Research Article

Evaluation of Nursing Students' Sleep Patterns, Social Jet Lag, and Quality of Life*,**

Azzet Yüksel[1] , Aylin Özakgül[2]

[1]Department of Fundamentals of Nursing, İstanbul University—Cerrahpaşa, Institute of Graduate Studies, Fundamentals of Nursing Thesis Master's Program, Istanbul, Turkey
[2]Department of Fundamentals of Nursing, İstanbul University—Cerrahpaşa, Florence Nightingale Faculty of Nursing, İstanbul, Turkey

Abstract

AIM: The aim of this study is to evaluate the relationship between the chronotypes of nursing students, social jet lag, and quality of life.

METHOD: This study was planned and performed in a descriptive, method. Research data were collected in the 2019–2020 fall semester. The research population consisted of nursing students working at the nursing departments of state and private universities in Istanbul. The study sample included 1152 nursing students who agreed to participate in the study after obtaining informed consent. Data were collected using the "Student Information Form," "Morningness- Eveningness Scale," and "Short Form of the Turkish WHO Quality of Life Scale."

RESULTS: Of the nursing students, 81.2% ($n = 935$) were women, 26.5% ($n = 305$) were first-year students, 86.5% ($n = 997$) were non-smoker, and 92.4% ($n = 1065$) not consumed alcohol. Most of the nursing students in this study were intermediate chronotypes (80.2%). Students' social-jet lag mean value was 1.36±0.73 hours (min:0-max:4.8). Multiple regression analysis showed that an increase in social jetlag decreases the average scores of the physical and environmental subdimension and an increase in the morning chronotype increases the average scores of the physical, mental, and social subdimension.

CONCLUSION: High social jet lag reduced the quality of life and a morning chronotype improved the quality of life.

Keywords: Chronotypes, circadian rhythm, nursing students, quality of life, social jet lag

Introduction

Chronotypes refer to morning-type people, intermediate-type people, and evening-type people, indicating preferences for being active at different times of the day (Zhang et al., 2018). Putilov et al. (2021) reported tstical Package for Social Sciences for Winde social jet lag, meaning that there is a greater mismatch between their biological clocks and their social clocks. High social jet lag can adversely affect people's quality of life (QOL) (Roenneberg & Merrow, 2016).

The relationships between chronotype and QOL in university students with heavy academic loads and a strong desire to socialize need to be determined. As they are at risk of unhealthy lifestyle behaviors, their awareness about these issues should be raised and healthy societies should be created (Chang & Jang, 2019; Díaz-Morales & Escribano, 2015). Previous studies have found that evening types have high social jet lag, poor sleep quality, daytime sleepiness, and high rates of alcohol and cigarette consumption (Bakotic et al., 2017). Studies of the relationships between chronotypes and health have reported that evening types are more prone to conditions that can adversely affect the QOL such as sedentary behaviors, unhealthy eating habits (Díaz-Morales & Escribano, 2015), and severe stress and depression (Haraszti et al., 2014). These issues indicate why the comprehensive investigation of chronotypes is important (López-Soto et al., 2019).

It has been reported that young university students tend to be evening types and that this reduces their QOL by causing high social jet lag (Chang & Jang, 2019). Díaz-Morales and Escribano (2015) found that social jet lag, which affects evening types more, negatively affects students' academic success and QOL. For students in healthcare departments, this issue is more important than it is for other university students because they will work in shifts, which will affect their chronotypes. Habits acquired during university education can later become lifestyles. Chang and Jang (2019) reported that nursing students with high social jet lag had lower QOL scores and that this is more important for nursing students than it is for other university students because they will work in shifts, which will affect their chronotypes. Chronotypes, social jet lag, and QOL can affect students' learning processes in theoretical and practical healthcare (Chang & Jang, 2019; Cruz et al., 2018). However, few studies have evaluated nursing students' chronotypes, social jet lag, and QOL together (Chang & Jang, 2019). This study aimed

to evaluate the relationship between the chronotypes, social jet lag, and QOL of nursing students. Here are this study's research questions:

1. Do the students' chronotypes vary with their individual characteristics?
2. Does the students' social jet lag vary with their individual characteristics?
3. Does the students' QOL vary with their individual characteristics?
4. Are there relationships between the students' social jet lag, Morningness-Eveningness Questionnaire (MEQ) scores, and QOL Scale subdimension scores?
5. Do the students' social jet lag and MEQ scores affect their QOL scale subdimension scores?

Method

Study Design
Research was planned and conducted as a descriptive study.

Sample and Setting
The study population consisted of 1608 nursing students in the nursing faculty of a national university ($n=1178$) and the nursing school of a private university ($n=430$) during the fall term of the 2019–2020 academic year. No sampling method was used. The study sample included 1152 students (response rate: 71.6%). The inclusion criteria were as follows: being a student at the state or foundation university in which the study was carried out, being aged 18 years and older, continuing to attend classes during the study, and having volunteered to participate. Those who met the inclusion criteria in November–December 2019 were not absent from school and who agreed to participate after being informed about the aim, content, and method of the study were included. Since the MEQ and the WHOQOL-BREF-TR Scale ask about the last 14 days, the data were collected 2 weeks after mid-term examinations, so that the chronotype changes of the students before, during, and after the examinations did not affect the results. The cumulative grade point average (CGPA) scores of students were based on the self-report. Students with CGPAs of 2.5/CB or less were classified as having moderate academic success or less, the students with CGPAs of 3.00/BB were classified as good, students with CGPAs of 3.50/BA were classified as very good, and students with CGPAs of 4.00/AA were classified as excellent.

