

Reliability and Validity of Pre-sleep Arousal Scale for Pakistani University Students

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University students have to face various stressors and hurdles during their academic career which significantly affect their performance. Sleep problems are one of those problems that every student faces. For this purpose the current study was designed to explore sleep problems in university students. The participants aged 18 to 25 were selected from five different universities of Lahore. Pre Sleep Arousal Scale (Nicassio, Mendlowitz, Fussell & Petras, 1985) was translated into Urdu and administered on 600 university students (Male =248, Female = 352) to establish psychometric properties of the scale. Factor analysis revealed two factors including somatic arousal and cognitive arousal. Cronbach Alpha was .87 and retest reliability was found to be .89 which indicated that the Pre Sleep Arousal Scale is highly significant for usage in future. Further results were discussed in the cultural context.

Key words: sleep problems, pre sleep arousal scale, university students.

Sleep is important for every human being and it is a natural periodic state of rest for the mind and body. According to Ban and Lee (2001) sleep deprivation not only weakens physical and mental functions of individuals but also could cause psychological problems and decrease productivity level.

Sleep disturbance is one of the most common health complaints reported by children, young adults, adolescents and old age people. Students and especially university students are most vulnerable for sleep disturbances because they are much occupied by their professional and practical life issues. Sleep deficiency, social activities, academic responsibilities and many other factors turn the heads of the students. When students have typically irregular sleep wake cycle or disturbed sleep patterns, this kind of general impaired sleep influence not only their academic performance but also have great impact on their social relationships (Buboltz & Brown, 2001).

According to Ekstedt (2005) sleep problems have impact on the functioning of an individual such as he/she could not perform up to his/her maximum abilities. Students have to face many difficulties during their academic period when they did not have proper sleep. In the current study, Pre Sleep Arousal Scale (Nicassio, Mendlowitz, Fussell & Petras, 1985) was translated and adapted in Urdu language, so that sleep problems faced by students can be easily identified. Secondly Urdu translation of the scale will also be helpful in future exploration of sleep problems in both literate and illiterate populations.

Nicassio, Mendlowitz, Fussell and Petras (1985) conducted a research to explore the state of arousal of individuals as they fall asleep. The instrument developed by the researchers in this study; "Pre-sleep Arousal Scale (PSAS)" is a self-report questionnaire with 16-item having both cognitive and somatic dimensions of arousal. In order to assess its psychometric properties PSAS was administered on 147 college students in Nashville, USA. Research participants were 30 adults who were normal sleepers and 30 insomniacs having psychological problems like anxiety, depression and other sleep disturbances. For ten consecutive nights, 31 college students were instructed to monitor their sleep patterns and pre-sleep arousal states. Results indicated that there was a strong correlation between cognitive and somatic subscales and dimensions of anxiety, depression and sleep difficulty. Moreover it was highlighted that both subscales were sensitive enough to differentiate between insomniacs and normal sleepers. It was reported that the cognitive subscale was more strongly associated with sleep disturbance than the somatic subscale. The findings of the study further suggest that the PSAS can be used efficiently as a screening tool for identifying sleep disturbances.

Nicassio, Mendlowitz, Fussell and Petras (1985) defined that scores on each subscale range from 8-40; high scores on both subscale indicate more arousal. The Cronbach alpha of this scale was .88 and test-retest reliability is .72.

Fromark and Clarke (2012) conducted a research to explore the psychometric properties of the Pre-Sleep Arousal Scale. A survey on sleep problems related symptoms during night, daytime symptoms, health issues, and psychological processes was completed by 2327 participants. Results explored two factors of pre sleep arousal scale, first cognitive arousal ($\alpha=.88$), consisted of five items (37.1%), and somatic arousal ($\alpha=.72$) of eight items (11.4%). Both factors cognitive and somatic arousal were significantly inter-correlated ($r=.51$).

