



A Scale Development Study: Psychometric Properties of the Cumhuriyet Subjective Sleep Quality Scale

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ABSTRACT

The aim of this study was to develop an instrument that could be used to assess sleep quality that was both valid and reliable. A two-part study group was included in the study. The study included 221 adults for exploratory factor analysis and 207 for confirmatory factor analysis. The participants were all aged between 18 and 56, with a mean age of 26.83 years. The validity and reliability of the scale were investigated by content validity, exploratory and confirmatory factor analysis, concurrent validity methods, internal consistency, and item analysis. For concurrent validity, the Intolerance of Uncertainty Scale-12 and the Fear of COVID-19 Scales were used. As a result of the explanatory factor analysis carried out to determine the construct validity of the 31-item draft scale, a structure consisting of 18 items and 3 sub-dimensions was obtained. This structure explains 60.45% of the total variance. The first factor was named "psychosomatic effects" (5 items), the second factor was named "sleep course" (7 items), and the third factor was named "sleep satisfaction" (6 items). In confirmatory factor analysis, fit index values were found as CMIN/df=2.78, RMSEA= .08, SRMR=.085, NFI= .90, PNFI= .91, RFI= .88, IFI= .92, CFI= .92, PGFI= .60, and AGFI=.82. Factor loadings ranged from .51 to .84. The Cumhuriyet Subjective Sleep Quality (CSSQS) Scale had significant positive relationships with the Intolerance of Uncertainty Scale-12 and the Fear of COVID-19 Scales in the concurrent validity. ($r = .43, .21$, respectively; $p < .01$). Cronbach's alpha internal consistency coefficients were found to be $\alpha = .91$ for the whole scale, $\alpha = .84$ for the psychosomatic effects, $\alpha = .87$ for the sleep course, and $\alpha = .84$ for the sleep satisfaction. Corrections to item-total correlations ranged from .48 to .69. Overall, the Cumhuriyet Subjective Sleep Quality Scale was found to be a viable and reliable instrument for assessing adults' subjective sleep quality levels.

Keywords: Sleep, sleep quality, sleep hygiene, scale development

Bir Ölçek Geliştirme Çalışması: Cumhuriyet Öznel Uyku Kalitesi Ölçeğinin Psikometrik Özellikleri

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ÖZ

Bu çalışmanın amacı uyku kalitesini değerlendirmek için geçerli ve güvenilir bir ölçme aracı geliştirmektir. Çalışma 2 farklı grup ile yürütülmüştür. Keşfedici faktör analizi için 221 yetişkin, doğrulayıcı faktör analizi ve eşzamanlı ölçek geçerliği için 207 yetişkin çalışmaya dâhil edilmiştir. Katılımcıların yaşları 18 ile 56 yaş arasında olup, yaş ortalaması 26.83'tür. Ölçeğin geçerlik ve güvenilirliği için kapsam geçerliği, keşfedici faktör analizi, doğrulayıcı faktör analizi, eş zamanlı ölçek geçerliği yöntemleri ile iç tutarlık ve madde analizi incelenmiştir. Belirsizliğe Tahammülsüzlük-12 Ölçeği ile COVID-19 Korkusu Ölçeği eşzamanlı ölçek geçerliği için kullanılmıştır. 31 maddelik taslak ölçeği yapı geçerliği için uygulanan keşfedici faktör analizi sonucunda 18 maddeli ve 3 alt boyutlu bir yapı elde edilmiştir. Bu yapı toplam varyansın %60.45'ini açıklamaktadır. İlk faktör: Psikosomatik etkiler (5 madde), ikinci faktör: Uyku süreci (7 madde) ve üçüncü faktör: Uyku doyumunu (6 madde) olarak isimlendirilmiştir. Doğrulayıcı faktör analizinde uyum iyiliği değerleri $\chi^2/sd=2.78$, RMSEA= .08, SRMR=.085, NFI= .90, PNFI= .91, RFI= .88, IFI= .92, CFI= .92, PGFI= .60 ve AGFI=.82 şeklinde hesaplanmıştır. Faktör yük katsayıları .51 ile .84 arasında sıralanmaktadır. Eş zamanlı ölçek geçerliği çalışmasında, Cumhuriyet Öznel Uyku Kalitesi Ölçeği (CÖÜKÖ) ile Belirsizliğe Tahammülsüzlük-12 Ölçeği ve COVID-19 Korkusu Ölçeği arasında istatistiksel olarak anlamlı pozitif ilişkiler bulunmuştur ($r = .43, .21$, sırasıyla; $p < .01$) Cronbach alfa iç tutarlık güvenilirlik katsayısı ölçeğin bütünü için $\alpha = .91$, psikosomatik etkiler faktörü için $\alpha = .84$, uyku süreci için $\alpha = .87$ ve uyku doyumunu için $\alpha = .84$ olarak hesaplanmıştır. Düzeltilmiş madde toplam korelasyon katsayıları .48 ile .69. arasında sıralanmaktadır. Tüm bu sonuçlar göstermektedir ki Cumhuriyet Öznel Uyku Kalitesi Ölçeği yetişkinlerin öznel uyku kalitelerini değerlendirmede kullanılabilecek geçerli ve güvenilir bir ölçme aracıdır.

