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Effects of basic body awareness therapy on pain, sleep, quality of life during COVID-19 pandemic –a randomized controlled study

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Abstract

Aim: In this study, we aimed to investigate the effects of the telerehabilitation-based BBAT (Basic Body Awareness Therapy) approach on body awareness, musculoskeletal pain, sleep, and quality of life (QoL) in university students during the COVID-19 social isolation and home quarantine period.

Material and Methods: The study was designed as a randomized controlled trial. A total of 40 university students participated in the study. Patients were divided into two groups: the treatment group who received the BBAT (n=20) and the control group who refused to receive treatment (n=20). BBAT was applied to the treatment group on an online platform for three days a week (60 minutes per session) for six weeks. Pre- and post-treatment self-reported questionnaire data were used. Pain severity was assessed using the McGill Pain Questionnaire (MPQ), sleep quality using the Pittsburg Sleep Quality Index (PSQI), body awareness using the Body Awareness Questionnaire (BAQ), and QoL using the World Health Organization Quality of Life (WHOQoL) questionnaire.

Results: In the treatment group, there was a statistically significant difference between the participants' pre-treatment and post-treatment scores in MPQ, PSQI and BAQ, as well as in the psychological health, social relationships and environment domains and general health facet of the WHOQoL questionnaire ($p<0.05$). In the control group, no statistically significant difference was observed between the participants' pre-treatment and post-treatment scores in MPQ, PSQI, BAQ and the psychological health, social relationships and environment domains of the WHOQoL questionnaire ($p>0.05$).

Discussion: The telerehabilitation-based BBAT approach is effective for university students' body awareness, musculoskeletal pain, sleep, and quality of life during the ongoing COVID-19 pandemic period.

Keywords

Body Awareness, COVID-19, Pain, Pandemic, Sleep Quality

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Introduction

During the COVID-19 pandemic, comprehensive social distancing and isolation policies have been adopted across the world to slow down infection rates in individuals with a high risk of morbidity and mortality [1]. It is seen that the new lifestyle that emerged during the pandemic and measures taken to control the spread of the virus have not only altered the routines of people, but also led to an increase in musculoskeletal pain and the development of serious disorders associated with poor sleep quality [2].

As a negative result of restriction measures taken to reduce the spread of COVID-19, the daily sitting hours of individuals increased by 23.8%-28.6% and physical activity levels decreased by 28.8-38% [3]. In a study conducted in Spain in 2020, evaluating the physical activity and sedentary lifestyle of 213 university students during the COVID-19 pandemic, there was an increase in both the physical inactivity level and sitting duration of individuals on both a global and group basis. In addition, sleep disorders and musculoskeletal pain began to increase in this period. Beck et al. determined that the highest rate of sleep disorders was detected in the young population during the COVID-19 pandemic. With the start of home quarantine, 60% of young people began to experience a higher rate of sleep disorders [4]. Toprak Celenay et al., who evaluated musculoskeletal pain during the quarantine period, concluded that the low back pain of individuals in home quarantine increased compared to the pre-quarantine period [5]. In another study, a physical exercise program was conducted with university employees during the COVID-19 pandemic, and this program resulted in a healthier lifestyle and increase the quality of life (QoL) of the participants. This study revealed the importance of physical exercise programs in the COVID-19 pandemic [6].

Sleep quality and musculoskeletal pain have been evaluated in several different COVID-19 studies [4,5], but no study has been found to examine the effect of basic body awareness therapy (BBAT) applied to university students on musculoskeletal pain and sleep quality together during the COVID-19 pandemic. The aim of BBAT was to develop body awareness and unite the mind and body as an inseparable whole by performing movements and activities frequently used in daily life, such as standing, walking, running, jumping, sitting, and lying [7]. The BBAT, which is an effective intervention method for chronic pain and non-specific musculoskeletal disorders, increased pain control in individuals suffering from fibromyalgia, which is one of the diseases characterized by musculoskeletal pain [8].

The aim of our study is to investigate the effects of the telerehabilitation-based BBAT approach on body awareness, musculoskeletal pain, sleep, and QoL in university students during the COVID-19 social isolation and home quarantine period. The hypothesis of our study is that the telerehabilitation-based BBAT approach will be more effective in body awareness, musculoskeletal pain, sleep, and QoL than the non-exercise group in university students during the COVID-19 pandemic period.

