IMPACT OF PHYSICAL EXERCISES FOR BACK PAIN RELIEF POST-COVID-19 DISEASE

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ABSTRACT

Regular exercise has been identified as primary prevention and management of pain. It is believed that there is a clear relation between COVID -19 and a pain increase. The purpose of this study to establish the effectiveness and impact of physical exercises to relieve back pain after COVID-19 disease. Subject of the study is the impact of physical exercises on pain post COVID-19. Object of study is the effectiveness of physical exercises. 56 people aged between 25 and 65 years (27 of them in the experimental group and 29 in the control group) were observed and examined with The Numerical Pain Rating Scale. Each individual was examined for 30 days. They were instructed to complete and rate their pain on a scale either in person or as an online form. The mathematic-statistic results have been processed by MS Excel. Results showed that there was a reduction in both groups. However, the differences in pain reduction were greater in the experimental group than in the control group. Data from the analysis of the results clearly suggests that the pain is reduced due to the beneficial effect of exercises, which confirms that regular exercises are identified as a primary prevention and management of pain. As COVID-19 is considered to worsen the pain, and additionally, the neurological effects may last for at least months after the infection. We can confirm that physical exercises positively reduced the pain within a month, which will help impact the pain after COVID-19. In conclusion, the results of the study summarize that physical exercises are suitable to reduce pain when applied methodically, will relieve back pain, and will decrease it overall after COVID-19 disease.

Keywords: *Physical activity, pain, health, exercises, COVID-19*

ВЪЗДЕЙСТВИЕ НА ФИЗИЧЕСКИТЕ УПРАЖНЕНИЯ ЗА ОБЛЕКЧАВАНЕ НА БОЛКИТЕ В ГЪРБА СЛЕД COVID-19

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РЕЗЮМЕ

Редовните упражнения са идентифицирани като основна превенция и управление на болката. Смята се, че има ясна връзка между COVID-19 и увеличаването на болката.

Целта на това проучване е да установи ефективността и въздействието на физическите упражнения за облекчаване на болки в гърба след заболяване от COVID-19. Предмет на изследването е влиянието на физическите упражнения върху болката след COVID-19. Обект на изследване е ефективността на физическите упражнения. 56 души на възраст между 25 и 65 години (27 в експерименталната група и 29 в контролната група) са наблюдавани и изследвани с Цифровата скала за оценка на болката. Всеки индивид е изследван в продължение на 30 дни. Те бяха инструктирани да попълнят и оценят болката си по скалата лично или в онлайн формуляр. Математико-статистическите резултати са обработени с MS Excel. Резултатите показват, че има намаление на болката и в двете групи. Въпреки това, разликите в намаляването на болката са по-големи в експерименталната група в сравнение с контролната група. Данните от анализа на резултатите показват ясно, че болката е намалена поради благоприятния ефект от упражненията, което потвърждава, че редовните упражнения се идентифицират като основна превенция и управление на болката. Тъй като се смята, че COVID-19 влошава болката и освен това неврологичните ефекти могат да продължат поне месеци след инфекцията. Можем да потвърдим, че физическите упражнения намалиха значително болката в рамките на един месец, което ще помогне за повлияване на болката след COVID-19. В заключение, резултатите от проучването обобщават, че физическите упражнения са подходящи за намаляване на болката. Когато се прилагат методично, ще облекчат болката в гърба и ще я намалят като цяло след заболяване от COVID-19.

Ключови думи: *физическа активност, болка, здраве, упражнения, COVID-19*

INTRODUCTION

In December 2019, the World Health Organization (WHO) made the first COVID-19 announcement (WHO, 2021). The available research and WHO reports indicate that pain, particularly low back pain, is a common complaint during infection (Gomes, 2020). Studies from 2021 show that muscle (myalgia), neuropathic, and joint pain are the most frequent additional symptoms of shortness of breath (Weng et al., 2021). Back pain is currently one of the prominent symptoms of the predominant SARS-CoV-2 strains in circulation. One in five people with COVID-19 have back pain (Joi, 2022).

