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Comparing Sleep Disorders, Procrastination, and Cognitive Intelligence in Male and Female Upper Secondary Students in Rudsar

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A B S T R A C T

Objective: This study aimed to compare sleep disorders, procrastination, and cognitive intelligence among male and female upper secondary students in Rudsar.

Methods and Materials: This descriptive-analytical causal-comparative study was conducted on 400 upper secondary students, including 200 girls and 200 boys, selected through two-stage cluster random sampling from a population of 1,958 students in Rudsar during the 2024–2025 academic year. Data were collected using the Lynch et al. Sleep Disorders Questionnaire, Lay's Procrastination Scale, and Raven's Progressive Matrices. Data were analyzed using SPSS-26 through descriptive statistics, Levene's test, multivariate and univariate analysis of variance, and Mann–Whitney and Wilcoxon tests for cognitive intelligence due to non-normal distribution.

Findings: The multivariate analysis showed a significant overall difference between male and female students across the studied variables (Wilks' Lambda = 0.710, F = 26.730, $p < 0.001$, $\eta^2 = 0.290$). Significant gender differences were found in sleep disorders (F = 30.54, p = 0.04, $\eta^2 = 0.071$) and cognitive intelligence (p = 0.002). Girls obtained higher mean scores than boys in both sleep disorders and cognitive intelligence. However, no significant difference was observed between the two groups in procrastination (F = 0.437, p = 0.509, $\eta^2 = 0.001$), although boys had a slightly higher mean procrastination score.

Conclusion: The findings indicate that gender is associated with significant differences in sleep disorders and cognitive intelligence among upper secondary students, while procrastination does not differ significantly between girls and boys. These results highlight the need for gender-sensitive school-based screening and intervention programs targeting sleep health and cognitive-academic functioning.

Keywords: *Sleep disorders; Procrastination; Cognitive intelligence; Gender differences; Secondary students.*

1. Introduction

Adolescence is a critical developmental period in which biological maturation, psychological reorganization, social role transition, and academic demands converge to shape students' mental health, behavioral functioning, and cognitive performance. During this stage, schools are not only educational institutions but also major developmental environments in which students' emotional adjustment, self-regulation, academic engagement, and

health-related behaviors are formed and expressed. Supportive school contexts can contribute to the early identification of psychological difficulties and the promotion of student well-being, particularly when educational systems attend to gender-related differences in students' developmental needs (Mollahshahi & Rezaei, 2023). Global evidence shows that mental disorders and psychological difficulties during childhood and adolescence are major contributors to disability, reduced educational functioning, and long-term psychosocial impairment, making adolescent mental health a central concern for educational psychology and public health (Kieling et al., 2024). Puberty intensifies this vulnerability because hormonal, physical, emotional, and social changes may increase anxiety, emotional instability, behavioral problems, and sensitivity to environmental stressors (Mokari et al., 2016). Therefore, studying psychological and cognitive variables among secondary school students is essential for identifying risk patterns and designing developmentally appropriate school-based interventions.

Gender differences become especially visible during adolescence, when boys and girls may differ in emotional expression, behavioral regulation, social expectations, vulnerability to psychological symptoms, academic engagement, and coping strategies. Recent evidence suggests that age and gender are associated with meaningful differences in emotional and behavioral functioning among youth, indicating that adolescent psychological adjustment should be examined with attention to gender-specific developmental pathways (Levkovich et al., 2025). Similarly, gender and sex differences in anxiety prevalence and comorbidity are shaped by biological factors, socialization processes, cultural expectations, and contextual stressors, which together influence how psychological difficulties are expressed and interpreted in boys and girls (Farhane-Medina et al., 2022). In educational settings, these differences may be reflected in sleep behavior, procrastination tendencies, and cognitive performance. Although many studies have examined psychological characteristics in adult or university samples, fewer studies have simultaneously compared sleep disorders, procrastination, and cognitive intelligence among male and female upper secondary students. This gap is important because adolescence is a sensitive period in which gender-related patterns may become consolidated and influence future academic and mental health trajectories.

Sleep is a fundamental biological process that supports emotional regulation, cognitive functioning, physical restoration, learning, memory consolidation, and daily behavioral regulation. Sleep disorders may include difficulty initiating sleep, difficulty maintaining sleep, problems awakening, insomnia, circadian rhythm disturbances, parasomnias, sleep-related breathing disorders, and movement-related sleep disorders (Ashrafi et al., 2017; Kryger & Roth, 2017). Disturbed sleep is not merely a physiological complaint but a multidimensional psychological and educational concern because poor sleep quality is associated with mood disturbance, reduced executive functioning, impaired concentration, academic decline, daytime sleepiness, and increased vulnerability to mental health problems. Genetic research also suggests meaningful links between sleep-related mechanisms and psychiatric disorders, indicating that sleep problems may share underlying biological pathways with broader psychological vulnerabilities (Jia et al., 2025). Moreover, experimental and meta-analytic evidence shows that improving sleep quality can contribute to better mental health, which highlights sleep as both an outcome and a potential intervention target in adolescent psychological functioning (Scott et al., 2021).