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Similarly, Fromark and Clarke (2012) found total scores on PSAS and the two subscales showed discriminant validity between three sleep groups i.e. normal sleep, poor sleep, and insomnia. The PSAS and the subscales demonstrated convergent validity with measures on worry about sleep, beliefs about poor sleep, anxiety, and depression. Results also indicated that PSAS and the two subscales were significantly correlated with sleep limitation and daytime impairment.

Another study was conducted to determine relationship between pre sleep arousal and sleep disturbance reported in adults and children in two inner city schools of London. Results indicated that most of the children and adults experiences sleep problems during their academic career. It was also found that pre sleep arousal scale and two sub factors somatic and cognitive arousal significantly predicted sleep disturbance (Gregory, Willis, Wiggs, & Harvey, 2008).

Empirical evidence clearly indicates that under stressful life conditions, sleep is likely to get disturbed. Researchers have also used Pre sleep arousal scale repeatedly in different parts of the world to explore sleep problems. It has been found that the scale has high reliability and validity which makes it an authentic tool to identify sleep problems. For the purpose of making this tool more relevant to Pakistani population, it was translated into Urdu language in the current study and its reliability and validity was established.

Method

Phase I Translation and Adaptation of Pre Sleep Arousal Scale

Pre sleep arousal scale (Nicassio, Mendlowitz, Fussell & Petras, 1985) was translated and adapted with the help of professionals after getting permission from the author. Five experts who had command over English and Urdu languages from Clinical psychology Unit and English Departments of Government College University were consulted. Experts were selected by using purposive sampling.

Experts were provided with 16 items of Pre Sleep Arousal Scale. After getting translation it was reviewed in a group discussion with researcher, research supervisor and two clinical psychologists. Through discussion, the appropriate translation which reflected the true meaning of each item was selected. The translated items were once again given to the experts with command over both English and Urdu languages to back translate Urdu items into English.

Phase II Pilot Study

The aim of this phase was to find out the correlation between the English and Urdu versions of Pre Sleep Arousal Scale. 20 students (15 girls, 5 boys) studying in 2nd semester of BS Hons in GCU participated in the pilot study.

Procedure

First of all permission was taken from Head of the department. They were given rationale of the study and information regarding time and administration. Permission was also taken from the class teacher and information regarding time and scale administration was given. Instructions were given to the participants after getting the verbal consent. Administration was done in group setting and students were requested to rate every item in the scale. Pre Sleep Arousal Scale English version was first administered and then after one week interval Pre Sleep Arousal Scale Urdu version was administered again using same procedure and instructions. It was noticed that students took 10 minutes to complete the scale. Students did not find any difficulty in rating items. The range of correlations between English and Urdu version of the scale was found to be between 0.48 to 0.78.

Phase IV Main Study

In order to determine the psychometric properties of the pre sleep arousal scale Urdu version, the scale was administered on 600 university students from five different Universities of Lahore. Stratified random sampling technique was used to select the students of 2nd and 8th semesters of bachelors. These strata were then divided in to sub strata of male and female students.

Procedure

First of all permission were taken from the different head of departments of five public sector universities of Lahore. Rationale of the study was explained to all Head of departments and also assured that all information will be used for research purpose only. BS Hons students of 2nd and 8th semester were approached in their classes. Information regarding purpose of the study and time required for administration was given to the participants. Written consent from research participants was taken and confidentiality was assured to them. After that each participant was provided with Pre sleep Arousal Scale. Group administration was done. Students were also encouraged to ask questions after the administration.

Results

Psychometric properties of Pre Sleep Arousal Scale

The psychometric properties of Pre sleep arousal scale Urdu version were established using factor analysis, Cronbach Alpha and test retest reliability.

Factor analysis

Exploratory factor analysis with Varimax Rotation was used in the current study which revealed two factors.

