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Relationships Between Work Schedule and Chronotype, Nutrition Attitude, Mood, and Sleep Quality: Police–Teacher Comparison

Çalışma Düzeni ile Kronotip, Beslenme Tutumu, Ruh Hali ve Uyku Kalitesi Arasındaki İlişki: Polis-Öğretmen Karşılaştırması

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Abstract

Objective: This study aimed to compare the relationships between chronotype and nutrition attitudes, mood, and sleep quality among police officers and teachers with different work schedules.

Materials and Methods: This cross-sectional, comparative study was conducted with 176 participants (104 teachers and 72 police officers). Participants completed an online survey including demographic data, dietary habits, the Attitude Scale for Healthy Nutrition, Morningness–Eveningness Questionnaire, Depression Anxiety Stress Scale, and Pittsburgh Sleep Quality Index.

Results: Police officers' eating habits were more affected by their work schedule than those of teachers ($p < 0.05$). In terms of chronotype, the majority of police officers were intermediate types, while the majority of teachers were morning types ($p < 0.05$). Teachers reported better sleep quality than police officers, although the difference did not reach significance ($p > 0.05$). Evening- and intermediate-type participants had higher depression, anxiety, and stress scores than morning types (2- to 4-fold higher for teachers; 5- to 6-fold higher for police officers). In addition, evening-type police officers had significantly poorer sleep quality than morning types.

Conclusion: These findings suggest that the intermediate and evening chronotypes may be associated with a greater negative impact on mood and sleep quality, particularly in rotating shift workers.

Keywords: Chronotype, circadian rhythm, mood, nutrition, police officer, sleep, teacher

Öz

Amaç: Bu çalışma, farklı çalışma düzenlerine sahip polis memurları ve öğretmenler arasında kronotip ile beslenme tutumları, duygu durumu ve uyku kalitesi arasındaki ilişkileri karşılaştırmayı amaçlamıştır.

Gereç ve Yöntem: Kesitsel ve karşılaştırmalı nitelikte olan bu araştırma 176 polis ve öğretmenden ile gerçekleştirilmiştir. Çevrimiçi anket ile katılımcılara demografik verilere ait sorular, beslenme alışkanlıkları (öğün düzenleri, diyet yapma durumu vs.), Sağlıklı Beslenmeye İlişkin Tutum Ölçeği, Sabahçıl–Akşamcıl Testi, Depresyon Anksiyete Stres Ölçeği ve Pittsburgh Uyku Kalitesi İndeksi yönlendirilmiş ve verilen cevaplar değerlendirilmiştir.

Bulgular: Polis memurlarının beslenme durumunun, öğretmenlerin beslenme durumuna göre çalışma düzenlerinden daha fazla etkilendiği gözlemlenmiştir ($p < 0,05$). Kronotip açısından, polislerin çoğu ara tip, öğretmenlerin ise çoğunluğunun sabahçıl olduğu görülmüştür ($p < 0,05$). Uyku kalitesi açısından, öğretmenlerin polislere oranla daha iyi uyku kalitesine sahip olduğu bulunmuştur ($p > 0,05$). Sabahçıllara kıyasla, diğer kronotiplerdeki öğretmenlerin depresyon, anksiyete ve stres puanları 2 ila 4 kat daha yüksekken, polis memurlarının puanları 5 ila 6 kat daha yüksektir. Ayrıca, akşam tipi polis memurlarının uyku kalitesinin sabah tiplerine kıyasla yaklaşık 2 kat daha kötü olduğu tespit edilmiştir.

Sonuç: Bu bulgular, ara ve akşam kronotipine sahip olmanın polis memurlarının duygu durumu ve uyku kalitesi üzerinde öğretmenlere göre daha olumsuz bir etkiye sahip olabileceğini göstermektedir.

Anahtar Kelimeler: Beslenme, duygu durumu, kronotip, öğretmen, polis, sirkadiyen ritim, uyku

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Introduction

In modern society, fluctuations in working hours can have a detrimental effect on mental and behavioral health outcomes, including dietary behaviors, depression, stress, and sleep quality (1). Bibliometric analyses have shown that epidemiological publications related to shift work and health have increased rapidly over the past 10–15 years, with the focus broadening to include cancer and mental/psychological health (2). In this context, increasing attention has been directed toward the circadian system, which includes the central clock in the suprachiasmatic nucleus of the hypothalamus and peripheral clocks in the metabolic tissues. This system regulates many of the body's daily physiological processes, from hormone release to body temperature regulation and the sleep-wake cycle (3).

