THE EFFECTS OF ONLINE EXERCISE PROGRAM ON FATIGUE, BENEFITS AND QUALITY OF LIFE IN WOMENS DURING COVID-19 LOCKDOWN

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Abstract

Abstract Objective: Live-based exercise programs offer great potential for the implementation of evidence-based interventions focused on promoting healthy habits. The outbreak of COVID-19 provided an opportunity to undertake an online survey to study the changes in exercise barriers/benefits, fatigue level, and quality of life after online live exercise program during lockdown, or quarantine. Methods: The sample was composed of a total of 143 women (age Mean = 32.48±6.6yrs) from a convenience sample of participants was recruited through social media (e.g. Facebook, Twitter, WhatsApp). The questionnaire asked for demographic information, body weight, body height, physical activity, and lifestyle factors before and during the quarantine. One-hundred and forty-three women volunteers were received an online live exercise program including strengthening, HIIT and stretching 6 sessions in a week during COVID19 pandemic and were assessed the measures of recruitment, exercise benefits/barriers, fatigue severity level and general quality of life at baseline, 3rd-wk and 6th-wk of the exercise program. Results: Significant differences were observed in fatigue severity scale and health status between baseline and at 3rd-wk ($p < 0.05$) in women. No difference in the level of fatigue, barriers, benefits of exercise, quality of life and health status between baseline and at 3rd-wk, and 3rd-wk and 6th-wk or baseline and 6th-wk ($p>0.05$). Conclusion: This study demonstrates that the internet-based exercise program is a viable alternative for the delivery and dissemination of interventions focused on promoting healthy habits, and a totally self-administered intervention can also produce short-term positive results. This program supports during lockdown reduce the risk of developing persistent fatigue related chronic fatigue syndrome.

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Methods: The sample was composed of a total of 143 women (age Mean = 32.48±6.6yrs) from a convenience sample of participants was recruited through social media (e.g. Facebook, Twitter, WhatsApp). The questionnaire asked for demographic information, body weight, body height, physical activity, and lifestyle factors before and during the quarantine. One-hundred and forty-three women volunteers were received an online live exercise program including strengthening, HIIT and stretching 6 sessions in a week during COVID19 pandemic and were assessed the measures of recruitment, exercise benefits/barriers, fatigue severity level and general quality of life at baseline, 3rd-wk and 6^{th}-wk of the exercise program.

Results: Significant differences were observed in fatigue severity scale and health status between baseline and at 3^{rd}-wk ($p < 0.05$) in women. No difference in the level of fatigue, barriers, benefits of exercise, quality of life and health status between baseline and at 3^{rd}-wk, and 3^{rd}-wk and 6^{th}-wk or baseline and 6^{th}-wk ($p>0.05$).

Conclusion: This study demonstrates that the internet-based exercise program is a viable alternative for the delivery and dissemination of interventions focused on promoting healthy habits, and a totally self-administered intervention can also produce short-term positive results. This program supports during lockdown reduce the risk of developing persistent fatigue related chronic fatigue syndrome.

Key words: Exercise, online, lockdown, fatigue, motivation

Introduction

In winter 2020, a novel coronavirus (COVID-19) that originated in Wuhan, China, began to present itself in Turkey [1]. COVID-19 was classified as a global pandemic by the World Health Organization (WHO) on March 12, 2020 with a decree that pre-emptive measures be taken to mitigate the viral spread[2,3].

Published literature have clearly revealed that the negative situations during lockdown we experience about our health are related to our daily inactivity [4-9]. In a study conducted in individuals with insufficient daily physical activity (average 17 minutes), it was shown that the 30-minute sitting time every day was changed with light physical activity, the mortality risk decreased by 14%[10], and when it was changed with moderate physical activity, it decreased by 45% [11-12]. For this reason, if enough exercise cannot be done, at least mild physical activities should be tried instead of staying still.

In the face of the present COVID-19 pandemic, public health recommendations and governmental measures have enforced lockdowns and restrictions. While these restrictions help to abate the rate of infection, such limitations result in negative effects by limiting participation in normal daily activities, physical activity travel

and access to many forms of exercise (e.g., closed gyms and recreation facilities, city parks and playgrounds, no group gatherings, increased social distancing) [11,13-16]. As schools and some workplaces have been closed during the COVID-19 pandemic, this also compromises physical activity participation, therefore increasing the risk of longer-term sedentary behaviours [2-3]. As working from home becomes mainstream, opportunities to engage in flexible lifestyles may permit opportunities to more naturally incorporate physical activity into daily living during lockdown.

