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Efficacy of homoeopathy in treating post-COVID fatigue in adults using fatigue assessment scale

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Abstract
One of the disease that has been and is still in the talk of the world, is COVID-19 and its variants and its complications. These are caused by the virus SARS-COV-2. The Novel corona (COVID-19), marked its start in 2019, with the first case appearing in Wuhan, China during the month of December. In India, the first case was recorded in Kerala in January 2020[1]. In Telangana, the first case was reported in March 2020. It is a droplet or airborne infection which has been widespread in 3 waves across the world by different variants of the virus (alpha, beta, delta, gamma, omicron being the latest) and now a new variant of omicron namely Omicron BF.7 has been escalating lately. It mainly affects the respiratory system causing mild to severe pneumonia. Other symptoms include anosmia, ageusia, dyspnoea, fatigue, sore throat, fever, abdominal pain, vomiting, diarrhoea, etc. It is diagnosed mainly by RT-PCR testing, other tests include TMA and RT-LAMP. Thus, the main aim of this study is to assess the severity of fatigue in post-COVID-19 in adults by using the Fatigue assessment scale and to find the efficacy of homoeopathic remedies in treating this post-COVID fatigue. The objective is to evaluate the severity of post-COVID fatigue and to find the efficacy of homoeopathy in treating post-COVID fatigue.

Keywords: Post COVID weakness, homoeopathy, FAS scale

1. Introduction
The prime topic of discussion at present, is the impact of COVID on the positive tested population which sums up the post COVID symptoms also known as 'long COVID'. They include fatigue, dyspnoea, muscle weakness, problems in sleeping and memory, persistent cough, chest pain, anosmia, and ageusia [1].
These complications are termed post COVID symptoms when they last for 4 weeks or more from the date of detection positive for COVID according to 'CDC' [2].

1.1 Post-COVID Fatigue
Fatigue is defined as "a subjective, unpleasant symptom which incorporates total body feelings ranging from tiredness to exhaustion creating an unrelenting overall condition which interferes with individual's ability to function to their normal capacity". It is the most prevalent symptom in patients with long COVID-19. it could be physiological i.e., due to everyday work or due to a pathological for example anaemia, or he may also refer it to as in case of dyspnoea or muscle fatigue or low mood, somnolence, difficulty in concentration or weakness in general.[3] Patients describe fatigue as both physical- unable to perform physical activities efficiently as the person used to prior to COVID and mental i.e., weakness of memory, difficulty in concentrating, and difficulty in cognitive functions [3].
Many viral diseases (epidemic or non-epidemic diseases) have exhibited post-viral fatigue. For example:

a) **Epidemic viral diseases:** influenza (AH1N1), SARS COVID
b) **Non-epidemic diseases:** in post-Epstein Barr virus fatigue was one of the symptoms, tick-borne encephalitis.

Prevention of long COVID can be possible only by the prevention of the disease which includes social distancing, use of masks covering nose and mouth, sanitization, taking healthy food, and vaccination [3].
The persistence of fatigue for months after the attack of the acute infection is what is to be taken into consideration. The persistence of fatigue for more than 6 months accounts for it to be chronic fatigue [4].

Even though a proper definition for long COVID has not been derived but there has been a persistent clinical diagnosis of post COVID fatigue gaining the attention of the media and public.

1.2 Aetiology of Post COVID weakness

Long COVID is frequently characterized by persistent weariness, which has numerous underlying causes. They are: [5]

- Pre-existing anxiety
- Female sex
- Old age
- Pre-existing comorbidity
- Pre-existing autoimmune disease or elevated antinuclear antibodies
- More children
- Higher levels of ferritin or vitamin D
- Initial disease severity/duration

1.3 Pathophysiology of Post COVID fatigue

Inspite of significant efforts to explain the pathogenic mechanisms of fatigue, the current knowledge is limited. This may be due to the fact that the cause of fatigue often cannot be attributed to a single source. But factors like changes in neurotransmitter levels, inflammation, psychiatric disorders, psychosocial burden, cognitive dysfunction and substrate metabolism/availability are potential contributors to fatigue [5].

There were also indications among patients that abnormalities in the central nervous system, such as brain hypometabolism, may have contributed to its start. Its physical aspect might be influenced by muscle mitochondrial malfunction, and environmental and psychological variables are also probably at play. According to one study, impaired brain glymphatic outflow could cause cerebrospinal fluid to get clogged and toxins to build up inside the brain causing fatigue [6].