In the natural circadian rhythm, individuals should rise early in the morning and carry out activities such as eating and working during daylight hours (1,4). As exposure to sunlight decreases, individuals typically reduce their activity levels and spend the nighttime hours obtaining restorative sleep. However, there are individual variations in the preferred timing of sleep and daily activities, which are termed chronotypes. People inclined to be more active during daylight hours are considered morning types, while those who are more active in the evening hours are called evening types. Morning types have been shown to be more closely aligned with the endogenous circadian rhythm (5).

Shift work has been shown to significantly alter sleep-wake cycles and eating patterns (6). These alterations can in turn disrupt the circadian rhythm, disturbing the body's equilibrium and negatively impacting health. A large-scale epidemiological study showed that the prevalence of circadian rhythm sleep-wake disorders (particularly delayed sleep phase and shift work disorder) in the general population is around 10% to 13% (7). In professions with shift work systems, such as policing, night shifts cause individuals to spend their mornings sleeping and being physically inactive, while being active at night when sleep would normally occur. This disruption of biological rhythms can affect mood, causing them to feel more depressed and stressed (8,9). In a study examining the sleep patterns and nutritional status of police officers working different shifts, the authors noted their inability to adequately assess the long-term effects of circadian rhythm disruptions because of the participants' constantly changing shift schedule (10).

Chrononutrition, a subfield of chronobiology, is an emerging area of interest, with research focusing on the role of meal timing and its alignment with the body's natural circadian rhythms in regulating metabolic health and energy balance (11,12). Eating/feeding time is a well-known zeitgeber (13). Irregular working hours or shift work, which can lead to fluctuations in mealtimes and irregular eating habits, have been associated with negative health outcomes such as obesity and type 2 diabetes, although definitive evidence remains limited (14).

The fundamental principle of chrononutrition is the optimization of the release of hormones such as insulin, cortisol, and melatonin through the consumption of meals at specific times of the day. Given that the body's insulin sensitivity is elevated during the day and reduced at night, the consumption of a late-night meal can elevate blood sugar levels and impair insulin sensitivity (13). Consequently, in addition to the traditional focus of dietary guidelines, namely food quantity and quality (i.e., how much we eat and what we eat), it is also important to consider the timing of food intake (i.e., when we eat) (15). Although previous studies have examined the circadian rhythms and nutritional status of shift workers, the exact nature of these disruptions remains poorly defined (16).

To the best of our knowledge, there has been no analysis and comparison of potential relationships among chronotype, dietary habits, nutrition attitudes, mood, and sleep quality in police officers and teachers, two occupational groups with different work schedules. Therefore, this study aimed to compare the relationship between chronotype, an individual determinant of circadian rhythm, and nutrition attitudes, mood, and sleep quality among shift-working police officers and daytime-working teachers.

Materials and Methods

Study Design

This cross-sectional, comparative study compared the possible relationship between the work schedules of two occupational groups, police officers and teachers, and their chronotype, nutrition attitudes, mood, and sleep quality. According to a power analysis performed using G*Power 3.1 software, assuming a significance level (α) of 0.05 and a test power (1-β) of 0.90, a total of 140 participants were required, with a minimum of 70 for each group. The study was conducted with 104 teachers and 72 police officers.

Participating police officers worked in a two-shift system with rotation every two weeks. The day shift runs from 6:00 AM to 6:00 PM, and the night shift runs from 6:00 PM to 6:00 AM. All participating teachers worked standard daytime shifts (approximately 8:00 AM to 4:00 PM).

Inclusion criteria were (1) age over 18 years, (2) at least one year of professional experience, (3) ability to speak and understand Turkish, and (4) absence of any chronic disease (e.g., diabetes mellitus, insulin resistance, hypertension, ischemic heart disease, thyroid disorders, chronic kidney or liver disease), psychiatric diagnosis, or eating disorder. Exclusion criteria were (1) pregnancy, (2) currently following any specific diet, and (3) use of medications that affect sleep quality or nutritional status.

Study data were obtained using an online survey from volunteer participants. All participants were informed of the purpose of the study and provided written informed consent online, in accordance with the Declaration of Helsinki. Ethical approval for the study was obtained from the Ordu University Social and Human Sciences Research Ethics Committee (date: 29 April 2025; session no: 04; decision no: 2025-74).

Data Collection Tools

Participants were asked questions about their demographic information, and completed the Attitude Scale for Healthy

Nutrition (ASHN), Morningness–Eveningness Questionnaire (MEQ), Depression Anxiety Stress Scale (DASS-21), and Pittsburgh Sleep Quality Index (PSQI).

Demographic Information Form: This form was used to determine the participants' general characteristics and included questions about their age, gender, health status, smoking and alcohol use, length of professional experience, typical sleep duration, and dietary habits. In addition, height and weight information was collected based on participants' self-report. Body mass index (BMI) was calculated from these data and evaluated according to the World Health Organization (WHO) classification (17,18).