Shortening working hours, curfews, transition to online working and education system increased the inactivity levels of the people and caused poor physical condition [8-10]. In order to reduce the burden on the health system during the COVID -19 process and to provide services to people who cannot leave the house, many health institutions have started to provide online consultancy services. Despite the fact that many people do not comply with physical activity recommendations [1-3], smartphone applications (apps) that promote physical activity are also popular [17-20].

We hypothesize that COVID-19 would negatively impact physical activity participation overall and that this would be associated with barriers to physical activity. Lastly, we do not expect that those participants who able to decrease motivation with more fatigue would have greater well-being due to lockdown. The aim of this study was to investigate the effects of benefits/barriers of exercise, quality of life and the level of fatigue on the live-based online exercise program during the COVID-19 process in Turkish women.

Methods

Participants

One-hundred-forty-three Turkish women aged 18years and over (age range of those who completed the survey 18–51years) that were quarantined due to COVID-19 were included in this study. A convenience sample of sedentary female adults without any existing injuries or systemic diseases was recruited through snowball sampling using social media (e.g. Facebook, Twitter, WhatsApp). They were directed to a data encrypted website, where they indicated their consent to participate after reading an information sheet and they confirmed that they were in a quarantine situation.

The cross-sectional study design was reviewed and approved by the National City Hospital institutional review board for protection of human subjects in research. After signing informed consent and undergoing screening, subjects were taken online live exercise program by same physical therapist. The online live exercise program involved passive computer-based online viewing of three exercise modalities of daily content including strengthening, high intensity interval training, and stretching. Subjects were given identical information regarding the purpose of the experiment (understanding out what the effects of regular computer-based physical activity are on movement ability). Both written and electronic materials included with the live-based online exercise program encouraged participants to aim for 1 h of program use on "6 days of the week". All subjects were debriefed at the time of post-testing. In order to be a participant in the study, participants had to be over the age of 18 and be a Turkish resident. The purpose of this study and how they would evaluate themselves was explained in detail to the participants by the phone. A communication network (WhatsApp) was established by the one physiotherapist to ensure that the participants apply the exercise program every day, to make specific reminders and to motivate. In the message groups that were created, it was questioned whether people did their daily exercises or not. At the same time, physiotherapists warned from time to time about the following[21]:

* Do not do exercises on a full stomach and just before going to bed.

* Do exercise 1 to 1.5 hours after eating.

* Ventilate the room where you will be exercising and provide fresh air.

* Wear suitable clothes and sport shoes for exercise.

* Do not wrap anything around your body and avoid wearing thermal sweatpants.

* Use a mat to protect your joint health when exercising on the ground.

* If there is pain during the exercises, stop the exercise and consult the physiotherapist who follows you.

* Check your breathing while doing the exercises, to be able to speak but be careful not to get out of breath.

Measures

One-hundred and forty-three people who participated on the online exercise program were directed to fill out the questionnaires via an online survey software (SurveyMonkey) before online exercise program during the strictest public health restrictions in our country. The link to the online survey was shared through social media, such as Facebook, Instagram, and WhatsApp, and by personal contacts of the research group members. We received 377 answers; after excluding answers that met the exclusion criteria, such as living abroad, over 52yrs-old, below 18yrs-old, duplicate answers, pregnancy or lactation, and lack of any data, the final data set included 143 participants. This manuscript was written in accordance with the STROBE Statement (Strengthening the Reporting of Observational studies in Epidemiology)[22].

We also asked the participants to share the study link to increase the number of persons who receive the invitation to the study and thus increase study participants. The survey comprised four parts: demographics, benefits/barriers, general quality of life, and fatigue level. The age, height, weight, pain condition, and background of the persons were questioned. During the 6-week program: before starting the exercise, at the end of the 3rd and 6th week, people were asked to evaluate themselves by filling out the forms again.