Also, specific conditions of post COVID are coded under the ICD10 classification [7]. ICD classification has been made for COVID-19, Post COVID conditions and also condition post-vaccination. The code for post-COVID-19 conditions under ICD 10 is U09 [7]

And under ICD11 is RA02 [7].

1.4 Diagnosis

The specific investigations required for the diagnosis of post COVID fatigue or post COVID conditions are not clear. Presently it is based on the symptomatic diagnosis.

There is a lot of scope for research in this field.

1.5 Fatigue assessment scale

The fatigue assessment scale (FAS) is one of the valid and reliable scales used in the assessment of fatigue. It is a 10-questioned, unidimensional structure that helps in evaluating all the aspects namely, the mental and physical fatigue along with the quality of life. The scale has been validated in the population of both male and female respondents of mean ages of 45 ± 8.4 years and 43 ± 9.5 years. The developers Michielsen and colleagues evaluated the scale's psychometric properties which attained an internal consistency of .90. Rand likewise was used in various studies which confirm its validity and reliability. The scale also corresponds to the subscales related to fatigue (Checklist Individual Strength) [8].

1.6 Management

1. The general management includes

- Limiting daily activities and taking proper rest and limiting physical exertion [9]
- Taking a nutritious diet- taking proper portions of proteins, vitamins, and carbohydrates is very important.[9]
- Exercise- breathing exercises, physical exercises and yoga prove to be advantages [10].
- CBT[11]
- Counselling the patient

2. Homoeopathic Management

- Homoeopathic management is given based on the totality of symptoms and the susceptibility of the patient. This is done by proper case taking [12].
- Many remedies can be given for post COVID fatigue [13]

2. Materials and Methods

A sample of not less than 20 that fall in the age group of 18-60 years from the OP and peripheral clinics of MNRHMC, Sangareddy and included under the inclusion and exclusion criteria were collected through screening provided, the patient tested positive for covid about 4 or more weeks ago and must be showing symptoms of weakness which were screened by using fatigue assessment scale (FAS).

The score is considered as a total of >20.

Then a detailed case that included the onset, duration and progression of the disease was taken and a homoeopathic remedy was prescribed. The remedy and its dosage were based on the principles of Homoeopathy, the totality of symptoms and the susceptibility of the patient. Repertorization of the case is done only if required. The progress was assessed with the FAS scale.

Scoring using FAS

The scoring of each question carries a maximum of 5 points which sums to a maximum of 50 points and a minimum of 10 points. A score of >22 points marks, prominent fatigue and is considered for the study [14].

Table 1: Grading of the severity of fatigue using FAS

Score	Grade of fatigue
10-21	No fatigue
22-34	Moderate fatigue
≥35	Extreme fatigue

Then the analysis of the result was done using paired t-test.

2.1 Materials

- Patients after screening
- FAS scale
- Homoeopathic remedies from Homoeopathic Pharmacy

2.2 Inclusion criteria

- Those between the age of 18-60 years
- Sex- both
- Those willing to take homoeopathic medication.
- Those willing to answer the questionnaires required.
- Fatigue for at least 4 weeks from the diagnosis of COVID-19
- Fatigue score of- >20

2.3 Exclusion criteria

- Patients below 18 years and above 60 years of age.
- Already under treatment by other Homoeopathic practitioners or under any other system of medicine
- Diagnosed as chronic fatigue syndrome, fibromyalgia or any other organic disease before COVID
- Pregnant women/breastfeeding women
- Diagnosed for any chronic psychiatric illness before COVID.

A written consent form is taken from the patients and ethical clearance is obtained from the institution.

3. Results

3.1 Distribution of gender among the participants

Table 2: Percentage distribution of males and female

Gender	Number of Participants	Percentage
Female	14	70%
Male	6	30%

Out of the total 20 participants, 70% (14) of participants were female and 30% (6) participants were male.

3.2 Age distribution among participants

Table 3: Distribution of patients according to age

Age group	Number of participants	Percentage
20-25	5	25%
25-30	3	15%
30-35	2	10%
35-40	0	0
40-45	4	20%
45-50	4	20%
50-55	2	10%

From the study of 20 participants, it is found that the participants of age groups 20-30 years and those of the age group 40-50 years (40% each) are more affected by post COVID fatigue than those of the other age groups.

3.3 Distribution of Age to the number of males and Females

Table 4: Table showing the number of individuals, number of males and females affected by post-COVID fatigue.

