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Relation Between Night Eating Syndrome and Academic Grades Among University Students

Üniversite Öğrencilerinde Gece Yeme Sendromu ve Akademik Derece Arasındaki İlişki

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Abstract

Objective: Night eating syndrome refers to a condition, characterized by night hyperphagia and nocturnal ingestions that are often accompanied by an altered sleep and mood pattern. It is very common among students, who become prone to night eating syndrome owing to sleep deprivation and nocturnal eating habits. Adherence to such behavior increases the chances of poor higher mental function and an altered circadian rhythm, eventually resulting in compromised learning and academic failures. The present study intended to explore the relationship between night eating syndrome, grade point average, age, and body mass index of students attending college. **Material and Methods:** The present study was based on a cross-sectional correlation design to find a correlation between night eating syndrome and academic achievement among students studying in the College of Applied Medical Sciences. Students who participated in the study were asked to complete a paper-based Night Eating Syndrome Diagnostic Questionnaire. The participants were categorized into four groups, namely, non-night eating syndrome, mild-night eating syndrome, moderate-night eating syndrome, and full-night eating syndrome based on the scores they received in the questionnaire. The registration department of the University provided the grade point average to the students at the end of the academic semester. **Results:** The questionnaire results categorized 86 students (35.7%) into mild night eating syndrome, 32 (13.3%) into moderate night eating syndrome, and 23 (9.5%) into full night eating syndrome. An increase in the body mass index was found to be associated with night eating syndrome, with an odds ratio of 1.113 (95% confidence interval, 1.071-1.156), Wald χ^2 (1)=29.918, p<0.001. A decrease in the grade point average was associated with night eating syndrome, with an odds ratio of 2.1876 (95% confidence interval, 1.765-3.886), Wald χ^2 (1)=33.318, p<0.001. **Conclusion:** The present study concluded that night eating syndrome exerts detrimental effects on the academic performance of university students.

Keywords: Night eating syndrome; grade point average; body mass index; eating disorder

Özet

Amaç: Gece yeme sendromu, genellikle ruh hâli ve uyku paterninde değişikliğin eşlik ettiği gece hiperfajisi ve gece beslenmeleri ile karakterize bir durumu ifade eder. Uyku yoksunluğu ve gece yeme alışkanlıkları nedeni ile gece yeme sendromuna yatkın hâle gelen öğrenciler arasında çok yaygındır. Bu tür davranışların sürekliliği, yüksek zihinsel işlevlerde zayıflık ve sirkadiyen ritimde değişiklik riskini artırır ve sonunda öğrenmede baskılanmaya ve akademik başarısızlıklara neden olur. Bu çalışmada, üniversiteye giden öğrencilerde gece yeme sendromu, not ortalaması, yaş ve beden kitle indeksi arasındaki ilişkinin incelenmesi amaçlamıştır. **Gereç ve Yöntemler:** Bu çalışmada, Uygulamalı Tıp Bilimleri Üniversitesinde okuyan öğrencilerin akademik başarısı ve gece yeme sendromu arasında bir korelasyon bulmak için kesitsel korelasyon tasarımı kullanılmıştır. Çalışmaya katılan öğrencilerden, basılı hâldeki Gece Yeme Sendromu Tanı Anketi'ni doldurmaları istenmiştir. Katılımcılar ankette aldıkları puanlara gore non-gece yeme sendromu, hafif gece yeme sendromu, orta gece yeme sendromu ve tam gece yeme sendromu olmak üzere dört gruba ayrılmışır. Üniversitenin kayıt bölümü, akademik dönem sonunda öğrencilere not ortalaması vermiştir. **Bulgular:** Anket sonuçları 86 (%35,7) öğrenciyi hafif gece yeme sendromu, 32 (%13,3) öğrenciyi orta gece yeme sendromu ve 23 (%9,5) öğrenciyi tam gece yeme sendromu olarak kategorize etmiştir. Beden kitle indeksindeki artış gece yeme sendromu ile ilişkili bulunmuştur [odds oranı=1,113 (%95 güven aralığı, 1,071-1,156), Wald χ^2 (1)=29.918, p<0,001]. Not ortalamalarındaki azalma gece yeme sendromu ile ilişkili bulunmuştur [Odds oranı=2,1876 (%95 güven aralığı, 1,765-3,886), Wald χ^2 (1)=33.318, p<0,001]. **Sonuç:** Bu çalışmada, gece yeme sendromunun üniversite öğrencilerinin akademik performansı üzerinde zararlı etkileri olduğu sonucuna varılmıştır.

