JOURNAL OF
PSYCHIATRIC NURSING

DOI: 10.14744/phd.2022.05902
J Psychiatric Nurs 2023;14(2):165-174

Original Article

Effectiveness of cognitive–behavioral-based psychoeducation in university students with smartphone addiction

Ayşe Tanşu, Gül Ünsal

Marmara University Faculty of Health Sciences, Department of Nursing, Department of Psychiatric Nursing, İstanbul, Türkiye

Abstract

Objectives: This study aims to determine the effectiveness of cognitive–behavioral-based psychoeducation on smartphone addiction levels in university students.

Methods: This study was conducted on university students studying in the academic year of 2019–2020 using baseline (preintervention) and postintervention measurements and follow-up tests. We selected 104 students scoring ≥31 points on the smartphone addiction scale. Psychoeducation training was applied to the experimental group for 60 min once a week in six sessions. At the end of the training, posttest was applied to both experimental and control groups, and follow-up tests had been performed at the end of the 3rd and 6th months after the training.

Results: When the mean smartphone addiction scores of the experimental and control groups at postintervention and 3rd- and 6th-month follow-up were compared, there were significant differences between the groups ($p< 0.05$). These findings show that the psychoeducation program is effective in reducing addiction levels in university students with smartphone addiction.

Conclusion: In this respect, our study is thought to guide future studies focusing on interventions for behavioral addiction(s).

Keywords: Addiction; smartphone; cognitive–behavioral approach; psychoeducation.

It is a known fact that smartphones have replaced personal computers and have found a fairly wide field of use. Their capability to offer the benefits of multiple features, including simultaneous video chat, messaging, and recording, has augmented their appeal.[1] Smartphone addiction or the frequency of problematic smartphone use has reached serious rates in our country and world worldwide.[2] A study made in Türkiye reports that 77% of the Turkish population uses smartphones.[3] As per the results of the "Cellphone User Survey" in Türkiye, smartphone use has increased from 86% in 2015 to 92% in 2017.[4] The Cisco Connected World Technology Report (2012) asserts that smartphone use is most common among university students. The results of a 2010 study conducted by the Turkish Statistical Institute show that smartphone use in Türkiye is at 95.3% in the 16- to 74-year age group and the most robust rate is in the 18- to 24-year age group with 98%.[5,6]

Smartphones continue to make changes in habits, communication methods, cultural approaches, and family interaction.[7] Nevertheless, although they eliminate hardships and accelerate life, on another dimension, they cause certain unpreventable behavior. Particularly in the academic field, smartphones have been found to have a negative effect effect on the learning process of students, thus affecting their achievements at the university.[8] Yet another study concluded that university students' smartphone addiction is not related to enjoying life but is correlated negatively with their academic

Address for correspondence: Ayşe Tanşu, Marmara University Faculty of Health Sciences, İstanbul, Türkiye
Phone: +90 216 777 57 00 **E-mail:** ayse.tansu.80@hotmail.com **ORCID:** 0000-0002-6151-0237

Submitted Date: June 05, 2022 **Revised Date:** September 13, 2022 **Accepted Date:** October 16, 2022 **Available Online Date:** June 15, 2023

What is presently known on this subject?

- It is known that the incidence of smartphone addiction is constantly increasing , and covid-19 pandemic has had a significant effect on this increase. Nevertheless, studies on the intervention methods of smartphone addiction are insufficient, and in Türkiye, no study on the intervention of smartphone addiction through a cognitive–behavioral-based group psychoeducation program could be found .

What does this article add to the existing knowledge?

- The findings of the study have proven that a cognitive–behavioral-based group psychoeducation program is effective in reducing smartphone addiction levels.

What are the implications for practice?

- Cognitive–behavioral-based psychoeducation program is a structured program that is usable in reducing smartphone addiction levels .
- It is expected that this program may be used by university experts and may provide guidance for counseling efforts and experimental studies at universities.

success.[7]

Studies on the relationship between smartphone addiction and communication skills, loneliness, academic achievement, sleep, emotional intelligence, satisfaction with life, self-esteem, and parents' behavior have been found in the literature.[9-12] The literature presents examples of intervention efforts concerning technology, the internet, or social media addiction, where psychoeducation is applied.[13-16] An examination of the international literature revealed only two studies where a cognitive–behavioral intervention program concerning smartphone addiction was applied.[17,18] Conversely, no study has been found showing that Türkiye's smartphone addiction has been intervened.