Adolescence is particularly associated with changes in circadian rhythm, delayed sleep phase, increased evening alertness, academic pressure, and intensified use of digital media, all of which may increase sleep difficulties. Research on adolescents has shown that sleep patterns are influenced by age, environmental conditions, cultural context, screen exposure, and gender (Breda et al., 2023). Studies on children and adolescents have also emphasized that sleep habits and sleep problems are common and require careful assessment in school-aged populations (Mohammadi et al., 2007; YousefGomrokchi et al., 2009). Screen time is one of the most frequently discussed behavioral factors related to poor sleep among school-aged children and adolescents; systematic evidence indicates that greater screen exposure is generally associated with shorter sleep duration and poorer sleep quality (Hale & Guan, 2015). Earlier research similarly showed that television viewing during adolescence is associated with later sleep problems, suggesting that media-related sleep disruption may have developmental continuity (Johnson et al., 2004). Time-budget research on children also showed that extensive screen time occupies a significant portion of daily routines and may displace healthier activities, including sleep (Olds et al., 2006). The adolescent delay in circadian rhythm further increases the risk of late sleep onset, morning fatigue, and daytime impairment (Crowley et al., 2007). These findings are consistent with studies showing that sleep duration and daytime tiredness

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affect positive attitudes toward life, persistence, and academic achievement (Perkinson-Gloor et al., 2013). In student populations, problematic mobile phone use has also been linked to academic performance through sleep quality, suggesting that technology-related sleep disruption may indirectly impair educational functioning (Sadoughi, 2017). Gender differences in sleep problems have also been reported, with some findings indicating higher prevalence or poorer sleep quality among female students (Zaidi et al., 2021). In the Iranian context, adolescent sleep disorders have been linked to parenting styles, attachment styles, and internet addiction (Khanshan & Tamanaeifar, 2023), while adolescents with sleep disorders have shown difficulties in executive functions such as planning, emotional control, behavioral regulation, and time management (Ghadiri Sourmanabadi & Abdolmohammadi, 2023). Although sleep disorders have also been studied in clinical and post-COVID samples (Nikyar et al., 2024), school-based comparisons of sleep problems between adolescent boys and girls remain important for educational health planning.

Procrastination is another major behavioral and educational variable among students. It refers to the voluntary delay of intended tasks despite expecting negative consequences, and it is often associated with poor time management, avoidance, low self-regulation, fear of failure, perfectionism, distractibility, and reduced academic motivation (Gono, 2024). In educational psychology, procrastination is a central concern because it can undermine learning, increase academic stress, reduce performance, and contribute to burnout. The relationship between academic motivation and procrastination has been emphasized in school populations, showing that motivational weakness may increase task delay and reduce persistence (Piri, 2024). Academic procrastination is also associated with burnout, especially when students experience parental perfectionism or chronic pressure in educational contexts (Souri et al., 2024). During the COVID-19 pandemic, the expansion of online learning and increased social media use intensified academic procrastination among high school students, especially when self-regulated learning was weak (Latipah et al., 2021). These findings show that procrastination is not only an individual habit but also a context-sensitive behavior shaped by learning conditions, digital environments, and self-regulatory resources.

Gender differences in procrastination have been examined with mixed results. Some studies have found that male students report higher levels of procrastination than female students, possibly because of differences in self-discipline, academic motivation, time management, impulsivity, and social expectations (Imanpour & Imanpour, 2023; Mauliana et al., 2024). Other studies have reported gender-based differences in procrastination attitudes in younger students (Parantika et al., 2020), while broader meta-analytic evidence indicates that gender, socioeconomic status, cultural background, educational level, and family size may all influence procrastination patterns (Lu et al., 2022). Research also shows that procrastination may interact with academic satisfaction and academic performance differently across genders (Balkis & Duru, 2017). In contrast, some studies have reported weak or inconsistent gender differences, suggesting that procrastination may depend more on motivational, emotional, and contextual factors than on gender alone (Gohil, 2014). In Iranian research, procrastination has been studied among university students and school students, with findings highlighting its prevalence and its associations with demographic characteristics, study preferences, and academic conditions (Roustaei et al., 2014; Tamadoni, 2010; Tavakoli, 2013). The measurement of procrastination has also been supported by earlier work on behavioral and decision-making procrastination and metacognitive beliefs (Hosseini & Khayer, 2009), as well as intervention research showing that cognitive hope enhancement training can reduce academic procrastination in male upper secondary students (Hosseini et al., 2014). Furthermore, health-related procrastination research indicates that procrastination may extend beyond academic delay and influence health behaviors, suggesting that it is a broad self-regulatory problem with implications for adolescent well-being (Sirois, 2007).

