



Physiotherapy

A CROSS SECTIONAL STUDY TO EVALUATE PSYCHOMETRIC PROPERTIES AND FUNCTIONAL CAPACITY AMONG ADOLESCENTS WITH LONG COVID-19

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ABSTRACT **Context:** Long COVID-19, a condition characterized by persistent symptoms and functional impairment following acute COVID-19 infection, has been reported in both adults and children. However, limited research exists on the psychometric properties and functional capacity of adolescents with long COVID-19. This cross-sectional study aims to assess the psychometric properties index and evaluate the functional capacity among adolescents with long COVID-19. **Methods:** The study was conducted among 100 adolescents aged 12 to 16 years with history of COVID-19 and persistent symptoms for more than 12 weeks (without checking diagnosis report to avoid misapprehension). Psychometric properties of selected participants were evaluated using Psychometric Properties Questionnaire Index and Functional capacity was assessed using Six Minute Walk Test. Data was analyzed using graph pad and Microsoft Excel. **Results:** The study showed that the distance covered by adolescents was 594±56.16 suggesting reduced functional capacity without affecting their day to day life and the psychometric properties of the selected adolescents moderately involves COVID-19 symptoms such as early Fatigue, Headache, Chills, Fever and concentration difficulties. **Conclusion:** Functional capacity was reduced and based on the psychometric properties questionnaire index adolescents are affected moderately involving long COVID-19.

KEYWORDS : Long COVID-19, Adolescents, Psychometric Properties, Functional Capacity, Symptom Severity, Quality Of Life, Physical Performance

INTRODUCTION:

“Long COVID,” also called “post-COVID syndrome” or “post-acute sequelae of SARS-CoV-2 (PASC)” is described as persisting symptoms following COVID, described mainly in adults, affecting the sensory, neurologic, and cardiorespiratory systems, as well as mental health. To date, there is no clear definition for this syndrome and no agreement on the duration of symptoms that justify the diagnosis, which ranges from 4 to 12 weeks after the acute infection. In adults, reported risk factors for long COVID include female sex, middle age, white ethnicity and comorbidities, especially asthma. There is much less data about long COVID symptoms in children and adolescents.⁽¹⁾ Age-disaggregated cases reported to WHO from 30 December 2019 to 25 October 2021 show that Older children and younger adolescents (5 to 14 years) account for 7% (7 058 748) of reported global cases and 0.1% (1 328) of reported global deaths while older adolescents and young adults (15 to 24 years) represent 15% (14 819 320) of reported global cases and 0.4% (7 023) of reported global deaths.⁽²⁾ The low-risk posed by the acute disease means that one of the key benefits of COVID vaccination of children and adolescents might prevent them from long COVID. An accurate determination of the risk of long COVID is therefore crucial in the debate about the risks and benefits of vaccination in this age group.

Over 200 symptoms have been attributed to long COVID, many of them nonspecific and highly prevalent in the general population.⁽¹⁾ The prevalence of long COVID symptoms varied.

Long-term symptoms after a viral infection are a known phenomenon in children and adolescents— e.g., persistent coughing after a respiratory syncytial virus infection in infants and toddlers and persistent fatigue, headaches, and abdominal pain after Epstein-Barr virus infection. Thus, long COVID in adolescents would not be unexpected. Another perspective on the health of adolescents during the pandemic is the effect of pandemic living conditions such as physical distancing and lockdown of schools and society affecting physical activity levels and have also reported to have more anxiety and depression than before the pandemic and more so during lockdown. However, evidence about the extent is conflicting.⁽²⁾ An unavoidable limitation is that asymptomatic children or those with mild symptoms might not have been tested.

Reports suggest that more than half of children who did not have covid-19 experienced symptoms such as headaches, fatigue, sleep disturbance, and concentration difficulties during the pandemic. Distinguishing long term symptoms caused by SARS-CoV-2 infection from pandemic related symptoms remains a challenge.⁽²⁾

Unfortunately, fewer data are available on long COVID in adolescent

compared with adults. Hence, the study aimed at evaluating the psychometric properties and functional capacity among adolescents with long COVID.

MATERIALS AND METHODOLOGY:

This is a cross sectional study conducted in schools around Pune. Ethical clearance was taken from Modern college of physiotherapy, Pune. Sample size calculation was done based on the previous prevalence based study and was found to be 100.