ASHN: The ASHN was developed in 2019 by Tekkurşun Demir and Cicioğlu (19) to determine attitudes toward nutrition in adults, and its validity and reliability have been established. It is a 21-item, 5-point Likert-type scale with 4 factors (nutrition knowledge, attitudes toward nutrition, positive nutrition, and poor nutrition). Responses to positive items range from "strongly disagree" (1 point) to "strongly agree" (5 points). Scoring is reversed for negative items. Higher scores indicate better nutrition knowledge, attitudes, and behaviors (19).

Morningness-Eveningness Questionnaire: The MEQ was developed by Horne and Östberg (20) in 1976. Its validity and reliability in Turkish were established in 2005 (21). It consists of 19 multiple-choice and time-based items regarding lifestyle, sleep-wake patterns, and peak performance times. Each item receives a point value ranging from 0 to 6 points. Chronotype is determined according to total MEQ score, with total scores of 16–41 classified as "evening type," 42–58 as "intermediate type," and 59–86 as "morning type" (21).

Depression Anxiety Stress Scale (DASS-21): This study utilized the 21-item DASS scale, adapted from the studies by Henry and Crawford (22) and Mahmoud et al. (23). The validity and reliability study of this version in Turkish was conducted by Yılmaz et al. (24) in 2017. The DASS-21 contains 7 items in each of 3 dimensions: depression, stress, and anxiety. Items are rated on a 4-point Likert-type scale from "does not apply to me" (0 points) to "applies to me very much" (3 points). Based on the respective subscale scores, the individual's depression, anxiety, and stress levels are assessed as normal, mild, moderate, severe, or very severe (24).

Pittsburgh Sleep Quality Index (PSQI): The PSQI, developed in 1989 by Buysse et al. (25), was used to assess participants' sleep quality over the previous month. The Turkish validity and reliability study was conducted by Ağargün (26) in 1996. The index consists of 7 subscales: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, sleep medication use, and daytime sleep dysfunction. Each component is scored between 0 and 3 points, yielding a total score ranging from 0 to 21 points. A score of 5 or below indicates good sleep quality, while a score of 6 or above indicates poor sleep quality (25,26).

Statistical Analysis

SPSS Statistics version 27.0 software (IBM Corp., Armonk, NY) was used for statistical analyses, with a significance level of $p < 0.05$. Categorical data are expressed as frequencies (n) and percentages (%). The normality of continuous variables was examined using the Kolmogorov-Smirnov test, as well as evaluation of skewness and kurtosis. In descriptive analyses, normally distributed data were expressed as mean ± standard deviation (SD) and non-normally distributed data were expressed as median and interquartile range (IQR). Comparisons among variables were assessed using chi-square analysis for categorical data, parametric tests (t-test, analysis of variance) for normally distributed data, and non-parametric tests (Mann-Whitney U, Kruskal-Wallis H) for non-normally distributed data. Spearman correlation analysis was used to identify associations between variables, and linear regression analysis was performed to determine the strength of these relationships. Due to the limited number of participants in the highest severity categories of the DASS-21, the 'severe' and 'very severe' classifications were combined for the depression and anxiety subscales. Similarly, for the stress subscale, the four severity levels were reduced to two categories, 'mild to moderate' and 'severe to very severe', to ensure sufficient data for analysis.

Results

A total of 104 teachers and 72 police officers participated in the study. The sociodemographic characteristics of both groups are shown in Table 1. The proportion of female teachers and police officers was 59.6% and 20.8%, respectively ($p < 0.001$). Police officers reported significantly higher rates of smoking and alcohol use than teachers ($p < 0.001$ for both). Teachers were significantly older than police officers (mean ± SD: 40.3 ± 8.20 vs. 34.0 ± 6.25 years; $p = 0.011$) and had more professional experience (median [range]: 3 [1–4] vs. 2 [1–4] years, respectively; $p < 0.001$). Work schedule impacted diet more frequently for police officers than teachers ($p < 0.001$).

The chronotypes, depression, anxiety, and stress levels, sleep quality, and nutrition attitudes of teachers and police officers are examined in Table 2. In terms of chronotype (determined by the MEQ), the majority of police officers were classified as intermediate type (69.4%), whereas a higher proportion of teachers were classified as morning type (54.8%). When stress levels were examined according to the DASS-21, most teachers (84.6%) had normal stress levels, while a greater percentage of police officers (19.4%) reported mild/moderate stress ($p = 0.037$). Regarding sleep quality, teachers tended to have better sleep quality than police officers, although the difference was not significant ($p > 0.05$). There was also no significant difference in nutrition attitudes between teachers and police officers as determined by the ASHN ($p > 0.05$).