Exercising as an activity can be an extremely helpful tool to help you maintain your composure and continue to protect your health throughout this time. WHO recommends 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity per week (WHO, 2020). Any contraction of skeletal muscle that produces bodily movement and requires energy is an activity, but planned exercise can be performed with the goal of attaining or maintaining physical fitness (Levine, 2009).

Physical activity benefits those who lead a sedentary lifestyle and experience chronic musculoskeletal pain, according to studies (D'Silva et al., 2018; Luque-Suarez et al., 2018). Studies reveal a connection between physical activity levels and quality of life that is both significant and somewhat strong in adults with spinal cord injury (Stevens et al., 2008), and it even helps people with multiple sclerosis (Motl, McAuley, 2009).

Since the human body is meant to move, it requires regular physical activity to function at its best and to prevent disease (Hills et al., 2015). Back pain, one of the main sources of discomfort and a role in declining quality of life in the west, has been linked to sedentary lifestyles as a risk factor for the development of many chronic diseases (COM, 2008). Due to quarantines, there was little mobility and activity during COVID-19, and a sedentary lifestyle arose, which led to an increase in the number of people with back pain.

Due to the COVID-19 pandemic, significant back pain prevalence and intensity are reported. People have been exposed to remote working conditions, higher psychological demands, and stress. The main risk factors identified were: no physical activity performed, no compliance with ergonomic recommendations, and stress (Prieto-González et al., 2021).

Pain can occur in different spine locations and can be treated differently depending on the location and type of pain. To decrease pain, a variety of medications can be taken (Zdziarski et al., 2015). Nowadays, pain treatment includes injections and (Vincent et al., 2013) and NSAIDs to eliminate the cause (Wertli, Steurer, 2018; Chou, Huffman, 2007), but they can be painful and not long-lasting or with side effects.

However, other treatment options can be used, as studies show that regular exercise has been identified as primary prevention and management of pain (Sulejanov, 2009; Lizier et al., 2012; Washif et al., 2019). It is believed that there is a clear relation between COVID and a pain increase (Serrano-Ibáñez et al., 2021).

Reports assert that neurological side effects (such as back pain and joint pain) may last for at least months after infection, which suggests sensory neuronal involvement in persistent diseases like COVID-19 (Shiers et al., 2020).

It has been demonstrated that if the pain is ignored, it may become chronic, increase tension, limit movement, disturb sleep, and decrease the chances of a full recovery (Geneen et al., 2017). In all cases, adequate control of pain will reduce its accuracy.

Accordingly, proper education about safe pain management will help prevent undertreatment of pain and the resulting harmful effects (Wells et al., 2008).

Since the primary objective of physical activity as a health activity is to create physical education techniques and tools aimed at improving the functional capabilities of the immune

and endocrine systems for their essential functioning (Sulejanov, 2009), These techniques could aid the body in regaining strength following COVID-19.

People who engage in little to no physical activity have a higher risk of developing severe COVID-19 illness compared to those who engage in physical activity. Inactivity raises the risk of COVID-19 hospitalizations and deaths, according to a comprehensive review done by Communicable Disease Centre's (CDC), but physical activity lowers those risks (CDC, 2022).

During the pandemic, physical activity was decreased, and musculoskeletal pain was increased, but no relationship between exercise and musculoskeletal pain was found, which might be related to psychosocial state (Efe Is et al., 2021).

The impact of pain on changes in physical activity during the COVID-19 pandemic is unknown, but the analytic survey in studies made in 2021 on adults who had pain after the COVID-19 suggests that they had lower physical activity levels after the COVID-19 in comparison to people that hadn't had pain during the COVID-19 (Hirase et al. 2021).

Furthermore, meeting physical activity recommendations consistently was highly linked to a lower probability of severe COVID-19 outcomes (Sallis et al., 2021).

The British Heart Foundation (BHF) suggests exercises and stretching, as so far, there is no specific advice on how to deal with back pain related to COVID-19 compared to any other back pain (BHF, 2022).

Isometric exercises have a key function in reducing pain as a result of a variety of intensities and lengths of isometric contractions (Lemley et al., 2014). Furthermore, by strengthening and stabilizing the muscles isometric exercises help to improve posture and physical stamina (Lum, Barbosa, 2019). As evidenced by studies demonstrating positive outcomes following the execution of these sorts of contractions, they have a variety of effects on the body (Rio et al., 2017; Noorkõiv et al., 2015; Schott et al., 1995).