Covid-19 and consequent social isolation and lockdowns have caused young people to apply all processes such as shopping, chatting, research, gaming, and especially their studies on smartphones. Because of the increase in smartphone use, future intervention efforts in this field have gained further importance. In the management of problematic smartphone use, the application of awareness-based and cognitive–behavioral psychotherapy and motivational interview techniques is particularly suggested.[19] In a meta-analysis study, it is reported that exercise activities for individuals with smartphone addiction help in decreasing the rate of smartphone use.[20] In Türkiye, no study on the intervention of smartphone addiction, which is the subject matter of this study, using a cognitive–behavioral-based group psychoeducation program was found. Literature data presented to date on therapy methods employed against smartphone addiction show that no clear intervention procedure has been set forth. The thought–emotion–behavior cycle plays an active role in the smartphone addiction process. It is known that an individual's awareness of his/her erroneous and unhealthy ideas through self-dialogue and replacing them by developing new, healthy, and positive alternatives and learning approaches that eliminate distress have a healing effect on addiction.[21,22] Accordingly, the use of a cognitive approach technique was preferred.

It is considered that studies on reducing smartphone addiction levels will play guiding and supporting roles and will act as important references for presenting new data on improving quality of life as regards smartphone use. On these grounds, study aims to identify the effectiveness of a "cognitive–behavioral-based" group psychoeducation program on the smartphone addiction levels of university students.

We proposed the following hypotheses:

H1: The smartphone addiction scale (SAS) final test and follow-up scores of the students in the experimental group participating in the cognitive–behavioral-based group psychoeducation program will be lower than students in the control group.

H2: The SAS posttest and follow-up scores of the students in the experimental group participating in the cognitive–behavioral-based group psychoeducation program shall be lower than their pretest scores.

Materials and Method

Study's Design

This study has been conducted on a pretest and posttest randomized control group using a follow-up measurement experimental research design

Study's Place and Time

The study had been conducted at a foundation university in the academic years of 2019–2020.

Population and Sample

The study's population was composed of 1,320 students. Of these students, power analysis was applied to 513 students with an above-average SAS score (between 31 and 60).[23] Effective values were calculated using the Power Analysis for Sample Size (PASS) 11 application and entering the expected variations from previous studies.[24] On the basis of the value calculated by entering 80% power and 5% alpha value, it was decided that the experimental and control groups should each have at least 39 individuals. Foreseeing potential absences during implementation due to various reasons, it was decided to have a sample number with a 20% surplus.[19] Of the 513 individuals who volunteered for the study, randomization was applied to 104 students (52 students each in the experimental and control groups). Randomization was applied using a computer-assisted table of numbers. The number of students in the posttest and follow-up processes was indicated in the Consolidated Standards of Reporting Trials (CONSORT) flowchart presented in Figure 1.

Data Collection Tools

Data were collected using the personal data questionnaire prepared by the researcher and SAS. After permissions from the university management and department chair were obtained, data collection tools had been applied to the students in their classrooms, which took approximately 20 min to complete.

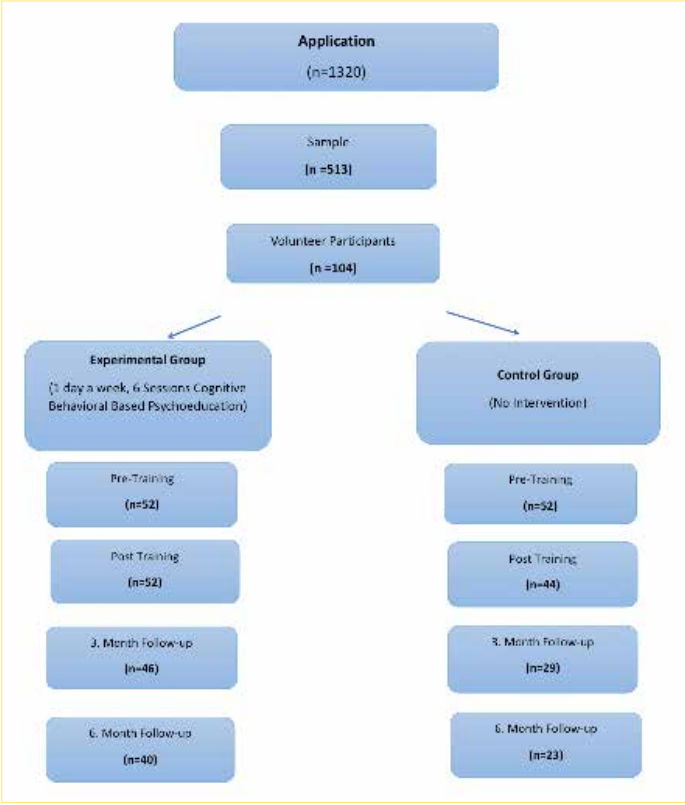

Figure 1. Consort Diagram, flow-chart of study design

Personal Data Questionnaire (Appendix 1): The questionnaire prepared by the researcher is composed of 28 questions on the students' age, classes, gender, the educational background of their parents, leisure activities, frequency of checking their smartphones, daily time intervals for smartphone use, the purpose of smartphone use, and the daily duration of involvement with a smartphone.