Anahtar kelimeler: Gece yeme sendromu; not ortalaması; beden kitle indeksi; yeme bozukluğu

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Introduction

Night eating syndrome (NES) was first defined by Stunkard among obese individuals who showed resistant to weight loss (1). People who suffer from NES exhibit a non-normative eating behavior and an altered circadian pattern of food intake (2). Studies on the prevalence of NES among different age groups revealed that the risk of developing NES is higher among the young population as compared to people belonging to other age groups (3, 4). Students face a high level of stress, accompanied by sleep deprivation and irregular meal timings, which increase the risk of developing NES. A study found the prevalence of NES to be higher in patients who were already suffering from depression and anxiety (5). It has been observed that these individuals use eating as a coping strategy during a stressful situation, which, in turn, may result in obesity. There are other eating disorders, such as binge eating disorder (BED), bulimia nervosa (BN), and anorexia nervosa (AN), that are related to the impulsive behavior of an individual toward eating (6). Eating disorders, such as Binge eating, are seldom confused with NES. Although both are clearly distinguishable, e.g., Binge eating is an eating disorder associated with rapid consumption of large quantity of food (7), whereas NES is related to consumption of food at night with an altered sleep and mood pattern. Allison et al. (8) proposed a diagnosis criterion, that is, consumption of at least 25% of the daily meal after the evening meal and two episodes of nocturnal eating per week, led to significant distress. Moreover, at least three of the following criteria should be present, morning anorexia, surge to eat between dinner and sleep; insomnia, a belief that the individual needs to eat to fall asleep; and worsening of mood in the evening and an altered pattern of eating lasting for 3 months. NES is now included in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition with complete diagnostic criteria (9).

Prevalence of NES in the general population is approximately 1.1 to 1.5% (10). The prevalence is high among the people with a higher BMI, that is, approximately 10% among those in the second and third stages of obesity. NES displays a positive correlation with body weight in several studies (11-14). There exists sizeable evidence in the literature on the relationship between NES, anxiety, depression, and BMI (15). A recent prospective study revealed that no clear association exists between obesity and NES (16) although several clinical trials have linked NES directly to obesity (17, 18). This disparity could be due to the variations in diagnostic criteria of NES and population characteristics.

Researchers worldwide have identified certain factors believed to be affecting the academic performance of students. These could be categorized into academic, demographic, cognitive and psychosocial variables (18). A psychosocial variable of academic achievements could be the presence of NES among students. To the best of our knowledge, no study has been published on the relation between the NES and grade point average (GPA), making it essential to explore whether NES affects the academic achievements of students.

Material and Methods

A cross-sectional correlational design was used to find any association between variables such as age, NES, obesity, and GPA of students. The study was done in agreement with the principles described in the Declaration of Helsinki.

Subjects

Students studying in the College of Applied Medical Sciences, Majmaah University agreed to participate in the study. The ethical clearance for the study was obtained from the Ethical Committee of the College of Applied Medical Sciences, Majmaah University with a letter no. MUREC-Dec.16/COM-2016/12) dated 11th December 2016.

Inclusion criteria

Inclusion criteria involved students currently studying at the College of Applied Medical Sciences, Majmaah University.

Exclusion Criteria

Students with other eating disorders, such as BED, BN, and AN, were excluded from the study. Out of a total of 253 students, only 241 completed the study, 12 students were excluded due to various reasons (3 partici-

pants suffered from BED and other 9 did not complete the questionnaire), with the response rate of 95.3%.