This manuscript aims to study and establish the effectiveness and impact of physical exercises to relieve back pain after COVID-19 disease.

METHODS

Research methods each individual was instructed to rate their pain on a scale, either in person or by checking out the scale as an online form. Each individual was examined for 30 days, as the reporting dates were the first day (x1), the 10th day (x2), the 20th day (x3), and the 30th day (x4). All individuals signed informed consent to participate in the study.

Subject of the study is the impact of physical exercises on pain post COVID-19.

Object of study is the effectiveness of physical exercises.

Individuals examined were 56 people aged between 25 and 65 years old (27 in the experimental group and 29 in the control group), who were observed and examined with the Numerical Pain Rating Scale (NPRS).

Mathematical-statistical methods; the data from the received answers were organized and analyzed in Microsoft Excel using analysis of variance.

The methodology of exercises

The author's methodology of exercises was applied to the experimental group for 10 days, followed by 10 days of rest and repetition of the method for 10 days. The scale was used to evaluate each person at the start and finish of the performed methodology (experimental group).

The methodology is based on coordinating the static tension combined with the dynamic tension, which covers the same region of the spinal column with including the rhythmic breathing. Gym mats, fit balls, and foam rollers, or substitutes, could be used. As follows:

Table 1. *Training program over review*

Methodology duration	10 days
Performances per day	5
Number of exercises	5
Phases	4
Phase repetitions	3
Phase duration	5-6 s
Exercise duration	1 min (3x20 s)
Duration of series	7-8 min
Breaks duration	20-40 s
Execution	Slow pace
Load type	Isotonic and isometric
Breathing rhythm	Inhale at first phase - exhale at fourth phase

Figure 1. *Exercises that were used in the author's methodology after COVID*

Figure 1 illustrates that the author’s methodology consists of five exercises. The first exercise is performed while standing, the second and third are performed while seated, and the

fourth and fifth are performed while lying on the ground in a prone posture. The back muscles are emphasized in each workout.

RESULTS

Tables 2-3 and Figures 2-3 present the data on the frequency analysis results for processing the (NPRS).

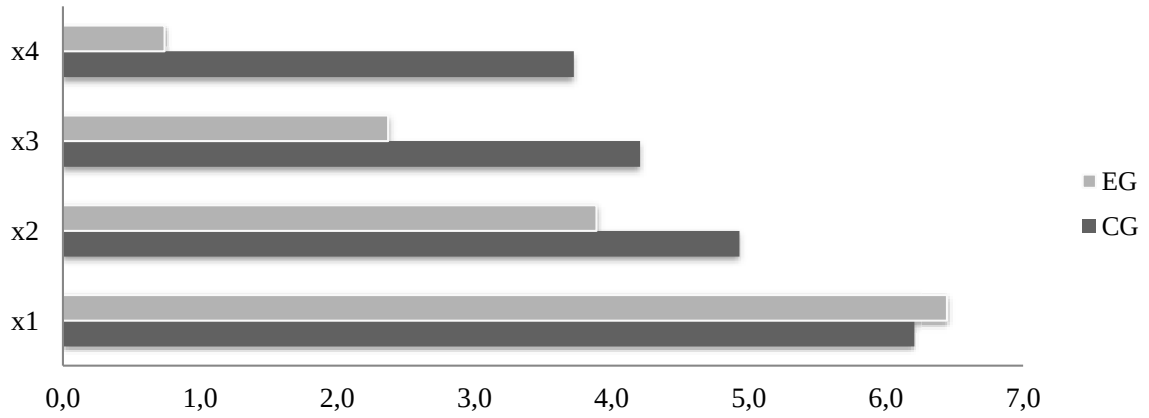

Figure 2. *Data on average values on a pain scale, EG = experimental group; CG = control group*

The results presented in Figure 2 for mean values on the pain scale show that the mean values from the first to the fourth date decreased in both groups, but it seems that in the experimental group, they decreased significantly more. On the first date, both groups had similar points; in the control group, it was 6.2, and in the experimental group, it was 6.4, but on the fourth date, the values have a bigger difference, from 3.7 in the control group and only 0.7 in the experimental group.

