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Relationship among sleep quality, quality of life and academic self-efficacy of university students

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Abstract

This study aimed to explore the interconnections among quality-of-life, sleep quality, and academic self-efficacy as loads of researches have indicated a correlation between these elements, suggesting that they are intricately linked. The current investigation delved into the reciprocal relationships between these concepts, examining their bidirectional correlations with 410 students (Female = 267, Male = 143), (M = 22.04, SD = 3.367), and the findings indicated an interrelationship among the quality-of-life, academic self-efficacy, and sleep quality of university students. The results of the study revealed a continuous positive significant relationship between all sub-categories of the quality of life and academic self-efficacy ($r = .396$, $p < .01$) which is a novel result in the field. Another novel result is that decreasing sleep quality is associated with low academic self-efficacy (r=-.121, $p < .01$). Studies in the field were supported with this study in terms of revealing the existing correlation between quality of life and sleep quality measured with Richards – Campbell Sleep Scale ($r = .341$, $p < .01$) and Pittsburgh Sleep Quality Index ($r = .439$, $p < .01$) both of which indicate a relationship between an increasing sleep quality and high quality of life. On the other hand, the quality of life and sleep quality are found to be significant predictors of academic self-efficacy which is an important contributing result to the field (R2 = 0.226, $p < .0,01$), (R2 = 0.015, $p < .0,05$). These results must be taken into account when the role of sleep quality and quality-of-life on academic life of individuals is researched.

Keywords Quality of life · Academic self-efficacy · Sleep quality · Higher education

Introduction

Sleep, which is a periodic and reversible behavioural state, is a complex structure and a basic physiological need, in which awareness of the environment temporarily disappears, body functions continue, the level of perception decreases relative to the perception rate in wakefulness (Moller & Lam, 2008). Sleep is also a complex process in addition to being a behavioural and physiological process in individuals' body, but it is a periodic state that is usually accompanied by closed eyes, low attention, a relaxed and unresponsive body (Carskadon & Dement, 2005). Growth hormones are secreted during sleep which is necessary for our immune, heart, and metabolic system (Savard et al., 2003). Sleep is of great importance in human life in terms of both physiological and social aspects, and it significantly affects the quality of life of the individual. Spending a sufficient amount of time on sleep is of high importance for our health and well-being, and being deprived of sleep not only makes you feel tired, but also has devastating physiological and psychological effects and greatly affects the immune system (Plaford, 2009). Emerging studies research the correlates of sleep quality, its impact on the academic state of learners, and psychoeducation for sleep is mostly advised as a college service for university students (Gardani et al., 2022). The presumable effect of sleep quality on the academic performance of learners and its relationship with academic self-efficacy level of them is still widely researched. Poor sleep quality is mostly associated with being depressed, alcohol use, poor academic achievement (Paudel et al., 2022), technostress, compulsive smartphone use, academic problems (Zhang et al., 2022; Yao & Wang, 2023), academic stress and problematic peer relationship (Deng et al., 2023), prolonged screen exposure before bedtime for spending good

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time (Mao et al., 2022), stress, exhaustion (Schmickler et al., 2023), anxiety related low academic engagement (Ng et al., 2022), internet addiction (Mahmoud et al., 2022; Sagar & Hulya, 2022), and quality of life (Saffari et al., 2022).