Response from participants

Phase 1: A pilot study on five students revealed 99.9% intra- and inter-rater reliability. The test was introduced in its original form (English language). The study was conducted at the beginning of the academic semester (Jan 2017–June 2018) to avoid anxiety and stress among students due to examinations. A physiotherapist assessed weight, height, and age of students who participated in the study. Pen- and paper-based Night Eating Syndrome Diagnostic Questionnaire (NESDQ) (19) was provided to students who were asked to fill the form confidentially to avoid peer influence and preserve the anonymity of information among students. NESDQ is a valid and reliable scoring tool, as shown to have a strong positive correlation with original Night eating Questionnaire (20) developed by Allison et al. The NESDQ is designed to obtain information based on six criteria for the diagnosis of NES. Participants who completed the NESDQ were placed into four categories, namely, normal, mild, moderate, and full. The NESDQ consists of 21 questions related to eating and sleeping, and it takes approximately 15 min to complete it. It enquires about the perception of a person as night eater, the frequency of night eating, and psychosomatic distress associated with night eating. Several questions in the questionnaire are dichotomized in nature such as yes or no type and some are open-ended questions. The questionnaire contains questions related to semester, general medical status, smoking history, previous suicide attempts, and questions related to BED.
Phase 2: University registration department provided the GPA of participants at the end of the academic semester (Jan 2017-June 2018).

The data were entered and analyzed using SPSS version 25.0. Frequencies and percentages were reported for qualitative variables. Normality of the data was checked by one sample Kolmogorov-Smirnov test. Mean + inter-quartile range (IQR) was reported for non-normally distributed quantitative variables. Correlation between BMI, age, NES, and GPA was assessed through Spearman`s rho correlation. The Kruskal–Wallis H test was applied to compare NES with quantitative variables. Ordinal logistic regression analysis was performed to identify the predictors for NES. A p-value of <0.05 was considered statistically significant. Spearman's rank-order correlation was considered to determine the relationship between NES and age, and BMI and GPA.

Results

Demographic data and sample characteristics

The number of participants enrolled in the current study was 241. The total number of male students was 135 (56%) and female students were 106 (44%). The median age of the participant was 21.00±2.06, BMI 25.73±6.82, and GPA 3.34±0.68. Only 100 (41.5%) participants were reported as not suffering from NES. However, 141 (58.5%) participants were found to be suffering from NES; they were further classified as mild NES (86, 35.7%), moderate NES (32, 13.3%), and full NES (23, 9.5%).

Statistical analysis

The data for age, BMI, and GPA were not distributed generally, as evident from the one sample K-S test. The distribution of data for male and female students showed that there was a significant difference between the age ($p=0.025$) and BMI (0.036). However, no significant change in the GPA (0.517) between the selected sample of male and female students was detected.

There was a strong, positive correlation between NES and BMI, which was statistically significant ($rs=0.385$, $p<0.001$). Also, a strong, statistically significant, negative correlation existed between NES and GPA ($rs=-0.320$, $p<0.001$). There was no significant correlation between NES and age.

Kruskal-Wallis H test showed that there was a statistically significant difference in BMI between the different subgroups of NES, $c2 (2)=79.57$, $p<0.001$. Furthermore, there was a statistically significant difference in the GPAs between the different subgroups of NES, $c2 (2)=25.55$, $p<0.001$ (Table 1).

Tukey's HSD post-hoc tests were conducted for multiple comparisons between NES and age, and BMI and GPA. Mean scores for BMI

Table 1. Comparison of the night eating syndrome groups with regard to age, BMI, and GPA.

Variable	Night Eating Syndrome Groups	n	mean±SD	p**
Age	Non NES*	100	21.04±2.44	0.319
	Mild NES	86	20.95±2.16	
	Moderate NES	32	21.47±1.81	
	Full NES	23	20.43±2.09	
BMI	Non NES	100	21.69±5.35	<0.001#
	Mild NES	86	29.43±6.10	
	Moderate NES	32	30.94±4.52	
	Full NES	23	22.22±5.13	
GPA	Non NES	100	3.59±0.68	<0.001#
	Mild NES	86	3.30±0.69	
	Moderate NES	32	2.97±0.51	
	Full NES	23	2.92±0.35	