Age Group	Number of Participants	Percentage	Number of Males	Percentage of males	Number of Females	Percentage of females
20-30	8	40%	3	37.5%	5	62.5%
31-40	2	10%	1	50%	1	50%
41-50	8	40%	1	12.5%	7	87.5%
51-60	2	10%	1	50%	1	50%

Among 20 participants who participated in the study females (7) 35% of the total number of participants, of the age group 40- 50 years were more affected than the males of the same age group, also this age group was more affected than the female and male participants of the other age groups.

3.4 FAS Score before treatment and the number of patients with the gradation of severity

Table 5: Distribution of patients according to the severity of fatigue

FAS Score Range	Severity	No. of participants	Percentage of patients
10-21	No fatigue	0	0%
22-34	Moderate fatigue	11	55%
≥35	Extreme fatigue	9	45%

The FAS Scale is used to estimate the severity of fatigue in each individual. These two graphs indicate the same for the 20 patients who participated in the study in which 7 (35%) patients have severe fatigue. And also there were no patients with mild fatigue.

3.5 Distribution of age to the severity of fatigue

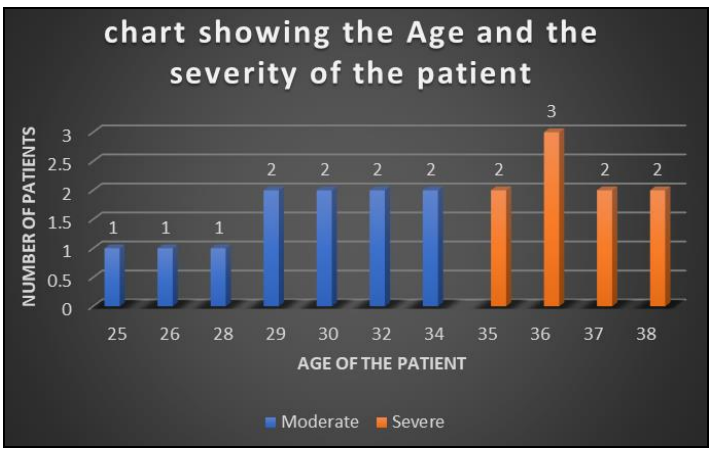
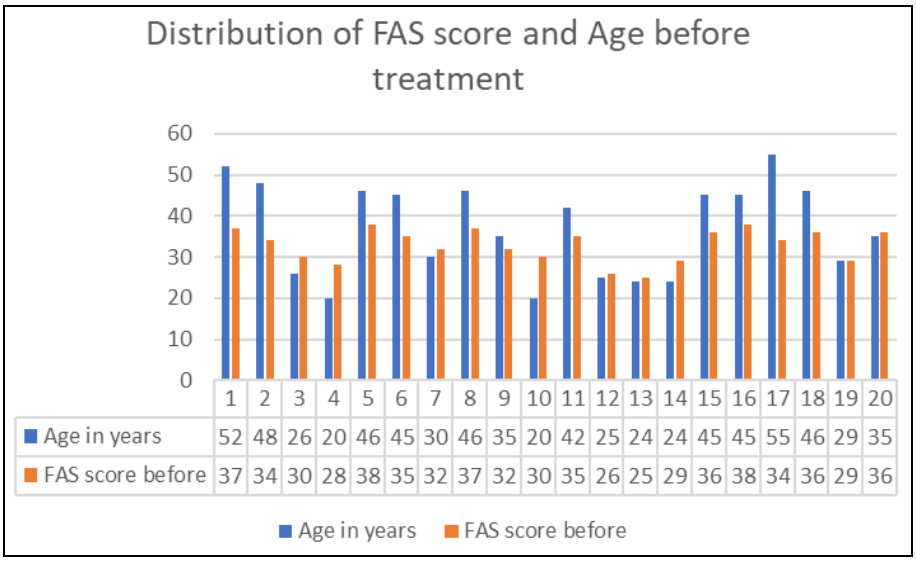


Chart 1: Table depicting the FAS score and severity of fatigue

Based on the previous tables and graphs 45% of patients (9) were suffering from severe fatigue while 55% of participants (11) were suffering from moderate fatigue. Cases of mild fatigue were not found.

3.6 Distribution of Age and FAS scores before treatment in 20 patients



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Age in years	52	48	26	20	46	45	30	46	35	20	42	25	24	24	45	45	55	46	29	35
FAS score before	37	34	30	28	38	35	32	37	32	30	35	26	25	29	36	38	34	36	29	36

Fig 1: Table showing the age and the FAS scores before treatment

Among the 20 participants, the patients of the age group >30 years were more severely affected than those of the age group < 30 years.