On the other hand, quality of life has a comprehensive ground and it is as important as sleep in the life of an individual. In a study conducted in 1984, Calman stated that quality of life is based on an individual's current lifestyle, past experiences, hopes, dreams, and wishes for the future, and it would be correct to define and measure it only by considering individual conditions. Quality of life, which is affected by physiological, psychological, and social dimensions, is a highly dynamic and individual concept. It also embraces new aspects of a patient's well-being in the sense that it includes subjective perceptions of them with regard to the most important details in their lives, and it has become not only an asset that is objective and definable, but more of a self-perception (Cai et al., 2021). Quality-of-life (QoL) is questioned from various perspectives and mediating role of any psychological, physical, and social situation on QoL is researched in various fields. A study researching the mediating effect of internet addiction on QoL was conducted with 1535 participants, and the results indicated that risk perception and addiction to the internet badly effects QoL (Qian et al., 2022). A similar study researching the relationship among using smartphone problematically, difficulties in behaviour, quality of life, and school performance with 564 children and adolescents indicated that using smartphone for long times escalate young ones into behavioural difficulties, poorer school performance, and poorer QoL (Kliesener et al., 2022). Students suffering from disturbed sleep quality or insomnia in a large group of 1279 university students was found to have a perceived stress at high level and physical and mental health related QoL at a low level (Carpi et al., 2022). Another study investigating the impacts of physical activities of adults on psychological and physical health outcomes indicated that physical activities support physical self-esteem, learning experience, and quality of life (Zayed & Elshaer, 2022). A review of longitudinal and cross-sectional studies researching the connection between bullying and health related QoL indicated that being bullied ends up with a dissatisfying health related QoL (Dubey et al., 2022). Similar studies questioning the relationship of QoL with other components in life are also conducted with people having mental or health related problems. A cohort study collecting data of adolescents with and without an ADHD diagnosis for 8 years revealed that, despite the common belief that diagnosis might help, adolescents diagnosed with ADHD can resort to self-harm, and no contribution of the diagnosis on QoL was found (Kazda et al., 2022). Another study reviewing the quality of life of asthmatic children indicated that children suffering from asthma have psychological and social problems as in anxiety, depression, ADHD, shyness, impulsivity, psychopathic behaviours, aggressiveness, impaired school performance, being bullied, dysfunctional family relationships, and lower socioeconomic status (Plaza-González et al., 2022). All in all, recent studies point to the association between impaired QoL and risk perception, internet addiction, problematic smartphone use, behavioural difficulties, poorer school performance, being bullied, less physical activities, personal recovery orientation problems and maladaptive coping mechanisms, ADHD, self-harm, asthma, poor sleep quality, and insomnia etc. all of which are factors that might impact the academic struggle of students.

The self-efficacy, on the other hand, was first emphasized in Albert Bandura's Social Learning Theory and the essence of self-belief, or self-efficacy, was described as the foundation of human passions, motivations, and achievements. (Bandura, 1977). Self-efficacy describes an individual's self-judgment about the things he is capable of handling while academic self-efficacy, which is one of the subdimensions of the self-efficacy, is grounded on the theory of self-efficacy (Bandura, 1977) referring to the academic life. Schunk and Pajares (2002) expressed the concept of academic self-efficacy as an individual's self-judgment with which he or she can ably reach a level in an academic task, or achieve a certain academic goal. In the perspective of existing studies, the connection of self-efficacy, which is a prominent element of self-controlled personality, and academic success has been emphasized (Khan, 2013). It is also highlighted that individuals with high academic self-efficacy are also the ones with high academic achievement (Zimmerman, 2000). Results of a study that was designed for 222 university students revealed that academic self-efficacy and resilience and social support are correlated (Warshawski, 2022). Another study with 419 adolescents researching the role of teachers and parents over academic self-efficacy and academic performance of students indicated that they both positively affect the performance of students and while teachers' impact is mostly correlated with the academic self-efficacy of learners, the monitoring of parents triggers motivation (Affuso, 2023). Some research also link mindfulness and positive reappraisal with academic self-efficacy (Hanley, 2015). Generalized self-efficacy at a moderate and high ground is also regarded as a key factor contributing to lowering the degree of academic anxiety as well as increasing the academic self-efficacy of learners (Green, 2022).

Therewithal, the interrelationship among sleep quality, quality of life, and academic self-efficacy needs being discerned with the aim of relating them to the academic performance of students as well as their psychological state. As referred above, there are loads of studies pointing to the relationship of quality of life and sleep quality with

academic performance. However, their relationship with academic self-efficacy, which is highly linked to academic success and positive psychological state of individuals, has not still been researched. Revealing the possible relationship among sleep quality, quality of life, and academic self-efficacy, which have been reciprocally but separately studied in very limited number of studies, might contribute to the design of learners' life and help determine the indicators for a successful academic life. With this aim, in this study we investigated the relationship among sleep quality, quality of life, and academic self-efficacy, and the following research questions were questioned in the study:

1. Is sleep quality related to the quality of life of individuals residing in Turkiye as loads of study indicated in other populations?
2. If related, is short-term sleep quality related to quality of life at the same level with long term sleep quality?
3. Can we collect similar results from short-term sleep quality scale and long-term sleep quality index in terms of indicating similar results with academic self-efficacy and quality of life?
4. Is sleep quality related to academic self-efficacy of individuals?
5. If related, is short-term sleep quality related to academic self-efficacy at the same level with long term sleep quality?
6. Is quality of life related to academic self-efficacy of individuals?