Cognitive intelligence is another important individual factor that contributes to educational achievement, problem-solving, reasoning, and adaptive functioning. Cognitive intelligence includes abilities such as logical reasoning, verbal and nonverbal problem-solving, abstraction, analysis, and the processing of complex information. In educational contexts, cognitive intelligence remains a significant predictor of learning capacity and academic success, even though emotional and social dimensions of intelligence also contribute to student adjustment (Mousavi et al., 2023). Studies have emphasized the relationship of cognitive intelligence and emotional intelligence with academic achievement, suggesting that students with stronger cognitive capacities may acquire, organize, and apply educational information more efficiently (Jalil Abkenar & Ashouri, 2016). Cognitive intelligence has also been discussed in relation to emotional and social intelligence,

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indicating that intellectual functioning is part of a broader system of personal and interpersonal competencies (Keshavarz & Roozbehani, 2016). The Raven's Progressive Matrices is one of the most widely used measures of nonverbal reasoning and fluid intelligence, with evidence indicating cultural stability and long-term relevance in assessing cognitive ability (Raven, 2000). Iranian validation work has also supported the reliability and validity of Raven's Advanced Progressive Matrices in student samples (Rahmani, 2006).

The question of gender differences in intelligence has long been debated. Some theoretical and empirical perspectives emphasize gender similarities in cognitive ability, suggesting that males and females are more alike than different across many psychological domains (Hyde, 2005). Other studies have examined possible sex differences in specific cognitive abilities, variability, or profiles of intelligence rather than global intelligence alone (Halpern, 2012; Johnson et al., 2008). Earlier research proposed sex differences in intelligence and brain size, although such claims remain controversial and must be interpreted cautiously within developmental, cultural, and methodological contexts (Lynn, 1994). More recent work has also reviewed sex differences in verbal abilities in Wechsler tests (Lynn, 2021), while studies among young adolescents have examined sex differences in general intelligence defined as g (Aluja et al., 2000). Some research has focused on cognitive profiles among children with specific learning disabilities and found that gender differences may vary across intellectual domains rather than appearing as a uniform pattern (Giofre et al., 2022). Other studies have linked intellectual functioning with adjustment across adolescence and midlife, indicating that high IQ may have complex associations with later psychological and social outcomes (Zettergren & Bergman, 2014). Additional research on achievement goals has shown that gender may interact with social-oriented achievement motives in ways that affect educational behavior and motivation (Nie & Liem, 2013). In applied educational contexts, programs based on the structure of intellect have been adapted to support cognitive development, further demonstrating the practical relevance of assessing intellectual capacities in school settings (Copeland, 2005). Iranian research has also compared boys' and girls' intelligence in relation to family efficiency, reflecting continued interest in gender-based cognitive comparisons in local educational and family contexts (Rasouli-Fashtami et al., 2023).

Despite the extensive literature on sleep disorders, procrastination, and cognitive intelligence, these variables are often examined separately. This separation limits understanding of how gender-related differences may appear across physiological, behavioral, and cognitive domains within the same adolescent sample. Sleep disorders may impair executive functioning and academic behavior, procrastination may reflect difficulties in self-regulation and task management, and cognitive intelligence may influence learning efficiency and problem-solving. When these variables are examined together, they can provide a more integrated profile of adolescent functioning in school contexts. For example, poor sleep may reduce attention and self-regulation, which can intensify procrastination; procrastination may increase stress and delay bedtime through last-minute academic work; and cognitive intelligence may either buffer or interact with these difficulties depending on the student's learning strategies, motivation, and emotional adjustment. Gender may further shape these patterns through differences in social expectations, parental monitoring, digital media use, emotional expression, and academic role internalization.

Therefore, comparing male and female upper secondary students in terms of sleep disorders, procrastination, and cognitive intelligence can clarify whether gender is associated with distinct patterns of vulnerability or strength in adolescence. Such findings may guide school counselors, psychologists, teachers, and educational policymakers in designing gender-sensitive assessment, prevention, and intervention programs. Given the importance of sleep health for mental functioning, the role of procrastination in academic maladjustment, and the predictive value of cognitive intelligence for educational success, simultaneous investigation of these three variables among adolescents can contribute to a more comprehensive understanding of student well-being and performance.