SAS–Short Version (Appendix 2): SAS is a scale developed by Kwon et al.[25] for identifying smartphone addiction in adolescents, which consists of 6 factors and 33 items with a 6-point Likert scale. The validity and reliability of its Turkish version were evaluated by Noyan et al.[23] (2015). Individuals read the articles and decide on their subjective validity by marking on a scale consisting of the options "1, strongly disagree"; "2, disagree"; "3, weakly disagree"; "4, weakly agree"; "5, agree"; and "6, strongly agree." The scores of the scale range from 10 to 60. The higher the score obtained from the test, the more likely the risk of addiction. The test/retest reliability coefficient is 0.92. The scale consists of a single factor and does not have subscales. The study for the reliability of the scale's articles achieved a Cronbach alpha coefficient of 0.96. In this study, the Cronbach alpha coefficient was identified as 0.90.

Ethical Issues

Ethics approval for the study was obtained from the Marmara University School of Medicine Scientific Research and Publication Ethics Committee (4.10.2019/09.2019.872). Moreover, formal permissions from the institution where the research is conducted were obtained. As per the Helsinki Declaration , the participants were informed before the study, and their consent was obtained. We obtained permission to use SAS from the author who developed it. An authorized expert with experience in cognitive–behavioral therapy and learning processes provided psychoeducation training.

Procedure/Implementation of the Study

The CONSORT flowchart of the study is shown in Figure 1. The projected psychoeducation program was planned for 6 weeks, 1 day each week, and in 60- to 90-min sessions. An expert nurse who received "Cognitive–Behavioral Theory and Skills Training" prepared the psychoeducation program designed with the view of overcoming smartphone addiction. The prepared training program was applied after it was finalized by presenting it to an expert review. Psychoeducation program sessions are as follows:

Session 1: Introduction, sharing, conscious smartphone use, and smartphone addiction

Session 2: Addiction neurobiology and the reward system

Session 3: Introducing the cognitive–behavioral therapy model

Session 4: Time management

Session 5: Self-awareness, identifying and naming emotions, and effective listening

Session 6: Methods to overcome smartphone addiction and the ability to say "no"–finishing

Statistical Analyses

Data were analyzed using the Statistical Package Program for Social Science 21.0 application.[26] Frequency tables and descriptive statistics were used in interpreting the findings. Skewness and kurtosis coefficients were used for the test of normality for scale scores.

A ±1 range of skewness and kurtosis coefficients used at the normal distribution of scores obtained from a continuous variable is interpreted to indicate that the scores do not show a significant deviation from the normal distribution.[27]

Nonparametric methods were used for measurements not compatible with the normal distribution. In compliance with nonparametric methods, the "Mann–Whitney U" test (Z-table value) and "Friedman" test (χ^2-table value) method were used for comparisons of the measurements of two independent groups and the three or more dependent groups, respectively. Bonferroni correction was applied for dual comparisons of variables with significant differences for three or more groups. "Pearson-χ^2" cross-tabulations were used in assessing the interaction of two qualitative variables.

Because control and experimental group scores before the psychoeducation training and immediately after the training showed a normal distribution, independent two-sample and paired t-tests were used for comparisons between the groups and between pretest and posttest scores within the group, re-

spectively. Because SAS scores obtained 3 and 6 months after the training were found to be not showing a normal distribution, the Mann–Whitney U test was used for a comparison between the groups.

In the analyses, the confidence interval was designated as 95% (level of significance 0.05, $p<0.05$).[27] To assess the effect size of the training, because a significant difference ($p<0.05$) was seen between the pretest and posttest scores of the ex-

Table 1. University Students' Distribution by their Socio-Demographic Characteristics

	Experimental group (n=52)		Control group (n=52)		Statistical analysis* Probability
	n	%	n	%	
Gender					
Female	34	65.4	34	65.4	χ^2=0.000 p=1.000
Male	18	34.6	18	34.6	
Age group					
17-25	50	96.2	51	98.1	χ^2=0.000 p=1.000
26-34	2	3.8	1	1.9	
Region of birth					
Marmara	30	57.7	33	63.5	
Aegean	2	3.8	- 3	-	
Mediterranean	- 5	-	3	5.8	
Black Sea	1	9.7	3	5.8	χ^2=11.916 p=0.103
Central Anatolia	9	1.9	2	5.8	
East	4	17.3	7	3.8	
Southeast	1	7.7	1	13.5	
Overseas		1.9		1.8	
Department					
Economics/social	6	11.5	4	7.8	
Engineer/architect	4	7.8	6	11.5	
Art/design	1	1.9	1	1.9	
Health sciences	1	1.9	1	1.9	χ^2=1.087 p=0.955
Vocational college	8	15.4	10	19.2	
Health services	32	61.5	30	57.7	
Mother's educational background	3	5.8	2	3.8	
Illiterate	16	30.8	15	28.8	
Primary school	13	25.0	21	40.4	χ^2=4.336 p=0.362
Middle school	15	28.8	8	15.4	
Lycée University	5	9.6	6	11.6	
Father's educational background	1	1.9	-	-	
Illiterate	14	26.9	13	25.0	
Primary school	13	25.0	19	36.5	
Middle school	17	32.7	12	23.1	χ^2=3.091 p=0.543
Lycée University	7	13.5	8	15.4	
Parents' status					
Living together	42	80.8	43	82.7	
Divorced	5	9.6	7	13.5	χ^2=1.631 p=0.442
Mother/father deceased	5	9.6	2	3.8	
Income level					
Low	5	9.6	9	17.3	
Middle	44	84.6	39	75.0	χ^2=1.587 p=0.452
High	3	5.8	4	7.7	

