INFLUENCING PSYCHOLOGICAL WELL-BEING THROUGH PILATES EXERCISES DURING THE COVID-19 PANDEMIC IN PEOPLE WITH MULTIPLE SCLEROSIS

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Abstract

Background: The period of the Covid-19 pandemic was also very challenging for people with chronic neurological disease (multiple sclerosis) who already suffer from increased levels of depression and anxiety due to the nature of their illness. They may also have reduced levels of self-efficacy due to disability.

Objective: The aim of the pilot study was to test whether a telerehabilitation programme of Pilates exercises could improve psychological wellbeing in people with multiple sclerosis.

Methods:The online Pilates exercise programme was scheduled for 12 weeks (2 times a week for 45 minutes of Pilates exercise combined with 30 minutes of aerobic activity based on participants preferences).

The participants' psychological well-being were measured before and after exercise programe with the patient reported outcomes Hospital Anxiety and Depression Scale and General Self-efficacy Scale.

Results: There were no significant changes in the evaluated parameters after the three-month telerehabilitation program.

Conclusion: Therefore it is possible that a similar online exercise program could help maintain psychological wellbeing in people with a chronic neurological disease such as MS. However, this needs to be tested in a larger sample of individuals

***Keywords**:*

Pilates, Multiple Sclerosis, Telerehabilitation, Covid-19, Exercise

BACKGROUND

The COVID-19 disease pandemic presented an unprecedented increase in stress stimuli. The public health measures such as quarantine, lockdowns and further limitations, necessary to limit the spread of infectious diseases, caused a disruption in the usual lifestyle. Moreover, combined with an atmosphere of fear of contagion. As a result, increased levels of anxiety and depression were noted in general population (Salari et al. 2020). Some people also reacted on this stresfull situation with pathological eating habits or sleeping disorders (Martínez-de-Quel et al. 2021).

During the pandemic period, various government restrictions resulted in reduced opportunities for physical activities and exercise, and led to an increase in sedentary lifestyles (due to the closure of sports venues, restriction of social contacts and cancellation of all types of exercise classes) (Tarakci et al. 2021). These restrictions on the inability to engage in physical activity have also had a significant impact on people suffering from various chronic diseases, such as

musculoskeletal or neurological conditions. A review study from 2022 of more than 7,000 adult patients with a variety of neurological diagnoses described a reduction in physical activity during pandemic time that was associated with worsening symptoms, depression and reduced quality of life (Abasıyanık et al. 2022). For these people with chronic diseases is the regular physical activity very important to maintain good functional status and also for promoting mental wellbeing. One of these chronic neurological diseases for which physical activity is part of the complex treatment is multiple sclerosis.

Multiple sclerosis (MS) is a chronic neurodegenerative disease affecting young adults that can manifest with different neurological symptoms depending on the specific localization and severity of inflammatory damage to the central nervous system. The most common physical symptoms of the disease include reduced muscle strength, spasticity, balance difficulties, sensory impairment, fatigue, impaired sphincter function etc. (Dobson et al. 2019). The most common neuropsychiatric symptoms of MS include cognitive deficits (work memory, visuospastial memory) and mood disorders (increased level of depression and anxiety) (Chiaravalloti et al.2008). Depression in MS may be a subjective response to the onset of and development of the disease, a direct consequence of the disease process, a side effect of drug therapy, or an independent coexisting disease. The prevalence of depressive disorders is higher in MS patients than in the general population, even than patients with various chronic internal or other neurological disorders (Sadovnik et al.1996, Sullivan et al. 1995). The lifetime risk of depression in MS has been found to be 50,3 % and over 75 % of patients experience at least one depressive episode during the course of their illness (Sullivan et al. 1995). Aproximately 25 % of people with MS suffer from anxiety symptoms, and women are more likely to suffer from them. Anxiety is also a frequent comorbidity with depression, or anxiety disorders can occur independently (Feinstein et al. 1999)

Regular physical activity and exercise helps, not only positively affect many of the physical symptoms of MS (e.g. fatigue, muscle weakness, impaired mobility) (Motl et al.2017), but has also positive impact on depression (Ensari et al. 2014), anxiety (Fahy et al. 2022) and cognitive function (Sandroff et al. 2016). However, during pandemic period the opportunities to engage in physical activity and exercise were limited (Pedulla et al. 2022). It seems that practiced activity in the form of online distance can help to influence the physical condition of patients (Di Tella et al. 2019). However, the question remains whether exercise can also help to influence the psychological state of MS patients during difficult pandemic time.