The present study aimed to compare sleep disorders, procrastination, and cognitive intelligence between male and female upper secondary school students in Rudsar County.

2. Methods and Materials

2.1. Study Design and Participants

This study was a descriptive-analytical research of the causal-comparative type. The statistical population of the study consisted of all male and female upper secondary school students in Rudsar County. According to statistics provided by the Rudsar Department of Education, the

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population of upper secondary school students was reported to be 1,958 students who were studying in Rudsar high schools during the second semester of the 2024–2025 academic year. The research sample consisted of 400 participants (200 female students and 200 male students). Based on Cochran's formula and in order to increase the generalizability of the findings, 200 participants were considered for each group (226). The female and male student groups were selected using a two-stage cluster random sampling method and completed the research questionnaires. The inclusion criteria were: age range between 15 and 18 years, enrollment in the 10th and 11th grades of upper secondary school in Rudsar County, absence of severe psychiatric disorders, and willingness and interest in participating in the study. The exclusion criteria included incomplete completion of the questionnaires and unwillingness to continue participation in the research process.

2.2. Measures

Lynch et al.'s Sleep Disorders Questionnaire (2003): The Sleep Disorders Questionnaire was developed by Thomas R. Lynch et al. (2003) and was validated for the Iranian population by Mohammadi et al. (2009). This questionnaire assesses 17 items related to sleep disorders across three domains: difficulty initiating sleep, difficulty maintaining sleep, and difficulty awakening from sleep. In Lynch's study, the content validity of the questionnaire assessed using the Waltz and Bausell method was acceptable and equal to 0.35, and the test–retest reliability coefficient reported by Lynch et al. was 0.86 (Lynch et al., 2003; Nikyar et al., 2007). Babaei (2015) also reported a Cronbach's alpha coefficient of 0.89 for this questionnaire using the test–retest method. In the present study, the Cronbach's alpha coefficient for sleep disorders was 0.76. This questionnaire uses a 5-point Likert scale, with response options scored as follows: very low = 1, low = 2, somewhat = 3, high = 4, and very high = 5. Scoring is performed by summing the scores of all items. Scores higher than the average indicate the presence of sleep disturbances. The total score range of the questionnaire is between 17 and 85. The questionnaire evaluates disturbances in three aspects of sleep: difficulty initiating sleep, assessed through items 1–5, with a score range of 5–25; difficulty maintaining sleep, assessed through items 6–12, with a score range of 7–35; and difficulty awakening from sleep, assessed through items 13–17, with a score range of 5–25.

Lay's Procrastination Scale (1986): This scale was developed by Clarry H. Lay (1986). It is a self-report instrument consisting of 20 items that assess general procrastination and task delay behaviors. Sample items include: "I do not complete my tasks until it is almost too late" and "I complete my assignments exactly when the deadline arrives." Sirois (2007) evaluated the validity of Lay's Procrastination Scale among a sample of secondary school students using factor analysis and reported satisfactory validity. The Cronbach's alpha coefficient reported by Lay was 0.82, while Sirois reported a Cronbach's alpha of 0.90 in a sample of 254 participants (Lay, 1986; Sirois, 2007). Hosseini and Khair (2009) also confirmed the validity of the scale in Iran using factor analysis and identified the scale as representing a significant general factor. The reliability coefficient obtained through Cronbach's alpha was 0.86 (Hosseini et al., 2009). Hosseini et al. (2014) also measured the internal consistency of the scale using Cronbach's alpha and reported a reliability coefficient of 0.86. In the present study, the Cronbach's alpha coefficient for procrastination was 0.82. The items of this questionnaire are scored on a 5-point Likert scale. The total score is obtained by summing the scores of all items, with higher scores indicating greater procrastination. The total score range is between 20 and 100, with a score of 100 representing the highest level of procrastination. Some items are reverse scored. For items 1, 2, 5, 7, 9, 10, 12, 16, 17, and 19, scoring ranges from very low = 1 to very high = 5. For items 3, 4, 6, 8, 11, 13, 14, 15, 18, and 20, reverse scoring is applied, meaning that the response "very low" receives 5 points and "very high" receives 1 point.