Anahtar sözcükler: Uyku, uyku kalitesi, uyku hijyeni, ölçek geliştirme

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Introduction

In most living organisms, sleep is a temporary, partial, and periodic absence of communication with the environment, with stimuli of varying intensity, and is among the most basic needs for human beings. As a matter of fact, when this need is not met in sufficient amount on time, physical and mental problems occur. Not only the amount of sleep, but also its quality and course/process affect the life quality and life satisfaction in many living things. However, sleep problems such as insufficient sleep, insomnia, sleep distress, and poor sleep quality have been reported in almost every country in the world¹⁻⁴. In fact, according to Chattu et al.¹ inadequate sleep is a global issue with major public health implications.

Sleep quality is the individual feeling vitality, fit and ready for a new day after waking up. In other words, the term "sleep quality" refers to how well you sleep. Various factors, such as lifestyle, drugs and other substances, environmental factors, alcohol and cordials, job, diet, social life, emotional state, economic situation, physical activity, general health and stress have an impact on sleep quality⁵⁻⁹. Diseases often cause pain, physical distress, anxiety and depression; as a result, it causes sleep problems or disorders. Among the chronic diseases, cardiovascular diseases, hypertension, peptic ulcer, diabetes, gastroesophageal reflux, diseases affecting the respiratory system, some endocrine system diseases, and obesity cause difficulty in falling and staying asleep, and waking up frequently at night¹⁰⁻¹⁶. Increased vulnerability to stress, physical difficulties, poorer quality of life, emotional problems, and mood disorders are all short-term repercussions of poor sleep quality. Other mental health issues in healthy people include cognitive, memory, and performance deficiencies, as well as behavioral issues¹⁷. Various disorders, on the other hand, first show symptoms with disruptions in sleep patterns. Mood disorders, depression and bipolar disorder are important examples of this situation¹⁸⁻²⁰. Therefore, a practical evaluation of sleep quality will contribute to preventive and remedial practices.

Scales with sleep problem or disorders content have been adapted before in Turkey. Izci et al.²¹ adapted Epworth Sleepiness Scale (ESS) which is a simple and self-reported scale and gives scores for the individual's overall sleepiness level. The Stanford Sleepiness Scale is a subjective questionnaire developed by MacLean, Fekken, Saskin, and Knowles²² to determine the level of daytime sleepiness. Buysse et al.²³ developed Pittsburgh Sleep Quality Index (PSQI) which was adapted into Turkish by Ağargün et al.²⁴. The Sleep Hygiene Index, developed by Mastin, Bryson and Corwyn²⁵ to assess sleep quality and hygiene was adapted into Turkish by Ozdemir et al.²⁶. In addition, there some tools about sleep disorders and disturbances such as Stop and STOP-Bang Questionnaire^{27,28}, Berlin Questionnaire© Sleep Apnea^{29,30} etc.

The Present Study

The Covid-19 pandemic not only affected the social, economic and health sectors, it significantly damaged people's quality of life³¹. Sleep quality is one of the most important determinants of life quality. In Turkey, there are adapted scales that evaluate sleep quality, as mentioned above. In addition to these scales, there are also some measurement tools within the scope of sleep disorders, quality, and hygiene. For example, Yi, Shin, and Shin³² developed an instrument for measuring sleep quality. A single-item sleep quality scale (SQS) was developed by Snyder et al.³³ as a simple and practical sleep quality assessment and psychometrically evaluated. Sleep Hygiene Index²⁵ evaluates sleep quality, quantity, consequences of poor sleep, and sleep hygiene. The Holland Sleep Disorder Questionnaire (HSDQ; Kerkhof et al.³⁴) gives information about six potential sleep disorders: (1) insomnia, (2) parasomnia, (3) hypersomnia, (4) sleep-related breathing disorder, (5) circadian rhythm sleep disorder restless, and (6) legs/periodic limb movement disorder. the Groningen Sleep Quality Scale (GSQS; Mulder-Hajonides Van Der Meulen et al.³⁵) assessed sleep quality on a 14-item scale. Almost all of the same scales in this regard are related to sleep quality, quantity, and hygiene. Morrone et al.³⁶ developed a measurement tool that evaluates the functions of sleep problems on emotional distress in patients with sleep disorders. The items and content of all these foreign scales are of psychopathological origin and generally emphasize sleep disorders. Besides some scales have very complex scoring and some have too many items. However, there is no comprehensive and qualified national measurement tool that evaluates self-reported sleep quality. In other words, there is no sleep quality scale developed in line with the living conditions and cultural structure of our country and based on quality of life. In this context, the basic aim of this study is to develop the Subjective Sleep Quality Scale; to examine its psychometric properties.