perimental group, Cohen's d statistic was used to calculate the effect size. In Cohen's d statistic, scores of 0–0.20, 0.20–0.50, and >0.50 refer to a "small," "medium," and "large" effect, respectively.[24] The Cochran Q test was utilized to verify the assumption that variables with a dependent dual value are from the same population.

Findings

University Students' Distribution by Their Sociodemographic Characteristics

Of the 104 students participating in the study, 65.4% are female and 34.6% are male. Of the participants, 96.2% are in the 17- to 25-year age group and 61.5% study in health services departments. In terms of educational background, 32.7% and 30.8% of the participants' mothers and fathers had middle school-level education, respectively. In terms of their parent's living conditions, 80.8% live together. In terms of income, 78.8% have a middle-income level. The experimental and control groups have similar sociodemographic characteristics (Table 1).

University Students' Distribution by Smartphone Use Patterns

It was found that 57.7% of the participants started using smartphones at the age of 11–14 years or later, 41.3% has been using smartphones for 5–7 years or longer, 69.2% uses smartphones between 6 and 11 PM, and 40.4% uses smartphones 6–10 h/day. It was found that 26% of the participants check their smartphones 16–30 times without any stimulus, and the most common purposes of use are social media (95.2%), messaging (83.7%), and talking (76%). It was also found that 46.2% checked their smartphones as soon as they woke up in the morning and 75.5% checked their smartphones just before going to bed. Except for the "excessive smartphone use," the experimental and control groups were similar in their patterns of smartphone use (Table 2).

Pretest, Posttest, and 3rd- and 6th-month Follow-up SAS Scores of the Experimental and Control Groups

The SAS scores of the experimental group were 47.17±4.55, 34.17±2.88, 33.48±3.32, and 35.30±3.48 at the pretest, posttest, and 3rd- and 6th-month follow-up, respectively. Conversely, the SAS scores of the control group were 47.63±5.17, 48.23±4.75, 48.27±4.76, and 47.83±4.85 at the pretest, posttest, and 3rd- and 6th-month follow-up, respectively (Fig. 2).

A Comparison of SAS Scores between the Experimental and Control Groups

No significant difference in terms of pretest SAS scores was found between the experimental and control groups ($p>0.05$). A significant difference between the experimental and control groups was identified for pretest ($Z=-8.414$; $p<0.001$); 3rd-month follow-up ($Z=-7.182$; $p<0.001$), and 6th-month follow-up ($Z=-6.274$; $p<0.001$) SAS scores. The posttest and

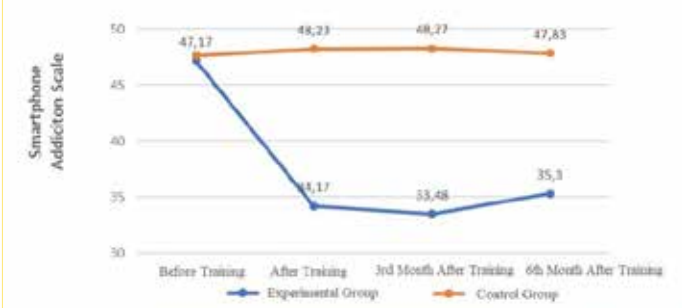

Figure 2. Comparison of the score trends in the Intervention and Control Groups (pre-intervention, post-intervention,3rd month and 6th month follow-up)

3rd- and 6th-month follow-up SAS scores of the participants in the experimental group were found to be lower than those in the control group. An examination of the effect sizes revealed that the largest effect was at the 3rd-month follow-up, the 6th-month effect was similar to the 3rd-month effect, and the smallest effect was in the pretraining phase (Table 3).

A Comparison of the Internal SAS Scores of the Experimental and Control Groups

An examination of the changes in the internal SAS scores of the experimental and control groups yielded a significant difference for the experimental group ($\chi^2=91.649$; $p<0.001$). Consequent to dual comparisons with Bonferroni correction, this difference was detected between pretest, posttest, and 3rd- and 6th-month follow-up SAS scores and between 3rd- and 6th-month follow-up SAS scores. A significant difference was also found in the control group ($\chi^2=20.729$; $p<0.001$). Consequent to dual comparisons with Bonferroni correction, a significant difference was detected between posttest and 3rd- and 6th-month follow-up SAS scores (Table 4).