Based on loads of studies conducted in the field and concerns arising along with these research questions, it is hypothesized in this study that quality-of-life and sleep quality might be correlated as in other populations, their relation with academic self-efficacy might be similar, and long-term and short-term sleep quality might not differ in terms of being correlated with academic-self efficacy, if found correlated. Revealing out these correlations is aimed to be linked to the role of quality-of-life and sleep quality in academic life as many studies advised to research.

Materials and methods

Participants and procedures

The participants were 410 university students from various universities in Turkiye. In the research, a Socio-Demographic Information Form with twelve questions asking the participants' gender, age, university, and department, where and with whom they live, their general sleeping patterns, general health status, general level of perceived quality of life, financial situation, how competent they are in the academic context, and how they evaluate their academic self-efficacy were used.

Richards-Campbell Sleep Scale

The Richards-Campbell Sleep Scale (1976), which includes 6 items, is evaluated on a chart with numbers between 0 and 100 and each of the 6 items is for evaluating the depth of night sleep, the time they fall asleep, the frequency of waking up, the duration they stay awake, the quality of sleep, and the noise level in the environment. Scores in the range of "0–25" point to a very bad sleep, while scores in the range of "76–100" points to a good sleep. The scores obtained in the scale increases in direct proportion to the sleep quality of the participants. The Cronbach's alpha value of the scale was found to be 0.82.

Pittsburgh sleep quality index

The Pittsburgh Sleep Quality Index is used for determining an individual's sleep quality over a one-month period. The purpose of this scale is to define good and bad sleep and determine the sleep quality of individuals. The scale consists of 24 questions in total. 19 of the questions in the scale were prepared based on the participant's self-assessment, and the remaining 5 questions were asked to be answered by his/her spouse or a roommate. The Pittsburgh Sleep Quality Index includes 7 components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication, and daytime dysfunction (Buysse et al., 1989). Each item in the scale is determined with a score between 0 and 3 and the total score is between 0 and 21. A high total score is related to a poor level of sleep quality with a score of 5 or more. The result of the survey determines the sleep level of the participants as "Those with good sleep" and "Those with bad sleep". The Cronbach's alpha value of the scale was found to be 80.

World health organization quality of life (WHOQOL-BREF)

The World Health Organization Quality of Life Scale Short Form (WHOQOL-BREF) is a scale developed by the World Health Organization (2010). In the WHOQOL-BREF-27 scale, which was prepared as the short form of the WHOQOL-100 scale, the participants are asked to answer the questions by taking into account the last 15 days. The scale examines four dimensions of the individual's physical health, psychological health along with their social relations level, and degree of environmental health. The scale was designed in a 5-point Likert type with 27 questions in total.

The 27th question in the scale is a national question. Each dimension in the scale is evaluated independently of each other.

Academic self-efficacy scale

The Academic Self-Efficacy Scale was designed by Owen & Froman in the year 1988, and the original one was created in a 5-point Likert type with 33 items. Various studies have been carried out on the validity of the scale and these studies have shown that the scale can be used in Turkish as well the Cronbach alpha value of which was found as 0.82 by Oncu (2012).

Results

The statistical analyses of the research were obtained with the SPSS program (SPSS 25.0). Before the analysis process, the normal distribution of the data was examined. The analysis of the distribution in the normal level of the variables and the sample group was performed under the control of the Kurtosis-Skewness values, and the distribution of all scales was normal. All scale and subscale values are between −2 and +2 and show normal distribution. The reliability level of the analysis was 95%. The association of the scales with each other was investigated with Pearson Correlation analysis. Multiple Linear Regression was used for measuring the effect of Independent Variables on Dependent Variable.

92.2% of the participants were between 18 and 25 ages, 5.1% between 26 and 30 ages, 1.5% between 31 and 35 ages, and 1.2% between 35 ages. According to the results of the analysis in terms of gender, 65.1% of the participants attending the study were female while the rest 34.9% were male. The majority of the research population consists of 65.1% female participants between the ages of 18–25. According to the results of the research, 78.5% of the participants were parents/siblings etc. living together, 2% with relatives, 6.8% in student dormitory, 6.3% with friends, 3.9% alone, 1.5% with spouse and children, 1% stated that they live in a place other than the ones stated in the form. The perceptions of the participants about their general health status indicated that 0.5% of them have very poor general health status, 2% have poor general health status, 25.9% have moderate general health status, and 56.3% have a good general health status while the general health status of 15.4% is perfect.