Data Collection
Prior to data collection, the information form and scales were administered to five students from each year of study to assess their intelligibility. The pilot study determined that the ruler format of the MEQ was not understood by 10 students and the time-lapse format of the scale was administered to 10 more students. The scale's time-lapse format was deemed to be clear and comprehensible.

Data were collected through face-to-face questionnaire. The questionnaire has three parts. The first part was developed by the researcher based on a review of the literature (Gangwar et al., 2018). In addition to demographic questions, it has eight questions such as height, weight, and perceived sleep quality. Social jet lag for the students' waking/sleeping time on work/school days and waking/sleeping time on free days was calculated using this formula (Jankowski, 2017):

Social jet lag $=|$ mid-sleep on free days (MSF) − midsleep on workdays (MSW) $|$ (Jankowski, 2017).

Information Form: It was developed by the researcher under the guidance of the literature (Gangwar et al., 2018). It consists of seven questions including the individual characteristics of the students, as well as the features that may affect the chronotype, social jet lag, and QOL.

Morningness–Eveningness Scale: The questionnaire's second part is the MEQ developed by Horne and Östberg (1976) to determine the chronotypes of individuals. Its Turkish validity and reliability were conducted by Pündük et al. (2005) with university students (Cronbach's alpha$=0.812$). The time-lapse format for responses was used in this study. This 4-, 5-, and 6-point Likert-type scale has 19 questions. Although it can be used for either three or five chronotypes, this study used the triple classification of morning types, intermediate types, and evening types. According to the total scores, between 70 and 86 points "definitely morning type"; between 59 and 69 points "close to morning type"; between 42 and 58 points "intermediate type"; between 31 and 41 points "close to evening type"; and between 16 and 30 points "definitely"; and 5 different daily rhythm types are classified as "evening type." In previous studies, the groups that are strictly morning-type and close to the morning-type type were combined and grouped as morning type and definitely evening type and groups close to the evening-type type were combined and grouped as evening type (Çakır et al., 2018; Pündük et al., 2005). In this study, the Cronbach's alpha was found to be 0.82.

WHO Quality of Life-Short Form-Turkish: The questionnaire's third part is the WHO Quality of Life-Short Form-Turkish (WHOQOL-BREF-TR) scale, developed by the WHO QOL Group (1999) to assess perceived QOL. It has four subdimensions: Physical, mental, social, and environmental. The Turkish version's validity and reliability study was conducted by Eser et al. (1999). Its Cronbach's alpha values were .83 for the physical subdimension, .66 for the mental subdimension, .53 for the social subdimension, and .73 for the environmental subdimension. In this study, they were .81 for the physical subdimension, .80 for the mental subdimension, .79 for the social subdimension, and .84 for the environmental subdimension. In the Turkish form, the 27th question is used for the environmental-TR subdimension score instead of the environmental score (Eser et al., 1999). The WHOQOL-BREF-TR is a 4-point Likert-type scale. Its subdimensions are scored on a scale of 20 or 100 and are used in place of the total scale score. The 20-point scale is generally used in studies conducted in Turkey, and this study did so, too. A higher score on the scale indicates better QOL.

Statistical Analysis
The data were recorded using the Statistical Package for Social Sciences for Windows 22.0 (IBM Corp.; Armonk, NY, USA)

and sent to the WHO pool by Erhan Eser for calculation of the WHOQOL-BREF-TR Scale scores. Numbers, percentages, means, and standard deviations were used as descriptive statistics. The t-test was used to compare quantitative continuous data between independent groups, and one-way analysis of variance (ANOVA) was used to compare quantitative continuous data between more than two independent groups. Scheffe's test was used as a complementary post hoc analysis to determine differences after ANOVA. Pearson's correlation was used for continuous variables. The Kolmogorov–Smirnov test was used, and the data were found to be in accordance with normal distribution. Using the multiple regression model, the effects of the subdimensions of the QOL scale on social jet lag and the morningness–eveningness scale were examined.

Ethical Considerations

This study's data were collected after obtaining permissions from the ethics committee (2019/04-02) and the institution (2019/5). The students were contacted outside of class hours and the principle of voluntariness was considered. Written permission was obtained from Zekine Pündük, who conducted the Turkish validity and reliability study of the MEQ, and Erhan Eser, who conducted the Turkish validity and reliability study of the WHOQOL-BREF-TR Scale. The students in the sample group were informed about the scope and duration of the study, and the expectations from them. It was explained that the participation was based on the principle of willingness and voluntariness. Also, their written consent was obtained using the "Voluntary Information Consent Form."

Results

Individual characteristics of the participants are given in Table 1. Of the participants, 81.2% (n = 935) were women, 26.5% (n = 305) were first-year students, 86.5% (n = 997) were non-smokers, and 92.4% (n = 1065) not consumed alcohol. In addition, 80.2% (n = 924) of them were of the moderate chronotype and their social jet lag was 1.36 ± 0.73. The WHOQOL-BREF-TR scale scores were the highest in the physical and the lowest in the environmental subdimension. These results are described in the following section.