Figure 1
Scree Plot for the Factors of Pre Sleep Arousal Scale

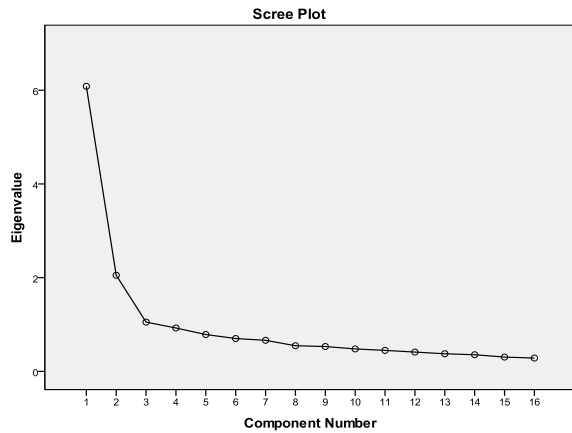


Figure 1 shows the scree plot which reveals a two factor solution. In order to get a clear picture 2, 3 and 4 factors solution were carried out. The two factor solution revealed a clearer factor structure with no dubious items and cross loadings. The factor loadings greater than 0.50 was set as a criteria for inclusion in each factor.

Table 1
Factors Loading of Pre Sleep Arousal Scale (Factors Loading >.05), Eigen Values, Percentages of Variance and Cronbach Alpha for 2 Factors of Pre Sleep Arousal Scale

Scale items	Somatic Arousal	Cognitive Arousal
Heart racing or beating irregularly	.72	.15
Feeling nervousness	.74	.21
Feeling shortness of breath	.76	.09
Feeling stress and tension in muscle	.72	.22
Coldness in hands, feet and body	.76	.01
Have stomach problems	.69	.16
Sweating in hands and other body parts	.68	.18
Dryness in mouth or throat	.56	.32
Worry about falling asleep	.51	.43
Analyze events of the day	.14	.52
Thoughts of sadness and restlessness	.38	.65
Worry about problems other than sleep	.28	.71
Being mentally alert or consciousness	.10	.57
Unable to stop thoughts	.10	.75
Thoughts keep racing in your head	.03	.78
Being distracted by sound	.13	.56
Eigen Values	6.08	2.0
% of Variance	38.04	12.79
Alpha Coefficient	.87	.82

Factors Loading >.50 and selected items are in the bold face

Table 1 show that the pre sleep arousal scale has two factors and on the basis of themes of items converging in factor I, it was labeled as Somatic arousal and factor II was labeled as cognitive arousal. Table 1 also indicated that the percentage of variance on somatic arousal is higher than

cognitive arousal. Cronbach Alpha value for the total scale was found to be .89 (** $p < 0.001$) which shows that pre sleep arousal scale has high internal consistency. The details of factors are as follows:

Factor I somatic arousal: This subscale includes 8 items describing the physiological symptoms that effect sleep patterns such as “Heart racing or beating irregularly”, “Feeling shortness of breath” and “Have stomach problems”.

Factor II cognitive arousal: This subscale of Pre Sleep Arousal Scale also contains 8 items exploring the cognitive disturbances which significantly effect the sleep patterns. The items included “Thoughts of sadness and restlessness”, “Being mentally alert or consciousness” and “Unable to stop thoughts”.

Table 2
Mean and SD of Two Factors and Total of Pre Sleep Arousal Scale (N=600)

Factors	No. of items	M	SD
Somatic Arousal	8	19.46	8.02
Cognitive Arousal	8	24.32	7.13
Scale Total	16	43.79	13.24

Table 2 shows the mean and standard deviation of the two factors and the total of pre sleep arousal scale for students. It depicts that university students experienced more cognitive arousal than somatic arousal.

Cut off Score: In order to find out the cut off scores on Pre sleep Arousal Scale Urdu version percentile analysis was carried out.

Table 3
Pre Sleep Arousal Scale Urdu Version, Percentiles and their Categories (N=600)

Pre Sleep Arousal Scale Scores	Percentile	Categories
0-34	25	Mild
35-43	50	Moderate
44-53	75	Severe
54-61	90	Very Severe

Table 3 shows the pre sleep arousal scale at various percentiles in the current study and their significance level. The significance of the score provides a useful guideline to identify the level of sleep problems among university students.