Raven's Progressive Matrices (RPM): This test was developed by John C. Raven and Penrose (1938) in England to assess nonverbal intelligence. The adult version of Raven's Progressive Matrices was used in the present study to assess cognitive intelligence. The adult form consists of 60 black-and-white figures organized into five sets of 12 items with progressively increasing difficulty. In each item, a portion of the figure is missing, and the participant must identify the correct missing piece from the provided options. Rahmani (2007), in a standardization study of these matrices, reported a Cronbach's alpha coefficient of 0.827 through item analysis, indicating satisfactory internal consistency. To establish validity, the correlation coefficient between the scores of 60 participants on the David Wechsler Intelligence Scale and Raven's Progressive Matrices was calculated as 0.73, which was significant at the 0.01 level. The researcher concluded that the test demonstrated

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acceptable validity for measuring students' intelligence. In the present study, the Cronbach's alpha coefficient for this test was 0.82. In this test, each correct response receives 1 point and each incorrect response receives 0 points. Participants obtain a raw score ranging from 0 to 60. The administration time for the test is a maximum of 45 minutes. Final intelligence scores are determined based on the participant's raw score and age using standardized IQ conversion tables. For example, if an individual correctly answers 40 out of 60 items, the raw intelligence score is 40. This raw score is then interpreted according to the participant's age in the normative table to determine the standardized IQ score. The minimum score on this test was 51, while the maximum score, depending on the age range of the statistical population in this study, varied between 136 and 144.

2.3. Data Analysis

For data analysis, descriptive statistics including mean and standard deviation were used. In the inferential statistics section, the Kolmogorov–Smirnov test was used to examine the normality of data distribution, and Levene's test was used to assess the homogeneity of variances. Pearson's correlation test was also employed to determine the relationships among the study variables. The data were analyzed using univariate and multivariate analyses of variance. Due to the non-normal distribution of the cognitive intelligence (IQ) variable, the nonparametric Mann–Whitney U and Wilcoxon tests were used to compare IQ scores between the two groups.

3. Findings and Results

The demographic findings showed that in the female group, 199 participants (99.5%) were single and only 1 participant (0.5%) was married, whereas all male participants (100%) were single. Regarding fathers' educational level in the female group, 48 fathers (24%) had less than a diploma, 96 (48%) had a diploma, 31 (15.5%) held a bachelor's degree, 21 (10.5%) held a master's degree, and 4 (2%) held a doctoral degree. In the male group, 29 fathers (14.5%) had less than a diploma, 84 (42%) had a diploma, 58 (29%) held a bachelor's degree, 24 (12%) held a master's degree, and 5 (2.5%) held a doctoral degree. Regarding mothers' educational level in the female group, 43 mothers (21.5%) had less than a diploma, 101 (50.5%) had a diploma, 32 (16%) held a bachelor's degree, 20 (10%) held a master's degree, and 4 (2%) held a doctoral degree. In the male group, 27 mothers (13.5%) had less than a diploma, 93 (46.5%) had a diploma, 48 (24%) held a bachelor's degree, 29 (14.5%) held a master's degree, and 3 (1.5%) held a doctoral degree. In terms of economic status, 95 female students (47.5%) reported good economic status, 104 (52%) moderate economic status, and 1 participant (0.5%) poor economic status. Among male students, 64 participants (32%) reported good economic status, 116 (58%) moderate economic status, and 20 (10%) poor economic status.

Table 1

Descriptive Statistics of Sleep Disorders, Procrastination, and Cognitive Intelligence in Male and Female Students

Variable	Group	Min	Max	Mean	SD
Total Sleep Disorders	Female	18	70	36.14	10.26
	Male	17	58	31.80	7.51
Difficulty Initiating Sleep	Female	5	19	9.85	3.28
	Male	5	18	9.09	2.85
Difficulty Maintaining Sleep	Female	7	30	13.83	4.46
	Male	7	37	12.72	4.38
Difficulty Awakening from Sleep	Female	5	29	14.46	4.54
	Male	5	29	9.76	4.37
Procrastination	Female	30	78	53.66	10.65
	Male	32	78	54.23	9.43
Cognitive Intelligence (IQ)	Female	70	119	97.51	9.37
	Male	70	119	94.60	10.93

As shown in Table 1, female students obtained higher mean scores than male students in total sleep disorders and all sleep disorder subscales, including difficulty initiating sleep, difficulty maintaining sleep, and difficulty awakening from sleep. The highest mean score among female students was related to difficulty awakening from sleep (M = 14.46, SD = 4.54). Male students demonstrated a slightly higher mean score in procrastination (M = 54.23, SD = 9.43)

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compared to female students (M = 53.66, SD = 10.65). In the cognitive intelligence variable, female students achieved a higher mean IQ score (M = 97.51, SD = 9.37) than male students (M = 94.60, SD = 10.93).

Before conducting the multivariate analysis of variance, the assumptions of MANOVA were examined. The Kolmogorov–Smirnov test showed that the distributions of sleep disorders and procrastination scores were normal in both groups ($p > 0.05$), whereas the cognitive intelligence variable was not normally distributed in either group ($p < 0.05$). Pearson correlation coefficients among the dependent variables indicated acceptable intercorrelations without multicollinearity problems. In addition, Box's M test examining the equality of covariance matrices was not significant (Box's M = 282.269, F = 13.23, p = 0.21), confirming the assumption of homogeneity of covariance matrices.