Exercise Benefit /Barriers Scale was used to evaluate the awareness, perceived benefit and the obstacles faced by the people participating in the online exercise program. The Likert format scale, developed by Sechrist et al. in 1987 [23], consists of 43 items in total. Each item has 4 answers, consisting of 4 (strongly agree), 3 (agree), 2 (disagree), 1 (strongly disagree). There are two subgroups of Exercise Benefit / Barriers Scale, each of which can be evaluated independently. To calculate the barriers scale, 4, 6, 9, 12, 14, 16, 19, 21, 24, 28, 33, 37, 40 and 42nd questions were evaluated, the result was between 14 and 56 points. The score range of the benefits scale was 29-116. The score obtained from the sum of all items in the scale ranges between 43 and 172, the higher the score of the people, the more they understood the benefit of the exercises. Validity and reliability of this scale by Cronbach's alpha coefficient was determined to be 0.95 [24].

The Fatigue Severity Scale , developed by Krupp et al. in 1989, was used to evaluate the overall fatigue status of the participants[25]. The scale, which consists of a total of 9 items, is scored from 1 to 7 for each item, 0 indicates no disagreement and 7 completely agrees. The total score is calculated by taking the average of all items, with a minimum of 9 and a maximum of 63rd scores of 36 or higher are indicative of severe fatigue, the lower the score the lower the level of fatigue. The Cronbach alpha reliability coefficient of the Fatigue Severity Scale is 0.96 [26].

The EQ-5D-3L (the EQ-5D 3 level version) general quality of life scale was used to evaluate the general health status of individuals. This scale consists of 2 different parts, in the first part, the parameters of movement, self-care, usual activities, pain, anxiety / depression are evaluated over 3 points. In the second part, people are asked to mark a vertically graded scale between 0 and 100 to evaluate their daily health status, 0 indicates the worst result, 100 represents perfect health [27]. An increase in the total score indicates that people have difficulties related to their health status, the lower the score, the healthier the person is considered.

Online Exercise Program

A comprehensive exercise prescription was prepared by an experienced physiotherapist by evaluating the muscle groups and exercise models required for the continuity of health. Participants taken an exercise program including (Table 1)

Warm-up: In order to prepare the body mentally and physically and to minimize possible injuries, the Online Exercise Program was started with warm-up exercises. Participants were asked to do arm movements for 5 minutes, to walk where they were, and to take steps left and right.

Conditioning Program: The conditioning program was determined as aerobic exercise for 3 days a week and strength training for 3 days a week:

Aerobic Program:

High Intensity Interval Training (HIIT) was added to aerobic exercises once a week. HITT was preferred because it does not require extra equipment, increases durability and explosive power, provides rapid fat burning and prevents injuries that may occur by placing loads on joints for a shorter time [27]. HITT exercises were planned progressively to be 5 minutes in the first week, 10 minutes in the second week, and 15 minutes in the third week (20 seconds of movement, 10 seconds rest).

Walk at home: Thirty minutes for 2 weeks, forty-five minutes from the 3rd week, at home walking program was given. During the walk, they were asked to take a half litre water bottle in their hands and make arm movements.

Strengthening Program: Participants performed progressive strength training for the muscles of the whole body (lower/ upper extremities, core, abdomen, hips) 3 days a week. Two sets of 12 repetitions were planned for each muscle group, with 10 seconds of rest between the sets (Table 1). The exercises planned to ensure that the body maintains a healthy and proper posture with minimum effort. It includes lower extremity quad, hamstring, oblique, abdominal, back muscles, triceps, chest muscles, spinal extensors, deep abdominal muscles with breathing and gastro muscles.

3. Cooling-Down Program: A 5-minute stretching program was given to all muscle groups working during the training for the cooling process. A waiting period of 10 seconds was determined for stretching exercises given statistically.

Statistical analysis

The statistical analyses were computed utilizing SPSS-25.0 software (SPSS Inc., Chicago, IL, USA) and significance was set at $p < 0.05$. The Kołmogorov–Smirnov test was applied to check normality. Demographic characteristics were summarized using paired t-tests as descriptive statistics. Lastly,

Differences in physical activity behaviour, associated barriers and facilitators to physical and well-being outcomes before exercise, at 3rd-wk and 6th-wk during COVID-19 quarantine (overall, by exercise duration) were assessed by Wilcoxon-signed rank test, providing the mean and standard deviation of each group, the mean difference, the z and the P values.

Results

The baseline characteristics of the 143 subjects at 3^{rd}-wk and 62 subjects at 6^{th}-wk are summarized in Table 1. Total eighty-one participants who including 22 people lack motivation, 1 person is pregnant, 30 people don't have time, 8 people were not satisfied with their health problem and 20 people were not satisfied with WhatsApp group left the exercise program after evaluating at 3rd-wk. Therefore, 62 subjects (mean age, 32.83±6.86 years) completed the study after 6 weeks. There were all subjects self-selected to the online exercise program at home via Zoom Application.