Material and Methods

Participants

For this study, easily accessible sampling technique has been carried out for participant selection. Data was obtained from 428 (221 + 207) adults who volunteered to take part in this study. Draft scale was filled in by 221 adults, and final scale was filled in by 207 adults from different cities in Turkey. The participants were all aged between 18 and 56, with a mean age of 26.83 years. Males made up 21.50% (N=92) of all participants, and females 78.50% (N= 336).

Data Collection Tools

Intolerance of Uncertainty Scale-12 (IUS-12): The short 12-item version of the IUS, created by Carleton et al.³⁷, was used to assess uncertainty level intolerance. It's a 5-point Likert scale ranging from 1 (not at all characteristic of me) to 5 (entirely characteristic of me). Calculating the overall score of the scale, as well as the total scores of the

sub-dimensions, is possible. The high scores on the scale suggest that the person has a high level of uncertainty intolerance. In the Turkish validity and reliability study of the scale (Sarıçam et al³⁸), the Cronbach's alpha internal consistency coefficient was reported to be $\alpha=.88$ for the total scale, .84 for prospective anxiety, and .77 for the inhibitory anxiety sub dimension. Cronbach's internal consistency coefficient was found to be $\alpha=.90$ in this study.

The Fear of COVID-19 Scale (FCV-19S): For the measurement of COVID-19 fear, Ahorsu et al³⁹ designed the scale. It's a seven-item, one-dimensional scale. A 5-point Likert type (ranging from 1: Strongly disagree to 5: Strongly agree) rating system is used. In the Turkish validity and reliability study of the scale^{40,41}, the Cronbach's alpha internal consistency coefficient was reported to be $\alpha=.88$, .82; respectively. Cronbach's internal consistency coefficient was found to be $\alpha=.89$ in this study.

Preparation of The Items and Data Analysis

While preparing the items pool, DSM-5 and the systematic reviews of sleep quality in adults⁴²⁻⁴⁵. Moreover, some books were examined deeply such as 'Oxford textbook of sleep disorders'⁴⁶, 'mindfulness and sleep: How to improve your sleep quality through practicing mindfulness'⁴⁷, and 'sleep and health risk'⁴⁸. Second, the same scales were used to build an item pool, and appropriate objects were either included in the scales or altered to fit the subject, with the rest of the items being generated by the researcher. In the end, 43 items were created. These items were analyzed by two doctors (psychiatrist and neurologist) working on sleep disorders. Twelve items were deleted after getting feedback from the 10 experts via face-to-face conversations and mail. As a consequence, 31 items were selected for inclusion in the draft scale. The items in the scale were arranged to have a 4-point type rating (0=Never, 1=Very rarely, 2=Sometimes, 3=Very often). A small group of 30 people took part in a pilot study to test the intelligibility and readability of the items. After it was determined that there was no problem, the actual data collection study was started via google form. Ethics committee permission was obtained before sharing the link. Data collection was conducted between July-October 2021 based on ethical approval of Sivas Cumhuriyet University Social Sciences Ethics Committee with 04.07.2021, the application number 2021-07-15, and the decision number 12. Exploratory factor analysis (EFA) was used on the data gathered from the 221 people, and confirmatory factor analysis (CFA) was used on the data collected from the 207 adults, to determine the structural validity of the SSQS. Exploratory factor analysis (EFA) was used to reveal the structure between variables, while confirmatory factor analysis (CFA) to confirm the resulting construct from the EFA. Goodwin⁴⁹ stated that EFA enables to see the possible theoretical structure of the variables, and also CFA provides empirical evidence about whether the theoretical structure is supported or not. In SEM model, the application of CMIN/df, RMSEA, SRMR, NFI, PNFI, RFI,

IFI, CFI, AGFI and etc. are heavily contingent on a set of cutoff criteria. IUS-12 and FCV-19S were used for concurrent validity via Pearson's correlation coefficient. Simultaneously, the correlation between the scores obtained from the developed or adapted scale and the specified criteria is evaluated as concurrent validity. The significance level is set at p.01. For the validity and reliability analysis of the SSQS, the statistical computer program packages were used (SPSS and LISREL).