*NES: night eating syndrome, BMI: body mass index, GPA: grade average points, n: number of subjects **ANOVA (Analysis of Variance) was performed and Tukey's HSD post-hoc tests were used for multiple comparisons. In multiple comparisons: #BMI was statistically significantly different between Non-NES and Mild NES and between Non-NES and Moderate NES, but not between Non- NES and full NES. #GPA scores were statistically significantly different between Non-NES and moderate NES and between Non-NES and full NES.

were statistically significantly different between non-NES and mild NES (p=0.0001) and non-NES and moderate NES (p<0.0001), but not between non-NES and full NES (p=0.976). Mean GPA scores were statistically significantly different between non-NES and moderate NES (p<0.0001) and non-NES and full NES (p<0.0001); however, the difference between non-NES and mild NES was not statistically significant (p=0.752; Table 1).

The regression analysis was performed by categorizing non-NES as the reference group and other forms of NES (mild, moderate, and severe) as the second group. An increase in the BMI was associated with NES, with an odds ratio (OR) of 1.113 (95% CI, 1.071-1.156), Wald c^2 (1)=29.918, p<0.001. A decrease in the GPA was associated with NES, with an OR of 2.1876 (95% CI, 1.765-3.886), Wald c2 (1)=33.318, p<0.001 (Table 2).

Discussion

The aim of the present study was to find the association between the presence of NES and the academic achievement of students. Our study reported 50% of students to be suffering from NES, which is considerably higher as compared to the prevalence in the general population. This difference could be attributed to the fact that college students have a tendency to studying late at night than the general population, resulting in a higher level of stress. Another reason for the higher level of NES in our study could be the small sample size and cultural differences. The prevalence of NES is approximately 1% to 2% in the general population (21). A study (22) has reported the prevalence of NES among college students to be 4.2-5.7%. Students tend to study and work late at night, which, in turn, causes food consumption at night; this finally leads to skip-

Table 2. Results of the logistic regression analysis of the factors associated with night eating syndrome.

Factors related to Night Eating Syndrome (analyzed by logistic regression)*	Beta±SE**	p	OR (%95 CI)***
†BMI	0.107±0.020	<0.001	1.113 (1.071-1.156)
†GPA	-0.993±0.197	<0.001	2.1876 (1.765-3.886)
Constant	3.839±1.656	<0.001	

*Variables included in the analysis: BMI, GPA, and Age; **B ±SE: Regression coefficient and its standard error.

ping of breakfast. Such habits increase the chance of developing a full-fledged NES (23, 24). The cause of insomnia and late night eating is still in the exploratory stage. However, students studying in a college or a university inevitably experience a lot of academic challenges, which eventually disrupt their circadian rhythm. Glucose and lipid metabolism are also reported to be impaired in an individual's abnormal circadian rhythm (25). This mismatch between the circadian rhythm and the biological clock may lead to the development of obesity (26). Another cohort study (27) reported that a group of individuals who skipped breakfast and ate late at night developed increased appetite and gained weight. No study exists currently to explain the development of NES as a consequence of a stressful environment or vice versa. It is possible that a person with insomnia may engage in eating at night. Research has also indicated that sleep deprivation also affects cognitive functions (28). Sleep deprivation has specifically shown to affect almost all components of cognitive function. In line with the above-stated studies, the present study reported that students with NES scored low academic grades than their peers with mild- NES or non-NES. Memory, retention, concentration, and attention span are some of the most important factors that affect academic achievement and performance of students (29).

Based on the cut-off score of 25, the present study revealed approximately 50% (n=102) students to be suffering from NES. Of those having NES, 61% (n=36) were females. Although our study did not assess the students for depression and anxiety, other studies have reported a moderate level of depression in individuals with NES. Individuals with NES have shown to display significant mood changes that worsen in the evening (30). Psychiatric disorders such as schizophrenia and BN also display the signs and symptoms of NES (31). Furthermore, a strong relationship exists between the biological rhythm and human behavior such that harmony between these two is essential for maintaining appropriate human behavior. Disturbances in the normal circadian rhythm affect individuals both mentally and physically.