Table 3 shows that evening-type teachers had higher depression (median [IQR]: 11.1 [20.00]; $p < 0.001$), stress (10.0 [20.00]; $p = 0.045$), and sleep quality (7.3 [2.63]; $p = 0.037$) scores compared to morning and intermediate types (higher PSQI score indicates worse sleep quality). Evening-type police officers were also found to have significantly higher depression (median [IQR]: 9.1 [4.17]; $p = 0.002$), anxiety (8.0 [15.00]; $p = 0.017$), and stress levels (6.0 [18.00]; $p = 0.022$) compared to morning and intermediate types. No significant difference in nutrition attitudes was observed among chronotypes in either occupational group.

Table 1. Sociodemographic characteristics of participants.

		Teacher		Police officer		χ^2; p
		n	%	n	%	
Gender	Female	62	59.6	15	20.8	χ^2 = 26.002; **p < 0.001**[a]
	Male	42	40.4	57	79.2	
Marital status	Single	22	21.2	24	33.3	χ^2 = 3.269; p = 0.71[a]
	Married	82	78.8	48	66.7	
Smoking	Yes	27	26.0	36	50.0	χ^2 = 10.697; **p = 0.001**[a]
	No	77	74.0	36	50.0	
Alcohol consumption	Yes	10	9.6	21	29.2	χ^2 = 11.207; **p = 0.001**[a]
	No	94	90.4	51	70.8	
Skipping meals	Yes	62	56.6	51	70.8	χ^2 = 2.330; p = 0.127[a]
	No	42	40.4	21	29.2	
History of dieting	Yes	11	10.6	6	8.3	χ^2 = 0.245; p = 0.620[a]
	No	93	89.4	66	91.7	
Does your work schedule affect your diet?	Never	11	10.6	2	2.8	χ^2 = 26.285; **p < 0.001**[a]
	Rarely	55	52.9	17	23.6	
	Usually	29	27.8	32	44.4	
	Always	9	8.7	21	29.2	
		$\bar{X}$/M	**SD/min-max**	**$\bar{X}$/M**	**SD/min-max**	**p**
Age (years)		40.3	8.20	34.0	6.25	**0.011**[c]
Professional experience (years)		3	1–4	2	1–4	**<0.001**[b]
Sleep duration (hours)		7	5–10	7	4–12	0.813[b]
Number of meals per day		3	2–5	3	1–7	0.791[b]
Height (cm)		167.8	8.68	176.9	8.74	0.540[c]
Body weight (kg)		71.3	13.29	77.8	13.14	0.716[c]
BMI (kg/m²)		25.2	3.52	24.8	3.16	0.382[c]
		n	%	n	%	
BMI classification	Normal	52	50.0	39	54.2	0.497[a]
	Overweight	43	41.3	30	41.6	
	Obese	9	8.7	3	4.2	

[a]Chi-square test; [b]Mann-Whitney U test; [c]Independent samples t-test. BMI: Body mass index, M: Median, Max: Maximum, Min: Minimum, SD: Standard deviation. $\bar{X}$: Mean, Significant results ($p < 0.05$) are in bold.

In morning-type and intermediate-type teachers, there were moderate to strong positive correlations among depression, anxiety, stress, and sleep quality ($p < 0.01$). These associations were stronger for evening-type teachers, with depression showing very strong correlation with anxiety and stress ($r = 0.964$; $p < 0.01$). Intermediate-type and evening-type police officers also exhibited moderate to strong positive correlations among depression, anxiety, and stress ($p < 0.05$). Additionally, sleep quality was moderately correlated with anxiety in intermediate-type police officers ($r = 0.464$; $p < 0.01$) (Figure 1).

Regression analyses of teachers' and police officers' mood, BMI, and sleep quality according to chronotype are presented in Table 4. Intermediate and evening types had significantly higher depression, anxiety, and stress scores compared to morning types (2- to 4-fold higher for teachers; 5- to 6-fold higher for police officers). Furthermore, evening-type police officers' sleep quality was approximately twice as poor as that of morning types.

Discussion

The present study examined the potential relationship between chronotype and nutrition attitudes, mood, and sleep quality in two occupational groups with different work schedules. The findings indicated that police officers' shift work schedule had a greater impact on their eating habits than teachers' daytime schedule, although there was no difference in nutrition attitudes between the two groups. According to the MEQ, the majority of teachers were morning types, whereas the majority of police officers were intermediate types. Teachers and police officers who were evening types reported significantly higher levels of depression, stress, and anxiety compared to other chronotypes. Furthermore, more than half of police officers had poor sleep quality, while both teachers and police officers who were

Table 2. Classification of teachers and police officers according to chronotype, depression, anxiety, and stress levels, sleep quality, and nutrition attitudes.