Of the nursing students, 80.2% (n = 924) were intermediate types, 11.1% (n = 128) were morning types, and 8.7% (n = 100) were evening types. Table 1 compares their individual characteristics and chronotypes. No statistically significant differences in chronotype were found by gender, year of study, academic success (weighted grade point average), or BMI (p < 0.05, Table 1).

Table 1.
Comparison of the Nursing Students' Characteristics and Chronotypes (n = 1.152)

		Morning Type		Moderate Type		Evening Type		Statistics
		n	%	n	%	n	%	
Gender	Female	112	87.5	743	80.4	80	80.0	$\chi^2 = 3.79$
	Male	16	12.5	181	19.6	20	20.0	$p = 0.150$
Year of study	First	46	35.9	235	25.4	24	24.0	$\chi^2 = 8.09$
	Second	30	23.4	228	24.7	27	27.0	
	Third	27	21.1	224	24.2	27	27.0	$p = 0.232$
	Fourth	25	19.5	237	25.6	22	22.0	
WGPA	Moderate or lower	11	13.4	167	24.2	27	35.5	$\chi^2 = 12.48$
	Good	41	50.0	302	43.8	24	31.6	
	Very good	24	29.3	180	26.1	22	28.9	$p = 0.052$
	Excellent	6	7.3	40	5.8	3	3.9	
Smoking	No	127	99.2	805	87.1	65	65.0	$\chi^2 = 58.46$
	I quit	0	0.0	32	3.5	11	11.0	$p = 0.000^{**}$
	I smoke	1	0.8	87	9.4	24	24.0	
Alcohol consumption	No	125	97.7	865	93.6	75	75.0	$\chi^2 = 50.37$
	Yes	3	2.3	59	6.4	25	25.0	$p = 0.000^{**}$
BMI	Low	15	11.7	105	11.4	17	17.0	$\chi^2 = 6.42$
	Normal	92	71.9	700	75.8	65	65.0	$p = 0.169$
	Overweight or obese	21	16.4	119	12.9	18	18.0	
Perceived sleep quality	Poor	101	78.9	505	54.7	37	37.0	$\chi^2 = 42.53$
	Good	27	21.1	419	45.3	63	63.0	$p = 0.000^{**}$

Note: BMI = body mass index; CGPA = cumulative grade point average.
*Significant at < 0.05; **Significant at < 0.01, χ^2: chi-squared test.

More of the nursing students who did not smoke than the students who did (*p* < 0.05, Table 1) and more of the nursing students who did not consume alcohol than the students who did (*p* < 0.05) were morning types (Table 1). More of the nursing students who perceived their sleep quality as good were morning types than the students who perceived their sleep quality as poor (*p* < 0.01, Table 1).

The nursing students' mean social jet lag was 1.36 ± 0.73 hours (min: 0-max: 4.8). Table 2 shows that there were no statistically significant differences in social jet lag by gender or BMI (p > 0.05). The second-, third-, and fourth-year students had higher social jet lag than the first-year students, and the fourth-year students had higher social jet lag than the third-year students (*p* < 0.01, Table 2). High social jet lag negatively affected nursing students' academic success. The nursing students who said that their academic success was moderate or less and very good or excellent had higher social jet lag than the students who said that their academic achievement was good (*p* < 0.05, Table 2). The nursing students who had quit smoking and the smokers had higher social jet lag than the students who did not smoke at all (*p* < 0.01, Table 2). The nursing students who consumed alcohol had higher social jet lag than the students who did not (*p* < 0.01, Table 2), and the nursing students who evaluated their sleep quality as poor had higher social jet lag than the students who evaluated their sleep quality as good (*p* < 0.01, Table 2).

A comparison of the nursing students' mean WHOQOL-BREF-TR subdimension scores and individual characteristics is shown in Table 2. In this study, a significant difference was found between the grade of the students and the WHOQOL-BREF-TR subscale scores in areas other than the mental domain (*p* < 0.05). The mean social subdimension score of the nursing students who evaluated their academic success as good or very good was higher than that of the students who evaluated their academic success as moderate or less (*p < 0.01*, Table 2). The mean mental subdimension scores of the students with low BMIs and normal weights were higher than the overweight or obese students. The mean environmental subdimension score of students with low BMIs was higher than the mean scores of the students with normal BMIs and the overweight students (*p < 0.05*, Table 2). The students who perceived their sleep quality as good had higher mean scores in all the QOL subdimensions than the students who perceived their sleep quality as poor (*p < 0.01*, Table 2).

Positive correlations (*p* < 0.05, Table 3) were found between all the subdimensions of the WHOQOL-BREF-TR scale and the MEQ. Negative correlations were found between all the subdimensions of the WHOQOL-BREF-TR scale and social jet lag (*p* < 0.05, Table 3).

Regression analysis of the nursing students' social jet lag, mean MEQ score, and mean WHOQOL-BREF-TR scale subdimension scores indicated that their mean MEQ score correlated with higher mean physical subdimension (ß=0.027; Table 4), mental subdimension (ß=0.043; Table 4), and social subdimension (ß=0.043; Table 4) scores for QOL. Social jet lag, however, reduced their mean physical subdimension (β=−0.349; Table 4) and environmental subdimension (β=−0.205, Table 4)

WHOQOL-BREF-TR scores. The nursing students' social jet lag and mean MEQ score accounted for 2.4% of the variance in the physical subdimension, 1.9% of the variance in the social subdimension, 0.9% of the variance in the environmental subdimension, and 0.6% of the total variance. Social jet lag and MEQ affected the nursing students' physical subdimension scores the most.