Table 2

Results of Multivariate Analysis of Variance (MANOVA)

Effect	Test	Value	F	df	Error df	Sig.	Partial Eta Squared	Power
Group	Pillai's Trace	0.290	26.730	6	393	0.000	0.290	1.000
	Wilks' Lambda	0.710	26.730	6	393	0.000	0.290	1.000
	Hotelling's Trace	0.408	26.730	6	393	0.000	0.290	1.000
	Roy's Largest Root	0.408	26.730	6	393	0.000	0.290	1.000

The results presented in Table 2 indicate a statistically significant multivariate effect of group membership on the dependent variables. Pillai's Trace showed a significant group effect, $F(6, 393) = 26.730$, $p < 0.001$, $\eta^2 = 0.290$. Similarly, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root all confirmed the significance of the group effect at $p < 0.001$. The partial eta squared value of 0.290 demonstrated a large effect size according to Cohen's criteria, indicating that gender explained a substantial proportion of the variance in the dependent variables. Furthermore, the statistical power for all multivariate indices was 1.000, reflecting the adequacy of the sample size and the strong capability of the analysis to detect significant differences between groups.

Table 3

Results of Between-Subjects Analysis of Variance

Effect	Variable	SS	df	MS	F	Sig.	Partial Eta Squared
Group	Psychosomatic Problems	6220.360	1	6220.360	109.59	0.000	0.216
	Sleep Disorders	2470.09	1	2470.09	30.54	0.040	0.071
	Procrastination	44.223	1	44.223	0.437	0.509	0.001
Total	Psychosomatic Problems	2432844	400				
	Sleep Disorders	1206607	400				
	Procrastination	487862	400				

The results of the univariate analyses presented in Table 3 demonstrated that there was a significant difference between male and female students in psychosomatic problems, $F(1, 400) = 109.59$, $p < 0.001$, $\eta^2 = 0.216$. A statistically significant difference was also observed in sleep disorders, $F(1, 400) = 30.54$, $p = 0.040$, $\eta^2 = 0.071$. However, no statistically significant difference was found between the two groups regarding procrastination, $F(1, 400) = 0.437$, $p = 0.509$, $\eta^2 = 0.001$. These findings indicate that gender differences were evident in psychosomatic problems and sleep disorders, whereas procrastination levels were relatively similar between male and female students.

4. Discussion

The present study aimed to compare sleep disorders, procrastination, and cognitive intelligence between male and female upper secondary school students in Rudsar County. The findings demonstrated that significant gender differences existed in sleep disorders and cognitive intelligence, whereas no statistically significant difference was observed in procrastination. Female students obtained higher mean scores in sleep disorders and cognitive intelligence, while male students demonstrated slightly higher levels of procrastination. These findings indicate that

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gender-related developmental, psychological, behavioral, and sociocultural factors may shape adolescents' experiences differently across cognitive and behavioral domains.

One of the most important findings of the present study was the significant difference between male and female students in sleep disorders, with female students reporting higher levels of sleep-related problems. This finding is consistent with previous studies indicating that adolescent girls and women often report poorer sleep quality and more sleep-related difficulties than boys and men (Breda et al., 2023; Zaidi et al., 2021). The findings are also aligned with evidence emphasizing the relationship between emotional functioning, psychological vulnerability, and gender differences during adolescence (Farhane-Medina et al., 2022; Levkovich et al., 2025). Adolescence is accompanied by hormonal changes, emotional sensitivity, academic stress, and social role transitions, all of which may intensify sleep disturbances, particularly among girls. Because female adolescents often experience higher emotional reactivity and greater interpersonal sensitivity, they may be more vulnerable to anxiety-related sleep disruption and emotional rumination before sleep.

The results can also be explained through the developmental changes in circadian rhythm that occur during adolescence. Delayed sleep phase, late-night alertness, and disrupted sleep schedules are common during this period (Crowley et al., 2007). However, girls may experience stronger interactions between emotional stress and physiological arousal, which could contribute to difficulties in initiating and maintaining sleep. Research has consistently shown that sleep quality is closely associated with emotional well-being and mental health (Scott et al., 2021). Therefore, the higher level of sleep disorders among female students may partly reflect their greater sensitivity to emotional and academic pressures during adolescence.