		Teacher		Police officer		χ^2; p
		n	%	n	%	
Chronotype	Morning	57	54.8	10	13.9	χ^2 = 14.433 **p = 0.001**
	Intermediate	40	38.5	50	69.4	
	Evening	7	6.7	12	16.7	
Depression level	Normal	35	33.7	18	25.0	χ^2 = 1.804; p = 0.614
	Mild	30	28.8	23	31.9	
	Moderate	31	29.8	23	31.9	
	Severe/very severe	8	7.7	8	11.1	
Anxiety level	Normal	38	36.5	20	27.8	χ^2 = 3.947; p = 0.267
	Mild	24	23.1	12	16.7	
	Moderate	20	19.2	19	26.4	
	Severe/very severe	22	21.2	21	29.2	
Stress level	Normal	88	84.6	57	79.2	χ^2 = 6.615; **p = 0.037**
	Mild/moderate	9	8.7	14	19.4	
	Severe/very severe	7	6.7	1	1.4	
Sleep quality	Good	57	54.8	34	47.2	χ^2 = 0.980; p = 0.322
	Bad	47	45.2	38	52.8	
Nutrition attitudes	Moderate	9	8.7	12	16.7	χ^2 = 2.600; p = 0.107
	Good	95	91.3	60	83.3	

Chi-square tests. Significant results (p < 0.05) are in bold.

Table 3. Comparison of teachers' and police officers' mood, sleep quality, and nutrition attitudes according to chronotype.

	Teacher				Police officer			
	Morning-type	Intermediate-type	Evening-type		Morning-type	Intermediate-type	Evening-type	
Depression	5.8 (3.55)[x]	5.6 (2.72)[x]	11.1 (20.00)[y]	**p < 0.001**[a]	4.5 (1.27)[x]	6.2 (3.00)[x]	9.1 (4.17)[y]	**p = 0.002**[a]
Anxiety	4.0 (21.00)	5.0 (12.00)	13.0 (21.00)	p = 0.099[b]	3.0 (8.00)[x]	6.0 (13.00)[y]	8.0 (15.00)[y]	**p = 0.017**[b]
Stress	3.0 (21.00)[x]	3.0 (13.00)[x]	10.0 (20.00)[y]	**p = 0.045**[b]	2.0 (7.00)[x]	4.5 (12.00)[y]	6.0 (18.00)[y]	**p = 0.022**[b]
PSQI	4.7 (3.08)[x]	5.8 (2.58)[x]	7.3 (2.63)[y]	**p = 0.037**[a]	4.5 (1.84)	6.0 (3.06)	7.3 (1.78)	p = 0.062[a]
ASHN total	67.6 (30.00)	67.6 (28.00)	67.6 (30.00)	p = 0.588[b]	65.6 (39.00)	67.8 (36.00)	68.3 (20.00)	p = 0.155[b]
ASHN subscales								
Nutrition knowledge	20.0 (4.03)	20.1 (5.03)	19.9 (0.03)	p = 0.810[b]	19.2 (14.00)	19.9 (15.00)	19.6 (3.00)	p = 0.391[b]
Attitudes toward nutrition	16.3 (4.81)	16.1 (7.00)	17.0 (5.81)	p = 0.122[b]	15.2 (17.00)	16.1 (16.00)	16.7 (10.00)	p = 0.608[b]
Positive nutrition	15.7 (4.00)	15.5 (7.00)	15.6 (0.39)	p = 0.524[b]	15.9 (13.00)	15.5 (11.00)	15.5 (1.00)	p = 0.669[b]
Poor nutrition	16.8 (5.55)	16.5 (8.00)	16.6 (1.55)	p = 0.327[b]	15.4 (15.00)	16.3 (13.00)	16.3 (8.00)	p = 0.995[b]

Data expressed as mean (standard deviation) or median (interquartile range). [a]Analiysis of variance, [b]Kruskal-Wallis H test. Significant results (p < 0.05) are in bold. There is a significant difference between x, y, z groups. PSQI: Pittsburgh Sleep Quality Index, ASHN: Attitude Scale for Healthy Nutrition.

morning types had good sleep quality. Positive correlations between mood and sleep quality were observed in morning- and intermediate-type teachers and intermediate-type police officers. Regression analyses revealed that depression, anxiety, and stress levels were 3- to 6-fold higher in evening and intermediate types compared to morning types for both occupational groups, although this association was more pronounced among police officers.

