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Original Article

Effectiveness of Video-Based Exercises on Quality of Life during COVID-19 Pandemic

Video Temelli Egzersizlerin COVID-19 Pandemisi Döneminde Yaşam Kalitesine Etkisi

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ABSTRACT

Objective: In this study, we aimed to investigate the effectiveness of video-based exercise program on quality-of-life (QoL) domains.

Material and Methods: A total of 68 participants, aged 18–35 years, were included in the study. The participants were divided into two groups on the basis of their willingness to exercise-the exercise group (n=39, 26.74±3.91 years, 28.2% men) and the control group (n=29, 27.59±2.82 years, and 41.4% men). Both groups were evaluated with Rapid Assessment of Physical Activity and World Health Organization Quality of Life BREF through web-based forms, and the exercisers' aerobic capacities were evaluated with a two-minute walk test (2MWT). The exercise group attended 35 minutes of video-based exercise intervention three times a week for six weeks, whereas the control group continued their regular life. At the end of the study, the change in the general health status of the participants was rated with the Global Rating of Chance Scale (GRCS) and exercise satisfaction with the 10-point Likert scale.

Results: There were no differences in the QoL domains within or between the groups ($P > .05$) except within the group change in 2MWT total walking distance parameter in the exercise group ($P < .001$). However, GRCS scores were statistically higher in the exercise group ($P < .001$). The overall satisfaction with the video-based exercise program was 8.28±1.76 points.

Conclusion: There was no significant increase in QoL domains with video-based exercises compared to the control group. However, these exercises may contribute to the preservation of aerobic capacity during periods when face-to-face exercises cannot be performed.

Keywords: Exercise, quality of life, social isolation, telerehabilitation, young adult

ÖZ

Amaç: Çalışmanın amacı video temelli egzersiz programının yaşam kalitesi alt parametreleri üzerindeki etkinliğini incelemektir.

Gereç ve Yöntem: Çalışmaya 18-35 yaş arası, 68 katılımcı dahil edildi. Katılımcılar egzersiz yapma istekliliklerine göre iki gruba ayrıldı: Egzersiz grubu (n=39, 26,74±3,91 yıl, %28,2 erkek), kontrol grubu (n=29, 27,59±2,82 yıl, %41,4 erkek). Her iki grup da çalışma öncesi ve sonrası Dünya Sağlık Örgütü Yaşam Kalitesinin kısa versiyonu, Hızlı Fiziksel Aktivite Değerlendirmesi online formları ile değerlendirilirken, egzersiz grubunun aerobik kapasiteleri 2 Dakika Yürüme Testi (2DYT) ile değerlendirildi. Egzersiz grubu, altı hafta boyunca haftada üç kez 35 dakikalık video temelli egzersiz programına katılırken, kontrol grubu normal yaşamına devam etti. Çalışma sonunda katılımcıların genel sağlık durumlarındaki değişim Global Değişim Değerlendirme Ölçeği (GDDÖ) ile egzersiz memnuniyeti ise 10 puanlık Likert ölçeği ile sorgulandı.

Bulgular: Egzersiz grubundaki 2DYT toplam yürüme mesafesi parametresindeki grup içi değişiklik ($P < ,0001$) dışında grup içinde veya gruplar arasında yaşam kalitesi alt parametreleri açısından farklılık yoktu ($P > ,05$). GDDÖ skorları egzersiz grubunda istatistiksel olarak daha yüksekti ($P < ,001$). Video temelli egzersiz programından genel memnuniyet 8,28±1,76 puandı.

Sonuç: Kontrol grubuna kıyasla video tabanlı egzersizlerle yaşam kalitesi alanlarında anlamlı bir artış olmadı. Bununla birlikte, bu egzersizler yüz yüze egzersizlerin yapılamadığı dönemlerde aerobik kapasitenin korunmasına katkı sağlayabilir.

Anahtar Kelimeler: Egzersiz, yaşam kalitesi, sosyal izolasyon, telerehabilitasyon, genç yetişkin

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Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a new form of coronaviruses. It is spreading across the globe and is transmitted from person to person through respiratory secretions.[1] To prevent the spread of SARS-CoV-2, it is recommended for people to stay at home in social isolation. Therefore, public places such as gyms, parks, and shopping malls were closed; travel was restricted, and house quarantines took place in several countries. Consequently, people's activities have been significantly restricted.[2]

Human beings are social entities by nature, and social isolation/distancing may physically and psychologically affect the individuals in a negative manner as seen in previous pandemics.[3] Physical activity has multiple benefits on both physical and psychological health, such as controlling weight gain, strengthening muscles and bones, reducing risk of chronic diseases, improving mental health, emotional status, and quality of life (QoL).[4]

