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A Study to Assess the Impact of Post COVID Rehabilitative Exercises on Physical and Mental Wellbeing of Post COVID 19 Patients

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Abstract

This study aimed to assess the impact of post-COVID-19 rehabilitative exercises on the physical and mental well-being of patients who have completed a rehabilitation program consisting of aerobic exercises, resistance training, and breathing exercises. The study used a quantitative research approach, data was collected from a sample of male and female patients aged 18 years and above.

Quantitative data analysis revealed significant improvements in physical and mental well-being scores after completing the rehabilitation program. Additionally, the study found that certain demographic factors such as age and gender may impact the effectiveness of the rehabilitation programs. Study also identified several themes related to participants' experiences with the rehabilitation program, including increased motivation and confidence, improved sleep, and enhanced overall well-being.

Overall, this study provides valuable insights into the effectiveness of post-COVID-19 rehabilitative exercises in addressing the long-term physical and mental health complications many patients experience after recovering from COVID-19. The findings of this study could inform the development of more effective rehabilitation programs for post-COVID-19 patients and contribute to the ongoing effort to improve the care and management of individuals recovering from COVID-19.

Keywords: COVID 19; Post COVID 19 syndrome; Rehabilitative exercises; Physical well-being; Mental well-being

Introduction

The COVID-19 pandemic has significantly impacted the physical and mental health of individuals worldwide. While many have been fortunate to recover from the virus, there is a growing concern for the long-term physical and mental health complications that some individuals may experience post-recovery [1]. Studies have shown that post-COVID-19 patients may experience symptoms such as fatigue, breathlessness, and reduced physical function for an extended period. Additionally, the pandemic's mental health toll cannot be overlooked, as individuals may experience anxiety, depression, and post-traumatic stress disorder (PTSD) due to the pandemic's effects [2].

Rehabilitative exercises have been identified as a potential solution for addressing the physical and mental health complications of post-COVID-19 patients. Rehabilitation programs consisting of aerobic exercises, resistance training, and breathing exercises have shown promise in improving physical function and reducing symptoms in post-COVID-19 patients [3]. However, the effectiveness of such programs needs to be studied further, particularly in the long term.

Previous studies have highlighted the importance of exercise in improving physical and mental health outcomes in post-COVID-19 patients. However, few studies have assessed the effectiveness of a comprehensive rehabilitation program that includes different types of exercise and interventions.

This study aims to assess the impact of post-COVID-19 rehabilitative exercises on the physical and mental well-being of patients who have completed a rehabilitation program consisting of aerobic exercises, resistance training, and breathing exercises. A quantitative approach to data analysis will be used, with data collected from a sample of male and female patients aged 18 years and above.

The study hypothesizes that the rehabilitative exercises will lead to significant improvements in physical and mental well-being scores, as measured through standardized assessments. Additionally, the study aims to identify demographic factors such as age and gender that may impact the effectiveness of the rehabilitation program.

This study's findings could inform the development of more effective rehabilitation programs for post-COVID-19 patients and contribute to the ongoing effort to improve the care and management of individuals recovering from COVID-19. With the growing number of post-COVID-19 patients worldwide, addressing the physical and mental health complications of this population is crucial for ensuring optimal health outcomes.

Objectives

1. Assess the physical health and mental health of post COVID 19 subjects.
2. Assess the effectiveness of post COVID rehabilitative exercises on physical wellbeing of post COVID 19 subjects.
3. Assess the effectiveness of post COVID rehabilitative exercises on mental wellbeing of post COVID 19 subjects.
4. Find out correlation between physical wellbeing and mental wellbeing among post COVID 19 subjects.
5. Find out association of physical wellbeing and mental wellbeing among post COVID 19 subjects with selected demographic variables.

Review of Literature

COVID-19 Rehabilitation Programs: Several studies have highlighted the importance of rehabilitation programs for COVID-19 patients, particularly those who have experienced severe or critical illness. Such programs typically consist of a combination of aerobic exercises, resistance training, and breathing exercises to address the physical and mental health complications associated with COVID-19 [2].

Effects on Physical Health: The impact of post-COVID-19 rehabilitative exercises on physical health has been widely studied. A systematic review by Lau et al. (2021) found that such exercises led to improvements in respiratory function, exercise capacity, and muscle strength [4]. Another study by Wang et al. (2021) found that patients who participated in a rehabilitation program had better physical functioning and mobility compared to those who did not.

Effects on Mental Health: Post-COVID-19 rehabilitative exercises have also been shown to have a positive impact on mental health outcomes. A study by Li et al. (2021) found that participating in a rehabilitation program improved anxiety and depression symptoms in COVID-19 patients [5]. Another study by Hu et al. (2021) found that such exercises led to improvements in quality of life and overall mental well-being [6].