3.7 Remedies Prescribed to Participants

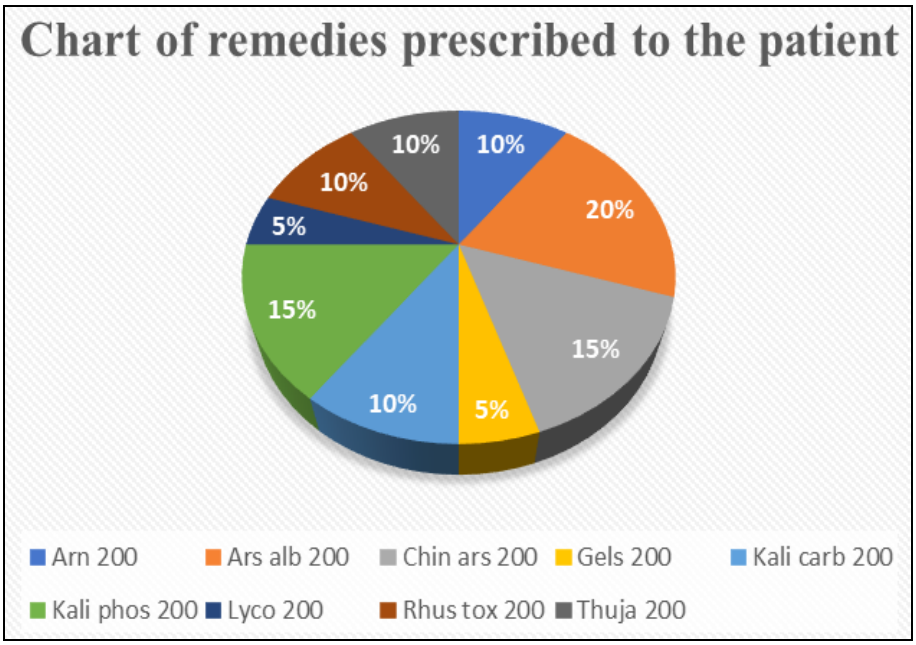


Fig 2: Percentage distribution of the remedies given to patients

The remedy that was most indicated among the patients was Ars alb 200-20% i.e., among 8 patients then in the order came Kali phos 200 and Chin ars 200:15% i.e., 3 patients each.

3.8 Distribution of FAS scores before and after treatment in 20 patients

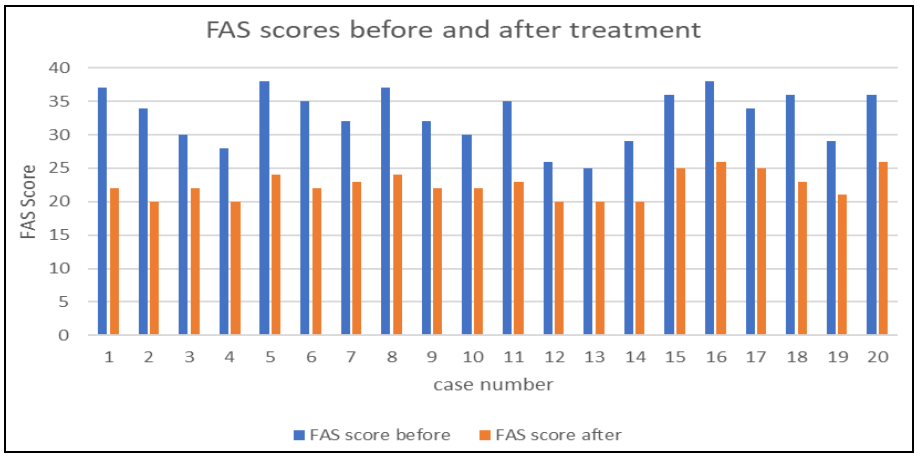


Fig 3: Table showing the FAS scores before and after treatment

The remedies given based on the individualization of the patient were very effective which explains the decrease in the FAS scores after subsequent follow-ups and also the improved health of the patients.

3.9 Statistical Analysis

The statistical analysis is performed by comparing the mean and median of the FAS scores before and after the treatment.

Table 6: Statistical analysis

t-Test: Paired Two Sample for Means		
	FAS score before	**FAS score after**
Mean	32.85	22.5
Variance	16.23947	4.052632
Observations	20	20
Pearson Correlation	0.762307	
Hypothesized Mean Difference	0	
df	19	
t Stat	16.44341	
P(T<=t) one-tail	5.41E-13	
t Critical one-tail	1.729133	
P(T<=t) two-tail	1.08E-12	
t Critical two-tail	2.093024	

3.10 Inference

Degrees of freedom: 19

The t-test shows that: the value of $p < 0.001$

Which means that the alternate hypothesis that states that post COVID fatigue can be effectively treated by homoeopathy stands true.