Results

Construct Validity

Exploratory Factor Analysis (EFA): The Kaiser-Meyer-Olkin (KMO) coefficient was calculated and the Bartlett Test of Sphericity was used to determine whether the data was suitable for factor analysis. The Kaiser-Meyer-Olkin (KMO) sampling adequacy measure was .88, and Bartlett's test of sphericity yielded a significant result $\chi^2=2304.90$ (df=153, $p<.001$). Then EFA was applied, because KMO should be equal to or higher than 0.50 and the Bartlett's Test of Sphericity should be significant ($p<.05$)⁵⁰. As a result of the EFA applied to data from the study conducted on 221 adults. According to Principal Component Analysis, Scree plot and Rotated Component Matrix, three-factor structure explains 60.45 % of the total variance, and which consists of 18 items, and three subscales (Psychosomatic effects=5 items, Sleep course=7 items, and Sleep satisfaction=6 items). Results was given Table 1. Items with a factor loading of less than .45 were ignored. It was discovered that the factor loading of 18 items was larger than .45. After completing the item correlation and component analysis, the correlation of the items was assessed, and 13 items were tossed as a result.

As seen Table 1, the first factor of the scale accounts for 22.88 % of the total variance, while the item factor loadings range from .58 to .82. The scale's second factor explains 21.87% of the total variation, and the item factor loadings range from .48 to .86. The third factor of the scale explains 15.70% of the total variance, and the factor loadings of the items range between .59 and .67.

Confirmatory Factor Analysis (CFA): CFA was applied on a new data set (207 adults) because of its importance in establishing if the model structured in EFA is a good match or not. In the confirmatory factor analysis applied for the three-dimension model, fit indices values were $\chi^2=359.00$, df= 129 ($\chi^2/df=2.78$), RMSEA= .08, SRMR=.085, NFI= .90, PNFI= .91, RFI= .88, IFI= .92, CFI= .92, PGFI= .60, and AGFI=.82. Figure 1 shows the CFA path diagram with standardized analysis coefficients for factor-item relations determined with CFA.

As seen on Figure 1, a single modification was made between S6 and S17; S13 and S18, and the scale was validated. The factor loadings for the items range from .51 to .84. The factor-item associations identified were determined to be statistically significant ($p<.01$).

Table 1. EFA Factor Loading and Variance rates of the CSSQS

Item No	Psychosomatic effects	Sleep course	Sleep satisfaction
S1	.807		
S2	.813		
S3		.860	
S4		.766	
S5	.800		
S6			.618
S7			.621
S8		.666	
S9		.481	
S10			.672
S11		.707	
S12		.712	
S13	.642		
S14		.562	
S15			.638
S16	.578		
S17			.589
S18			.606
Total variance 60.45%	22.88%	21.87%	15.70%