Another possible explanation concerns the increasing influence of digital media and screen exposure on adolescent sleep behavior. Studies have shown that screen time and media use are strongly associated with sleep disturbance among school-aged children and adolescents (Hale & Guan, 2015; Johnson et al., 2004; Olds et al., 2006). Female adolescents often use social media platforms more frequently for interpersonal communication and emotional interaction, which may prolong nighttime device use and negatively affect sleep onset and sleep quality. Exposure to screen light before bedtime suppresses melatonin secretion and interferes with normal circadian functioning, thereby increasing sleep latency and reducing sleep efficiency (Kryger & Roth, 2017). The relationship between problematic mobile phone use and poor sleep quality has also been emphasized in student populations (Sadoughi, 2017). Consequently, the greater prevalence of sleep disorders among female students may partly be attributed to differences in communication patterns, emotional engagement in online environments, and increased nighttime media exposure.

The present findings are also consistent with Iranian studies indicating that adolescent sleep disorders are associated with parenting styles, attachment styles, and internet addiction (Khanshan & Tamanaeifar, 2023). Family monitoring and parental supervision may differ between boys and girls, especially during adolescence, affecting bedtime routines, technology use, and emotional coping behaviors. Moreover, adolescents with sleep disorders often demonstrate impaired executive functioning, including difficulties in emotional control, planning, concentration, and behavioral regulation (Ghadiri Sourmanabadi & Abdolmohammadi, 2023). These impairments may negatively influence academic functioning and emotional adjustment in school settings. Given the strong relationship between sleep quality and psychological health, the present findings highlight the importance of school-based interventions focused on sleep hygiene and healthy digital habits among adolescents.

The findings of the present study also showed that no statistically significant difference existed between male and female students in procrastination, although male students obtained slightly higher mean scores. This finding is partly consistent with studies reporting higher procrastination among male students (Imanpour & Imanpour, 2023; Mauliana et al., 2024). Previous research has suggested that boys often experience greater difficulties in time management, self-regulation, and academic discipline, which may increase procrastination tendencies (Balkis & Duru, 2017). However, the lack of a statistically significant difference in the present study suggests that procrastination may now be a widespread behavioral problem affecting both genders similarly in contemporary educational environments.

One possible explanation for this finding is the growing impact of digital technology, social media, and online learning environments on all students regardless of gender. During and after the COVID-19 pandemic, adolescents experienced increased dependence on online communication and virtual learning, which intensified procrastination

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behaviors across student populations (Latipah et al., 2021). Academic delay, distraction, and reduced self-regulated learning may therefore represent common challenges among both boys and girls in modern educational systems. In addition, procrastination is strongly associated with academic motivation and self-regulation rather than gender alone (Piri, 2024). Students with weak academic motivation, low task engagement, or poor self-management skills are more likely to postpone academic responsibilities irrespective of gender.

The findings may also be interpreted through sociocultural changes in educational expectations. Traditionally, some studies suggested that male students might devalue academic tasks or show weaker academic commitment because of cultural beliefs regarding masculinity and independence (Lu et al., 2022). Nevertheless, current educational pressures and competitive academic conditions increasingly affect both genders, potentially reducing gender-based differences in procrastination. Moreover, procrastination is influenced by multiple psychological variables such as perfectionism, fear of failure, anxiety, impulsivity, and metacognitive beliefs (Gono, 2024; Hosseini & Khayer, 2009). Therefore, the absence of a significant gender difference may indicate that these underlying factors are similarly distributed among contemporary adolescents.

The present findings are also compatible with research linking procrastination to academic burnout and psychological stress (Souri et al., 2024). Adolescents face extensive academic expectations, entrance examination pressure, and concerns regarding future educational and occupational opportunities. Such pressures may contribute to procrastination in both genders by increasing emotional exhaustion and reducing intrinsic motivation. Earlier Iranian studies have similarly emphasized the prevalence of procrastination among school and university students (Roustaei et al., 2014; Tamadoni, 2010; Tavakoli, 2013). Furthermore, intervention studies have shown that enhancing hope and cognitive self-regulation can reduce procrastination behaviors (Hosseini et al., 2014), indicating that procrastination is a modifiable behavioral pattern rather than a fixed personality characteristic.

Another important finding of the present study was the significant gender difference in cognitive intelligence, with female students obtaining higher mean scores than male students. This finding is consistent with studies suggesting that adolescent girls may outperform boys in certain intellectual or academic domains during specific developmental stages (Giofre et al., 2022; Johnson et al., 2008). It also aligns with research demonstrating that cognitive intelligence is strongly associated with academic learning, information processing, and educational achievement (Jalil Abkenar & Ashouri, 2016; Mousavi et al., 2023). Female students' higher scores may reflect better self-regulation, stronger academic engagement, and more stable developmental adaptation during adolescence.