Discussion

This study aimed to focus on the chronotypes, social jet lag, and QOL of nursing students, who will work in shifts in the future and explain the relationship between chronotype, social jet lag, and QOL.

Most of the nursing students in this study were intermediate chronotypes (80.2%) (Table 1). Studies conducted with nursing students (Zhang et al., 2018) have reported similar results. This study found no significant correlation between academic success and chronotype (*p* > 0.05). However, previous study conducted with nursing students has reported that morning-type students have higher academic success (Toscano-Hermoso et al., 2020). The absence of a significant correlation between academic success and chronotype in this study may be because the first-year students' GPAs had yet to be calculated during data collection and that the students self-reported their GPAs.

Most of the nursing students who did not smoke or consume alcohol were morning types. This finding is similar to the results of other studies conducted with university students (Rodríguez-Muñoz et al., 2020). It has been reported that cigarette and alcohol consumption affect sleep quality and thus affect chronotype (Ergün et al., 2017). The fact that more of the nursing students who did not smoke or consumption of alcohol were morning types can be seen because of their chronotypes being unaffected by these habits. This study found that more of the students who evaluated their sleep quality as good were morning types, like previous studies of university students (Gangwar et al., 2018; Jongte & Trivedi, 2022; Rodríguez-Muñoz et al., 2020). Being a morning type positively affects physical and mental health (Fabbian et al., 2016), and this may be why the morning types perceived their sleep quality as better.

This study found that the nursing students' mean social jet lag was 1.36 hours (Table 2), which is similar to the results of the previous studies conducted with university students by Tassino et al. (2016), who reported 1.91 hours, and Chang and Jang (2019), who reported 1.36 hours. The fourth-year students had higher social jet lag than the first- and third-year students. Chang and Jang (2019) found no significant difference in social jet lag by year of study, in one of the few studies of this subject conducted with nursing students (Chang & Jang, 2019). However, the fact that the nursing students who evaluated their academic success as moderate or lower and very good and excellent had high social jet lag than good is thought to be due to their busy schedules and late-night studying especially exam term.

Previous studies have reported that cigarette and alcohol consumption negatively affect sleep quality and thus increase social

Table 2.
Comparison of the Nursing Students' Characteristics, Social jet lag, and WHOQOL-BREF-TR Subdimension Scores