Material and Methods

- *Data source and design*

The study was evaluated by the Non-Interventional Clinical Research Ethics Committee of Istanbul Medipol University and ethically approved with decision number 138 dated 04/02/2021. Each patient was informed about the method and purpose of the study, and provided written consent stating that they participated in the study voluntarily. The inclusion criteria were as follows: attending Istanbul Medipol University School of Health Sciences as a student, age 18-24 years, and consent to participate in the study. Individuals with progressive and chronic diseases, and those that had contracted COVID-19 within the last six months were excluded from the study. Participants were divided into two separate groups as treatment and control with the basic randomization method using the www.random.org website. Statistical power values for each statistical significance test were obtained with the help of the G*POWER program. It was calculated based on 80% power and 5% significance values and the sample size was found to be 40.

- *Evaluation measures*

Information on gender, age, body mass index (BMI), alcohol use, smoking status, and medication use was questioned for all the participants. All the evaluation measures were collected using Google Polls.

McGill Pain Questionnaire (MPQ)

The MPQ is a valid and reliable method used to evaluate pain, and consists of three parts. In the first part, there are 15 descriptive word groups. Of these, 11 evaluate the sensory dimension of the pain, and 4 evaluate the perceptual dimension. These descriptors are rated on an intensity scale from 0 to 3 (0= none, 1= mild, 2= moderate, 3= excess). In the first part of the scale, a total of 3 pain scores were obtained: sensory pain score, perceptual pain score and total pain score. In the second part of the form, there were five-word groups ranging from "mild pain" to "unbearable pain" to determine the severity of the patient's pain. In the third part, the current pain intensity of the patient was evaluated using a visual comparison scale [9].

Pittsburgh Sleep Quality Index (PSQI)

The PSQI is a valid and reliable assessment tool. It consists of 7 components that assess subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and loss of daytime functionality. Each item is scored between 0 and 3 points. It is accepted that a total scale score of 5 and above indicated poor sleep quality. The sum of these 7 component scores gives the overall index score. The total score is between 0-21. A high total score indicates poor sleep quality [10,11].

Body Awareness Questionnaire (BAQ)

The Turkish version of BAQ was used in this study [12]. It is a valid and reliable questionnaire that measures body awareness of individuals for different situations (illness, cold, etc.). This likert-type questionnaire consists of 18 items and four domains. High scores obtained from the questionnaire indicate a high level of body awareness [13].

World Health Organization Quality of Life (WHOQoL)-BREF

The Turkish version of WHOQoL-BREF was used in this study. The scale has four domains: physical health, psychological health, social relationships, and environmental factors. The total score is evaluated in the range of 0 to 100. High scores obtained high level QoL [14].

● *Therapy program*

BBAT was applied to the individuals in the treatment group. In this group, BBAT was carried out through Zoom software program, with the camera of the participants turned on, under the supervision of a physiotherapist, who provided instructions and recommendations. The exercises were performed for six weeks, three sessions per week and 60 minutes per session. No intervention was made in the control group during the study.

BBAT consists of simple basic movements of daily life, such as lying, sitting, and standing, which are used to normalize postural control and coordination, breathing, and muscle tension [8]. The therapy program began with a body scan on the mat, with the individual in the supine position. Then, body muscle contraction, relaxation and stretching exercises were applied. Correct body alignment training was given to the participants in the sitting position for the development of postural stability. In the standing position, weight transfer and standing on one leg exercises were used to improve balance and coordination. The center line of the body was stimulated by applying weight transfer from the left to right and rotating around the center of the body. In the last stage of the program, meditation was included as a key element of body awareness therapies. For therapy sessions, the participants were asked to have a meditation mat and a headset ready. Meditation was applied with a prepared sound recording and lasted for five to 10 minutes. The therapy session ended with the participants verbally expressing their feelings and experiences. During the sessions, no known side effects were observed in the participants.