4. Discussion

Post COVID fatigue is one of the leading symptoms of long-COVID and it must be differentiated from the weakness caused by other diseases which is of significant importance as fatigue can be caused due to other diseases like diabetes mellitus, neurological conditions, etc. Owing to the increased incidence of this complaint suitable treatment must be administered. Post COVID fatigue can be effectively treated by homoeopathic medications. Furthermore, researches related to this topic are a prerequisite to understanding the pathophysiology and also the necessary steps to be taken to treat the condition.

In this study, females were found to be affected by post covid fatigue more than males. Likewise, according to the study Post – COVID syndrome – a case series and comprehensive review by JUAN- Manuel Anaya, Manuel Rojas, Martha L. Salinas et al, females were affected more than males and fatigue was the most prominent symptom of post covid syndrome. The study indicates that more number of patients at their 20's i.e., 8 (40%) participants and another 40% of participants were in the age group 40-55 years. A similar result was presented by André Saine at the Joint American Homeopathic Conference Global Summit on June 12, 2020, in her paper A Homeopathic Perspective to the Chronic and Post-COVID-19 Syndromes where among the long haulers, 11% were in their 20s, 30% in their 30s, 32% in their 40s, 20% in their 50s. The study also indicates that the age group of (30-55) were affected with more severity while According to Maarten Van Herck, Yvonne M J Goërtz, Sarah Houben-Wilke et al in their research study Severe Fatigue in Long COVID: Web-Based Quantitative Follow-up Study in Members of Online Long COVID Support Groups found that participants were usually severely affected by post covid fatigue according to scoring and were of the age group 50 years From my study the results show that Arsenic album, Kalium phosphoricum and Chininum arsenicosum prove to be effective in treating post covid fatigue. Similarly, Vishali Shinde and Ramesh Bawaskar in their article Homoeopathy for post- COVID-19 illnesses: A case series in the Indian Journal of Research in Homoeopathy found that Bryonia alba is very useful in treating post COVID sequelae while Dr. Shwetha Tiwari in her article Post COVID 19 syndrome and homoeopathy in the journal Homoeo Heritage recommended medicines like Chininum arsenicosum, kalium phosphoricum, gelsemium,

Arsenicum album, psorinum, Avena sativa, coca, Carbo vegetabilis.
From the results obtained the p-value is looked for since the p-value is lesser than 0.001, and the study is significant.
From the study the following conclusions are drawn:

- Females (70%) suffered from weakness more than males (30%).
- The range of FAS score before the treatment of fatigue ranges from high to moderate to severe in the participants of the age group 35-50 years (45%).
- The more affected age groups among the participants were 20-30 years and 40-50 years.
- Even though the number of participants in the age group 20-30 years were many but, the severity of the weakness or fatigue was comparatively moderate.
- The remedies Ars alb, Kali phos, and Chin ars were indicated often among all the medicine administered.
- Along with the remedy, prescription of diet, counselling and exercises is important.

4.1 Limitations

- The study sample is small.
- A detailed study on all the aspects of post covid fatigue could not be covered owing to the shorter duration of the study.
- The study is not randomized control trailed, case-controlled or blinded study so there may be a change in the results obtained if it is done in these procedures.
- It is not a comparative study to describe the effectiveness or duration of recovery with respect to other systems of medicine.

4.2 Recommendations

- Performing the study by case-control method or blinded method could be more useful.
- Randomized control trials would be a better approach for the study
- A larger sample size could give a clearer picture of the condition
- Comparative studies using different medicines of homoeopathy and also other systems of medicine could be done.
- From this study it is found that the age group >30 years were affected. So researchers could focus on this group in future.

5. Conclusion

Long COVID is one of the major problems ever since people were affected by COVID- 19. It is a new spectrum of disability conditions that are under research. This study shows that females 70% (14) were more affected than males 6 (30%) this could be with respect to the area from which the cases were taken. The age group above 30 years (45%) is more prone towards the severity of fatigue. The patients of the age group below 30 years had a speedy recovery than otherwise which also might be due to less severity of the condition as this age group was moderately affected and the patients of the age group above 40 years took more time to be cured. Even though they consulted for 4-5 follow-ups, still fatigue was present. The FAS scores before and after the treatment show a good progress of the patient. The homoeopathic remedies like Arsenicum album were effective among many patients (20%) and then in the race are Kalium phosphoricum, Chininum arsenicosum (15%). The p-value is lesser than 0.001 showing a high significance.

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