Multiple comparisons between the groups revealed exciting results as no statistically significant difference existed between the groups in BMI. A previous study compared the obese and non-obese NES groups and reported that the non-obese group with NES was less likely to suffer from depression (32). In the present study, we found that participants with obesity scored higher in the NESDQ as compared to the non-obese participants. NES may pose a challenge to individuals with obesity. According to recent studies, individuals with NES find it considerably difficult to lose weight (33, 34). Individuals with NES exhibit insomnia with 1.5 to 4.5 awakening per night. Moreover, the overall quality of sleep gets affected in individuals with NES. Individuals with NES have shown to display significant mood changes that worsen in the evening. Studies have reported that individuals within the NES group gained 4.3 to 4.5 kg weight over a period of 3-6 years (35, 36). Hypothetically, NES could lead to obesity as a result of consumption of high calories at night. On the contrary, our study showed a non-significant difference in BMI between non-NES and full NES ($p<0.976$). The reason is due to the vast difference between the number of participants in non-NES (n=100) and full-NES (n=23). Furthermore, obesity and high BMI in an individual depend on multiple factors, including genetics, level of physical activity, and other physiological factors (37).

The statistical significance was reported in the GPA between all four groups, indicating that a higher score in NES is negatively correlated with the academic performance of a student. On the contrary, no statistically significant correlation was found between BMI and GPA. The majority of participants in the full-NES group secured low academic grades. In the current study, a low GPA was strongly correlated with NES and moderately correlated to BMI. A previous study (38) reported NES to be moderately correlated with other eating disorders such as BED and BN. However, literature available on the association is little. It is also observed that the total calorie of food consumed by night eaters is much lower than those consumed by people with BED and BN. Eating at night strongly correlates with an increased probability of developing lifetime anxiety disorder

(47.4%) as compared to the normal counterpart (9.1%) (39).

The regression analysis was carried out for BMI, GPA, and NES. It revealed that an increase in the BMI increased the chance of having NES by approximately one-fold, and a decrease in the GPA increased the chance of developing NES by two-folds.

One of the limitations of the present study included the participation bias in self-reporting the symptoms of NES. The cross-sectional study design has predictive limitation, as exposure and outcome are assessed simultaneously. Generalizability of the study could be limited to university students of similar academic environments.

Conclusion

The findings of the present study suggest a moderate to a strong negative correlation between NES and GPA or academic performance. Mild to moderate BMI and NES also show a negative correlation with GPA.

Recommendations

Teachers and academic advisors need to be more vigilant about the signs and symptoms of NES among students. Once identified, academicians must take precautionary measures to reduce the burden on students without compromising the educational outcomes. Moreover, a regular campaign on the awareness of NES must be organized. Regular exercise could prove to be beneficial in counteracting the detrimental effects of NES; however, future studies are warranted to know the effect of exercise on NES.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Mehrunnisha Ahmad, ;Faizan Zaffar Kashoo Design: Faizan Zaffar Kashoo, Mazen Alqahtani; Control/Supervision: Moattar Rizvi; Data Collection and/or Processing: Faizan Zaffar Kashoo, Amira Bushra; Analysis and/or Interpretation: Waqas Sami, Moattar Rizvi; Literature Review: Faizan Zaffar Kashoo, Mazen Alqahtani; Writing the Article: Mehrunnisha Ahmad, Faizan Zaffar Kashoo, Mazen Alqahtani, Waqas Sami, Moattar Rizvi, Amira Bushra; Critical Review: Faizan Zaffar Kashoo, Waqas Sami; References and Fundings: Mazen Alqahtani; Materials: Moattar Rizvi, Amira Bushra.