			Social Jet Lag	Physical Subdimension	Mental Subdimension	Social Subdimension	Environmental Subdimension
		n (%)	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Gender	Female	935 (81.2%)	1.35 ± 0.71	14.13 ± 2.15	13.44 ± 2.31	13.89 ± 2.46	13.24 ± 2.04
	Male	217 (18.8%)	1.43 ± 0.80	14.08 ± 2.42	13.56 ± 2.47	13.55 ± 3.27	13.10 ± 2.19
			$t = -1.412$, $p = 0.158$	$t = 0.321$, $p := 0.766$	$t = 0.64$, $p = 0.517$	$t = 1.684$, $p = 0.158$	$t = 0.913$, $p = 0.361$
Year of study	First	305 (26.5%)	1.08 ± 0.67	14.67 ± 2.16	13.70 ± 2.51	13.93 ± 2.75	13.62 ± 2.11
	Second	285 (24.7%)	1.44 ± 0.73	14.34 ± 2.22	13.55 ± 2.23	13.61 ± 2.70	13.32 ± 2.08
	Third	278 (24.1%)	1.40 ± 0.68	13.71 ± 2.26	13.28 ± 2.39	13.57 ± 2.58	12.84 ± 2.05
	Fourth	284 (24.7%)	1.55 ± 0.75	13.73 ± 2.05	13.30 ± 2.19	14.16 ± 2.48	13.05 ± 1.96
			$F = 24.712$, $p = 0.000**$	$F = 13.845$, $p = 0.000**$	$F = 2.195$, $p = 0.087$	$F = 3.138$, $p = 0.025*$	$F = 7.972$, $p = 0.000**$
			b > a, c > a, d > a, d > c	a > c, b > c, a > d, b > d		d > b, d > c	a > c, b > c, a > d
WGPA	Moderate or less	205 (24.2%)	1.58 ± 0.77	13.83 ± 2.11	13.36 ± 2.33	13.32 ± 2.68	12.91 ± 2.06
	Good	367 (43.3%)	1.36 ± 0.70	13.92 ± 2.16	13.27 ± 2.19	13.86 ± 2.49	13.07 ± 2.03
	Very good	226 (26.7%)	1.50 ± 0.71	14.06 ± 2.37	13.66 ± 2.40	14.14 ± 2.70	13.20 ± 2.05
	Excellent	49 (5.8%)	1.58 ± 0.64	13.81 ± 1.91	12.95 ± 1.99	13.49 ± 2.28	13.17 ± 1.86
			$F = 5.085$, $p = 0.002*$	$F = 0.479$, $p = 0.697$	$F = 2.012$, $p = 0.111$	$F = 3.898$, $p = 0.009**$	$F = 0.766$, $p = 0.513$
			a > b, c > b, d > b			b > a, c > a	
Smoking	No	997 (86.5%)	1.31 ± 0.70	14.12 ± 2.21	13.47 ± 2.33	13.78 ± 2.63	13.21 ± 2.08
	I quit	43 (3.7%)	1.68 ± 0.77	13.58 ± 1.91	13.28 ± 1.92	14.26 ± 2.40	12.91 ± 1.71
	I smoke	112 (9.7%)	1.71 ± 0.86	14.40 ± 2.25	13.49 ± 2.56	14.07 ± 2.78	13.44 ± 2.12
			$F = 20.304$, $p = 0.000**$	$F = 2.224$, $p = 0.109$	$F = 0.137$, $p = 0.872$	$F = 1.225$, $p = 0.294$	$F = 1.148$, $p = 0.318$
			b > a, c > a				
Alcohol consumption	No	1065 (92.4%)	1.33 ± 0.71	14.15 ± 2.18	13.47 ± 2.32	13.81 ± 2.63	13.21 ± 2.06
	Yes	87 (7.6%)	1.80 ± 0.80	13.82 ± 2.53	13.32 ± 2.62	13.99 ± 2.77	13.25 ± 2.19
			$t = -5.851$, $p = 0.000**$	$t = 1.330$, $p = 0.244$	$t = 0.587$, $p = 0.598$	$t = -0.609$, $p = 0.542$	$t = -0.139$, $p = 0.889$
BMI	Low	137 (11.9%)	1.29 ± 0.68	14.38 ± 2.32	13.73 ± 2.40	14.13 ± 2.17	13.59 ± 2.06
	Normal weight	857 (74.4%)	1.39 ± 0.73	14.12 ± 2.12	13.50 ± 2.29	13.80 ± 2.72	13.13 ± 2.03
	Overweight or	158 (13.7%)	1.29 ± 0.75	13.91 ± 2.53	13.05 ± 2.53	13.67 ± 2.54	13.34 ± 2.24
	Obese		$F = 1.789$, $p = 0.168$	$F = 1.680$, $p = 0.187$	$F = 3.398$, $p = 0.034*$	$F = 1.188$, $p = 0.305$	$F = 3.267$, $p = 0.038*$
					a > c, b > c		a > b
Perceived sleep quality	Poor	509 (44.2%)	1.46 ± 0.73	13.22 ± 2.13	12.66 ± 2.31	13.45 ± 2.69	12.57 ± 1.95
	Good	643 (55.8%)	1.28 ± 0.72	14.84 ± 2.00	14.10 ± 2.17	14.12 ± 2.56	13.73 ± 2.02
			$t = -4.099$, $p = 0.000**$	$t = 13.201$, $p = 0.000**$	$t = 10.801$, $p = 0.000**$	$t = 4.322$, $p = 0.000**$	$t = 9.821$, $p = 0.000**$

Note: BMI = body mass index; SD, standard deviation; WGPA = weighted grade point average.
*Significant at < 0.05; **Significant at < 0.01.

Table 3.
Correlations between Social jet lag, Mean Morningness–Eveningness Scores and WHOQOOL-BREF-TR Subdimension Scores

		Morningness–Eveningness Scale	Social Jet Lag
Physical subdimension	r	.119**	−.142**
	p	0.000	0.000
Mental subdimension	r	.135**	−.087**
	p	0.000	0.003
Social subdimension	r	.090**	−.075*
	p	0.002	0.011
Environmental subdimension	r	.059*	−.084**
	p	0.047	0.004

*Pearson correlation $p < 0.05$; **Pearson correlation $p < 0.01$; r= correlation coefficient.

jet lag (Akıncı & Orhan, 2016). The nursing students who smoked and consumed alcohol had higher social jet lag, and this result is similar to findings of previous studies conducted with university students (Gangwar et al., 2018; Tavares et al., 2020). The nursing students who evaluated their sleep quality as poor had higher social jet lag than the students who evaluated their sleep quality as good, which is in accord with the findings of previous studies conducted with adults (Chakradeo et al., 2018; Sűdy et al., 2019).

In this study, the finding that the QOL scale physical and environmental subdimensional scores of the first-year students was higher than that of the third and fourth grades, Labrague et al. (2018) study's on finding was similar. The students with high academic success had higher QOL scores in the social subdimension, like this in previous study of this subject (Shareef et al., 2015). The nursing students with low BMIs had higher QOL scores in the mental and environmental subdimensions,

like previous studies conducted with adolescents (Eddolls et al., 2018) and adults (Dong et al., 2018). This is because high BMI is associated with low self-confidence and negative body image, which negatively affect interpersonal relationships and QOL (Geniş et al., 2021). The students who evaluated their sleep quality as good had higher QOL scores in the physical, mental, social, and environmental subdimensions than the students who evaluated their sleep quality as poor. This result is similar to those of previous studies of both university students (Kwon et al., 2020) and adults (Chakradeo et al., 2018). These results can be explained by good sleep quality making people feel vigorous and energetic (Gunaydin, 2014).