QoL is defined by the World Health Organization (WHO) as "perceptions of individuals in life regarding their expectations, standards, and concerns in the context of their culture, value systems, and goals." It is a comprehensive concept that combines the domains of physical and psychological health, level of independence, social relationships, personal beliefs, and relationships with the environment.[5] It has been reported that emotions such as anxiety and stress might negatively affect a person's overall well-being and thus their QoL.[6] Regular aerobic exercise and walking may improve health status and the emotional state of the individuals. It may also affect mental health by enable individuals to adapt to stress and avoid negative thoughts.[7, 8]

In this study, we aimed to investigate the QoL, specifically the physical and psychological domains, in young adults who attended regular video-based exercise programs compared with those who did not follow an exercise regimen.

Material and Methods

The non-randomized, controlled study protocol was recorded in the database "clinicaltrials.gov" with the number NCT04335851. Ethical approval was obtained from the human research ethics committee of Biruni University (IRB: 2020/40-14). All the included individuals provided informed consent. The study was planned to include individuals in each group: a) between the ages of 18 and 35 years who spend their time at home (that is, not going to work or school) as a part of the COVID-19 social isolation (during past four weeks); b) if they had not been exercising in the past four weeks; c) if they were at the level of sub-optimal physical activity (Rapid Assessment of Physical Activity [RAPA] score < 5). The participants in the exercise group were excluded if they: a) had any disease that may interfere or be aggravated with exercise, such as orthopedic problems, chronic diseases, etc.; b) had difficulty of understanding and following video-based exercises; and c) had been diagnosed with any kind of psychiatric condition such as major depression, panic attack, etc. The exclusion criteria for the control group were chronic disease, chronic pain, and psychiatric diseases, which could affect physical and mental well-being. The two groups were formed on the basis of stages of exercise behavior change (SEBC) scale as follows: a) those who were willing to exercise were assigned to the exercise group; and b) those who did not want to exercise were assigned to the control group.

During this critical period, psychological factors such as fear of infection, loneliness, depression owing to weight gain, and sociodemographic factors such as age, sex, level of education, smoking, use of alcohol, loss of social networks, financial loss, unemployment, and low income may negatively affect the QoL.[9] Therefore, sociodemographic information of individuals such as age, sex, body mass index (BMI), smoking and alcohol consumption, education level, and questions about their reasons to exercise during this isolation process were collected through a web-based survey prepared by physical therapists.

SEBC is a scale that questions the stages of exercise behavior of individuals, such as pre-contemplation, contemplation, preparation, action, and maintenance.[10] In this study, SEBC was used to assess the participants' willingness to exercise.

The physical activity levels of the individuals participating in the study were evaluated with a self-reported RAPA questionnaire.[11] RAPA is an easy-to-use form that assesses both aerobic and strength-flexibility exercise levels. The activities are divided into low, moderate, and vigorous activities. The total score of the first seven items ranges from one to seven points, with the respondent's score categorized into one of five levels of physical activity: 1=sedentary, 2=underactive, 3=regular underactive (light activities), 4=regular underactive, and 5=regular active. Responses to the strength training and flexibility items are scored separately, with strength training=1, flexibility=2, or both=3. The second part of RAPA (that is, strength and flexibility) is scored separately and is not included in the final score. A score of five or below signifies sub-optimal physical activity and that of six and above signifies optimal physical activity. Clinicians are encouraged to use this information to have a brief conversation with their participants about their current level of physical activity. The Turkish version of RAPA was used in the study.[12] Initially, all participants were at the level of sub-optimal physical activity based on RAPA.

The short version of the WHOQOL-BREF instrument comprises 26 items, which measure the following broad domains: physical health, psychological health, social relationships, and environment. The WHOQOL-BREF produces a QoL profile. In addition to the four above-mentioned domains, there are also general health items that are scored separately: first item questions overall perception of QoL and the second the overall perception of health of an individual. The four domain scores state an individual's perception of QoL in each particular domain. Domain scores are scaled in a positive direction (that is, higher scores denote higher QoL). The mean score of items within each domain is used to calculate the domain score. The Turkish version of WHOQOL-BREF was used in the study.[13]

The two-minute walking test (2MWT) is a simple measuring test of the distance that a person can walk in two minutes. The test is a short form of six-minute walking test and measures self-

paced walking ability, functional mobility, and aerobic capacity.[14] The test procedure was explained by a therapist in a video. A trial was performed by the same therapist. Detailed written instructions were also provided. The participants were asked to perform the test a day before the first exercise session and a day after the last exercise session. Rest breaks were allowed if needed. Individuals were encouraged to walk as fast as they can safely for two minutes. The heart rates before and after the test and the total walking distance (in meters) were recorded in the exercise diary. As there was no exercise-oriented intervention in the control group, the 2MWT was also not performed.