According to the results for the perceived sleep pattern component, 12% of the participants had a very bad sleep pattern, 24.4% had a bad sleep pattern, 39% had a moderate sleep pattern, 20.7% had a good sleep pattern, and 3.9% had a perfect sleep pattern. When the perceived quality-of-life component was questioned, 1.7% of the participants' perception against general quality of life was very poor, 6.8% the participants' perception regarding the general quality of life was very bad, 39.8% of the participants' perception of general quality of life was moderate, 43.2% of the participants' perception of general quality of life was good, 8.5% the participants' perception of general quality of life was perfect. When the financial situation component analyses are examined in general, 1.5% of the participants have a very bad financial situation, 10.5% have a bad financial situation, 46.3% have a moderate financial situation, 38.5% have a good financial situation, 3.2% of them evaluated their financial situation as perfect.

When the Table 1 was examined, the results indicated that a significant positive correlation at a moderate level was found between the total score of the WHOQOL-BREF and the Academic Self-Efficacy Scale ($r = .396$, $p < .01$). A moderately significant positive correlation was found between the WHOQOL-BREF total score and the Social Status score (r=-366, $p < .01$). A moderately significant positive correlation was obtained for the total score of WHOQOL-BREF and the Cognitive Practice score ($r = .368$, $p < .01$). A moderately significant positive correlation was found between the WHOQOL-BREF total score and the Technical Skills score ($r = .307$ $p < .01$). There was a weak positive correlation between the General Health Status Total score and the Academic Self-Efficacy Scale score ($r = .188$, $p < .01$). There was also a weak positive correlation between the General Health Status Total score and the Social Status score (r=-193, $p < .01$). There was weak positive correlation between the General Health Status total score and the

Table 1 Pearson correlation analysis for the relationship between WHOQOL-BREF with its sub-dimension scores and academic self-efficacy scale with its sub-dimension scores ($N = 410$)

	Academic Self-Efficacy Scale		Social Status		Cognitive Practice		Technical Skills	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*
WHOQOL-BREF	,396**	0,000	,366**	0,000	,368**	0,000	,307**	0,000
General Health	,188**	0,000	,193**	0,000	,170**	0,001	,121*	0,014
Physical Health	,255**	0,000	,243**	0,000	,233**	0,000	,196**	0,000
Psychological Health	,442**	0,000	,412**	0,000	,416**	0,000	,312**	0,000
Social Relations	,347**	0,000	,326**	0,000	,312**	0,000	,297**	0,000
Environment	,275**	0,000	,238**	0,000	,259**	0,000	,236**	0,000

Note **$p < .001$, *$p < .05$

Table 2 Pearson correlation analysis for the relationship between WHOQOL-BREF with its sub-dimension scores and Richards-Campbell sleep scale scores

Richards-Campbell Sleep Scale			
	r	*p*	*N*
WHOQOL-BREF	,341**	0,000	410
General Health	,258**	0,000	410
Physical Health	,301**	0,000	410
Psychological Health	,256**	0,000	410
Social Relations	,219**	0,000	410
Environment	,287**	0,000	410

Note **$p < .001$

Table 3 Pearson correlation analysis results for the relationship between academic self-efficacy scale with its sub-dimension and Pittsburgh sleep quality index scores

Pittsburgh Sleep Quality Index			
	r	*p*	*N*
Academic Self-Efficacy Scale	-,121*	0,015	410
Social status	-,110*	0,025	410
Cognitive Practice	-,117*	0,018	410
Technical Skills	-0,075	0,131	410