OBJECTIVE

Therefore, the aim of our study was to evaluate whether regular physical activity, in the form of Pilates exercises practiced online, can help influence the psychological wellbeing of people with MS during a pandemic.

METHODS

Exercise programme

The exercise programme entitled “Pilates Medical Exercise for People with MS” was created simply so that it could be implemented without any special equipment. Participants could watch the exercise on their computer, tablet or smartphone. The programme took place in the form of online broadcasts (via the YouTube platform) once a week (each

lesson lasting 45 minutes) and was also available for later playback. Each week a new lesson was prepared by a physio-therapist with certified Pilates training education. In exercise lessons, exercises that considered the condition of participants as well as their comments from previous lessons (participants could communicate with the physiotherapist during the live broadcast or later in a Facebook chat room). The instruction for participants was to perform Pilates exercise twice a week according to the online lesson and combine it with some endurance activity for at least 30 minutes (based on personal preferences, they could choose from different types of aerobic activities such as walking, cycling, stationary bicycle etc.).

The programme was originally scheduled for 12 weeks, but was extended to 24 weeks, based on participants' increased interest (and due to persisting pandemic restrictions).

During the course of the study, participants (in addition to regular communication with the Pilates instructor) were contacted at least three times (by phone or email) by a study assistant who tried to motivate them to adhere to the exercise regimen. The assistant was available to them in case of any problems and to maximize adherence to the exercise programme.

All participants gave informed consent to participate in the study. The study was approved by the Ethical Committee of the College of Physical Education and Sport Palestra (VŠP/0383/2021).

Sample and settings

The exercise programme was offered to people with MS with the help of patient organization websites and their social networks. Participants were people with clinically stable MS (no relapse or medication change in the last 60 days) who were able to walk independently (without or with a walking aid). The primary goal of the study was to offer people with MS an online physical activity alternative to cancelled exercise lessons, so entry criteria for the programme were not further restricted. Only patients with some other acute or chronic disease that could interfere with physical activity were excluded.

At baseline and after completing the exercise programme participants were asked to complete the patient reported outcomes. Patient reported outcomes included the following questionnaires to monitor patients' psychological well-being and exercise effect: Hospital Anxiety and Depression Scale and General Self-efficacy Scale.

The Hospital Anxiety Depression Scale (HADS*)* is widely used to assess psychological distress in non-psychiatric patients. It consists of two subscales, measured via 14 items, seven items for the anxiety subscale (HADS-Anxiety) and seven for the Depression (HADS-Depression) subscale. Overall, it has demonstrated satisfactory psychometric properties in several different populations, including MS Bjelland et al. 2002, Honarmand et al. 2009). Each item is scored on a response scale with four alternatives ranging between 0 and 3 and a higher score indicates greater anxiety or depression. The HADS-depression cut-off for clinical depression was defined as scores ≥ 8.0.

The General Self-Efficacy Scale (GSES) is scale to measure optimistic self-beliefs regarding coping with variety of difficult demands in life. The scale consists of 10-items scored on 4-point scale, from 1 (not at all true) to 4 (exactly true). High consistency and reliability of scale was confirmed in many studies in patients with various condition (Schwarzer and Jerusalem 1995).

Statistical analyses

The program TIBCO Statistica was used for statistical analyses. In addition to descriptive statistics, selected methods of statistical induction were used for analysis of primary data. If the condition for the use of parametric tests were met, a paired t-test for dependent selection was used. Since the data did not meet the condition of normality of distribution in most cases with respect to the frequency of samples, the Wilcoxon paired test was used to test and generalize the significance of difference in the level of measured parameters. The threshold for significance was set at $p < 0.05$.

RESULTS

The total number of 22 women who completed all 12 weeks of online Pilates training were available for statistical analysis. Mean age of participants was 49.4 years and mean disease duration was 10.9 years. Most participants had relapse remitting MS (only 5 have secondary progressive MS and 2 primary progressive MS). From the total sample, 16 participants reported subjective perceived gait impairment and eight of them were using walking aid. Demographic characteristics are shown in Table 1. The results of the monitored parameters after 12 weeks of training are shown in Table 2. None of participant had a cut-off value for clinical depression at baseline (or at the end of the programe). None of the observed changes achieved a statistically significant improvement. However, a trend approaching statistical significance was observed for GSES (p=0.09).