● *Statistical Analysis*

The analysis of the data obtained from the study was performed using SPSS for Windows, v. 15.0 (IBM, United States) statistical software package. Descriptive statistics were obtained for demographic data, and rates were expressed as percentages. In the statistical analysis, the results were recorded as mean ± standard deviation (X ± SD), and the significance limit was accepted as $p < 0.05$ at the 95% confidence interval. The normality of data distribution was tested using the one-sample Kolmogorov-Smirnov test. The Wilcoxon test, one of the non-parametric methods, and the marginal homogeneity test for categorical variables were used for the analyses within the treatment and control groups. While examining the differences between the groups, the Mann-Whitney U test was used as a non-parametric method. The chi-square test was conducted to compare the categorical variables of the groups.

Results

This study, designed as a randomized controlled trial, was conducted with 40 participants (35 females, 5 males) aged 18-25 years as shown in the flowchart (Figure 1). The demographic and clinical characteristics of the participants are shown in Table 1. There was no statistically significant difference between the treatment and control groups in terms of age, gender and body mass index (BMI) results ($p > 0.05$) (Table 1).

In the treatment group, there was a significant difference between the participants' pre-treatment and post-treatment scores in MPQ, PSQI, BAQ and WHOQoL ($p < 0.05$). However, the pre-treatment and post-treatment scores in the physical health domain of WHOQoL did not significantly differ; therefore, treatment did not yield any result in this domain ($p > 0.05$) (Table 2). In the control group, there was no statistically significant difference between the participants' pre-treatment and post-treatment scores in MPQ, PSQI, BAQ and the psychological health, social relationships and environment domains of the WHOQoL questionnaire ($p > 0.05$) (Table 2).

When post-treatment changes in evaluated parameters were compared between the treatment and control groups, there was no significant difference in relation to the scores in MPQ, BAQ, and the general health facet and psychological health domain of the WHOQoL questionnaire ($p > 0.05$) (Table 3).

Figure 1. Flowchart for data collection

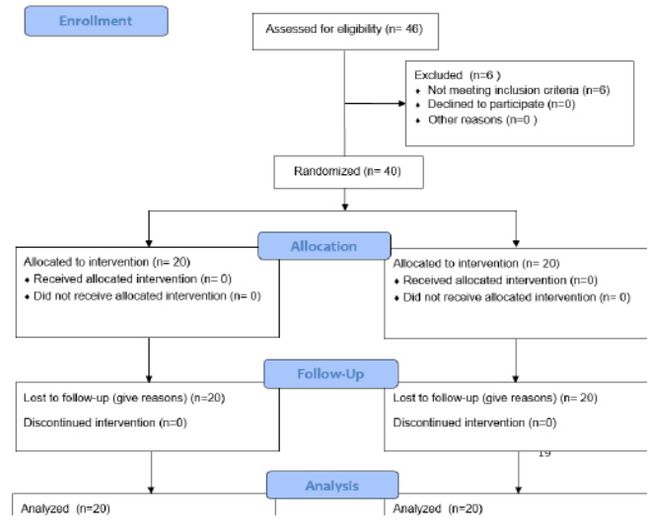

Table 1. Baseline demographic and clinical characteristics of the participants

Characteristics		Treatment Group (n=20) n (%) (unless otherwise stated)	Control Group (n=20) n (%) (unless otherwise stated)	P Value
Age (years), mean ± SD		20.70 ± 1.21	21.05 ± 0.94	0.144*
BMI (kg/m2), mean ± SD		21.38 ± 2.67	20.03 ± 2.58	0.070*
Gender	Male	17 (85)	18 (90)	0.633**
	Female	3 (15)	2 (10)	
Smoking status	Smoker	4 (20)	3 (15)	0.677**
	Non-smoker	16 (80)	17 (85)	
Alcohol use	Yes	4 (20)	2 (10)	0.376**
	No	16 (80)	18 (90)	
Medication use	Yes	2 (10)	2 (10)	1.00**
	No	18 (90)	18 (90)	
		mean ± SD	mean ± SD	
Body Awareness Questionnaire		89.85 ± 16.60	89.80 ± 15.01	0.871
McGill Pain Questionnaire		50.150 ± 15.38	42.55 ± 17.35	0.140
Pittsburg Sleep Quality Index		7.20 ± 1.96	6.00 ± 2.20	0.043*
WHOQoL General Health		54.37 ± 18.70	63.12 ± 11.80	0.044*
WHOQoL Physical Health		52.67 ± 15.05	70.66 ± 14.17	0.001*
WHOQoL Psychological Health		56.04 ± 17.38	64.79 ± 12.49	0.054
WHOQoL Social Relationships		147.67 ± 38.52	65.00 ± 15.90	0.000*
WHOQoL Environmental Health		61.56 ± 16.69	69.53 ± 11.28	0.054