One explanation for this finding involves differences in developmental maturation during adolescence. Female adolescents generally reach physiological and emotional maturation earlier than males, which may positively influence concentration, behavioral regulation, and academic discipline. In contrast, male adolescents may experience greater behavioral impulsivity and emotional instability during puberty, which can affect cognitive performance in structured testing situations (Mokari et al., 2016). Research on executive functioning and self-regulation suggests that girls often employ more organized learning strategies and better planning skills, which may indirectly contribute to higher cognitive test performance.

The findings are also partially supported by studies emphasizing gender differences in specific cognitive abilities (Aluja et al., 2000; Lynn, 2021). Although some researchers argue that overall intelligence differences between genders are minimal (Hyde, 2005), others suggest that variability and performance patterns may differ across developmental stages and cognitive domains (Halpern, 2012). Earlier theories proposed differences in intelligence variability between males and females (Lynn, 1994), while more recent research has emphasized the importance of examining intellectual profiles rather than global IQ scores alone (Giofre et al., 2022). The present findings may therefore reflect developmental, educational, and contextual influences rather than fixed biological differences.

Sociocultural and educational factors may also explain female students' stronger cognitive performance. In many educational settings, girls are encouraged to demonstrate greater academic responsibility, persistence, and compliance with school expectations. Such behaviors may increase concentration during testing and improve academic-related cognitive functioning. In contrast, boys may spend more time on recreational technology use, gaming, or peer-oriented activities that reduce academic focus and structured learning engagement. Studies examining achievement goals and gender differences indicate that motivational orientation and social expectations can significantly influence academic behavior and performance (Nie & Liem, 2013).

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Furthermore, research on adolescents with high intelligence suggests that intellectual functioning interacts with broader psychosocial adjustment processes (Zettergren & Bergman, 2014). Therefore, the observed gender difference in cognitive intelligence may represent the combined influence of developmental maturity, educational engagement, motivation, and sociocultural expectations.

At the same time, the findings should not be interpreted as evidence of absolute superiority of one gender over another. Research on gender similarities emphasizes that many psychological and cognitive differences between males and females are relatively small and strongly shaped by environmental influences (Hyde, 2005). The present findings therefore highlight the importance of examining contextual and developmental factors rather than assuming purely biological explanations for gender-related differences.

5. Conclusion

Overall, the present study demonstrated that sleep disorders and cognitive intelligence differed significantly between male and female adolescents, whereas procrastination appeared to affect both genders similarly. These findings underscore the importance of addressing adolescent psychological functioning through multidimensional perspectives that integrate behavioral, cognitive, emotional, and sociocultural factors. Schools represent one of the most important environments for identifying sleep-related difficulties, promoting healthy self-regulation, and supporting cognitive development among adolescents. Consequently, educational systems should pay greater attention to gender-sensitive mental health and academic support programs.

6. Limitations & Suggestions

One of the limitations of the present study was that the statistical population was restricted to upper secondary school students in one county, which limits the generalizability of the findings to students from other geographical regions and cultural contexts. In addition, the use of self-report questionnaires may have increased the possibility of response bias and socially desirable responding. Another limitation was the cross-sectional design of the study, which prevented the identification of causal relationships among the variables. Furthermore, environmental variables such as family climate, parenting practices, academic stress, and digital media exposure were not directly controlled.

Future studies are recommended to examine these variables in broader and more diverse populations across different cities and cultural settings. Longitudinal research designs could provide a clearer understanding of developmental changes in sleep disorders, procrastination, and cognitive intelligence during adolescence. Future researchers are also encouraged to investigate the mediating and moderating roles of variables such as emotional regulation, internet addiction, academic motivation, parenting styles, and socioeconomic status. Comparative studies involving different educational levels and clinical populations may further expand understanding of gender-related differences in adolescent psychological functioning.

From a practical perspective, the findings suggest that schools and mental health professionals should design preventive and educational programs focused on improving adolescent sleep hygiene, emotional regulation, and self-management skills. Educational workshops for students and parents regarding healthy technology use, sleep routines, and academic planning may reduce sleep-related problems and procrastination behaviors. School counselors should also pay greater attention to gender-related psychological needs and provide targeted support for adolescents experiencing emotional or academic difficulties. In addition, educational systems may benefit from implementing cognitive and motivational interventions that strengthen executive functioning, academic persistence, and adaptive learning strategies among students.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. This article was extracted from the master's thesis of the first author at the Lahijan Branch, Islamic Azad University, Lahijan, Iran." The study was approved by the Research Ethics Committee

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of Islamic Azad University, Lahijan Branch, with the ethics code IR.IAU.LIAU.REC.1404.074.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this article.

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