Circadian rhythm is described in terms of individual chronotypes (morningness/eveningness), which reflect a person's preferred timing for activity and sleep within a 24-hour period (27). The circadian rhythm plays a fundamental role in regulating biological functions, including sleep-wake preferences, body temperature, hormone secretion, food intake, and cognitive and physical performance. The timing and composition of food intake are important for synchronizing both the central and

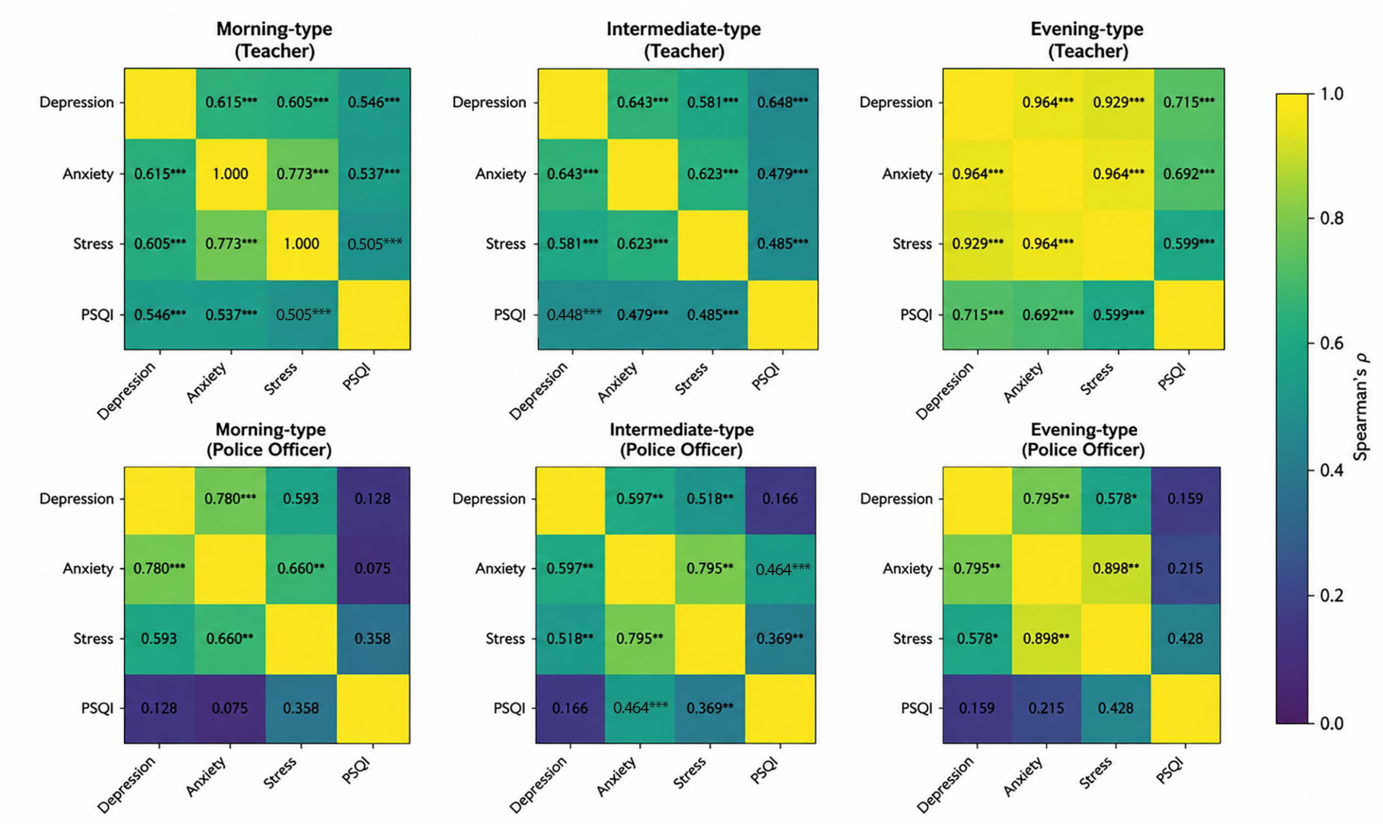

Figure 1. Relationship between mood and sleep quality according to chronotype in teachers and police officers heatmap. Heatmaps showing Spearman correlations among depression, anxiety, stress, and sleep quality scores, stratified by chronotype (morning, intermediate, evening) in teachers and police officers. Lighter colors indicate stronger associations. Correlation coefficients are displayed in each cell. Statistical significance is indicated by asterisks (*p < 0.05; **p < 0.01). PSQI: Pittsburgh Sleep Quality Index.

peripheral biological clocks in humans. These metabolic clocks coordinate the synthesis, breakdown, recycling, and disposal of metabolic substrates, ensuring that nutrients consumed at mealtimes can adequately meet our physiological needs (28). Furthermore, from a nutritional genomics perspective, genetic variants in "clock genes" can both affect metabolic health and alter an individual's response to diet (29). Therefore, a single food or specific combination of foods can lead to weight gain or loss in relation to chronotype and the hunger-satiety cycle (30). Having an evening or morning chronotype not only determines preferred sleep schedule but can also influence subsequent mealtimes, which in turn can affect the circadian rhythm (31). This is because the clocks within the hypothalamus (such as the suprachiasmatic nucleus) regulate the daily rhythm of food intake (32). Biological clocks outside the hypothalamus are sensitive to nutrients in the peripheral circulation, such as free fatty acids and glucose, and to nutrients-related hormones such as ghrelin, leptin, and insulin. Furthermore, biological clocks may also interact with dopaminergic motivation-reward circuits that influence eating behavior, effectively controlling food intake through both homeostatic and hedonic pathways (33).