Table 4
Frequency and Percentage of Students Experiencing Different Level of Sleep Problems (N=600)

Significance level of PSAS	Frequency	Percentage
Mild	161	26.8
Moderate	268	44.7
Severe	101	16.8
Very severe	70	11.7

Table 4 shows the frequency of participants experiencing different level of sleep problems in the current study. Most of the students were found to be experiencing moderate level of sleep problems. Almost 29% of students experience severe and very severe sleep problems which is quite higher.

Factor-total correlation: In order to calculate the factor total correlation, Pearson product moment correlation was carried out between the two factors of pre sleep arousal scale and the scale total.

Table 5
Inter Correlation between Two Factors and Total of Pre Sleep Arousal Scale

Factors	Somatic Arousal	Cognitive Arousal	Total PSAS
Somatic Arousal	-	.52**	.88**
Cognitive Arousal		-	.85**
Total PSAS			-

Table 5 shows the inter correlation between two factors of pre sleep arousal scale and also total score PSAS. Table 5 also shows highly significant correlation between somatic arousal and cognitive arousal and total scores.

Test-retest reliability

To establish test retest reliability the pre sleep arousal scale was re-administered on the 10% of sample from the target population. The test retest reliability was found to be .87($p < 0.001$) which is highly significant and shows that pre sleep arousal scale is highly reliable scale for identifying sleep problems in university students.

Discussion

Sleep is an essential part of life and it is as important for all human being as the food, the water, and the air. Most of people who have to do a lot of work in their daily life, they sometimes consider sleep as a waste of time. As a result they usually stay awake for longtime to deal with their daily life affairs (Durand & Barlow, 2003).

Students have to face issues such as time management, study skills, separation anxiety, high expectations, poor health and adjustment problems. It was also find out that

sleep problems have significant impact on the performance of students during their school, college and university period of study as they cannot perform with full to their capacities (Graham, Rogers, & Yassin, 2003, Pallos, Yamda, Dol, & Okawa, 2004, Ekstedt, 2005).

To identify sleep problems among university students in Pakistan Pre Sleep Arousal Scale was adapted and translated in to Urdu language. For the assessment of sleep problems among university students no scale was available in Urdu language. After getting formal permission from the author and translation of the scale, factor analysis was carried out and the factor structure was found to be very similar to the original one by Nicassio, Mendlowitz, Fussell and Petras (1985). This scale include two factors of somatic arousal and cognitive arousal which highlights somatic complaints and cognitive disturbances in students when they go to bed for sleep. It was found that most of the students experienced more cognitive arousal than somatic arousal.

When the students went to their beds for sleep or taking rest they could not shut off their negative thoughts, they review most of the bad events of the day, being distracted easily and remain mentally alert all the time. Due to these cognitive disturbances they cannot take proper healthy sleep. Fromark and Clarke (2012) also reported in their research that students experience sleep problem due to cognitive arousal more as compared to somatic arousal.

Cronbach Alpha and test retest reliability of the translated scale was also carried out on the local sample of university students. Re test reliability of this scale was .87 which also showed that it was highly reliable and valid scale and can be used in future research.

Percentile and the significance level for sleep disturbances were found in four categories such as mild, moderate, severe and very severe. It was find out that in Lahore city of Pakistan most of students were suffering from moderate level of sleep disturbances. On the other hand, 29% of the sample were found to be experienced either severe or very severe level of sleep problems. This finding highlights the need to take this problem seriously. If it is not worked out, it will end up negatively effecting the performance of our young generation.

It also indicated that in our Pakistani culture, sleep problems are becoming one of the major issues that need proper assessment and management at university level. With this indigenous knowledge base, now future researches can be planned to explore the relationship and impact of sleep problems on different areas of functioning of adolescents and educational personnel, including emotional and behavioral problems, coping skills, and so on. Future researches can also be planned to identify different risk factors that lead to sleep problems in university students.

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