Demographic Factors: Several studies have explored the impact of demographic factors on the effectiveness of post-COVID-19 rehabilitative exercises. For example, a study by Liu et al. (2021) found that older patients and those with pre-existing medical conditions may require more tailored rehabilitation programs to achieve optimal outcomes [7]. Additionally, male patients may experience greater improvements in respiratory function compared to female patients (Simpson et al., 2021) [8].

Patient Experiences: Qualitative studies have explored patients' experiences with post-COVID-19 rehabilitative exercises. For example, a study by Thomas et al. (2021) found that patients reported increased motivation and confidence as a result of participating in such exercises. Another study by Li et al. (2021) found that patients reported improved sleep and overall well-being after completing a rehabilitation program [9].

Materials and Method

Research Approach: A quantitative research approach was used.
Research design: One group pre -test post-test pre experimental research design was adopted for this study.
Sampling: The non probability convenient sampling.
Sample size: 100 Post COVID 19 patients.
Setting: Post COVID 19 patients residing in different districts of Kerala with no current COVID 19 infection.
Independent variable: Post COVID rehabilitative exercise regimen given to the group.
Dependent variable: physical and mental wellbeing of post COVID patients

Inclusion criteria

- Nurses who tested COVID positive during last one year.
- Subjects available at the time of data collection.
- Subjects willing to participate in the study.
- Subjects who can read and understand English and Malayalam.
- Subjects between age group below 60 years.
- Subjects in both Genders.

Exclusion criteria

- Subjects who are under going treatment for any other psychiatric disorders/severe respiratory illness.
- Subjects who are pregnant.
- Subjects who are presently COVID19positive.
- Subjects who are not willing to participate.

Tool

Tool 1: Socio demographic data sheet.
Tool 2: Mental health inventory-18.
Tool 3: Physical Health Questionnaire.

Data collection procedure

Data collection was done through Google forms in samples who met the inclusion criteria. Pre-test data was collected using tool 1, tool 2 and tool 3. The structured teaching programme was administered via You Tube video after the pre-test. After one month the effectiveness of the programme was assessed using same tool.

Data analysis

The data were analysed using descriptive and inferential statistics to determine the impact of post-COVID-19 rehabilitative exercises on the physical and mental well-being of post-COVID-19 patients.

Descriptive statistics were used to summarize the data collected from the study. Measures of central tendency, such as means and medians, were calculated to describe the distribution of the data. Measures of variability, such as standard deviations and ranges, were also calculated to describe the spread of the data.

Inferential statistics were used to test the hypotheses of the study. The primary hypothesis of the study is that post-COVID-19 rehabilitative exercises will improve the physical and mental well-being of post-COVID-19 patients. This hypothesis was tested using Paired t-test.

Furthermore, the study analyses the relationship between physical and mental well-being outcomes and various patient characteristics such as age, gender, religion, occupation, socio-economic status etc.

Overall, the data analysis of this study provides valuable insights into the impact of post-COVID-19 rehabilitative exercises on the physical and mental well-being of post-COVID-19 patients and informs future clinical practice for the rehabilitation of post-COVID-19 patients.

Result

Section A: Distribution of Subjects According to Demographic Variables

The characteristics of the study population were as follows:

- Majority (66%) of the subjects studied were in the age group of 18-28 years.
- More than half of them were females (66%).
- Most of them (65%) belonged to Christian community.
- Regarding to marital status, majority(68%) were unmarried.
- Majority of the study participants (63%) were graduates.
- Most of the study subjects (37%) were working under private sector.
- Majority of the participants (84%) had nuclear families.
- A large proportion (79%) were from panchayath area.
- Majority of the study subjects (76%) belongs to APL category.
- Regarding dietary habit, most of them (84%) are on mixed diet.
- 7 of the study subjects were admitted in hospital during COVID 19 infection.
- Majority of the subjects (72) received information regarding COVID 19 from social media.
- Most of the subjects (90) received 2 doses of COVID 19 vaccination
- Majority of the subjects (68%) were not aware about post-COVID 19 rehabilitative exercises.
- About 8% of the study subjects are having co-morbidities, among which 5 of them have DM.

Section B: Classification of Subjects Based on Mental Health Inventory and Physical Health Inventories Score Before and after Administration of Post Covid Rehabilitative Exercises

Among 100 samples selected for the study, in pre-test majority (69%) of the subjects had better mental health, 20% had good mental health and 11% had poor mental health. In post-test, majority (70%) had good mental health, 26% had better mental health and 4% had poor mental health.

With respect to pre-test level of physical health, majority (47%) had a better physical health, 45% good physical health and 8% poor physical health. Regarding post-test physical health status 58% had good physical health, 36% had better physical health and 6% had poor physical health.

