekmektedir (Cengiz ve., 2009; Leenders ve., 2002; McCleary-Jones, 2016).

Çalışmanın Sınırlılıkları

Bu çalışmanın çeşitli sınırlılıkları bulunmaktadır. Birinci sınırlılık, verilerin yalnızca Türkiye'nin Anadolu Bölgesi'nden toplanmış olmasıdır. Gelecekte yapılacak çalışmalar için Türkiye'nin yedi bölgesinden kapsamlı bir veri toplanabilir. İkinci sınırlılık, sonuçların katılımcıların motivasyon, bilgi ve davranışlarından etkilenebilmesi gibi anket tasarımının sınırlılıklarıdır. Üniversite öğrencilerinin fiziksel aktivite davranışlarını ve sağlık okuryazarlıklarını derinlemesine analiz etmek için nitel bilgiler toplanabilir. Bir diğer sınırlılık üniversite öğrencilerinin sınıf düzeyi ve cinsiyetiyle ilgili olabilir. Araştırmaya katılan öğrencilerin çoğunluğunun kadın ve lisansüstü düzeydeki öğrenciler olması çalışmanın sonuçlarını etkilemiş olabilir.

Çalışmanın Çıkarımları

Bu çalışmanın çeşitli çıkarımları vardır. Kampüslerdeki üniversite öğrencilerinin sağlık okuryazarlığını incelemek ve üniversite öğrencilerinin sağlıklı bir yaşam tarzına sahip olma konusundaki bilgilerini geliştirmek için üniversite politikaları geliştirilebilir (Juvinyà-Canal ve diğerleri, 2020; Wang ve ark., 2020). Sağlık okuryazarlığını iyileştirmek için üniversitenin fiziksel aktivite politikalarını revize etmek veya değiştirmek bu popülasyon için doğru yaklaşım olabilir (Buja ve ark., 2020). Üniversite öğrencilerini çeşitli spor dallarına katılmaya teşvik edebilecek etkinliklerin üniversite kampüslerinde arttırılması anlamlı olabilir (Huang ve ark., 2021; Sukys ve ark., 2017). Bu durum üniversite öğrencilerinin bilgi düzeylerini ve motor becerilerini olumlu yönde tetikleyebilir (Keating ve ark., 2005). Üniversite kampüslerinde fiziksel aktivite'yi teşvik edecek bu tür programların geliştirilmesi ve sayılarının artırılmasına yönelik yeni fikirlerin üretilmesi, üniversite öğrencilerinin fiziksel aktivite düzeylerine katkı sağlayabilir (Archer ve Blair, 2011). Politika

yapıcılar, üniversite öğrencilerinin sağlık okuryazarlığı ile ilgili faktörler arasındaki etkileşimi daha iyi anlayabilmek için üniversite öğrencilerinin sağlık okuryazarlığına ilişkin multidisipliner çalışmalar yapmalıdır.

Sonuç ve Gelecek Araştırmalara Yönelik Öneriler

Bu çalışmada üniversite öğrencilerinin çoğunun düşük sağlık okuryazarlık ve egzersiz öz-yeterlilik düzeyine sahip olduğu ortaya çıkmıştır. Öğrencilerin aktivite seviyeleri minimum düzeyde aktifti ve çoğu, önümüzdeki altı ay boyunca aktif bir yaşam tarzı sürdürme eğiliminde değildi. Ayrıca bu çalışmada fiziksel aktivite davranışları üniversite öğrencileri arasında algılanan sağlık okuryazarlığını açıklama eğiliminde değildir. Bu çalışma, üniversite öğrencilerinin gerçek sağlık okuryazarlığını incelemek için gelecekteki çalışmalara bir aşama olabilir. Sağlık okuryazarlığı, sağlığın teşviki ve geliştirilmesi için temel bir bileşen olarak kabul edilmektedir. Sağlık okuryazarlığı konusunda sınırlı bilgiye sahip olan bireyler, genel sağlık bilgilerini ve sağlık hizmetlerini anlama konusunda sorun yaşayabilirler. Fiziksel aktiviteye katılımının sağlık okuryazarlığı üzerindeki rolünün araştırılması, üniversite öğrencilerinin sağlığın teşviki ve geliştirilmesi için bilgiler sağlayabilir.

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