BMI, Body mass index; SD, Standard deviation. *Mann-Whitney U test; **Chi-square test (statistically significant at $p < 0.05$)

Table 2. Changes in pain, sleep quality, and quality of life from pre-treatment to post-treatment

Characteristics		Pre-Treatment Mean ± SD	Post-Treatment Mean ± SD	z	P Value
McGill Pain Questionnaire	Treatment Group	50.150 ± 15.38	33.90 ± 18.01	-2.446	0.014*
	Control Group	42.55 ± 17.35	43.15 ± 15.56	-0.071	0.943
Pittsburg Sleep Quality Index	Treatment Group	7.20 ± 1.96	4.35 ± 2.08	-3.568	0.000*
	Control Group	6.00 ± 2.20	6.20 ± 3.12	-0.391	0.695
Body Awareness Questionnaire	Treatment Group	89.85 ± 16.60	99.10 ± 14.88	-2.134	0.033*
	Control Group	89.80 ± 15.01	90.90 ± 17.63	-0.423	0.673
WHOQoL General Health	Treatment Group	54.37 ± 18.70	70 ± 13.69	-2.891	0.004*
	Control Group	63.12 ± 11.80	72.50 ± 17.01	-2.299	0.021*
WHOQoL Physical Health	Treatment Group	52.67 ± 15.05	58.21 ± 12.85	-1.502	0.133
	Control Group	70.66 ± 14.17	61.42 ± 11.79	-2.504	0.012*
WHOQoL Psychological Health	Treatment Group	56.04 ± 17.38	61.66 ± 14.21	-2,377	0.017*
	Control Group	64.79 ± 12.49	70.20 ± 11.95	-1.552	0.121
WHOQoL Social Relationships	Treatment Group	147.67 ± 38.52	64.16 ± 14.07	-3.784	0.000*
	Control Group	65.00 ± 15.90	71.66 ± 11.90	-1.352	0.176
WHOQoL Environmental Health	Treatment Group	61.56 ± 16.69	71.87 ± 16.25	-3.273	0.001*
	Control Group	69.53 ± 11.28	72.65 ± 13.63	-0.810	0.418

Wilcoxon test; SD, Standard deviation; WHOQoL: World Health Organization Quality of Life. *Statistically significant at $p < 0.05$

Table 3. Comparison of pre-treatment to post-treatment changes in pain, sleep quality, and quality of life between the study groups

Characteristics	Treatment Group Mean ± SD	Control Group Mean ± SD	z	P Value
McGill Melzack Questionnaire	-7.82 ± 26.05	0.60 ± 21.94	-1.920	0.055
Pittsburg Sleep Quality Index	-1.32 ± 2.13	0.20 ± 2.54	-3.551	*0.000
Body Awareness Questionnaire	5.17 ± 19.01	1.10 ± 18.69	-1.462	0.144
WHOQoL General Health	12.50 ± 19.81	9.37 ± 15.64	-0.790	0.430
WHOQoL Physical Health	-1.84 ± 14.72	-9.23 ± 18.24	-3.115	*0.002
WHOQoL Psychological Health	5.52 ± 10.31	5.41 ± 15.76	-0.081	0.935
WHOQoL Social Relationships	38.42 ± 39.38	6.66 ± 18.25	-4.822	*0.000
WHOQoL Environment	6.71 ± 10.78	3.12 ± 12.66	-2.254	*0.024

Mann-Whitney U test; SD, Standard deviation; WHOQoL: World Health Organization Quality of Life. *Statistically significant at $p < 0.05$

Discussion

In this study, it was determined that body awareness therapy had positive effects on all these parameters. In addition, to the best of our knowledge, this study was the first to examine the efficacy of BBAT in healthy young people during the COVID-19 pandemic.