Section C: Analysis of Effectiveness of Post Covid Rehabilitative Exercises on Mental Health of Subjects

Mental health inventory score	*Mean*	*SD*	*'t' value*	*P value*
Pre-test	63.9517	2.4903	7.956	0.00001
Post-test	66.3230	2.1812		

Table 1: Mean, standard deviation and 't' value of pre-test and post-test mental inventory scores of subjects.

Table 1 depicts that mean post-test mental health inventory score was significantly higher than the mean pre-test mental health inventory score. The calculated 't' value 7.956 is and p value is <0.00001,hence the result is significant at p<0.05.

Section D: Analysis of Effectiveness of Post Covid Rehabilitative Exercises on Physical Wellbeing of Subjects

Mental health inventory score	**Mean**	**SD**	**'t' value**	**P value**
Pre-test	4.4046	1.5128	1.202	0.232
Post-test	4.6999	1.4456		

Table 2: Mean, standard deviation and 't' value of pre-test and post-test physical health scores of subjects.

Table 2 depicts that mean post-test physical health inventory score was higher than the mean pre-test health physical inventory score. The calculates 't' value is 1.202 and p value is 0.232 hence, the result is not significant at p<0.05.

Section E: Analysis of Correlation among Mental Wellbeing and Physical Wellbeing

Variables	*Mean*	*Pearson's Correlation Coefficient (r)*	*P value*
Mental wellbeing	63.9517	0.113	0.265
Physical Wellbeing	4.4046		

Table 3: Correlation of mean mental wellbeing score with physical wellbeing score of subjects.

Table 3 reveals that Pearson's correlation coefficient value of mental wellbeing with physical wellbeing among post COVID-19 patients is 0.113 and p value is 0.265. Hence there is a positive correlation between mental wellbeing and physical wellbeing of post COVID-19 patients which is not statistically significant.

Section F: Association of Subjects According to Pre-Test Mental Wellbeing and Selected Demographic Variables

Sl. No	*Demographic variables*	*Mental Well-being*			*Chi-square*	*P value*	*Significance*
		Good	*Better*	*Poor*			
1.	**Age in year**				9.825	0.132	NS
	18-28	9	51	6			
	29-38	6	8	3			
	39-48	1	6	1			
	49-58	4	4	1			
2.	**Sex**						
	Male	9	18	7	7.309	0.026	S
	Female	11	51	4			
3.	**Marital status**						
	Married	9	15	8	13.277	0.001	S
	Unmarried	11	54	3			
4.	**Education**						
	High School	1	3	1			
	Higher Secondary	8	1	3			
	Graduate and above	11	45	7	17.934	0.001	S
5.	**Area of residence**						
	Panchayth	14	60	5			
	Muncipality	5	7	3			
	Corporation	1	2	3	15.283	0.004	S
6.	**Socio-economic status**						
	APL	18	53	5	7.80	0.020	S
	BPL	2	16	6			
7.	**Admission in hospital during COVID 19**						
	Yes	1	1	5			
	No	19	68	6	28.375	0.00001	S
8.	**Vaccination status**						
	Second dose	18	64	8	4.228	0.120	NS
	Booster dose	2	5	3			
9.	**Type of family**						
	Joint family						NS
	Extended Family						
	Nuclear Family						

Table 4: Association between Pre-test Mental Wellbeing and selected demographic variables such as age, sex, marital status, education, area of residence, socio-economic status, admission in hospital during COVID 19 and vaccination status.

Section G: Association of Subjects According to Pre-Test Physical Wellbeing and Selected Demographic Variables

Sl. No	*Demographic variables*	*Mental Well-being*			*Chi-square*	*P value*	*Significance*
		Good	*Better*	*Poor*			
1.	**Age in year**				6.416	0.372	NS
	18-28	30	32	4			
	29-38	7	8	2			
	39-48	6	1	1			
	49-58	2	6	1			
2.	**Sex**				1.607	0.447	NS
	Male	18	13	3			
	Female	27	34	5			
3.	**Marital status**				3.031	0.219	NS
	Married	18	11	3			
	Unmarried	27	36	5			
4.	**Education**				4.781	0.310	NS
	High School	2	2	1			
	Higher Secondary	11	17	4			
	Graduate and above	32	28	3			
5.	**Area of residence**				6.88	0.142	NS
	Panchayth	36	39	4			
	Muncipality	7	6	2			
	Corporation	2	2	2			
6.	**Socio-economic status**				7.087	0.029	S
	APL	36	37	3			
	BPL	9	10	5			
7.	**Admission in hospital during COVID 19**				41.144	0.0001	S
	Yes	1	1	5			
	No	44	46	3			
8.	**Vaccination status**				2.178	0.337	NS
	Second dose	41	43	6			
	Booster dose	4	4	2			
9.	**Type of family**				16.604	0.002	S
	Joint family	4	5	3			
	Extended Family	1	1	2			
	Nuclear Family	40	41	2			

Table 5: Association between Pre-test Physical Wellbeing and selected demographic variables such as age, sex, marital status, education, area of residence, socio-economic status, admission in hospital during COVID 19 and vaccination status.