The change in the self-perceived general health status was evaluated with the global rating of change scale (GRCS). GRCS has a short administration time and applicability to nearly all patients and healthy groups. In this study, a 5-point scale was used, which ranged from −2 (much worse), through 0 (same) to +2 (much better).

All assessments were performed at the beginning and at the end of the sixth week. For the exercise group, assessments were performed a day before and after the exercise intervention program. At the end of the study, the participants were also asked to rate their overall satisfaction with the video-based exercise program on a 10-point Likert scale.

Individuals were provided with exercise videos created by "Walk at Home®" with the partnership of American Heart Association (https://walkathome.com/). The videos were decided by a physical therapist each week. Participants initially started to walk two miles at home through the exercise video. They were asked to walk three days a week for six weeks by following the videos. The intensity and duration of the exercises were gradually increased each week. Because of safety considerations, the length of the videos was 30 minutes until the end of the fourth week. However, the exercise intensity in the videos were increased each week. By the fifth week, exercise videos were set to 40 minutes (three miles) and by the sixth week, it was 45 minutes. The mean duration of exercises in the intervention program was 35 minutes. Exercise follow-up was carried out over the phone, and the participants were asked to keep an exercise diary. The control group was asked to continue their daily routines and inform the researchers in case of participation in an exercise program.

Statistical analysis

Statistical Package for Social Sciences (IBM SPSS Corp., Armonk, NY, USA) version 20.0 was used to perform data analysis. Descriptive statistics were reported as mean and standard deviations (SDs) for continuous variables and as numbers, percentages, and frequencies for binary and categorical variables. For categorical variables, a chi-squared test was performed for group comparisons. Owing to non-normal distributions of the data, non-parametric tests were performed for continuous variables. Wilcoxon Signed-Rank Test and Mann-Whitney U Test were used for within and between group comparisons, respectively. Both within and between group comparisons were performed according to the mean changes in the outcome scores. The statistical significance was set at $P < .05$.

Results

Initially, 75 participants were included in the study; however, it was completed with 68 participants (39 in the exercise group and 29 in the control group) (Figure 1).

The characteristics of the participants, distribution of sex, smoking and alcohol consumption, and baseline scores of outcome measures of the groups are presented in Table 1. There were no statistical differences between the groups in terms of baseline assessments.

All the participants in the control group were at pre-contemplation level, 79.5% of exercising individuals were at contemplation level, 20.5% were at preparation level, according to SEBC, at baseline. The participants in the exercise group stated their reasons for exercising; 20% for losing weight, 55% for physical well-being, 76% for emotional well-being, and 69% for a hobby.

Table 1. Characteristics of Participants and Baseline Data for Outcome Measures in Both Groups

Characteristics and outcome measures	Exercise group (n=39) Mean (SD)	Control group (n=29) Mean (SD)	*P*
Age (years)	26.74 (3.91)	27.59 (2.82)	.41[a]
Years of education	16.66 (1.24)	16.82 (1.01)	.71[a]
BMI	23.31 (3.48)	22.53 (3.31)	.30[a]
RAPA	3.53 (1.80)	2.82 (1.58)	.09[a]
WHOQOL-BREF			
General Health	62.18 (18.02)	62.50 (13.63)	.81[a]
Physical Health	76.83 (11.43)	75.48 (15.25)	.89[a]
Psychological	66.45 (12.27)	68.38 (12.92)	.50[a]
Social Relationships	66.24 (17.09)	67.23 (16.95)	.83[a]
Environment	65.63 (14.10)	67.67 (13.88)	.45[a]
Sex (F/M)	28/11	17/12	.25[b]
Smoking (Y/N)	7/22	3/36	.14[b]
Alcohol consumption (Y/N)	12/27	7/22	.54[b]

Abbreviations: BMI, body mass index, RAPA, rapid assessment of physical activity, WHOQOL-BREF, The short version of World Health Organization Quality of Life, F/M, Female/Male; Y/N, Yes/No. [a]Mann-Whitney U Test, [b]Chi-squared test.

