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Effect of Body Weight Exercises for COVID-19 Survivors

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Abstract

Background: People recovered from the global pandemic of coronavirus disease 2019 (COVID-19) are known as COVID-19 Survivors. After recovery from COVID-19, Survivors faced multifarious health problems, still future research is required on disease and its long terms effects. Most of the COVID-19 survivors are suffering with Musculoskeletal system problems and they are affected by acute peripheral and respiratory skeletal muscle dysfunction accompanied by polyneuropathy and myopathy which resulted in decreased muscle strength, limited physical activity, impaired functional performance. Hence our study was undertaken with an intention to provide Body Weight exercises for COVID-19 Survivors to improve muscle strength.The aim of the study was to provide Body Weight exercises for COVID-19 Survivors.

Method: A randomized controlled trial was conducted on covid-19 Survivors by following PAR-Q and ACSM risk stratification. Covid-19 survivors were divided into 2 groups. Group-A and Group-B based on inclusion and exclusion criteria. The subjects were fully explained about the study and after getting their consent. The outcomes used in the study were 6minute walk test, sit and reach test. Group-A was treated with conventional exercises and group-B was treated with Body Weight exercises.

Result: The result of the study showed that there was a significant difference between the group -A and group-B. Statistical analysis of posttest vales of 6minute walk test and sit and reach test revealed that Covid-19 survivors who received Body Weight exercises in group-B showed marked improved compared to Group-A, the p value for both the outcomes are less than 0.001($P< 0.001$).

Conclusion: Statistical analysis of posttest vales of group-A and Group-B revealed that there was a significant difference between both the groups. This study concluded that both groups resulted in positive outcomes but group-B with Body Weight exercises showed higher level of positive outcome in improving muscle strength when compared with group-A.

Keywords

Coronavirus disease, COVID-19 Survivors, 6minute walk test, sit and reach test Muscle strength.

Introduction

Coronavirus disease 2019 also known as COVID-19 has spread worldwide which lead as a global pandemic “The World Health Organization (WHO) consequently declared COVID-19 to be a public health emergency of international concern”(Shanbehzadeh et al., 2021).Even though many patients recovered from COVID-19, some of them still experiencing some kind of symptoms for long time even after their COVID-19 polymerase chain reaction test turned

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negative and this is known as “Post-COVID-19 syndrome” or “long COVID.” As per guidelines by the National Institute for Health and Care Excellence (NICE), Post COVID-19 syndrome is defined as, “signs and symptoms that develop during or after an infection consistent with COVID-19, continuing for more than 12 weeks (3 months)” (Suvvari et al., 2021).

People recovered from the global pandemic of coronavirus disease 2019 (COVID-19) are known as COVID-19 Survivors. After recovery from COVID-19, Survivors faced multifarious health problems, still future research is required on disease and its long terms effects. Most of the COVID-19 survivors are suffering with Musculoskeletal system problems and they are affected by acute peripheral and respiratory skeletal muscle dysfunction accompanied by polyneuropathy and myopathy which resulted in decreased muscle strength, limited physical activity, impaired functional performance. For physical and mental conditions, including Musculoskeletal disorders, Physical activity is recommended as a preventive measure and it is considered as one of an independent predictor for successful healthy aging (AlOmar et al., 2021). Hence our study is undertaken with an intention to provide Body Weight exercises for COVID-19 Survivors to improve muscle strength.

Methodology

An Experimental study was conducted at Department of Physiotherapy, NRI General Hospital onCovid-19 Survivors by following PAR-Qand ACSM risk stratification. Convenient sampling method was used in the study, 30Covid-19 survivors were selected for the study based on inclusion and exclusion criteria. They were divided into 2 groups that is group-A and Group-B,15 subjects were allotted in group-A and 15 subjects were allotted group-B. After receiving IRB certificate from NRI College of Physiotherapy, NRI Academy of Sciences, the subjects were fully explained about the study, subjects were also explained about 6minute walk test, sit and reach test. An informed consent was received from the Covid-19 Survivors. Subjects who recovered from covid-19, Women and Men below 55 years of age were included in the study (Ramalingam et al., 2023). Subjects not recovered from covid-19, Subjects not effected with covid-19, high risk population were excluded from the study. As subjects were already explained about6minute walk test, sit and reach test their outcomes were measured before starting the treatment procedure. Group-A was treated with warm up exercises, breathing exercises, upper limb stretching, lower limb stretching, upper limb strengthening and lower limb strengthening exercises using a stretch band, all the exercises were performed with 12x3times for 5days per week for a period of 16weeks. Group-B was treated with warm up exercises, breathing exercises and body weight exercises which contains push-ups, squats, plank and burpee all the exercises are performed with 12x3times for 5days per week for a period of 16weeks**.**6minute walk test, sit and reach test their outcomes were measured after the treatment procedure. Data was extracted from the outcomes then Pre-test and post-test values were calculated and their results were analysed statistically between group-A and group-B.