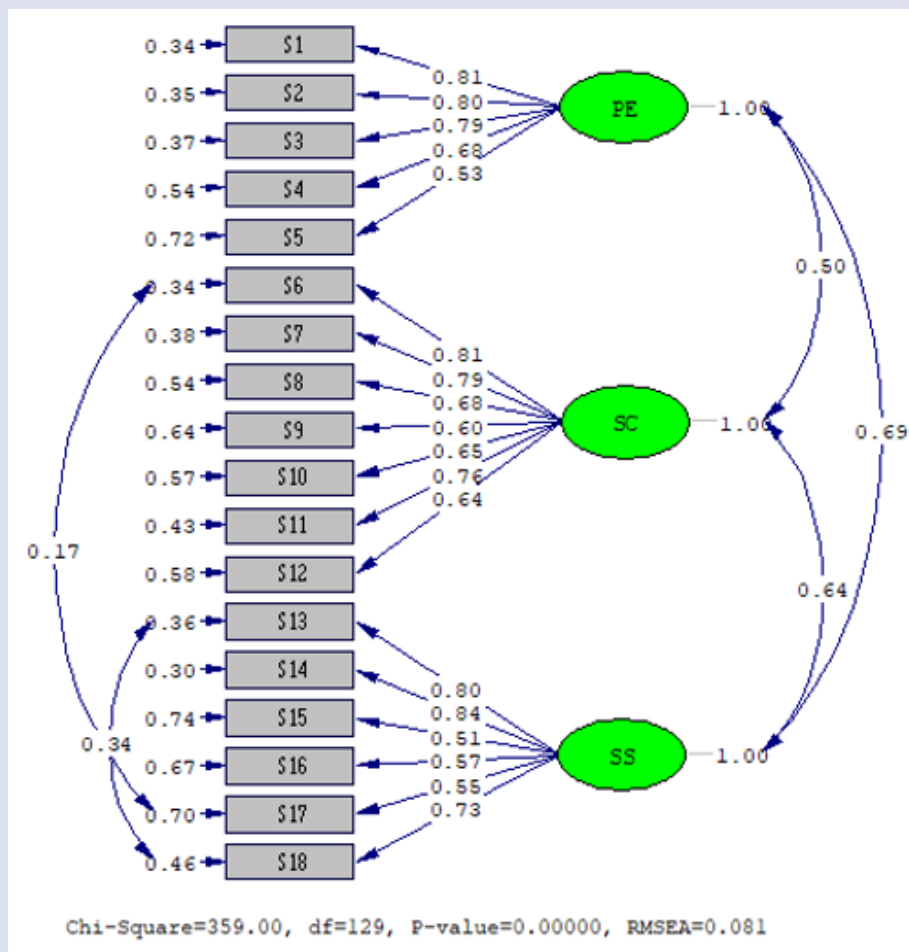


Figure 1. CFA Path Diagram

Table 2. Correlation coefficient between the CSSQS, IUS12, and FCV-19S

Dimension	1.	2.	3. PE	4. SC	5. SS	6. CSSQS
1. IUS12	-	.32**	.36**	.35**	.41**	.43**
2. FCV-19S		-	.19**	.18**	.17**	.21**
3. PE			-	.54**	.65**	.80**
4. SC				-	.68**	.88**
5. SS					-	.88**
6. CSSQS (Total)						-
Mean	41.75	16.48	7.99	10.52	8.30	26.69
SD	10.42	6.80	4.13	5.85	4.86	12.85

**p<.01 IUS-12: Intolerance of Uncertainty Scale-12; FCV-19S: The Fear of COVID-19 Scale; PE: Psychosomatic Effects; SC: Sleep Course; SS: Sleep Satisfaction; CSSQS: Cumhuriyet Subjective Sleep Quality Scale

Table 3. Corrected item-total correlations coefficients

Item No	Psychosomatic effects	Sleep course	Sleep satisfaction	SSQS
S1	.72			.54
S2	.71			.54
S3	.71			.59
S4	.63			.61
S5	.49			.48
S6		.76		.61
S7		.71		.60
S8		.66		.59
S9		.57		.56
S10		.60		.53
S11		.69		.65
S12		.60		.62
S13			.74	.69
S14			.71	.68
S15			.49	.46
S16			.56	.54
S17			.50	.53
S18			.69	.63

Concurrent Validity

Correlation coefficients between CSSQS, IUS and FSV-19S were determined as $r=.43$, $.21$, respectively ($p<.01$) for concurrent validity. In addition, correlation coefficients of the sub-dimensions are shown in Table 2.

As seen on Table 2, Total CSSQS have positive correlations with PE, SC, and SS ($r=.80$, $.88$, $.88$, respectively). There are also positive correlations among dimensions.

Reliability

Internal Consistency: Cronbach's alpha internal consistency coefficient was $\alpha=.91$ for the whole scale, $\alpha=.84$ for the psychosomatic effects, $\alpha=.87$ for the sleep course, and $\alpha=.84$ for the sleep satisfaction.

Item Analysis

Corrected item-total correlation: In addition, corrected item-total correlations of the scale items are shown in Table 3.

As seen on Table 3, The corrected item-total correlations range between $.48$ and $.69$ for whole scale

Discussion

In this study, the Cumhuriyet Subjective Sleep Quality Scale was developed to evaluate subjective sleep quality of people who did not diagnosed with any sleep disorders, and the validity and reliability analyzes of the CSSQA were performed. Content validity, construct validity, and concurrent validity are all part of the scale's validity analysis. The field specialists determined that the scale items were at a level that could evaluate sleep quality in terms of content validity. The adequacy of the data for factor analysis was assessed first in the context of concept validity. In the literature, it is accepted as 'very good' ⁵¹ that the KMO measure of sampling adequacy value is $.80$ s in scale development. The result of Bartlett's Sphericity test should be statistical meaningful ⁵². The coefficients revealed in the study show that these criteria have been met. As a result of EFA, 3 factors were occurred with an eigenvalue above 1, and the item factor loadings below them were greater than $.40$. The minimum factor loading is $.30$; for medium size between $.30$ - $.59$, and high magnitude with a load value of $.60$ and above ⁵³. In this context, it can be said that items 9, 14, 16, 17 are moderately large; all other items have a high factor

coefficient. In addition, it can be said that the explained total variance value is 50-60%, which is an acceptable percentage in scale development studies in social sciences. The criteria are shown in Table 4 to evaluate the coefficients of goodness-of-fit as a result of CFA.

As seen in Table 4, almost all of the specified goodness-of-fit values (CMIN/df, RMSEA, SRMR, NFI, PNFI, IFI, CFI, PGFI, and AGFI) are at an acceptable level. But the RFI is slightly below the acceptable fit. In addition, all factor loadings are above .50. The limit for this value is .30. For concurrent validity, the CSSQS have positive relations with the IUS and FSV-19S at the level of $p < .01$ significance. As a result, it was determined that it met the condition. All these validity scores indicate that the scale is valid. When the internal consistency reliability values of the scale and its sub-dimensions were checked, it was determined that all Cronbach's alpha values were greater than the minimum value of .70. In addition, the corrected item-total correlation values of the scale are .50 and above, excluding item 5 and 15. The minimum value for this is .30⁵⁶. The scale can be said to be dependable based on these findings. Furthermore, the item-to-total scale correlation values are favorable. As a result, the CSSQS can be considered a valid and trustworthy assessment technique for assessing the subjective sleep quality of adults.