References

1. Allison KC, Grilo CM, Masheb RM, Stunkard AJ. Binge eating disorder and night eating syndrome: a comparative study of disordered eating. J Consult Clin Psychol. 2005;73:1107-1115. [Crossref] [PubMed]
2. Brownell KD, Walsh BT. Eating Disorders and Obesity: A Comprehensive Handbook (3rd ed). New York: Guilford Publications; 2017:690.
3. Runfola CD, Allison KC, Hardy KK, Lock J, Peebles R. Prevalence and clinical significance of night eating syndrome in university students. J Adolesc Health. 2014;55:41-48. [Crossref] [PubMed] [PMC]
4. Naji E, Kashoo FZ, Kashoo M. Prevalence of obesity and overweight among majmaah university students. Indian J Physiother Occup Ther. 2013;7:41. [Crossref]
5. Gluck ME, Geliebter A, Satov T. Night eating syndrome is associated with depression, low self-esteem, reduced daytime hunger, and less weight loss in obese outpatients. Obes Res. 2001;9:264-267. [Crossref] [PubMed]
6. McCuen-Wurst C, Ruggieri M, Allison KC. Disordered eating and obesity: associations between binge-eating disorder, night-eating syndrome, and weight-related comorbidities. Ann N Y Acad Sci. 2018;1411:96-105. [Crossref] [PubMed] [PMC]
7. Meule A, Allison KC, Platte P. Emotional eating moderates the relationship of night eating with binge eating and body mass. Eur Eat Disord Rev. 2014;22:147-151. [Crossref] [PubMed]
8. Allison KC, Lundgren JD, O'Reardon JP, Geliebter A, Gluck ME, Vinai P, Mitchell JE, Schenck CH, Howell MJ, Crow SJ, Engel S, Latzer Y, Tzischinsky O, Mahowald MW, Stunkard AJ. Proposed diagnostic criteria for night eating syndrome. Int J Eat Disord. 2010;43:241-247. [Crossref] [PubMed] [PMC]
9. Bovin MJ, Marx BP, Weathers FW, Gallagher MW, Rodriguez P, Schnurr PP, Keane TM. Psychometric properties of the PTSD checklist for diagnostic and statistical manual of mental disorders-fifth edition (PCL-5) in veterans. Psychol Assess. 2016;28:1379-1391. [Crossref] [PubMed] [PMC]