Table 2. *Mean values, standard deviation, and coefficient of variation of CG*

CG	$\overline{x}$	S	V
x1	6.21	1.63	26.33
x2	4.93	1.33	27.06
x3	4.21	1.01	24.09
x4	3.72	1.44	38.58

The data shown in Table 2 for the control group's mean values, standard deviation, and coefficient of variation demonstrate that the mean values reduced from 6.21 to 3.72 from the first to the fourth date. On the first three dates, the scattering of the values is average (V< 30%), and on the fourth date, it is large (V> 30%).

Table 3. *Mean values, standard deviation, and coefficient of variation of EG*

EG	$\overline{x}$	S	V
x1	6.44	1.22	18.92
x2	3.89	1.15	29.69
x3	2.37	1.08	45.54
x4	0.74	0.90	121.86

The experimental group's mean values from the first to the fourth dates were reduced to an extremely low score of 6.44 to 0.74, demonstrating the efficiency of the methodology used, according to the data shown in Table 3. The scattering of the values is large (V> 30%) on the second two dates, but it is average (V< 30%) on the first two dates.

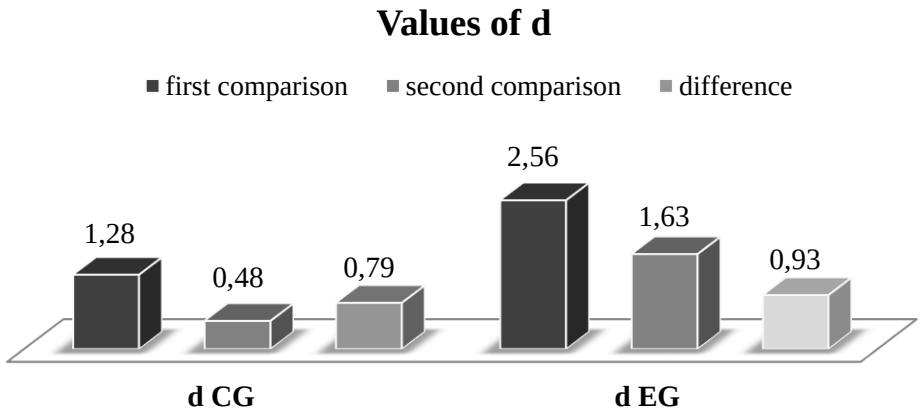

Figure 3. *Comparisons of the difference in the values of d*

The data presented in Figure 3 for comparison of the difference in the values of the absolute increase *d* for the pain intensity of the two groups show that the increase in the first comparison of the two groups is large (d> 0.8) and in the experimental group is higher (2.56). We notice that the experimental group once more leads with a significant rise in the second comparison. However, in the control group, there is a moderate increase (d< 0.5). It is clear from the results that the differences in pain reduction were greater in the experimental group, from 6.44 to 0.74, and in the control group, from 6.21 to 3.72.

DISCUSSION

Data from the compared results of the two groups clearly suggests that the pain is reduced due to the beneficial effect of exercise, which confirms that regular exercise has been found by researchers to be the primary method of pain prevention and management (Sulejanov, 2009, Lizier et al., 2012, Washif et al., 2019). Given that COVID is thought to have a significant relationship with the worsening of the pain (Serrano-Ibáñez et al., 2021) and also that

neurological effects may last for at least months after the infection of COVID (Shiers et al., 2020), we can confirm that physical exercises had a positive effect in reducing the pain within a month, which will help impact the pain after COVID. Therefore, this study confirms that pain can be reduced post-COVID and suggests that people should be encouraged to exercise and be more active after suffering from COVID-19 disease to have an impact on pain.

CONCLUSION

In conclusion, the results of the study summarize that physical exercises are suitable to reduce pain when applied methodically, will relieve back pain, and will decrease it overall after COVID-19 disease. Therefore, achieving these results gives us better clarity in dealing with problems during the pandemic. This will be useful for medical and sports science.

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