Note *$p < .05$

Cognitive Application score ($r = .170$, $p < .01$). There was a weak positive correlation between the General Health Status total score and the Technical Skills score ($r = .121$ $p < .01$). There was a weak positive correlation between the Physical Health Total score and the Academic Self-Efficacy Scale score ($r = .255$, $p < .01$). There was a weak and positive correlation between the Physical Health Total score and the Social Status score (r=-243, $p < .01$). There was a weak positive correlation between the Physical Health Total score and the Cognitive Practice score ($r = .233$, $p < .01$). There was a weak positive correlation between the Physical Health Total score and the Technical Skills score ($r = .196$ $p < .01$). A moderately significant positive correlation was found between the Psychological Health total score and the Academic Self-Efficacy Scale score ($r = .442$, $p < .01$). A moderately significant positive correlation was found between the Psychological Health Total score and the Social Status score (r=-412, $p < .01$). A moderately significant positive correlation was found between the Psychological Health Total score and the Cognitive Practice score ($r = .416$, $p < .01$). A moderately significant positive correlation was found between the Psychological Health Total score and the Technical Skills score ($r = .312$ $p < .01$). A moderately significant positive correlation was found between the Social Relations total score and the Academic Self-Efficacy Scale score ($r = .347$, $p < .01$). A moderately significant positive correlation was found between the Social Relations Total score and the Social Status score (r=-326, $p < .01$). A moderately significant positive correlation was found between the Social Relations total score and the Cognitive Practice score ($r = .312$, $p < .01$). There was a weak positive correlation between the Social Relations total score and the Technical Skills score ($r = .297$ $p < .01$). There was a weak positive correlation between the Environment Total score and the Academic Self-Efficacy Scale score ($r = .275$, $p < .01$). There was a weak positive correlation between Environment total score and Social Status score (r=-238, $p < .01$). There was a weak positive correlation between the Environment total score and the Cognitive Practice score ($r = .259$, $p < .01$). There was a weak positive correlation between the Environment total score and the Technical Skills score ($r = .236$ $p < .01$).

According to data in Table 2, the results indicated that a significant positive correlation at a moderate ground was found between the WHOQOL-BREF total score and the Richards-Campbell Sleep Scale score ($r = .341$, $p < .01$). There was a weak positive correlation between the General Health Status total score and the Richards-Campbell Sleep Scale score ($r = .258$, $p < .01$). A moderately significant positive correlation was found between the Physical Health total score and the Richards-Campbell Sleep Scale score ($r = .301$, $p < .01$). There was a weak positive correlation between the Psychological Health total score and the Richards-Campbell Sleep Scale score ($r = .256$, $p < .01$). There was a weak positive correlation between the Social Relations total score and the Richards-Campbell Sleep Scale score ($r = .219$, $p < .01$). There was a weak positive correlation between the Environment total score and the Richards-Campbell Sleep Scale score ($r = .287$, $p < .01$).

According to the Table 3, the results indicated that there was a weak and negative correlation between the Academic Self-Efficacy Scale total score and the Pittsburgh Sleep Quality Index score (r=-.121, $p < .01$). There was a weakly significant negative correlation between the Social Status total score and the Pittsburgh Sleep Quality Index score (r=-.110, $p < .01$). There was a weak and negative significant correlation between Cognitive Practice total score and Pittsburgh Sleep Quality Index score (r=-.117, $p < .01$). There was no significant correlation between Technical Skills total score and Pittsburgh Sleep Quality Index score (r=-0,075, $p = 0{,}131$).

According to the data in Table 4, the results indicated that a moderately significant negative correlation was found between the WHOQOL-BREF total score and the Pittsburgh Sleep Quality Index score (r=-.439, $p < .01$). A moderately significant negative correlation was found between the General Health Status total score and the Pittsburgh Sleep Quality Index score (r=-.335, $p < .01$). A moderately significant negative correlation was found between the Physical Health total score and the Pittsburgh Sleep Quality Index score (r=-.400, $p < .01$). A moderately significant negative correlation was found between the Psychological Health total score and

Table 4 Pearson correlation analysis results for the relationship between the WHOQOL-BREF with its sub-dimension Pittsburgh sleep quality index scores

Pittsburgh Sleep Quality Index			
	r	*p*	*N*
WHOQOL-BREF	-,439**	0,000	410
General Health	-,355**	0,000	410
Physical Health	-,400**	0,000	410
Psychological Health	-,340**	0,000	410
Social Relations	-,239**	0,000	410
Environment	-,361**	0,000	410

Note **$p < .001$

the Pittsburgh Sleep Quality Index score (r=-.340, $p < .01$). There was a weakly significant negative correlation between the Social Relations total score and the Pittsburgh Sleep Quality Index score (r=-.239 $p < .01$). A moderately significant negative correlation was found between the Environment total score and the Pittsburgh Sleep Quality Index score (r=-.361, $p < .01$).