A correlation was found between being of the morning type and having high like WHOQOL-BREF-TR subdimension scores, and low social jet lag (Table 3). Chang and Jang's study of nursing students reported similar results. It has been reported that morning type university students have healthier eating habits (Haraszti et al., 2014) and that morning type adults suffer from fewer chronic diseases (Shechter & St-Onge, 2014). It is thought that being a morning type increases QOL because it affects health positively. It has been reported that high social jet lag increases adults' BMIs (Zerón-Rugerio et al., 2019), insulin resistance, cholesterol levels (Wong et al., 2015), the likelihood of cardiovascular disease (Chakradeo et al., 2018), and thus reduces their sleep quality (Chakradeo et al., 2018; Wong et al., 2015). It has been reported that students with high social jet lag are more prone to cigarette and alcohol consumption (Gangwar et al., 2018; Tavares et al., 2020), obesity (Tassino et al., 2016), and lack of concentration and fatigue (Tavares et al., 2020). It is thought that social jet lag reduces QOL because of its association with conditions and diseases that negatively affect health.

Higher social jet lag negatively affected the nursing students' QOL scores, especially in the physical and environmental subdimensions, while being a morning chronotype affected their QOL

Table 4.
The Effect of Social jet lag and Mean Morningness–Eveningness Scores on WHOQOOL-BREF-TR Subdimension Scores

		ß	t	p	F	Model (p)	R^2
Physical subdimension	Constant	13.216	22.574	0.000	15.412	0.000	0.024
	Social jet lag	−0.349	−3.755	0.000			
	Morningness–eveningness	0.027	2.631	0.009			
Mental subdimension	Constant	11.499	18.457	0.000	11.897	0.000	0.019
	Social jet lag	−0.151	−1.532	0.126			
	Morningness–eveningness	0.043	3.872	0.000			
Social subdimension	Constant	12.589	17.850	0.000	6.012	0.003	0.009
	Social jet lag	−0.184	−1.647	0.100			
	Morningness–eveningness	0.029	2.342	0.019			
Environmental subdimension	Constant	12.942	23.345	0.000	4.699	0.009	0.006
	Social jet lag	−0.205	−2.329	0.020			
	Morningness–eveningness	0.011	1.119	0.263			

*Significant at < 0.05, **Significant at < 0.01.

scores positively in all subdimensions except the environmental subdimension. Türkoğlu and Selvi (2020) also found that being an evening type negatively affected adults' scores in all subdimensions of the QOL scale. A study of adolescents reported the same result for them (Suh et al., 2017). Conditions that can affect health negatively such as depression, obesity, and cardiovascular diseases are more common in evening types (Montaruli et al., 2017), so it is thought that this chronotype affects QOL negatively. Like this study, Chang and Jhang (2019) found that high social jet lag negatively affected nursing students' physical and mental QOL subdimension scores. Moon et al. (2017) also reported that medical students with high social jet lag had lower QOL scores. People with high social jet lag have lower QOL scores because social jet lag negatively affects their health (Uzunay et al., 2020).

Study Limitations
This study was conducted in only one nursing faculty and one school of nursing. The nursing students' responses are limited to the scale questions and cannot be generalized. Other limitations were the students' self-reporting their CGPA scores, the absence of a scale to evaluate sleep quality, and the fact that the data were collected 14 days after the mid-term examination. Also, other factors affecting social jet lag and QOL were not addressed in this study.

Conclusion and Recommendations

Being a morning type positively affected the nursing students' QOL, and high social jet lag negatively affected their QOL. These results suggest that education and counseling about the positive effects of being a morning person on health, QOL, abstaining from cigarette and alcohol consumption, and sleep quality should be provided to students. Education about high social jet lag reducing academic achievement, increasing tobacco and alcohol consumption, and negatively affecting sleep quality and QOL should also be provided. Studies with larger samples should be conducted to determine the relationships between the chronotypes, social jet lag, and QOL of nursing students who will later become health professionals and work in shifts.

In addition to being healthy, it is important for nursing students to acquire habits that enhance their QOL during their university educations while they try to balance their academic (theoretical and practical) work and their lifestyles, especially as role models for their peers. Education should be provided about the factors that negatively affecting health as social jet lag increases. This study showed the chronotypes, social jet lag, and changes in the QOL of nursing students with a mean age of 20 years. More studies should be conducted to determine the aforementioned changes and other inducing factors among nursing students and other students studying in health-related departments.

References

Akıncı, E., & Orhan, F. Ö. (2016). Sirkadiyen ritim uyku Bozuklukları. *Psikiyatride Guncel Yaklasimlar – Current Approaches in Psychiatry*, 8(2), 178. **[CrossRef]**

Bakotic, M., Radosevic-Vidacek, B., & Koscec Bjelajac, A. (2017). Morningness–eveningness and daytime functioning in university students: The mediating role of sleep characteristics. *Journal of Sleep Research*, 26(2), 210–218. **[CrossRef]**

Çakır, Y., Toktaş, N., & Karabudak, E. (2018). Üniversite Öğrencilerinde Kronotipe göre Besin Tüketiminin Değerlendirilmesi. [Evaluation of food consumption according to chronotype in university students]. *Journal of Nutrition and Dietetics*, 46(2), 136–146. **[CrossRef]**

Chakradeo, P. S., Keshavarzian, A., Singh, S., Dera, A. E., Esteban, J. P. G., Lee, A. A., Burgess, H. J., Fogg, L., & Swanson, G. R. (2018). Chronotype, social jet lag, sleep debt and food timing in inflammatory bowel disease. *Sleep Medicine*, 52, 188–195. **[CrossRef]**