The present study has also limitations. Data were collected from adults from online form. In the future studies, this scale should be conducted with normal and clinical samples face to face. In particular, it should be applied simultaneously to people diagnosed with sleep disorders and individuals with a normal health index, and its discriminant validity should be checked. This process will contribute to the measuring power of the scale.

References

1. Chattu VK, Manzar MD, Kumary S, Burman D, Spence DW, Pandi-Perumal SR. The Global Problem of Insufficient Sleep and Its Serious Public Health Implications. *Healthcare (Basel)*. 2018; 7(1): 1. DOI:10.3390/healthcare7010001
2. Dumith SC, Meneghini KFD, Demenech LM. Who are the individuals with the worst perceived quality of sleep? A population-based survey in southern Brazil. *Prev Med Rep*. 2020; 21:101288. DOI: 10.1016/j.pmedr.2020.101288
3. Ferrari G, Alberico C, Drenowatz C, Kovalskys I, Gómez G, Rigotti A, Cortés LY, García MY, Liria-Domínguez MR, Herrera-Cuenca M, Peralta M, Marques A, Marconcin P, Cristi-Montero C, Leme ACB, Zimberg IZ, Farías-Valenzuela C, Fisberg M, Rollo S. Prevalence and sociodemographic correlates of meeting the Canadian 24-hour movement guidelines among latin american adults: a multi-national cross-sectional study. *BMC Public Health*. 2022; 22(1): 217. DOI: 10.1186/s12889-022-12613-2
4. Hirshkowitz M, Whiton K, Albert SM, Alessi C, Bruni O, DonCarlos L, Hazen N, Herman J, Katz ES, Kheirandish-Gozal L, Neubauer DN, O'Donnell AE, Ohayon M, Peever J, Rawding R, Sachdeva RC, Setters B, Vitiello MV, Ware JC, Adams Hillard PJ. National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health*. 2015; 1(1): 40-43. DOI: 10.1016/j.sleh.2014.12.010
5. Dzierzewski JM, Sabet SM, Ghose SM, Perez E, Soto P, Ravyts SG, Dautovich ND. Lifestyle Factors and Sleep Health across the Lifespan. *Int J Environ Res Public Health*. 2021; 18(12): 6626. DOI: 10.3390/ijerph18126626
6. Grandner MA. Sleep, Health, and Society. *Sleep Med Clin*. 2017; 12(1): 1-22. DOI:10.1016/j.jsmc.2016.10.012
7. Park SY, Oh MK, Lee BS, et al. The Effects of Alcohol on Quality of Sleep. *Korean J Fam Med*. 2015; 36(6): 294-299. DOI:10.4082/kjfm.2015.36.6.294
8. St-Onge MP, Mikic A, Pietrolungo CE. Effects of Diet on Sleep Quality. *Adv Nutr*. 2016; 7(5): 938-949. Published 2016 Sep 15. DOI:10.3945/an.116.012336
9. Wu W, Wang W, Dong Z et al. Sleep Quality and Its Associated Factors among Low-Income Adults in a Rural Area of China: A Population-Based Study. *Int J Environ Res Public Health*. 2018; 15(9): 2055. DOI:10.3390/ijerph15092055
10. Aldabal L, Bahammam AS. Metabolic, endocrine, and immune consequences of sleep deprivation. *Open Respir Med J*. 2011; 5: 31-43. DOI: 10.2174/1874306401105010031
11. Antza C, Kostopoulos G, Mostafa S, Nirantharakumar K, Tahrani A. The links between sleep duration, obesity and type 2 diabetes mellitus. *J Endocrinol*. 2021; 252(2): 125-141. DOI: 10.1530/JOE-21-0155
12. Khanijow V, Prakash P, Emsellem HA, Borum ML, Doman DB. Sleep Dysfunction and Gastrointestinal Diseases. *Gastroenterol Hepatol (N Y)*. 2015; 11(12): 817-825.
13. Koren D, Dumin M, Gozal D. Role of sleep quality in the metabolic syndrome. *Diabetes Metab Syndr Obes*. 2016; 9: 281-310. DOI:10.2147/DMSO.S95120
14. Mallon L, Broman JE, Hetta J. High incidence of diabetes in men with sleep complaints or short sleep duration: A 12-year follow-up study of a middle-aged population. *Diabetes Care*. 2005; 28(11): 2762-2767.
15. Phillips B, Mannino DM. Do insomnia complaints cause hypertension or cardiovascular disease? *J Clin Sleep Med*. 2007; 3(5): 489-494.
16. Xu, C., Zhang, P., Xiang, Q. et al. Relationship between subjective sleep disturbances and glycaemia in Chinese adults with type 2 diabetes: findings from a 1.5-year follow-up study. *Sci Rep* 2019; 9: 14276. DOI: 10.1038/s41598-019-50814-9
17. Medic G, Wille M, Hemels ME. Short- and long-term health consequences of sleep disruption. *Nat Sci Sleep*. 2017; 9: 151-161. DOI:10.2147/NSS.S134864
18. Hensch, T., Wozniak, D., Spada, J. et al. Vulnerability to bipolar disorder is linked to sleep and sleepiness. *Transl Psychiatry* 2019; 9: 294. DOI:10.1038/s41398-019-0632-1
19. Nutt D, Wilson S, Paterson L. Sleep disorders as core symptoms of depression. *Dialogues Clin Neurosci*. 2008; 10(3): 329-336. DOI:10.31887/DCNS.2008.10.3/dnutt
20. Triantafyllou S, Saeb S, Lattie EG, Mohr DC, Kording KP. Relationship Between Sleep Quality and Mood: Ecological Momentary Assessment Study. *JMIR Ment Health*. 2019; 6(3): e12613. DOI:10.2196/12613
21. İzci B, Ardiç S, Fırat H, Şahin A, Altınörs M, Karacan I. Reliability and validity studies of the Turkish version of the Epworth Sleepiness Scale. *Sleep Breath* 2008; 12(2): 161-8.
22. MacLean AW, Fekken GC, Saskin P, Knowles JB. Psychometric evaluation of the Stanford Sleepiness Scale. *J Sleep Res* 1992; 1: 35-9.
23. Buysse DJ, Reynolds CF, Monk TH. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Res* 1989; 28: 193- 213.
24. Ağargün MY, Kara H, Anlar O. Pittsburgh Uyku Kalitesi İndeksi'nin Geçerliliği ve Güvenirliği. *Turk Psikiyatri Derg* 1996; 7: 107-11.