Table 1 – Demographic characteristics

Parameter (n=22)	Mean (SD)	Median (min-max)
Age (years)	49,4 (12,19)	47 (28-70)
Disease duration (years)	10,9 (8,6)	8 (1,5-29)
Height (cm)	166 (6,9)	165 (156 -185)
Weight (kg)	69,7 (17,5)	65 (48-126)
EDSS	3,1 (1,6)	3 (1,5-6,5)

Table 2 – Changes in monitored parameters

Parameter (n=22)	**Baseline Mean (SD)**	**95 % Confidence Interval**	**After 12 weeks Mean (SD)**	**95 % Confidence Interval**	**p-value**
HADS (points)	12,90 (6,5)	10,01-15,8	12,77 (6,7)	9,8-15,74	0.86
GSES (points)	28,86 (5,7)	26,33-31,39	30,0 (5,85)	27,4-32,59	0.09
Parameter (n=9)	**Baseline Mean (SD)**	**95 % Confidence Interval**	**After 24 weeks Mean (SD)**	**95 % Confidence Interval**	**p-value**
HADS (points)	8,33 (5,65)	3,98-12,68	9,11 (7,02)	3,71-14,51	0.43
GSES (points)	29,11 (5,46)	24,91-33,31	28,88 (6,77)	23,68-34,09	0.89

HADS-Hospital Anxiety and Depression Scale, GSES-General Self-Efficacy Scale

DISCUSSION

The Pilates exercise was chosen for this exercise program due to documented positive effect on different symptoms in people with MS (Sanchez-Lastra et al. 2019) and due to our previous positive experience with this type of exercise from

our clinical practice. Previous study showed that the Pilates performing can improve mental health (Fleming and Herring 2018). We have also considered the fact that people with higher neurological deficits can perform this exercise easily with some modifications, too. This exercise activity does not need any special equipment and can be easily performed at home.

In our cohort, only a slight (not statistically significant) improvement in anxiotic-depressive symptoms (p=0.86) and general self-efficacy was observed (p=0.09) after 3 months of online Pilates. The self-efficacy level has shown to be important determinant of health status and disease management strategies (Wilski and Tasiemski 2016). So, we consider our result, a slight increase in self-efficacy and no increase in anxiety-depressive symptoms, to be a good outcome. Therefore it's possible that even a small increase in self-efficacy will help improve your overall psychological status. Some studies mention an increase in anxiety and depression in people with MS during the pandemic (Garjani et al.2022), but others do not confirm this (Sbragia at al. 2021). This may be influenced by persistently elevated levels of anxiety and depression from the outset (due to the disease), but also by the evolution of the pandemic. Patients' fears for their loved ones and sleep disruption due to pandemic stress have also been documented (Yeni et al. 2022). As a result of the pandemic, a significant percentage of people with MS (especially those with higher levels of neurological impairment) have had to limit or discontinue their regular exercise and physical activities (Pedulla et al. 2022). An international European study also shows that not a very large percentage of people with MS used online exercise options during the pandemic (Moumdjian et al. 2022). This may be due to a lack of awareness of these options or a lack of tailoring them to patients' needs. Therefore, we tried to offer our program to as many patients as possible in the rehabilitation database of the MS centre and also to modify the difficulty of the exercises during the exercise program according to the needs of the participants. We also found it very useful to contact participants during the program by phone or email to maintain their adherence and motivation.

The programme ran from January to March 2021 and was further extended to June 2021 based on participant interest. However, less than half of the participants completed the entire 6-month programme. This is not attributed to lack of interest, but to the fact that as temperatures rose, pandemic restrictions were cancelled, and sports venues were opened as well as outdoor physical activity opportunities were expanded.

Limitation of the study are obstacles connected to telerehabilitations. In the first place, the availability of communi-cation technologies and the ability to work with them, which can be particularly limited in patients with neurodegenerative disorders, should be mentioned. Another disadvantage of telerehabilitation exercises is the lack of manual correction during exercise and limited possibility to assess patient in detail.

CONCLUSION

During an online Pilates exercise programme organised during the Covid-19 pandemic, there was no worsening of anxiety and depression levels in people with MS. There was a small (statistically insignificant) increase in self-efficacy measures. It is therefore possible that a similar online exercise program could help maintain psychological wellbeing in people with a chronic neurological disease such as MS. However, this needs to be tested in a larger sample of individuals.

Conflict of interest statement: None declared.

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