Results and Discussion

The data was analyzed statistically by using inferential and descriptive statistics, mean and standard deviation was done by using paired and independent t tests. For between groups analysis of the pre-test and post- test values unpaired ‘T test’ was utilized. To find the analysis

of within group Paired T- test was utilized. Subjects were completely assessed and examined before starting the procedure. 30 subjects were recruited in this study and 15 subjects were allocated in each group. All subjects completed the physical examination and the procedure. They were assessed by using two outcome measures. They are six-minute walk test and sit-and-reach test. The data analysis revealed that the results of this study were statistically significant. In six- minute walk tests, the pre-test and post-test mean and standard deviation of group A was 4.3(0.41) and 5.27 (0.2) respectively. The statistical analysis showed that there was a significant difference in-between pre and post-test among the values ($P< 0.0001$). While the pre and post-test mean and standard deviation of group B was 5.38 (0.37) and 6.28(0.37) respectively. The statistical analysis shows that there was no significant difference in-between the pre and post-test with the p values ($P=0.98$). In between the post-test mean and standard deviation of both group A and Group B was 5.27 (0.2), 6.28(0.37) and there was a significant difference in-between the group A & B among the values of $p=0.05$. In sit-and-reach test the pre- test and post-test mean and standard deviation of group A was 2.1(10.1) and 3.8(9.4) respectively. The statistical analysis showed that there was a significant difference in between pre and post-test ($p<0.0001$). While the pre and post-test mean and standard deviation of group B was 2.9(9.8) and 4.15 (9.4) respectively. The statistical analysis shows that there was a significant difference in between the pre and post-test with the p values ($p=0.043$). In between the groups; group A and Group B the post-test means and standard deviation was 3.8(9.4) and 4.15 (9.4) and the statistical analysis shows that there was a significant change in-between the group A and group B among the values of $p<0. 0001$.Hence, between group analysis of post-test values of six-minute walk test and sit-and-reach test and in both groups shows that there is significant difference in the values with $p=0.05$ and $p<0.0001$ respectively.

COVID-19 is a respiratory disease which is very infectious and it also leads to dysfunction like psychological, respiratory and physical dysfunctions and 81% of COVID-19 infection people suffered with 88.7% of fever 57.6% of cough and 45.6% of dyspnea symptoms. People above 65 years suffered with comorbidities of hypertension and diabetes. In hospitalized patients 20.3% required ICU management. In a China study more than one-third patients who are hospitalized had neurological symptoms and later they developed long term complications of cardiac injuries and lung injuries (Filatov et al., 2020). The symptoms like dizziness, headaches, impaired consciousness, vision, taste/smell impairment, and nerve pain are common in 47%. Sepehrinezhad et al. (2020) and McNally et al. (2015) stated that sleep problems had impaired emotional and attentional regulation and caused concentration problems in COVID-19 survivors (Mao et al., 2020). Due to the novelty of the virus only limited studies are available about its late complications. Literature suggested that long-term complications can cause major injuries to the heart, kidneys, brain, and even blood vessels (Wang et al., 2020). Covid-19 survivors presented variety of long-term complications in different organs including a post-recovery syndrome also known as "post-COVID lung disease" (Nogueira, 2020). Respiratory failure and acute respiratory distress syndrome (ARDS) are also seen in some patients. Majority of critical patients had suffered with lung injuries and fatal multi organ failure as well as haemolytic anaemia (SeyedAlinaghi et al., 2021).There is a marked rise in COVID-19 patients and its survivors and there is increasing number of neuromuscular and rheumatologic complications in them.COVID-19 Survivors had developed disorders of musculoskeletal system which includes of muscles, nerves, joints, soft tissues, and bone related issues(Ramani et al., 2021) as described by World Health Organization these musculoskeletal system may also effect locomotor system(Tharani & Borkar, 2022).In communities these musculoskeletal pain is associated with impairment in functional activities and participation in work and other activities of daily living. For this kind of impairments physiotherapy interventions are designed to reduce pain, improve function and promote activity

(Alsobayel et al., 2021). There are tools available to measure functional activity and flexibility among them six-minute walk test is the most reliable and valid test to measure the functional capacity (Ubuane et al., 2018) it is a simpler and priceless test which quantifies the functional capacity using distance walked by the subject in six minutes. To quantify the flexibility there is a valid test called sit-and-reach test (Mayorga-Vega, 2014) where the distance is measured from fingertips-to-tangent feet, in this whole-body movement is involved. Improvement of Functional capacity is important in COVID-19 Survivors hence our study was undertaken with an intention to provide the effect of body weight exercises. The result of the study showed that there was a significant difference between the groups. Statistical analysis of posttest vales of 6-minute walk test and sit and reach test revealed that Covid-19 survivors who received Body Weight exercises in group-B showed marked improved compared to Group-A, the p value for both the outcomes are less than 0.001($P< 0.001$). Number of samples can be increased and this study with large sample size can be recommended, further study can be done with longer duration of treatment and long term follow up was recommended.

Conclusion

Statistical analysis of posttest vales of group-A and Group-B revealed that there was a significant difference between both the groups. This study concluded that both groups resulted in positive outcomes but group-B with Body Weight exercises showed higher level of positive outcome in improving muscle strength when compared with group-A.

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