A Comparison of the Pretest, Posttest, and 3rd- and 6th-month Follow-up Average Scores of the Experimental Group

When the post-training and follow-up process SAS scores of the participants were examined using the Cochran test, a significant difference was found. Before the training, the addiction scale score of all participants in the experimental group (40 individuals) was identified as above the average, and the training was thus initiated. Moreover, 11 individuals after the training and 15 individuals 3 months later had SAS scores below the average. Although, at the assessment 6 months after the training, the number of individuals with above-average SAS scores was found to have increased, a significant difference was found between pretraining and post-training phases (Table 5).

Discussion

In this study, the effect of a cognitive–behavioral-based psychoeducation program on the smartphone addiction levels of university students is investigated. Accordingly, a comparison

Table 2. University Students' Distribution by Smartphone Use Patterns

	Experimental group (n=52)		Control group (n=52)		Statistical analysis* Probability
	n	%	n	%	
Age of smartphone use					
6-10	4	7.7	4	7.7	
11-14	32	61.5	29	55,8	χ^2=1.954 p=0.582
15-18	13	25.0	18	34.6	
>18	3	5.8	1	1.9	
Smartphone use history					
2-4 years	14	26.9	23	42.3	
5-7 years	24	46.2	19	36.6	χ^2=5.446 p=0.245
8-10 years	14	26.9	9	17.3	
11-13 years	-	-	1	1.9	
14-16 years	-	-	1	1.9	
Smartphone use time intervals					
07.00-15.00	6	11.5	2	3.8	
15.00-18.00	3	5.8	7	13.5	χ^2=3.600 p=0.308
18.00-23.00	36	69.2	36	69.2	
23.00-07.00	7	13.5	7	13.5	
Daily phone use					
1-5 hours	21	40.4	16	30.8	
6-10 hours	22	42.3	21	40.4	χ^2=6.699 p=0.082
11-16 hours	9	17.3	9	17.3	
17-20 hours	-	-	6	11.5	
Checking the phone					
1-15 times	14	26.9	9	17.3	
16-30 times	17	32.7	10	19.2	χ^2=10.068 p=0.073
31-60 times	7	13.5	5	9.7	
61-100 times	2	3.8	10	19.2	
101-150 times	3	5.8	3	5.8	
>150 times	9	17.3	15	28.8	
Purpose of use**					
Talking Messaging	40	15.7	39	15.5	
Gaming	43	16.9	45	17.9	
Social media	22	8.7	22	8.7	
Shopping	49	19.3	50	19.8	χ^2=1.123 p=0.997
Study	28	11.0	27	10.7	
Research	31	12.2	26	10.3	
Making friends	33	13.0	32	12.7	
Other	5	2.0	6	2.4	
Time between waking up and checking	3	1.2	5	2.0	
As soon as awake	24	46.2	24	46.2	
Within 5 minutes	17	32.7	18	34.6	χ^2=0.229 p=0.973
15 minutes	8	15.4	8	15.4	
Other	3	5.7	2	3.8	
Checking the phone before sleep					
Before sleep	39	75.0	38	73.1	
Within 5 minutes	9	17.3	5	9.6	χ^2=3.974 p=0.264
15 minutes	4	7.7	7	13.5	
Other	-	-	2	3.8	
Excessive smartphone use					
Yes	34	65.4	46	88.5	χ^2=8.178 p=0.017
No	9	17.3	4	7.7	
Does not know	9	17.3	2	3.8	

Experimental Group's and the Control Group's Pre-Test, Post-Test, and 3rd-month and 6th-month Follow-Up SAS Scores

Table 3. A Comparison of SAS Scores between the Experimental Group and the Control Group

	Experimental group			Control group			Test* and p value	Effect size
SAS	n	X ± S. S.	Median [IQR]	n	X ± S. S.	Median [IQR]		
Pre-test	52	47.17±4.55	45.0 [5.8]	52	46.63±5.17	45.0 [8.5]	Z=-0.029 p>0.05	0.054
Post-test	52	34.17±2.88	34.0 [3.8]	44	48.23±4.75	47.5 [7.0]	Z=-8.414 p<0.001	3.579
3rd-month follow-up	46	33.48±3.32	32.0 [3.0]	29	48.27±4.76	47.0 [7.0]	Z=-7.182 p<0.001	3.601
6th-month follow-up	40	35.30±3.48	35.0 [3.8]	23	47.83±4.85	47.0 [8.0]	Z=-6.274 p<0.001	2.973

*"Mann-Whitney U" test

of the pretraining, post-training, and 3rd- and 6th-month follow-up SAS scores of the experimental and control groups was included. In conclusion, the posttest and follow-up SAS scores of the students in the experimental group who participated in the cognitive–behavioral-based psychoeducation program were found to be lower than those in the control group (Fig. 2). Besides, the posttest and follow-up SAS scores of the students in the experimental group who participated in the cognitive–behavioral-based psychoeducation program were found to be lower than their pretest scores. It was observed that this had continued in their 3rd- and 6th-month follow-up tests. As for the control group, a significant difference was found between posttest and pretest and 6th-month follow-up SAS scores.