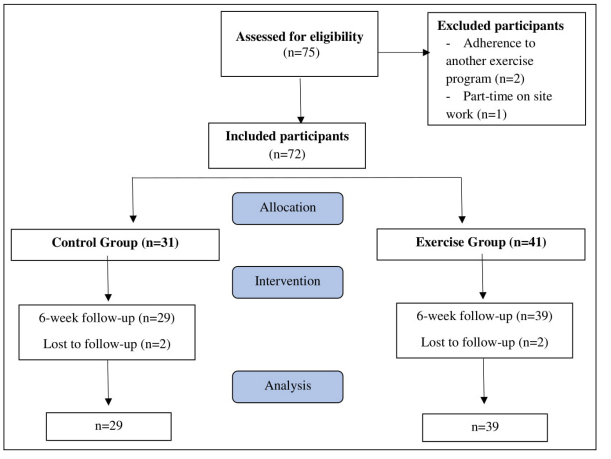

Figure 1. Flow Diagram of the Study

Table 2. Comparison of Outcome Scores within and between Exercise and Control Groups

Characteristics and outcome measures	Exercise group (n=39) Mean (SD)			Control group (n=29) Mean (SD)			
	Before the intervention	After the intervention	$P^{¥}$	Before the intervention	After the intervention	$P^{¥}$	$P^{¥}$
WHOQOL-BREF							
Physical health	76.83 (11.43)	77.83 (11.73)	.72	75.48 (15.25)	74.01 (13.99)	.42	.13
Psychological	66.45 (12.27)	69.87 (13.26)	.18	68.37 (12.92)	69.68 (13.81)	.82	.56
Social Relationships	66.23 (17.09)	68.42 (19.67)	.41	67.22 (16.95)	66.09 (14.59)	.23	.63
Environment	65.62 (14.1)	70.91 (13.7)	.57	67.67 (13.88)	69.5 (11.74)	.85	.19
2 MWT							
Total distance	136.86 (40.9)	150.75 (46.03)	<0.001*				
Heart rate change	19.50 (21.57)	15.00 (16.35)	0.32	NA	NA	NA	NA

Abbreviations: ¥Within the group (Wilcoxon Signed-Rank Test). ¥Between the groups (Mann-Whitney U Test) *$P < .05$. RAPA, rapid assessment of physical activity. WHOQOL-BREF, The short version of World Health Organization Quality of Life; 2 MWT, two-minute walk test; NA, not applicable

Table 3. Results of the GRCS and Distribution by Groups

	Score of change	Exercise group n (%)	Control group n (%)	*P*
GRCS	−2 (much worse)	0	1 (3)	< .001*
	−1 (worse)	1 (2)	3 (1)	
	0 (same)	10 (26)	21 (72)	
	+1 (better)	9 (23)	2 (7)	
	+2 (much better)	19 (49)	2 (7)	

Abbreviations: GRCS, Global Rating of Change Scale; n, number of participants *$P < .05$, Chi-squared test

In the exercise group, the baseline mean total distance was 136.86±40.9 m, and the mean heart rate change was 19.50±21.57 beats per minute when tested with 2MWT.

The average exercise duration of the participants in the exercise group was 34.33±2.43 minutes for each session, and the number of weekly sessions was 2.61±0.72 sessions. The comparison of the mean changes in the outcome measurements within and between the study groups are presented in Table 2. There was no difference between the two groups in the change of general health items ($P = .245$).

The results of the GRCS are presented separately in Table 3. Finally, the mean satisfaction score with the video-based exercise program in the intervention group was 8.28±1.76 was based on a 10-point Likert scale.

Discussion

This study aimed to investigate the QoL, specifically physical and psychological domains, in young adults who attended a regular video-based exercise program compared with those who did not follow an exercise protocol. To the best of our knowledge, this is the first study to document the effect of regular exercise on QoL in the time of social distancing in the literature. When the groups were compared in terms of QoL scores at the end of six weeks, no statistically significant difference was found. Although QoL scores increased in all domains in the exercise group, it was observed that the change in the scores in the control group was inconsistent. In addition, aerobic capacity increased in exercising individuals at the end of six weeks. The exercise group also showed significantly higher scores in self-reported improvements according to GRCS compared with the control group.

During this long-term isolation process, which has been implemented in Turkey since March to June 2020, we aimed to maintain and increase the physical and psychological health of individuals, considering the benefits and importance of regular physical activity. Physical activity associated with better QoL and physical and psychological health.[15, 16]

According to our results for WHOQOL-BREF, although there were no significant differences in the domains of physical and psychological health, social relationships, and environment between the groups; the scores increased in the exercise group numerically. Although psychological and environment scores increased minimally; physical health and social relationships scores decreased in the control group. Similar to our results, Ativie et al.[15] have reported that the increase in physical activity level was associated with psychological health sub-parameters such as autonomy, positive social and environmental relations, and self-acceptance in 400 young adults aged between 18 and 30 years. The increases in the control group may be because of the fact that they are not in a risky group for COVID-19 owing to young age and feeling better and safer when working from home.