In addition to the results from the above tables, a multiple regression analysis was applied for measuring the effect of quality-of-life on Academic Self-Efficacy and the sub-dimensions of the WHOQOL-BREF were found significant predictors of Academic Self-Efficacy ($R2 = 0.226$, $p < .0.01$). The aforementioned variables together explain approximately 23% of the total variance in multifaceted academic self-efficacy. According to the β coefficient values, their power of influence is in the form of psychological, social relations, general health, environment, physical health. According to the t-test result of the regression coefficients, psychological health, social relations, general health is a significant predictor of Academic Self-Efficacy. The effect of other variables was not found significant. Regression analysis measuring the effect of Sleep Quality on Academic Self-Efficacy indicated that Pittsburgh Sleep Quality Index is a significant predictor of Academic Self-Efficacy ($R2 = 0.015$, $p < .0.05$). The aforementioned variables together explain approximately 2% of the total variance in multifaceted Academic Self-Efficacy. According to the t-test result of the regression coefficients, the Pittsburgh Sleep Quality Index is a significant predictor of Academic Self-Efficacy. Additionally, regression analysis measuring the effect of sleep quality on WHOQOL-BREF revealed that Pittsburgh Sleep Quality Index is a significant predictor of quality-of-life ($R2 = 0.193$, $p < .0.01$). The aforementioned variables together explain about 19% of the total variance in the versatile quality-of-life. According to the t-test result regarding the regression coefficients, the Pittsburgh Sleep Quality Index is a significant predictor of quality-of-life.

Discussion

It was aimed herein this study to investigate the concepts of quality-of-life, sleep quality, and academic self-efficacy in terms of their reciprocal relationships. Emerging studies establish an association between these components as if they are separately and reciprocally related. In this study, the two-way relations between these concepts were examined. Significant relationship between sleep, which is one of the most important and vital components of an individual's life, and quality of life has been found in many studies with various different designs. There are also many other researches indicating an interrelationship between sleep quality and quality of life in various groups of people. All the same, the academic self-efficacy is just as important in the academic life of an individual as sleep quality, which necessitates the urge for researching the possible relation of it with sleep quality and quality of life. Holding the aim of revealing this possible relationship between a psychological state and an academic one, this study was designed the results of which indicated that each of the concepts of sleep quality, quality of life along with academic self-efficacy are both significantly and reciprocally related to each other as well as being reciprocal predictors.

In the research, the considerable majority of the participating individuals were between the ages of 18–25 (92.2%), women (65.1%), the majority of whom (78.5%) lived with their families. The evaluations of the participants about their perceived general sleep pattern were concentrated in the "moderate - poor" range, and their general health status was mostly described as "good". Participants evaluated their quality of life and financial situation mostly in the "moderate-good" range. In the question in which academic self-efficacy perceptions of them were measured, the participants stated that they mostly regarded themselves as sometimes sufficient, and their academic self-efficacy levels were mostly moderate.

When the sub-dimensions of both the participants' quality of life level as well as their level of academic self-efficacy were compared; relationships were found to be positive and significant among most of the sub-dimensions. The relationship between sub-dimensions of quality-of-life scale and academic self-efficacy scale was detailed which indicated that the participant's psychological health along with their social relations, and general health status were related to their level of academic self-efficacy while the same results were not correlating with the environment and physical health components. This finding, which supports the hypothesis of the study, indicated that there is a significant and positive relationship between academic self-efficacy and quality-of-life. This study might be the first to highlight the existence of such a relationship. The rationale behind the