A systematic review of 24 studies examining chronotype and body composition found that although evening and morning types had similar energy and macronutrient intakes, evening types were more likely to be overweight or obese (34). Another review reported that among Italian adults, intermediate and evening chronotypes were associated with lower adherence to the Mediterranean diet (35). Similarly, a meta-analysis by Zhang et al. (36) and a systematic review by Teixeira et al. (37) revealed that the evening chronotype was associated with unhealthy eating habits, obesity, and adverse metabolic parameters of glucose and lipid metabolism. Conversely, a study conducted among healthcare workers in Türkiye showed that morning types had higher BMI values compared to other chronotypes (38). In the present study, the majority of police officers and teachers had a normal BMI (54.2% and 50%, respectively). Although police officers working rotating shifts reported a greater impact of work schedule on diet and consumed tobacco and alcohol at higher rates than daytime-working teachers, there was no significant difference in BMI between the groups. This may be related to the higher prevalence of the intermediate chronotype among police officers, which may facilitate their adaptation to night shifts compared to morning types, or to their shift rotation every two weeks. Given the lack

Table 4. Regression analyses of teachers' and police officers' mood, BMI, and sleep quality according to chronotype.

	Chronotype	Model	Teacher β (95% CI), p	Police officer β (95% CI), p
Depression	Intermediate-type	Adjusted	-2.907 (-4.927, -0.886), **0.005**	-5.594 (-8.270, -2.918), **<0.001**
		Unadjusted	-2.843 (-4.806, -0.880), **0.005**	-5.529 (-8.297, -2.761), **<0.001**
	Evening-type	Adjusted	-4.889 (-7.668, -2.111), **<0.001**	-5.230 (-7.944, -2.516), **<0.001**
		Unadjusted	-4.583 (-7.198, -1.969), **<0.001**	-5.393 (-8.224, -2.561), **<0.001**
Anxiety	Intermediate-type	Adjusted	-3.362 (-5.503, -1.222), **0.003**	-6.357 (-9.488, -3.226), **<0.001**
		Unadjusted	-3.173 (-5.294, -1.053), **0.004**	-6.316 (-9.494, -3.137), **<0.001**
	Evening-type	Adjusted	-5.277 (-8.220, -2.333), **<0.001**	-5.988 (-9.163, -2.812), **<0.001**
		Unadjusted	-4.633 (-7.458, -1.809), **0.002**	-6.125 (-9.377, -2.873), **<0.001**
Stress	Intermediate-type	Adjusted	-3.155 (-5.389, -0.921), **0.006**	-6.288 (-9.428, -3.148), **<0.001**
		Unadjusted	-2.967 (-5.181, -0.752), **0.009**	-6.286 (-9.419, -3.153), **<0.001**
	Evening-type	Adjusted	-5.580 (-8.652, -2.509), **<0.001**	-5.845 (-9.030, -2.660), **<0.001**
		Unadjusted	-4.867 (-7.816, -1.917), **0.002**	-5.911 (-9.116, -2.706), **<0.001**
BMI	Intermediate-type	Adjusted	-0.035 (-1.780, 1.710), 0.968	0.903 (-1.732, 3.538), 0.498
		Unadjusted	0.172 (-1.873, 2.218), 0.867	0.375 (-2.449, 3.198), 0.793
	Evening-type	Adjusted	0.750 (-1.649, 3.150), 0.534	0.369 (-2.303, 3.041), 0.785
		Unadjusted	0.868 (-1.856, 3.593), 0.527	0.470 (-2.419, 3.358), 0.748
PSQI	Intermediate-type	Adjusted	-0.954 (-2.744, 0.835), 0.291	-1.688 (-3.905, 0.529), 0.134
		Unadjusted	-1.333 (-3.102, 0.436), 0.137	-1.522 (-3.743, 0.699), 0.177
	Evening-type	Adjusted	-2.109 (-4.568, 0.350), 0.092	-2.532 (-4.780, -0.285), **0.028**
		Unadjusted	-2.833 (-5.185, -0.482), **0.019**	-2.619 (-4.891, -0.348), **0.024**

Morning-type used as reference. Model was adjusted for age, gender, and professional experience (years). BMI: Body mass index, PSQI: Pittsburgh Sleep Quality Index. CI: Confidfencve interval.
Significant results ($p < 0.05$) are in bold.

of existing literature comparing police officers and teachers in terms of chronotype, obesity, or dietary patterns, these findings contribute novel insights to the literature.