10. Hay P, Girosi F, Mond J. Prevalence and sociodemographic correlates of DSM-5 eating disorders in the Australian population. J Eat Disord. 2015;3:19. [Crossref] [PubMed] [PMC]
11. Khan A, AlRshidi BA, AlRshidi IA, Elmosaad YM, Jaber M. Prevalence and determinants of obesity among male secondary schools students in Al Bukhiriyah, Qassim region, Saudi Arabia. Int J Community Med Public Health. 2017;4:4426-4430. [Crossref]
12. Yahia N, Brown C, Potter S, Szymanski H, Smith K, Pringle L, Herman C, Uribe M, Fu Z, Chung M, Geliebter A. Night eating syndrome and its association with weight status, physical activity, eating habits, smoking status, and sleep patterns among college students. Eat Weight Disord. 2017;22:421-433. [Crossref] [PubMed]
13. Alfarhan FA, Matrouk M Al, AlGaowba H, AlHamely R, Tork HM. Association between sleep pattern and body mass index among undergraduate health colleges' students at Qassim University, Saudi Arabia. J Nurs Educ Pract. 2018;8:86. [Crossref]
14. Alqahtani MM, Kashoo FZ, Ahmad F. Current scenario of evidence-based practice and rationale of preferred approach in stroke rehabilitation among physiotherapists in Saudi Arabia: a cross-sectional survey. Saudi J Heal Sci. 2018;7:53.
15. Sevincer GM, Ince E, Taymur I, Konuk N. Night eating syndrome frequency in university students: association with impulsivity, depression, and anxiety. Bulletin Clin Psychopharmacol. 2016;26:238-247. [Crossref]
16. Dorflinger LM, Ruser CB, Masheb RM. Night eating among veterans with obesity. Appetite. 2017;117:330-334. [Crossref] [PubMed]
17. Öner C, Günay N, Telatar B, Yeşildağ Ş. Night eating syndrome in young adolescents: frequency and significance. Anatol JFM. 2018;16:17-20. [Crossref]
18. Olejniczak D, Bugajec D, Staniszewska A, Panczyk M, Kielan A, Czerw A, Mańczuk M, Juszczyk G, Skonieczna J, Bryek-Matera A. Risk assessment of night-eating syndrome occurrence in women in Poland, considering the obesity factor in particular. Neuropsychiatr Dis Treat. 2018;14:1521-1526. [Crossref] [PubMed] [PMC]
19. Nolan LJ, Geliebter A. Validation of the night eating diagnostic questionnaire (NEDQ) and its relationship with depression, sleep quality, "food addiction", and body mass index. Appetite. 2017;111:86-95. [Crossref] [PubMed]
20. Elsadek AM, Hamid MS, Allison KC. Psychometric characteristics of the Night Eating Questionnaire in a Middle East population. Int J Eat Disord. 2014;47:660-665. [Crossref] [PubMed]
21. Rand CS, Macgregor AM, Stunkard AJ. The night eating syndrome in the general population and among postoperative obesity surgery patients. Int J Eat Disord. 1997;22:65-69. [Crossref]
22. Pyle RL, Neuman PA, Halvorson PA, Mitchell JE. An ongoing cross-sectional study of the prevalence of eating disorders in freshman college students. Int J Eat Disord. 1991;10:667-677. [Crossref]
23. Quick V, Shoff S, Lohse B, White A, Horacek T, Greene G. Relationships of eating competence, sleep behaviors and quality, and overweight status among college students. Eat Behav. 2015;19:15-19. [Crossref] [PubMed] [PMC]
24. Kashoo FZ, Dhawan L. Agreement between timed up and go test and tinetti assessment scale in institutionalized elderly. Indian J. 2010;4:2-27.
25. Kanwar S, Kashoo FZ. Comparing the immediate effect of auditory and visual mental imagery on reaching and grasping task among sub acute stroke patients. Indian J. 2011;5:155-159.
26. Roenneberg T, Allebrandt KV, Merrow M, Vetter C. Social jetlag and obesity. Curr Biol. 2012;22:939-943. [Crossref] [PubMed]
27. Knutson KL, Van Cauter E. Associations between sleep loss and increased risk of obesity and diabetes. Ann N Y Acad Sci. 2008;1129:287-304. [Crossref] [PubMed] [PMC]
28. Curcio G, Ferrara M, De Gennaro L. Sleep loss, learning capacity and academic performance. Sleep Med Rev. 2006;10:323-337. [Crossref] [PubMed]
29. Ausubel DP. The Acquisition and Retention of Knowledge: A Cognitive View (1st et). Dordrecht: Springer Science & Business Media; 2012;212.
30. Vander Wal JS. Night eating syndrome: a critical review of the literature. Clin Psychol Rev. 2012;32:49-59. [Crossref] [PubMed]
31. Colles SL, Dixon JB, O'Brien PE. Night eating syndrome and nocturnal snacking: association with obesity, binge eating and psychological distress. Int J Obes (Lond). 2007;31:1722-1730. [Crossref] [PubMed]
32. Marshall HM, Allison KC, O'Reardon JP, Birketvedt G, Stunkard AJ. Night eating syndrome among nonobese persons. Int J Eat Disord. 2004;35:217-222. [Crossref] [PubMed]
33. Fairburn CG, Harrison PJ. Eating disorders. Lancet. 2003;361:407-416. [Crossref]
34. Shaphe A, Ahmad I, Kashoo FZ. Effect of aerobic exercises on blood pressure in mild and moderate hypertensive middle aged and older patients. Majmaah J Heal Sci. 2013;216:1-14. [Crossref]
35. Faith MS, Matz PE, Jorge MA. Obesity-depression associations in the population. J Psychosom Res. 2002;53:935-942. [Crossref]
36. Kashoo F, Baradie R. Motorized multidirectional protuberance device for sitting balance of stroke patients. Int J Stroke. 2015;89.
37. Marti A, Moreno-Aliaga MJ, Hebebrand J, Martínez JA. Genes, lifestyles and obesity. Int J Obes Relat Metab Disord. 2004;28:S29-36. [Crossref] [PubMed]
38. Smink FR, van Hoeken D, Oldehinkel AJ, Hoek HW. Prevalence and severity of DSM-5 eating disorders in a community cohort of adolescents. Int J Eat Disord. 2014;47:610-619. [Crossref] [PubMed]
39. Stunkard A, Berkowitz R, Wadden T, Tanrikut C, Reiss E, Young L. Binge eating disorder and the night-eating syndrome. Int J Obes Relat Metab Dosrd. 1996;20:1-6.