25. Mastin DF, Bryson J, Corwyn R. Assessment of sleep hygiene using the sleep hygiene index. *J Behav Med.* 2006; 29(3): 223-227. DOI:10.1007/s10865-006-9047-6
26. Ozdemir PG, Boysan M, Selvi Y, Yildirim A, Yilmaz E. Psychometric properties of the Turkish version of the Sleep Hygiene Index in clinical and non-clinical samples. *Compr Psychiatry.* 2015; 59: 135-40. DOI: 10.1016/j.comppsy.2015.02.001
27. Chung F, Yegneswaran B, Liao P, Chung SA, Vairavanathan S, Islam S, et al. STOP questionnaire: a tool to screen patients for obstructive sleep apnea. *Anesthesiology* 2008; 108: 812-21.
28. Acar HV, Kaya A, Yücel F, Erdem M, Günal SE, Özgen F, et al. Validation of the STOP-Bang questionnaire: An obstructive sleep apnoea screening tool in Turkish population. *Turk J Anaesth Reanim.* 2013; 41: 115-20.
29. Netzer NC, Stoohs RA, Netzer CM, Clark K, Strohl KP. Using the Berlin questionnaire to identify patients at risk for the sleep apnea syndrome. *Ann Intern Med.* 1999; 131: 485-491.
30. Acar VH, Kaya A, Genç F et al. Berlin formu, Obstrüktif Uyku Apnesi Tarama Testi Olarak Kullanılabilir mi?. *Anestezi Dergisi* 2013; 21(2): 99-105.
31. Turan A, Çelikyay H. Türkiye’de Kovid-19 ile mücadele: Politikalar ve aktörler. *Uluslararası Yönetim Akademisi Dergisi*, 2020; 3(1): 1-25.
32. Yi H, Shin K, Shin C. Development of the sleep quality scale. *J Sleep Res.* 2006; 15(3): 309-16. DOI: 10.1111/j.1365-2869.2006.00544.x. Erratum in: *J Sleep Res.* 2006; 15(4): 465.
33. Snyder E, Cai B, DeMuro C, Morrison MF, Ball W. A New Single-Item Sleep Quality Scale: Results of Psychometric Evaluation in Patients with Chronic Primary Insomnia and Depression. *J Clin Sleep Med.* 2018; 14(11): 1849-1857. DOI:10.5664/jcsm.7478
34. Kerkhof, G. H., Geuke, M. E. H., Brouwer, A., Rijsman, R. M., Schimsheimer, R. J. and Van Kasteel, V. Holland Sleep Disorders Questionnaire: a new sleep disorders questionnaire based on the International Classification of Sleep Disorders-2. *J. Sleep Res.*, 2013; 22: 104-107.
35. Mulder-Hajonides Van Der Meulen, W., Wijnberg, J., Hollander, J., De Diana, I. and Van Den Hoofdakker, R. Measurement of subjective sleep quality. In: *Proceedings of the International European Sleep Congress.* Elsevier, Amsterdam, 1981.
36. Morrone E, Sguazzin C, Bertolotti G, Giordano A, Braghiroli A, Balestroni GL, Manni R, Ferini Strambi L, Castronovo V, Zucconi M, De Carli F, Pinna E, Ottonello M, Giorgi I, Terzaghi M, Marelli S, Fanfulla F. Development and validation of the Mageri Sleep Quality and Distress Inventory (MaSQUDI-17). *PLoS One* 2017; 12(7): e0180743. DOI: 10.1371/journal.pone.0180743
37. Carleton RN, Norton MA, Asmundson GJ. Fearing the unknown: a short version of the Intolerance of Uncertainty Scale. *J Anxiety Disord.* 2007; 21(1): 105-17. DOI: 10.1016/j.janxdis.2006.03.014
38. Sarıçam H, Erguvan FM, Akın A, Akça MŞ. Belirsizliğe Tahammülsüzlük Ölçeği (BTÖ-12) Türkçe Formu: Geçerlik ve Güvenilirlik Çalışması. *Route Educational and Social Science Journal*, 2014; 1(3): 148-157.
39. Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH. The Fear of COVID-19 Scale: Development and Initial Validation [published online ahead of print, 2020 Mar 27]. *Int J Ment Health Addict.* 2020; 1-9. DOI: 10.1007/s11469-020-00270-8
40. Bakiöglü F, Korkmaz O, Ercan H. Fear of COVID-19 and Positivity: Mediating Role of Intolerance of Uncertainty, Depression, Anxiety, and Stress [published online ahead of print, 2020 May 28]. *Int J Ment Health Addict.* 2020; 1-14. DOI:10.1007/s11469-020-00331-y
41. Ladikli N, Bahadır E, Yumuşak FN et al. Kovid-19 Korkusu Ölçeği'nin Türkçe güvenilirlik ve geçerlik çalışması. *Uluslararası Sosyal Bilimler Dergisi*, 2020; 3(2): 71-80.
42. Ali RM, Zolezzi M, Awaisu A. A Systematic Review of Instruments for the Assessment of Insomnia in Adults. *Nat Sci Sleep.* 2020; 12: 377-409. DOI: 10.2147/NSS.S250918
43. Fabbri M, Beracci A, Martoni M, Meneo D, Tonetti L, Natale V. Measuring Subjective Sleep Quality: A Review. *Int J Environ Res Public Health.* 2021; 18(3): 1082. DOI: 10.3390/ijerph18031082
44. Knufinke M, Nieuwenhuys A, Geurts SAE, Coenen AML, Kompier MAJ. Self-reported sleep quantity, quality and sleep hygiene in elite athletes. *J Sleep Res.* 2018; 27(1): 78-85. DOI: 10.1111/jsr.12509
45. Wang F, Bíró É. Determinants of sleep quality in college students: A literature review. *Explore (NY).* 2021; 17(2): 170-177. DOI: 10.1016/j.explore.2020.11.003
46. Chokroverty S, Ferini-Strambi L *Oxford Textbook of Sleep Disorders.* 2017. Print.
47. Black A. *Mindfulness and Sleep: How to improve your sleep quality through practicing mindfulness.* CICO Books, 2018.
48. Peter JH, Penzel T, Podszus T, von Wichert P (eds). *Sleep and health risk.* Springer, Berlin, Heidelberg, 1991. DOI: 10.1007/978-3-642-76034-1_63
49. Goodwin LD The role of factor analysis in the estimation of construct validity. *Measurement in Physical Education and Exercise Science*, 1999; 3(2): 85-100.
50. Gönültaş BM, Sarıçam H. The Scale of Knowledge and Awareness About Child Molesters (Kacms): Validity and Reliability Study. *Turkish Journal of Applied Social Work* 2021; 4(2): 116-126. DOI: 10.54467/trjasw.1021951
51. Kaiser HF, Rice J. Little Jiffy, Mark IV. *Educational and Psychological Measurement* 1974; 34(1): 111-117. DOI:10.1177/001316447403400115
52. Büyüköztürk Ş *Sosyal bilimler için veri analizi el kitabı.* Ankara: Pegem A Yayıncılık, 2011.
53. Kline P *An easy guide to factor analysis.* New York: Routledge, 1994.
54. İlhan M, Çetin B LISREL ve AMOS Programları Kullanılarak Gerçekleştirilen Yapısal Eşitlik Modeli (YEM) Analizlerine İlişkin Sonuçların Karşılaştırılması. *JMEEP.* 2014; 5(2): 26-42.
55. Schermelleh-Engel K, Moosbrugger H, Müller H. Evaluating the Fit of Structural Equation Models: Tests of Significance and Descriptive Goodness-of-Fit Measures. *Methods of Psychological Research*, 2003; 8(2): 23-74.
56. Şencan H. *Sosyal ve Davranışsal Ölçümlerde Güvenilirlik ve Geçerlilik.* Ankara: Seçkin Yayıncılık, 2005.