According to WHO data, sleep disorders are very common among adults, with approximately 30–35% of the world's population reporting sleep problems and 9–11% suffering from chronic insomnia (39). According to 2022 U.S. Department of Health data, 31.1% of adults fail to get adequate sleep (40). An epidemiological study in Cyprus indicated the prevalence of circadian rhythm sleep-wake disorders (particularly delayed sleep phase and shift work disorder) in the general population was 10–13% (7). Studies on shift-working nurses have shown that chronotype and work schedules impact sleep quality (41,42). Similarly, night and rotating shift work has been associated with poorer sleep quality and higher depression and anxiety among police officers (43,44). In a study of primary and secondary school teachers in China, Xue et al. (45) found that teachers generally had poor sleep quality (69.3%) and high rates of anxiety (65.3%) and depression (74.7%). In the current study, we determined that over half (52.8%) of police officers had poor sleep quality, while morning types in both groups reported good sleep quality. Both the literature and the current findings suggest that the morning chronotype and a stable daytime work schedule are conducive to better sleep. To address the global prevalence of sleep problems, individuals should be encouraged to seek employment compatible with their chronotype, and shift systems should be regulated.

A meta-analysis of 14 studies involving approximately 50,000 employees reported that shift workers have a higher risk of poor mental health compared to daytime workers, with 1.47-fold greater risk in evening shift workers, specifically (46). Depression is a debilitating mental health disorder that affects millions of people worldwide, and evidence that chronotype is an important factor associated with depression is steadily mounting. Research indicates that evening types have a significantly higher risk of depression, an increased tendency toward suicide, and greater risk for substance use, whereas the morning chronotype may have a protective effect (47,48). Shift work can further compound the mental health risk by disrupting the circadian rhythm (49). Togo et al. (50) reported higher levels of depressive symptoms among shift workers compared to daytime workers. Consistent with this, we found that evening-type teachers and police officers had higher levels of depression, stress, and anxiety than other chronotypes. Additionally, mood and sleep quality were positively correlated in morning- and intermediate-type teachers, but only in intermediate-type police officers. Further analyses revealed that, although more apparent among police officers, evening and intermediate types in both occupational groups had 3- to 6-fold higher levels of depression, anxiety, and stress than morning types. In line with the literature, both the evening chronotype and shift work were found to negatively impact sleep quality and psychological well-being.

Study Limitations

This study has certain strengths and limitations. It is the first study in Türkiye to compare the effects of different work schedules on chronotype, nutrition attitudes, mood, and sleep quality among daytime-working teachers and police officers working rotating shifts. However, several limitations should be acknowledged. First, the data were obtained by self-report. Therefore, participants may have expressed perceived or desired states rather than their actual situation. Second, because the study was cross-sectional in nature, we cannot establish causal relationships between variables. Third, the frequent rotation of the police officers' shift schedule (every two weeks) may have obscured differences related to work schedule. Fourth, we did not assess exposure to natural and artificial light, which is an important regulator of circadian rhythm. Fifth, nutritional attitudes and behaviors were assessed using only the ASHN scale, which precludes generalizations about the participants' diet. Finally, work-related stress was not assessed. Incorporating this variable into future studies could provide clearer insight and allow more accurate interpretations.

Conclusions

In this study, the chronotypes of police officers working rotating shifts and teachers on a daytime schedule were strongly associated with mood and sleep quality. This association was particularly evident among police officers. These findings suggest that considering chronotype is important for the health of workers in shift-based occupations. Consequently, to promote overall health and well-being, it may be advantageous to regulate police officers' working hours and shift rotations to minimize circadian rhythm deviations. Future research should explore the potential benefits of chronotype-aware work assignments or shift scheduling.

Ethics

Ethics Committee Approval: Ethical approval for the study was obtained from the Ordu University Social and Human Sciences Research Ethics Committee (date: 29 April 2025; session no: 04; decision no: 2025-74).

Informed Consent: All participants were informed of the purpose of the study and provided written informed consent online, in accordance with the Declaration of Helsinki.

Footnotes

Authorship Contributions

Concept: N.Ö., Design: N.Ö., A.B., Data Collection or Processing: N.Ö., A.B., Analysis or Interpretation: N.Ö., A.B., Literature Search: N.Ö., Writing: N.Ö., A.B.

Conflict of Interest: No conflict of interest was declared by the authors.

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