It has been reported that the exercise activities of university students, especially during the COVID-19 period had many positive effects, such as reducing musculoskeletal pain [15]. In a previous study, BBAT was applied to healthy young individuals, and their body awareness levels were evaluated using BAQ. As a result of the study, a significant increase was observed in the individuals' body awareness perceptions, and it was also stated that enhanced body awareness perception occurred with the development of physical and emotional body perception [16]. In the current study, we also determined that the university students who received BBAT through telerehabilitation had increased body awareness and perception. The BBAT can be helpful for university students for body awareness during COVID-19 period.

The body awareness therapy shows positive effects on long-term musculoskeletal pain [17]. There is evidence that BBAT provides greater improvement in both physical and mental health than conventional physiotherapy on long-term pain [18]. Physical inactivity can cause musculoskeletal pain, as well as the development of avoidance behavior due to the fear of pain worsening. In order to break the vicious circle of pain and inactivity, treatments supported by physically active participation are recommended. The biopsychosocial model suggests that the physiological, cognitive, emotional and behavioral traits of individuals are effective factors determining their pain experience [7]. According to the results of our study, the BBAT approach based on the biopsychosocial model was effective in reducing musculoskeletal system pain and improving psychosocial status. We consider that this improvement is beneficial not only for reducing musculoskeletal pain through pain-reducing exercise modalities, such as stretching and relaxation, which form the basis of BBAT but also for improving mental health and changing pain perception and management.

In a systematic review study examining sleep problems during the COVID-19 pandemic, the global prevalence of sleep problems in this period was reported to be 35.7% [19]. This is an indication that sleep problems, which can greatly affect health, have greatly increased with the current pandemic. It has been reported that students and working individuals experienced sleep disorders during the COVID-19 pandemic, and this was more common among students than in working individuals. It is stated that social isolation causes feeling of loneliness, vulnerability, emergency anxiety, feeling less efficient in overcoming problems, and increased anxiety and depression symptoms among young people, and these all contribute to a decrease in sleep quality [20]. As an alternative to general physiotherapy methods, there has been a significant increase in the use of BBAT in recent years as a method that has been

shown to be effective in various conditions, such as stress-related physical symptoms, sleep and self-efficacy problems, musculoskeletal pain, fibromyalgia, anxiety, and depression [7, 21]. In the current study, it was found that the BBAT program implemented with university students increased their quality of sleep, and thus achieved the desired outcome. Therefore, it can be suggested that this therapy method, which aims to improve the interaction and balance between the physical and emotional state, is effective and important, especially during the ongoing pandemic that requires social isolation and physical inactivity.

In a study applying BBAT for 10 weeks in the treatment of individuals with musculoskeletal injuries, it was concluded that the social functionality levels of these individuals increased at the end of the treatment protocol [22]. Similarly, the results of the current study demonstrated that the BBAT group had significant improvement compared to the control group in both the comparison of post-treatment values and the amount of change in the social relationships and environment domains of the WHOQoL questionnaire. It can be considered that the participation of socially isolated individuals in an online therapy program in groups, where they had the opportunity to meet and communicate with new people, had positive effects. The BBAT is effective in reducing anxiety, depression, and stress disorders, and in developing strategies for coping with events [23]. The results of our study were consistent with the literature, showing the efficacy of BBAT in improving QoL under pandemic conditions.

The strength of our study is that it is the first study investigating the effects of the telerehabilitation-based BBAT approach on body awareness, musculoskeletal pain, sleep, and QoL in university students. But our study also has some limitations. To mention these, the subjects included in the groups were not differentiated according to sleep quality, some QoL subparameters. Since the exercise program covered a period of 6 weeks, it lacks long-term results.

Conclusion

In conclusion, telerehabilitation-based BBAT approach was found to be effective in relieving musculoskeletal pain and increasing body awareness, sleep quality and QoL among university students during the COVID-19 pandemic when protective approaches are widely applied against the spread of the virus.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of interest

The authors declare no conflicts of interest.

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