Chang, S. J., & Jang, S. J. (2019). Social jetlag and quality of life among nursing students: A cross-sectional study. *Journal of Advanced Nursing*, 75(7), 1418–1426. **[CrossRef]**

Cruz, J. P., Felicilda-Reynaldo, R. F. D., Lam, S. C., Machuca Contreras, F. A., John Cecily, H. S., Papathanasiou, I. V., Fouly, H. A., Kamau, S. M., Valdez, G. F. D., Adams, K. A., & Colet, P. C. (2018). Quality of life of nursing students from nine countries: A cross-sectional study. *Nurse Education Today*, 66, 135–142. **[CrossRef]**

Díaz-Morales, J. F., & Escribano, C. (2015). Social jetlag, academic achievement and cognitive performance: Understanding gender/sex differences. *Chronobiology International*, 32(6), 822–831. **[CrossRef]**

Dong, Y., Berens, S., Eich, W., Schaefert, R., & Tesarz, J. (2018). Is body mass index associated with symptom severity and health-related quality of life in irritable bowel syndrome? A cross-sectional study. *BMJ Open*, 8(10), e019453. **[CrossRef]**

Eddolls, W. T. B., McNarry, M. A., Lester, L., Winn, C. O. N., Stratton, G., & Mackintosh, K. A. (2018). The association between physical activity, fitness and body mass index on mental well-being and quality of life in adolescents. *Quality of Life Research*, 27(9), 2313–2320. **[CrossRef]**

Ergün, S., Duran, S., Gültekİn, M., & Yanar, S. (2017). Evaluation of the factors which affect the sleep habit and quality of health college students. *Turkish Journal of Family Medicine and Primary Care*, 11(3), 186–193. **[CrossRef]**

Eser, E., Fidner, H., Fidaner, C., Yalçın Eser, S., Elbi, H., & Göker, E. (1999). Whoqol-100 and Psychometric Characteristics of WHOQOL-Bref. *3P dergisi*, 7, 23–25

Fabbian, F., Zucchi, B., De Giorgi, A., Tiseo, R., Boari, B., Salmi, R., Cappadona, R., Gianesini, G., Bassi, E., Signani, F., Raparelli, V., Basili, S., & Manfredini, R. (2016). Chronotype, gender and general health. *Chronobiology International*, 33(7), 863–882. **[CrossRef]**

Gangwar, A., Tiwari, S., Rawat, A., Verma, A., Singh, K., Kant, S., Garg, R. K., & Singh, P. K. (2018). Circadian preference, sleep quality, and health-impairing lifestyles among undergraduates of Medical University. *Cureus*, 10(6), e2856. **[CrossRef]**

Geniş, B.,, Kayalar, A., Dönmez, A., & Coşar, B. (2021). Obez ve aşırı kilolu bireylerde yapılandırılmış bilişsel davranışçı grup terapisinin vücut ağırlığı, ruhsal durum ve yaşam kalitesi üzerine etkisi: 16 haftalık bir takip çalışması [The effect of structured cognitive behavioral group therapy on body weight, mental status and quality of life in obese and overweight ındividuals: A 16-week follow-up study] (in press). *Turk Psikiyatri Dergisi*. **[CrossRef]**

Gunaydin, N. (2014). The quality of sleep and effects on general mental health of nurses who works in a State Hospital. *Journal of Psychiatric Nursing, 5*(1), 33–40. [CrossRef]

Haraszti, R. Á., Purebl, G., Salavecz, G., Poole, L., Dockray, S., & Steptoe, A. (2014). Morningness-eveningness interferes with perceived health, physical activity, diet and stress levels in working women: A cross-sectional study. *Chronobiology International, 31*(7), 829–837. [CrossRef]

Jankowski, K. S. (2017). Social jet lag: Sleep-corrected formula. *Chronobiology International, 34*(4), 531–535. [CrossRef]

Jongte, L., & Trivedi, A. K. (2022). Chronotype, sleep quality and academic performances among Mizo students. *Chronobiology International, 39*(3), 398–408. [CrossRef]

Kwon, S. J., Yoonjung, K., & Yeunhee, K. (2020). Relationship of sleep quality and attention deficit hyperactivity disorder symptoms with quality of life in college students. *Journal of American College of Health, 68*(5), 536–542. [CrossRef]

Labrague, L. J., McEnroe-Petitte, D. M., Papathanasiou, I. V., Edet, O. B., Tsaras, K., Christos, K. F., Fradelos, E. C., Rosales, R. A., Cruz, J. P., Leocadio, M., & Lucas, K. V. S. (2018) A cross-country comparative study on stress and quality of life in nursing students. *Perspectives in Psychiatric Care, 54*(4), 469–476. [CrossRef]

López-Soto, P. J., Fabbian, F., Cappadona, R., Zucchi, B., Manfredini, F., García-Arcos, A., Carmona-Torres, J. M., Manfredini, R., & Rodríguez-Borrego, M. A. (2019). Chronotype, nursing activity, and gender : A systematic review. *Journal of Advanced Nursing, 75*(4), 734–748. [CrossRef]