Subjects in this program completed an average of 18 possible exercise sessions over the initial 3-week study period. Average compliance based on six exercise sessions per week for 6 weeks was 44% for the live program via Zoom. There was a statistically significant decrease in the BMI in both at 3rd and 6th-wks ($P<0.05$ and $P< 0.05$ for the at 3rd and 6th, respectively). The change in the scores of the Levels of Fatigue, Benefits of Exercise, Barriers of Exercise Health Status and Quality of Life between baseline, at 3^{rd}-wk and 6^{th}-wk was evaluated using 95% confidence intervals (Table 2). There was a difference in exercise benefits / barriers between baseline and 3^{rd}-wk as $p<0.011$ and $p<0.009$, respectively. It could be related to concentration and duration of exercises (6days/wk; total: 18 sessions). There was no difference in exercise benefits/barriers between 3 wk and 6 wk in women.

Subjects who continued to exercise have a greater overall improvement in both their health status and

fatigue scores at 3rd-wk (Fig 2). For the within-group comparison, levels of fatigue values were significantly decreased for both at pretraining and at 3- and 6-weeks post-training in the women. The changes in outcome measurements at 6 weeks were analysed secondarily and are seen in Fig 3, with a comparison of those who continued the exercise program for another 3 weeks and those who stopped at 3rd-wk the exercise program. This exercise program was found to result in statistically significant improvements in fatigue levels compared to baseline measurement, as 6th-wk score.

Discussion

To our knowledge this is the first study to assess the impact of the COVID-19 pandemic and associated public health restrictions on exercise benefits / barriers, fatigue and quality of life behaviour in women aged 18-51 yrs-old. Our results show that there are significant differences between active women with a greater portion of reporting at 3rd-wk than the results at 6th-wk of active attendees participating more live exercise program via online with a physiotherapist-supervised exercise program during COVID-19 lockdown.

A well-known fatigue/function measure is the Fatigue Severity Scale (FSS) [25] which is composed of nine items, and in the initial validation study that FSS scores were significantly higher for individuals with chronic fatigue syndrome, as compared to individuals with MS or primary depression [28]. Therefore, Natvig et al explained the importance of physical activity in fibromyalgia in their study[29]. The present study is the first with a prospective design to show an association between online regular exercise program and the level of fatigue severity in women via online live program during lockdown as #stayhomestayfit slogan[30-31]. Therefore, we wanted to use a fatigue severity scale to identify cases of fatigue for a chronic fatigue syndrome diagnosis (n=14). However, for those individuals who have low stamina and endurance, but currently have less fatigue (n=113) because they are severely limiting their daily activities, an argument could also be made that they might satisfy the fatigue criterion by evidencing post-exertional fatigue [32].

The number of subjects who dropped out between the first and second data collection was high (44%), but there were some differences between the respondents and the dropouts. However, there was no difference between respondents to exercise program and dropouts with respect to participation in exercise program or the level of fatigue at baseline[33-34].

Lack of exercise is not the only determinant of fatigue, and the high prevalence of fatigue among women may be due to a wide range of factors, including psychosocial stress and physical and mental disorders related pandemic. Some patient groups may see exercise as a treatment; in another study, patients with fibromyalgia [29] and obese[34] were found to have a higher level of physical leisure time activity, but lower physical fitness, than the general female simple, and, as for all self-reporting, associated with recall bias.

The restrictions have reduced overall exercise program (number of days and hours) and access to exercise. In spite of an increased offering of physical activity guidance and classes available on social media, present results indicate that it has not been possible for individuals to adequately maintain their normal physical activity patterns with home activities [3,5]. Therefore, future exercise intervention to foster an active and healthy lifestyle during pandemic can be based on home-based exercise programmes and fitness apps. Our exercise program included strengthening, HIIT and stretching skills as enthusiastically. Studies in many countries as Spain[35], Belgium[36], Austria[37], Canada[38] and China[39] shared the same results related exercise at home during the COVID-19 pandemic. Our study supports these results. Overall health status was higher after exercise program as well this study.