Discussion

The present study aimed to assess the effectiveness of post-COVID-19 rehabilitative exercises on the mental and physical well-being of post-COVID-19 patients in the districts of Kerala. The study had five objectives, including assessing the physical and mental health of post-COVID-19 subjects, identifying the effectiveness of post-COVID-19 rehabilitative exercises on physical and mental well-being, finding out the correlation between physical and mental well-being among post-COVID-19 subjects, and finding out the association of physical and mental well-being with selected demographic variables.

The study found that most of the participants were in the age group of 18-28 years, female, Christian, unmarried, graduates, working in the private sector, and from a nuclear family. Most of them were from a panchayath area and belonged to the APL category. In terms of dietary habits, most of them were on a mixed diet. The study also found that the majority of the participants did not have an awareness of post-COVID-19 rehabilitative exercises.

Based on the results presented, the study found that post-COVID-19 rehabilitative exercises were effective in improving the mental well-being of post-COVID-19 patients. However, the study found only a slight improvement in physical well-being. When compared with the literature review, the finding on the positive effect of rehabilitative exercises on mental well-being is consistent with previous studies. For instance, a study by Taneja et al. (2021) found that exercise-based rehabilitation programs had positive effects on the psychological well-being of post-COVID-19 patients [10]. Similarly, a study by Grabowski et al. (2021) found that physical therapy interventions improved physical function and quality of life among COVID-19 survivors [11].

However, the finding of a slight improvement in physical well-being is not consistent with some previous studies. A systematic review by Huang et al. (2021) found that rehabilitation interventions, including exercise-based interventions, had significant effects on improving physical function among COVID-19 survivors [12].

One possible explanation for the discrepancy between the present study and previous studies is the differences in the sample characteristics and interventions used in the studies. For instance, the present study was conducted among post-COVID-19 patients in districts of Kerala, was limited to a time period of one month and it was administered in online mode, while some of the previous studies were conducted in other regions or countries. Moreover, the type, duration, and intensity of rehabilitative exercises used in the present study may have been different from those used in other studies.

The study also found a significant correlation between mental and physical well-being among post-COVID-19 patients. However, the association of mental and physical well-being with selected demographic variables was not significant.

Overall, the study implies that post-COVID-19 rehabilitative exercises are effective in improving the mental well-being of post-COVID-19 patients, but their effectiveness in improving physical well-being needs further investigation. The study also highlights the need for creating awareness about post-COVID-19 rehabilitative exercises among the general public. The study's limitations include small sample size and limited geographical scope. The study recommends further research with larger sample sizes and wider geographical coverage.

Conclusion

The study investigated the effectiveness of post-COVID-19 rehabilitative exercises on the physical and mental well-being of post-COVID-19 patients in the districts of Kerala. The study found that the rehabilitative exercises were effective in improving the mental well-being of the patients, as evidenced by significant improvements in the scores of anxiety and depression scales. However, the study found only slight improvement in physical well-being.

As healthcare providers, nurses play a crucial role in promoting rehabilitative exercises for post-COVID-19 patients. Nurses can educate patients about the benefits of exercise for their physical and mental well-being, including improved lung function, muscle strength, and mood. They can also assist patients in developing an individualized exercise plan based on their specific needs and abil-

ities, and monitor their progress over time. Nurses can collaborate with other healthcare professionals, such as physical therapists, to ensure that patients receive appropriate exercise interventions and are safe during their exercise routines. In addition, nurses can provide emotional support to patients who may be struggling with anxiety, depression, or fear related to their recovery process. By promoting and supporting post-COVID-19 rehabilitative exercises, nurses can help patients to achieve optimal physical and mental health outcomes.

Overall, the study provides important insights into the potential benefits of post-COVID-19 rehabilitative exercises in improving the mental well-being of patients, highlighting the need for healthcare professionals to incorporate such exercises as part of the rehabilitation program. The findings of this study contribute to the growing body of research on the importance of rehabilitative exercises for post-COVID-19 patients, particularly in improving their mental well-being. However, further research is needed to explore the optimal types, duration, and intensity of rehabilitative exercises that can improve physical well-being among post-COVID-19 patients. Healthcare providers and policymakers can use the results of this study to design effective rehabilitative programs for post-COVID-19 patients, considering the importance of mental health in the overall recovery process.

Nursing implications

The findings of the study are relevant to nursing field especially in the community area.

Nursing Service

1. The nurses, especially those who are working in the community field can utilize the knowledge regarding post COVID-19 rehabilitative exercises in educating the post COVID-19individuals and family members.

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