Montaruli, A., Galasso, L., Caumo, A., Cè, E., Pesenti, C., Roveda, E., & Esposito, F. (2017). The circadian typology: The role of physical activity and melatonin. *Sport Sciences for Health, 13*(3), 469–476. [CrossRef]

Moon, H. J., Yoo, S., & Cho, Y. W. (2017). The effect of chronotype and social jetlag on sleep, mental health, quality of life, and academic performance of medical students. *Journal of the Neurological Sciences, 381*, 296. [CrossRef]

Pündük, Z., Gür, H., & Ercan, İ. (2005). Sabahçıl-Akşamcıl Anketi Türkçe Uyarlamasında Güvenirlilik çalışması. [A reliability study of the Turkish version of the morningness-eveningness questionnaire]. *Turk Psikiyatri Dergisi, 16*(1), 40–45

Putilov, A. A., Sveshnikov, D. S., Bakaeva, Z. B., Yakunina, E. B., Starshinov, Y. P., Torshin, V. I., Alipov, N. N., Sergeeva, O. V., Trutneva, E. A., Lapkin, M. M., Lopatskaya, Z. N., Budkevich, R. O., Budkevich, E. V., Puchkova, A. N., & Dorokhov, V. B. (2021). Differences between male and female university students in sleepiness, weekday sleep loss, and weekend sleep duration. *Journal of Adolescence, 88*, 84–96. [CrossRef]

Rodríguez-Muñoz, P. M., Carmona-Torres, J. M., Rivera-Picón, C., Fabbian, F., Manfredini, R., Rodríguez-Borrego, M. A., & López-Soto, P. J. (2020). Associations between chronotype, adherence to the Mediterranean diet and sexual opinion among university students. *Nutrients, 12*(6), 1–12. [CrossRef]

Roenneberg, T., & Merrow, M. (2016). The circadian clock and human health. *Current Biology, 26*(10), R432–R443. [CrossRef]

Shareef, M. A., Alamodi, A. A., Al-Khateeb, A. A., Abudan, Z., Alkhani, M. A., Zebian, S. I., Qannita, A. S., & Tabrizi, M. J. (2015). The interplay between academic performance and quality of life among preclinical students career choice, professional education and development. *BMC Medical Education, 15*(1), 1–8. [CrossRef]

Shechter, A., & St-Onge, M. P. (2014). Delayed sleep timing is associated with low levels of free-living physical activity in normal sleeping adults. *Sleep Medicine, 15*(12), 1586–1589. [CrossRef]

Sűdy, Á. R., Ella, K., Bódizs, R., & Káldi, K. (2019). Association of social jetlag with sleep quality and autonomic cardiac control during sleep in young healthy men. *Frontiers in Neuroscience, 13*, 950. [CrossRef]

Suh, S., Yang, H. C., Kim, N., Yu, J. H., Choi, S., Yun, C. H., & Shin, C. (2017). Chronotype differences in health behaviors and health-related quality of life: A population-based study among aged and older adults. *Behavioral Sleep Medicine, 15*(5), 361–376. [CrossRef]

Tassino, B., Horta, S., Santana, N., Levandovski, R., & Silva, A. (2016). Extreme late Chronotypes and social jetlag challenged by Antarctic conditions in a population of university students from Uruguay. *Sleep Science, 9*(1), 20–28. [CrossRef]

Tavares, P. S., Carpena, M. X., Carone, C. M. M., Del-Ponte, B., Santos, I. S., & Tovo-Rodrigues, L. (2020). Is social jetlag similar to travel-induced jetlag? Results of a validation study. *Chronobiology International, 37*(4), 542–551. [CrossRef]

Türkoğlu, G., & Selvi, Y. (2020). The relationship between chronotype, sleep disturbance, severity of fibromyalgia, and quality of life in patients with fibromyalgia. *Chronobiology international, 37*(1), 68–81. [CrossRef]

Toscano-Hermoso, M. D., Arbinaga, F., Fernández-Ozcorta, E. J., Gómez-Salgado, J., & Ruiz-Frutos, C. (2020). Influence of sleeping patterns in health and academic performance among university students. *International Journal of Environmental Research and Public Health, 17*(8), 1–11. [CrossRef]

Uzunay, A. Ş., Kalfaoğlu, S., & Akgemci, T. (2020). Sosyal jet-lag Sendromu Üzerine Bir Değerlendirme. *Sosyal Araştırmalar ve Yönetim Dergisi, 1*, 53–61.

THE WHOQOL GROUP. (1998). Development of the World Health Organization WHOQOL-BREF Quality of Life Assessment. Psychological Medicine, 28, 551–558.

Wong, P. M., Hasler, B. P., Kamarck, T. W., Muldoon, M. F., & Manuck, S. B. (2015). Social jetlag, chronotype, and cardiometabolic risk. *Journal of Clinical Endocrinology and Metabolism, 100*(12), 4612–4620. [CrossRef]

Zerón-Rugerio, M. F., Cambras, T., & Izquierdo-Pulido, M. (2019). Social jet lag associates negatively with the adherence to the Mediterranean diet and body mass index among young adults. *Nutrients, 11*(8). [CrossRef]

Zhang, Y., Peters, A., & Bradstreet, J. (2018). Relationships among sleep quality, coping styles, and depressive symptoms among college nursing students: A multiple mediator model. *Journal of Professional Nursing, 34*(4), 320–325. [CrossRef]