The benefits of exercise participation identified two factors including the perceived personal benefits (52 %) (e.g., "I have a new or renewed confidence in myself") and physical benefits of exercise participation (48 %) (e.g., "I feel fitter"). Barriers to participation in exercise program after 3-wk identified three factors for barrier items including how personal barriers can impede exercise (56 %) (e.g., "I did not feel motivated") and on the theme of perceptual barriers for WhatsApp (22 %) (e.g., "I received too messages to my telephone everyday"), and how time constraints can act as a barrier to exercise engagement (22 %) (e.g., "I had no time due to family responsibilities"). This study examined the effect that causing factors had on perceived barriers, benefits, and motives, as the participants were from the women.

Exercise at home using various safe, simple, and easily implementable exercises is well suited to avoid the airborne coronavirus and maintain fitness levels [40]. Such forms of exercise may include, but are not limited to, strengthening exercises, activities for balance and control, stretching exercises, or a combination of these. In addition, traditional aerobic exercises, and yoga should be considered since they require no equipment, little space, and can be practiced at any time. The use of eHealth and exercise videos, which focuses on encouraging and delivering physical activity through the Internet, mobile technologies, and television are other viable avenues for maintaining physical function and mental health during this critical period. We used both aerobic and HITT exercise program via online by using Zoom application at home during COVID-19 pandemic.

Throughout the lockdown period, several web-based and social media lifestyle interventions were posted by private physiotherapists /personal trainers, gyms, sports federations and public health authorities. Therefore, the internet played a major role in promoting exercise and fitness activities during the lockdown period, increasingly serving as a simplified platform for the proposal of exercise and lifestyle activities and tips, which where meanwhile suggested by the medical community in the literature [11,12,30,31].

The mechanisms underlying the relationship between regular physical exercise and health are several and complex. With the lockdown during the Covid-19 pandemic, this program, which we suggested with the #stayathome call, encouraged people to exercise at home. The number of women we have reached is from the website of a physiotherapist who regularly exercises online, the number of participants is not a small number. Since the participants were also women who did not have the habit of exercising face-to-face, they were people who had this type of exercise willingness for a long time. They liked the program we recommended for the first 3 weeks.

Previous studies have used exercise interventions of varying intensity with respect to the number of exercise sessions per week. Ek and co-workers (2018) and Myers and associates (2019) have both reported statistically significant improvements in various outcome measures after exercise interventions with exercise sessions two times per week[17,19]. Therefore, in this study, it was believed that six exercise sessions per week would be sufficient to elicit a training effect. Moreover, it was believed that a greater number of exercise sessions would improve subject recruitment and compliance, especially in those who were in the lockdown. However, in our study, the number of women who stopped working due to lack of motivation, economic reasons and not wanting to receive more messages from WhatsApp was high. The dropout rate was high, both in the first phase (44% on average, considering the abandonment of the intervention) and at 6 weeks follow-up. This finding is relatively common in online interventions but still needs to be discussed, as it could be one of the main barriers to their implementation [33,34].

The main strength of this study is that it is the first study reporting levels of fatigue, exercise benefits/barriers and general quality of life in a sample of quarantined women without problem. Another strength of the present study is the high number of healthy voluntary women included. However, the present findings must be interpreted in light of the study limitations. First, all subjective parameters were self-reported, potentially introducing self-reporting bias into the findings. Second, analyses were cross-sectional and thus it was not possible to determine trajectories of exercise program during the whole period of quarantine. Finally, a technical consideration that may be a limitation for some users is battery consumption on their smartphones when using the app.

Conclusion

The COVID-19 pandemic has greatly impacted human health, causing sudden lifestyle changes through social distancing and isolation at home, with devastating social and economic consequences. As explained, we might be encouraged with a live exercise program via online as long-term during the lockdown which limits regular physical activity style.

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Declaration of conflicting interests

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Data availability

The data that support the findings of this study are available from the corresponding author [G.B.], upon reasonable request.

What's known

- The COVID-19 pandemic is currently exacerbating another established global pandemic – physical inactivity
- Worldwide restrictions have been imposed to limit the spread of the virus, and people have been encouraged to stay home.
- During that period, people have tended to stay away from the hospitals due to the fear of being infected, and to the restrictions.
- At a time when many individuals are choosing to move less, the message that exercise is medicine is needed more.

What's New

- First study analysing levels of fatigue, general quality of life, and exercise benefits/barriers in quarantined healthy women.
- Significant increase of online physical activity in Turkish healthy women during lockdown.
- These results should be considered to develop strategies of physical activity promotion via online live exercise program.
- Internet-based programs are considered cost-effective. This cost-effectiveness could be even higher when the intervention is completely self-administered.

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