In studies asserting the benefits of group psychoeducation planned on cognitive–behavioral approach to smartphone addiction, follow-up measurements were applied on a short--term basis. Consequent to a cognitive–behavioral-based group psychoeducation, Liu et al.[28] (2018) applied an experimental group of 21 and a control group of 21, pretest, posttest, and 2nd-month follow-up measurements revealed a significant difference (p<0.001, d=1.380). Although follow-up periods differ, the findings of the study are parallel to the findings of this study. In another study conducted by Lan et al.[29] (2018), 41 and 29 individuals were assigned to the experimental and control groups, respectively, and group psychoeducation had been applied with a cognitive–behavioral approach. Assessments were completed with pretest, posttest, and 14th and 20th-week follow-up measurements. The study's findings revealed a significant difference between pretest, posttest, and 14th-week follow-up results. As for the 20th-week follow-up, it was observed that, compared with the 14th-week follow-up, the effect had diminished, but a significant difference was nevertheless maintained. These results show parallelism with the study's findings. In the study, an examination of the 3rd-month follow-up measurements revealed a significant difference between pretest and posttest results. This is an important result that indicates the permanent effect of the training on follow-up measurements. It may be argued that the in-

Table 4. A Comparison of the Experimental Group's and the Control Group's Internal SAS Scores

Process	SAS		Test*	p value	Effect size
	X ± S. S.	Median [IQR]			
Pre-test(1)	46.55±4.95	45.0 [5.8]	χ^2=91.649 **[1-2,3,4], **[3-4]	p<0.001	3.302
Post-test(2)	33.92±3.13	34.0 [4.0]			
3rd-month follow-up(3)	33.60±3.43	32.0 [3.0]			
6th-month follow-up(4)	35.30±3.48	35.0 [3.8]			
Pre-test(1)	47.43±6.20	45.0 [9.0]	χ^2=20.729 **[2-1.4]	p<0.001	
Post-test(2)	49.04±5.29	49.0 [7.0]			
3rd-month follow-up(3)	48.13±5.11	48.0 [8.0]			0.607****
6th-month follow-up(4)	47.83±4.84	47.0 [8.0]			

**"Friedman" test; ***Bonferroni; ****Effect size.

Table 5. A Comparison of the Experimental Group's Pre-Test, Post-Test, and 3rd-month and 6th-month Follow-Up Average Scores

	Pre-test		Post-test		3rd-month Follow-Up		6th-month Follow-Up		Cochran's Q	p
	n	%	n	%	n	%	n	%		
SAS Above Average	40	100	29	72.5	25	62.5	34	85	22.8	<0.001
SAS Below Average	0	--	11	27.5	15	37.5	6	15		
Total	40	100	40	100	40	100	40	100		

*Cochran's test

crease in smartphone use was due to a decrease in awareness levels after the 3rd month, which was caused by the global pandemic and university students' consequent social isolation and lockdowns, which had led them to accomplish their daily tasks–including their studies–on smartphones.

In a case report by Erden and Hatun (2015), it was found that, after the applied individual cognitive–behavioral therapy, the client's addiction level had decreased and progress in healthy internet use was achieved.[30] In the cognitive–behavioral-based group therapy applied by Liu et al. (2015) to individuals with internet addiction and their families and targeting the reduction of internet addiction levels, a significant decrease in adolescents' internet addiction behavior was observed.[20] In an experimental study by Taş (2015), it was found that a psychoeducation program drawing on cognitive–behavioral and rational–emotional approaches was effective in reducing psychological symptoms occurrence and internet addiction levels.[31] Furthermore, consequent to a cognitive–behavioral-based psychoeducation program applied by Canoğulları Ayazseven (2019) to both families and adolescents, it was observed that offering training to parents along with students had caused positive effects on problematic internet use.[15] In another study by Berber (2016), it was found that the training plan developed for augmenting conscious internet use, efficient use of time, and academic motivation was effective in reducing the internet addiction levels of young people studying in secondary education.[14]

In the cognitive–behavioral theory, cognition, emotion, and behavior are conceptualized as inseparable components. It is argued that identifying and restructuring distorted or unrealistic cognition will also lead to improvement in emotion and behavior. Replacing nonfunctional thoughts with more constructive styles of thinking through restructuring will, in a sense, act as a correction in thinking.[32-34] All studies have been implemented to reduce present addiction levels using psychoeducation contents compatible with restructuring techniques identified in the literature. It is proven that psychoeducation and therapeutic applications based on a cognitive–behavioral approach have been effective in reducing addiction levels, regardless of the type of behavioral addiction. Psychoeducation sessions implemented in this study have also used similar techniques; warm-up games to prepare the participants for the session were played, and the improvement of members was supported by consolidating the information and practices presented at the sessions through home assignments. All of the foregoing conforms with the literature data and their associated studies.