fact that there is an association among the sub-dimensions of quality of life and academic self-efficacy scales would be that the individuals' life and education are interrelated from many perspectives. The existence of a relationship between these two concepts, which have many common sets, might be important for the educational life of individuals that is designed and directed by school managements. From this point of view, it would be saliently deduced that the academic self-efficacy of individuals with low satisfaction of quality of life would also be perceived as low, and that as the quality of life of the individual increases, their academic self-efficacy would be also the one increasing. Based on the relationship between these concepts, which are known to have a separate relationship with academic success, it can be assumed that high satisfaction of quality of life and academic self-efficacy will also set off academic success. Afari et al. worked with 255 participants, and found that a high level of academic self-efficacy is associated with academic achievement (2012). Honicke and Broadbent also conducted a research study researching this issue, and as a result of this review article in which 59 studies were compiled, it was determined that there is a partial relationship between the concepts of academic self-efficacy and academic achievement (2016). In a study designed with 670 medical students in 2017, Lyndon and colleagues found a positive relationship between academic achievement and quality of life (p. 108–114). Although these studies are rare ones researching this relationship, the sample size are quite high. The result of the aforementioned study, which highlights that as the quality of life of individual increases, their academic success also increases, can also be associated with the results of hereby this study, which also point to the fact that there is a positive relationship between quality of life and academic self-efficacy. As justified by the studies above, the concept of academic self-efficacy is directly related to academic success, and both concepts have a remarkable role in the educational life of individuals the relationship of which suggests that it might also have a relationship with academic success. Further studies on this subject investigating both the relationship between academic self-efficacy and quality of life and the relationship between academic success and quality of life in future studies will definitively contribute to these results.

Increasing scores of the Pittsburgh Sleep Quality Index (PSQI), designed for measuring a one-month period, indicate decreasing sleep quality. When the results obtained from the measurement of sleep quality, which is another component of the study, with the PSQI were examined and these results were compared with the scores obtained from the quality-of-life scale, a negative correlation was obtained. A similar result obtained from the comparison of the Richards-Campbell Sleep Scale results with the results of the quality-of-life was also obtained with the PSQI illustrating that the quality-of-life decreases as the sleep quality decreases which forms the rationale that they move in concert with one another. There are many studies examining the relationship between quality-of-life and sleep quality, and the PSQI and the WHOQOL-BREF are used in most of these studies. However, it also needs to be stated that the sample groups of the studies are generally composed of patient groups with a certain diagnosis and that such studies with university students are limited in number. Thus, the result collected from university students in this study potentially contributes to the field.

Simonelli et al., conducted a study with 150 participants in 2013, measured the components of sleep by using the PSQI and quality-of-life with WHOQOL-BREF, and found a positive correlation between them. There are many other studies in which PSQI and WHOQOL-BREF scales were used together and similar results were obtained with the results obtained in this study. Marques et al. started another study with 324 university students in 2017 to research the relationship between quality of life and sleep quality and used PSQI and WHOQOL-BREF, and found that these two are again positively correlated. In another study with 180 participants diagnosed with bipolar disorder in 2020, the same scales were used again, and a statistically significant and positive relationship was observed between low sleep quality and poor quality of life (Shamsaei et al., 2020 p. 65–69). As the results of this study revealed, the relationship was significant between all components of the quality-of-life and sleep quality. In a similar study conducted with 360 participants in 2020, it was found that sleep quality had a statistically significant positive effect on quality-of-life (Kamali & Hossein). As the results obtained from this study revealed, it can be grounded on the fact, in the light of all the aforementioned studies primarily using the PSQI and the WHOQOL-BREF scales conducted with different and various sample groups, that the quality-of-life of individuals will decrease depending on the decrease in their sleep quality. Therefore, this study conducted in Turkiye with university students primarily contributes to the studies in the field in terms of being conducted in a different population.

While the majority of studies using the PSQI for the sleep quality and including the quality-of-life are in the majority, the studies in which sleep quality is measured with the Richards-Campbell Sleep Scale are relatively limited. Increasing scores of Richards-Campbell Sleep Scale, which measures sleep level in short time intervals, is evaluated as an increase in the quality of it. When the results related to the sleep quality are examined, and the scores obtained from the Richards-Campbell Sleep Scale were compared with the scores from the WHOQOL-BREF, it can be easily stated that all sub-dimensions of the WHOQOL-BREF

were positively related to and significant with the Richards-Campbell Sleep Scale scores. Hence, the results typically report that individuals' increased sleep level behaviour is also associated with an increase in their quality-of-life. Accordingly, another important result hereby arising is that sleep quality and quality-of-life significantly correlate in both scales measuring sleep quality. Additionally, although the Richards-Campbell Sleep Scale was developed and is advised to be used with the aim of measuring sleep quality, this study is the first using it in the field to compare this relationship, and no similar study was designed to the best of our knowledge.