When the normative values in the comprehensive WHOQOL-BREF report of Skevington et al.[17] were compared with our baseline and post-intervention QoL values, it was found that the transformed scores of the participants were similar or higher. Accordingly, it can be concluded that the four- to six-week period that the participants spend at home during social isolation is not sufficient to decrease their QoL. Longer isolation times may negatively affect QoL. Moreover, it can be considered that the positive effects of exercise on the sub-parameters of the QoL can be better demonstrated in individuals whose QoL scores are below the norm.

As is well known, there are many other psychological and sociodemographic factors, other than physical activity, that may affect QoL. It is important to define and control these covariant factors, which can reverse the positive effects of exercise.[2, 9] Besides reg-

ular physical activity, activities like spending time with family, video calls with friends, and focusing on hobbies and housework may also improve self-esteem, well-being, joy, mindfulness, and QoL when staying at home after a busy work life.[18, 19]

In this study, the baseline sociodemographic factors were not different between groups. However, the results of QoL were not significant between the groups at the end of six weeks. In parallel with the findings from the literature, these results may be related to other psychological factors that were not within the scope of this study, such as individually different management of the lockdown process and domestic life. Future researchers should consider these factors when investigating home-based physical activity or effects of exercise.

Regular aerobic exercises are well documented to increase aerobic capacity because of intensity.[20] Gormley et al.[21] have investigated the effect of different exercise intensities on aerobic capacity in young adults in a six-week study. They reported that aerobic capacity increased in those exercising compared with controls, and this increase was highest in the vigorous-intensity exercise group; but resting heart rate did not change. In consideration of our findings parallel to these results, aerobic capacity can be increased in six weeks with moderate-intensity exercises in young adults, but vigorous-intensity exercises can be performed for greater changes. In addition, objective laboratory tests can be used for evaluation.

Although it is reported that all types of exercise performed regularly is better than not exercising at all in reducing the psychological burden, there is evidence that the optimal exercise time is 45 minutes, and the frequency is three to five days a week.[9] The exercise protocol in this study was 35 minutes per session, three times a week for six weeks. As this study was conducted only through online, and the participants were physically underactive adults; safety was the first priority. Therefore, the mean exercise time for a session was shorter than suggested to prevent overloading the musculoskeletal system. Nevertheless, the participants reported that they were highly satisfied with the frequency, duration, and content of the exercises.

In the study, the effectiveness of exercise was evaluated with GRCS, and it was seen that the change in the self-perceived health status of the exercise group was higher than the control group. The open nature of the question allowed the participants to take into account other factors that they might consider important in their clinical situation. There are similar studies that emphasize the positive effects of exercise on self-perceived health status.[22] Therefore, it appears that the internal process, which links daily changes in the self-perceived health status with physical activity, applies across all of adulthood.[2]

Strengths and limitations

To the best of our knowledge, this is the first study to investigate the effectiveness of a video-based exercise program on QoL in healthy young adults during the COVID-19 pandemic. One of the limitations of this study was that the participants in the control group did not perform 2MWT. Another limitation was that objective measurements other than 2MWT could not be included as the study was not conducted in a clinical setting.

Conclusion

In summary, our results suggested that exercise intervention increased aerobic capacity and led to a positive overall change in the exercise group. An approximately 35-minute exercise program, three times a week, was not enough to significantly increase the QoL including physical and psychological health domains compared with that of the control group. Nonetheless, the exercisers showed some gains in every domain of QoL and a significant improvement in the self-perceived health status. The individuals were highly satisfied with the video-based exercise program during social isolation.

Therefore, the use of video-based exercises in rough times such as a pandemic may prove beneficial to individuals and encourage them to stay physically active and to maintain aerobic capacity.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Biruni University (IRB: 2020/40-14).

Informed Consent: Written informed consent was obtained from individuals who participated in this study.

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Author Contributions: Concept – B.K.K., P.T., G.P.A., E.P.K., E.K.; Design – A.Z.A., B.K.K., P.T., G.P.A., E.P.K., E.K.; Supervision – A.Z.A.; Resources – B.K.K., G.P.A., E.P.K.; Materials – P.T., E.K.; Data Collection and/or Processing – B.K.K., P.T., G.P.A., E.P.K., E.K.; Analysis and/or Interpretation – A.Z.A., B.K.K., P.T., G.P.A., E.K.; Literature Search – A.Z.A., B.K.K., P.T., G.P.A., E.P.K., E.K.; Writing Manuscript – B.K.K., P.T., G.P.A., E.P.K., E.K.; Critical Review – A.Z.A.

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