Restrictions of the Study

Because the COVID-19 pandemic was not present during the design phase of the study, all training plans were designed in a face-to-face mode. Since the pandemic was announced at selecting the sample, the training location was changed and shifted from a face-to-face platform to an online environment. The challenge of implementing a training targeting smartphone addiction in an online environment is one of the restrictions.

Although the groups had an identical number of participants before the cognitive–behavioral-based online group psychoeducation program implemented at the start of the pandemic period, both groups exhibited losses in follow-up measurements, particularly in terms of the control group members (40 and 23 in the experimental and control groups, respectively) due to the failure of some participants to harmonize with the ongoing situation. The study is restricted by the fact that the number of participants in the experimental and control groups was not equal during the follow-up measurements.

Other restrictions of the study include the pandemic, the university students' obligation to stay at home, restriction of their social lives, travel obstacles, their concerns of infecting themselves or their family members, online maintenance of their courses, their deprivation of face-to-face learning and implementation, and their increased use of smartphones compared with earlier.

Conclusion

The findings of this study have shown that a psychoeducation program based on a cognitive–behavioral approach is effective in reducing smartphone addiction levels. It is found that similar international studies are also in support of these findings. Further, these findings conform with the literature on cognitive–behavioral therapies. Notwithstanding, due to

the pandemic, information access technologies are on the rise globe. Therefore, an increase in smartphone addiction levels is inevitable. In this study, taking into account the efficacy of a psychoeducation program developed for university students and based on a cognitive–behavioral approach, it is considered that these training procedures can be used to reduce addiction levels.

We have the following suggestions:

•Although a significant difference in follow-up results compared with pretraining and post-training results is found, concerning the decrease that emerged between the 3rd- and 6th-month follow-ups, supplementary psychoeducation sessions for this intermediate period are planned.

• The online training program during the pandemic period is implemented face-to-face when the circumstances of the pandemic cease.

• New studies with control groups using an experimental design are planned.

Smartphone addiction is an important problem that decreases the quality of life of university students. Given the relatively limited number of studies in Türkiye, it is considered that psychological consulting or psychoeducation programs with structured groups for reducing smartphone addiction levels will fill a significant gap.

Conflict of interest: There are no relevant conflicts of interest to disclose.

Peer-review: Externally peer-reviewed.

Authorship contributions: Concept – A.T.; Design – A.T.; Supervision – G.Ü.; Analysis and/or interpretation – A.T.; Literature search – A.T.; Writing – A.T.; Critical review – G.Ü.

References

1. Kuyucu M. Gençlerde akıllı telefon kullanımı ve akıllı telefon bağımlılığı sorunsalı:"Akıllı telefon (kolik)" üniversite gençliği. Global Media J TR Ed [Article in Turkish] 2017;7:328–59.
2. Poushter J. Smartphone ownership and internet usage continues to climb in emerging economies. Pew Res Center 2016;22:1–44.
3. We Are Social. "Digital in 2018". Available at: https://wearesocial.com. Accessed Oct 10, 2020.
4. Deloitte. Türkiye teknoloji. Deloitte global mobil kullanıcı araştırması. 2017. Available at: https://www.deloitte.com/tr. Accessed Oct 10, 2020.
5. Türkiye İstatistik Kurumu. Hane halkı bilişim teknolojileri kullanım araştırması. 2020. Available at: http://www.tuik.gov.tr. Accessed May 18, 2021.
6. The Brand Age. Türkiye'de akıllı telefon değiştirme sıklığı 2,5 yıl. Available at: https://www.thebrandage.com. Accessed Oct 10, 2020.
7. Rupert MS, Hawi N. Relationships among smartphone addiction, stress, academic performance and satisfaction with life. Comput Hum Behav 2016;57:321–5.
8. Matar Boumosleh J, Jaalouk D. Depression, anxiety, and smartphone addiction in university students- A cross sectional study. PLoS One 2017;12:e0182239.
9. Tohumcu MA, Karslı TA, Bahadır E, Kalender B. Analysis of the relationship between smartphone addiction and internet addiction and self-esteem and loneliness. Trakya Univ J Soc Sci [Article in Turkish] 2019;21:773–87.
10. Soni R, Upadhyay R, Jain M. Prevalence of smartphone addiction, sleep quality and associated behaviour problems in adolescents. Int J Res Med Sci 2017;5:515–9.
11. Levent A. Üniversite öğrencilerinde akıllı telefon bağımlılığı ve iletişim becerileri arasındaki ilişkinin incelenmesi. Yüksek Lisans Tezi. İstanbul: İstanbul Gelişim Üniversitesi Lisansüstü Eğitim Enstitüsü; [Article in Turkish] 2020.
12. Cayhan T. Akıllı telefon kullanımı ile duygusal zekâ ve yaşam doyumu arasındaki ilişkinin incelenmesi. Yüksek Lisans Tezi. İstanbul: İstanbul Gelişim Üniversitesi Sosyal Bilimler Enstitüsü; [Article in Turkish] 2017.
13. Meral D. Ortaöğretim öğrencilerinde akıllı telefon bağımlılığının yalnızlık, yaşam doyumu ve bazı kişisel özellikler bakımından incelenmesi. Yüksek Lisans Tezi. Erzincan: Erzincan Üniversitesi Sosyal Bilimler Enstitüsü, Eğitim Bilimleri Anabilim Dalı; [Article in Turkish] 2017.
14. Çelik ÇB. İnternet bağımlılığı eğilimini azaltmada eğitsel bir müdahale. Addicta: Turk J Addictions [Article in Turkish] 2016;3:175–86.
15. Canoğulları Ayazseven Ö. Ergenlerde problemli internet kullanımını önlemeye yönelik bilişsel-davranışçı temelli psikoeğitim çalışmasının etkisi. Yüksek Lisans Tezi. Adana: Çukurova Üniversitesi Sosyal Bilimler Enstitüsü; [Article in Turkish] 2019.
16. Sabırlı B. Üniversite öğrencilerindeki akıllı telefon kullanım sıklığının benlik saygısı ve çeşitli değişkenlerle ilişkisi. Yüksek Lisans Tezi. İstanbul: Üsküdar Üniversitesi Sosyal Bilimler Enstitüsü; [Article in Turkish] 2018.
17. Young KS. Cognitive behavior therapy with Internet addicts: Treatment outcomes and implications. Cyberpsychol Behav 2007;10:671–9.
18. Li, R, Shi G, Ji J, Wang H, Wang W, Wang M, et al. A 2-year longitudinal psychological intervention study on the prevention of internet addiction in junior high school students of Jinan city. Biomed Res 2017;28:10033–8.
19. Kim H. Exercise rehabilitation for smartphone addiction. J Exerc Rehabil 2013;9:500–5.
20. Liu S, Xiao T, Yang L, Loprinzi PD. Exercise as an alternative approach for treating smartphone addiction: A systematic review and meta-analysis of random controlled trials. Int J Environ Res Public Health 2019;16:3912.
21. Ahern E, Kinsella S, Semkovska M. Clinical efficacy and economic evaluation of online cognitive behavioral therapy for major depressive disorder: A systematic review and meta-analysis. Expert Rev Pharmacoecon Outcomes Res 2018;18:25–41.
22. Kaczkurkin AN, Foa EB. Cognitive-behavioral therapy for anxiety disorders: An update on the empirical evidence. Dialogues Clin Neurosci 2015;17:337–46.