When the association between the PSQI, whose increasing results indicate low sleep quality, and the Academic Self-Efficacy Scale, whose increasing results indicate high academic self-efficacy, was researched, a negative relationship was found between them. Results of this study establish an association between them by highlighting the fact that as sleep quality decreases, academic self-efficacy will also decrease and vice versa. In addition, it was found in this study that the PSQI was a significant predictor of the academic self-efficacy level of individuals. The link between sleep quality and academic self-efficacy has been researched in quite a few studies and only in this study such an important result was obtained. Based on the finding that this significant result was obtained, it may be recommended to conduct more studies investigating the relationship between academic self-efficacy and sleep quality concepts. Apart from that, when the sleep quality is measured via the Richards-Campbell Sleep Scale, no significant relationship was found between sleep quality and academic self-efficacy. To summarize, when the level of academic self-efficacy is compared with the results collected via PSQI data, which gives information about long-term sleep quality, a significant relationship was obtained between academic self-efficacy and sleep quality; however, Richards-Campbell Sleep Scale, which indicates short-term sleep quality status, is not correlated with academic self-efficacy. Therefore, academic self-efficacy can be confidently linked with long-term sleep quality, but not with a short-term one.

Conclusion

This study investigated the relationship among sleep quality, quality-of-life, and academic self-efficacy and the results of this study supported the hypotheses with regard to revealing the relationship them. The relationship between sleep quality measured with PSQI and quality-of-life measured with WHOQOL-BREF has been investigated in many studies and the results obtained through this study is consistent with other studies highlighting that sleep quality and quality-of-life reciprocally increase also for university students. One contribution that this study would make is that another similar relationship was obtained as a result of data from another sleep scale which is the Richards-Campbell Sleep Scale. Based on the fact that this scale, which is easier to use, gives similar results to the PSQI, it is suggested that the Richards-Campbell Sleep Scale can also be used in studies investigating the quality-of-life levels of individuals. In other words, the Richards-Campbell Sleep Scale can be included in the studies researching the sleep quality more as it might have the researchers gained ground for time.

This is a study with novel results with regard to investigating the relationship of academic self-efficacy with sleep quality and quality-of-life. When academic self-efficacy is evaluated within the sleep quality concept in terms of their contribution to the mental health and psychological state of individuals and the results of two different sleep quality scales are evaluated combinedly, a positive relationship is highlighted between the results of PSQI and academic self-efficacy. Nevertheless, the same positive relationship was not found in the data obtained with the Richards-Campbell Sleep Scale. This result can be saliently concluded as that there is a positive relationship between academic self-efficacy and long-term sleep quality but no correlation between academic self-efficacy and non-general, short term sleep quality level of individuals was found indicating that learners with a satisfaction of long-term sleep quality are possible successful students in classrooms with high academic self-efficacy which might set off life satisfaction, career adaptability, self-esteem and more. Additionally, academic self-efficacy and quality-of-life were found to be highly interrelated remarkable subjects. Individuals' quality-of-life levels are related to their academic self-efficacy levels, which is among other remarkable factors that will determine their success in the educational environment. Further studies with more participants and students at different academic levels would contribute to the results more. All in all, the hypotheses of the study regarding relationship among sleep quality, quality-of-life, and academic self-efficacy were supported in this study for university students. What is not supported herein is that short-term sleep quality and long-term sleep quality is not similarly correlated with academic self-efficacy as long-term predicts more of it. These results are novel and powerful ones that need to be taken into account in designing the academic life of individuals.

Recommendations for future research

The attention in this study has focused particularly on revealing possible associations among quality-of-life, sleep quality, and academic self-efficacy. The reason of this attention grounds on the loads of studies in the field pointing to

the relation of these components with academic success. It is nearly impossible to think the opposite for the relation of academic performance of students with their quality-of-life and sleep quality. Nevertheless, this study gives lights on the relationship among quality-of-life, sleep quality, and academic self-efficacy in Turkiye with university students which indicated a reciprocal relationship. This relationship is highly recommended to be researched in other populations with similar and various ages to ascertain how academic self-efficacy can be related with quality-of-life and sleep quality.

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Data availability All data, analysis code, and research materials are available at https://osf.io/unk6h/?view_only=03dde01b7e1149a0ab7b0c019a9b4267.

Declarations

Ethical approval The Ethics Committee of Rectorate in Istanbul Gelisim University in Turkiye approved this study with 2020 meeting date. The participants voluntarily attended and filled out the previously prepared consent form and were informed with regard to the processes in the study.

Conflict of interest No conflict of interest needs has a place to be declared.

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