Participants aged 12-16 years who have been diagnosed with COVID-19 at least 12 weeks ago were selected based on our inclusion and exclusion criteria. Psychometric properties of adolescents were evaluated using Psychometric Properties Questionnaire Index and Functional capacity was assessed using standardized physical performance test 6MWT. Data was analyzed using graph pad and Microsoft Excel.

Psychometric Properties Questionnaire Index:

Questionnaire index includes 15 of symptoms which can mostly see as a long covid symptoms. Psychometric properties index questionnaire was provided and asked to mark by the adolescents according to the symptoms experienced by them after 12 weeks of COVID 19 considered as long covid symptoms.

Six Minute Walk Test:

Functional capacity among adolescents was done in and around school in Pune. ATS Guidelines were followed to conduct and evaluate functional capacity among adolescents.⁽⁷⁾

Data Analysis:

Data was analyzed by using Microsoft Excel and Graph pad. Descriptive statistics was performed. Paired t-test was used to analyze the relationship between 6MWT and Psychometric properties questionnaire index and the p-value was kept as <0.05.

RESULTS:

Table 1: Psychometric Properties Questionnaire Index

	VARIABLE	TOTAL (%N)
PSYCHOMETRIC PROPERTIES QUESTIONNAIRE INDEX	MILD	72
	MODERATE	22
	SEVERE	6
RISK STRATIFICATION (MILD = 1 TO 8 MODERATE = 9 TO 12 SEVERE = 13 TO 15)	TOTAL	100

Table 2: Six Minute Walk Test.

VARIABLES	MEAN	SD
SIX MINUTE WALK TEST (n=100)	594.49	56.16
MALE	622.83	41.42
FEMALE	541.85	39.56

Table 3: 6 Mwt And Psychometric Properties Questionnaire Index

PARAMETERS	p-values	t-values
6MWT AND PSYCHOMETRIC PROPERTIES QUESTIONNAIRE INDEX	<0.0001	103.23

Functional capacity was reduced in adolescents, 100 of adolescents were examined in which 65 males and 35 females.

Psychometric properties questionnaire index includes 15 symptoms, adolescents are affected moderately according to categorization.

The association between functional capacity and symptoms among participants with long covid is found to be extremely significant statistically.

DISCUSSION:

During the first wave of the global COVID-19 pandemic in 2020 reports began to emerge that some patients had persistent symptoms weeks or months following SARS-CoV-2 infection despite having laboratory recovery of acute disease.

The present study was conducted to evaluate Psychometric properties questionnaire index and functional capacity among adolescents with long covid.

The 6MWT revealed that functional capacity is reduced in adolescents with long covid (after six weeks) having more than five symptoms included in psychometric properties questionnaire index and the results found were statistically significant.

This study was done on limited population in which participants were selected on their inclusion and exclusion criteria, mainly the participants were having long covid. According to the present study, long covid did not affect the adolescent's sedentary life as much as with those participants having some severe symptoms. Functional capacity was reduced in the participants which showed some difficulties in breathing, fatigue, etc. after 12 weeks. This study also includes psychometric properties index questionnaire which have 15 symptoms such as fatigue, breathlessness, fever, chill, concentration difficulties, etc. is categorized as mild moderate and severe. Most of the adolescents showed early fatigue, fever, headache, chills and concentration difficulties.

In the current study, Functional capacity was assessed using the outcome measure 6MWT. Adolescents who were tested positive for covid 19 (without checking laboratory reports) 12 weeks prior to the study were only selected and consent taken from the parents. During the test it was observed that most of the participants showed early breathlessness and fatigue.

Persistent fatigue is a common symptom of long COVID with multifactorial causes. Abnormalities in the central nervous system like brain hypometabolism could be involved in its onset, which was evidenced among patients.

Muscle mitochondrial dysfunction could contribute to its physical dimension, while psychological and environmental factors were also likely to be involved. One article suggested that a dysfunctional brain lymphatic drainage might lead to cerebrospinal fluid congestion, with toxin accumulation within the brain.⁽¹¹⁾

In one of the studies, it was stated that persistent cough, Rhinorrhea and Feelings of chest tightness or difficulty breathing specific pulmonary symptoms were retained in adolescents with long covid which eventually affects lung capacity.⁽¹³⁾

In the current study it was observed that functional capacity was reduce while assessing 6MWT among adolescents with long COVID and they were moderately affected based on psychometric properties index questionnaire without affecting day to day life.

CONCLUSION:

6MWT showed reduced functional capacity in the adolescents and according to Psychometric properties index questionnaire participants are moderately affected.

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