23. Noyan CO, Darçın AE, Nurmedov S, Yılmaz O, Dilbaz N. Validity and reliability of the Turkish version of the Smartphone Addiction Scale-Short Version among university students. Anadolu Psikiyatri Derg [Article in Turkish] 2015;16:73–81.
24. Büyüköztürk Ş. Sosyal bilimler için veri analizi el kitabı. Ankara: Pegem Akademi; [Article in Turkish] 2012.
25. Kwon M, Kim DJ, Cho H, Yang S. The smartphone addiction scale: Development and validation of a short version for adolescents. PLoS One 2013;8:e83558.
26. Brosius F. SPSS 21. MITP-Verlags GmbH & Co. KG, Frechen. 2013.
27. Ron K, Faltin F, Ruggeri F. Statistical methods in healthcare. USA: Wiley; 2012.
28. Liu J, Nie J, Wang Y. Effects of group counseling programs, cognitive behavioral therapy, and sports ıntervention on internet addiction in East Asia: A systematic review and meta-analysis. Int J Environ Res Public Health 2017;14:1470.
29. Lan Y, Ding JE, Li W, Li J, Zhang Y, Liu M, et al. A pilot study of a group mindfulness-based cognitive-behavioral intervention for smartphone addiction among university students. J Behav Addict 2018;7:1171–6.
30. Erden S, Hatun O. İnternet bağımlılığı ile başa çıkmada bilişsel davranışçı yaklaşımın kullanılması: Bir olgu sunumu. Addicta: Turk J Addiction [Article in Turkish] 2015;2:53– 83.
31. Taş İ. Psikolojik belirtileri azaltmaya yönelik psiko-eğitim programının ergenlerde internet bağımlılığına etkisi. Doktora Tezi. Sakarya: Sakarya Üniversitesi Eğitim Bilimleri Enstitüsü; [Article in Turkish] 2015.
32. Bağatarhan T. Lise öğrencilerinde internet bağımlılığını önlemeye yönelik bilişsel davranışçı yaklaşıma dayalı psiko-eğitim programının geliştirilmesi ve etkililiğinin değerlendirilmesi. Doktora Tezi. İzmir: Dokuz Eylül Üniversitesi; [Article in Turkish] 2020.
33. Radziwon CD, Lackner JM. Cognitive behavioral therapy for IBS: How useful, how often, and how does it work? Curr Gastroenterol Rep 2017;19:49.
34. Yau YH, Potenza MN. Gambling disorder and other behavioral addictions: Recognition and treatment. Harv Rev Psychiatry 2015;23:134–46.