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Prevalence of Long covid-19 syndrome among health care workers of Patan Academy of Health Sciences

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Abstract

Introduction: Any symptoms acquired after COVID-19 infection that persists beyond 12 weeks period and not explained by any other disease either already present or acquired after COVID-19 infection is termed as long COVID 19 by World Health Organisation. We tried to find out the prevalence of long COVID 19 in healthcare workers.

Method: Questionnaire was made in google form based on COVID-19 Yorkshire Rehabilitation Screening Tool (COVID YRS Tool). Ethical approval was taken from IRC-PAHS. Data collected from all health care workers of PAHS from 2022/05/20 to 2022/07/20. Difference in Precovid and Postcovid status in different domains were compared by statistical tests.

Result: The median age of our participants was 29 years. Prevalence of Long COVID 19 was 68.1%. 19 55.3% ha mild, 10.4% had moderate, 2.4% had severe symptoms. The most common symptom was fatigue (44%), anxiety (41%) and shortness of breath (36%). The COVID YRS Tool overall score was statically significant with p value <0.001. Pre COVID 19 and Post COVID 19, patients had statically significant in breathlessness, fatigue, nutrition, anxiety, usual activity, pain, anxiety and depression. Only 6% of our patients had severe COVID 19.

Conclusion: People are still experiencing various symptoms after COVID 19 infection. Long COVID 19 has now been a health care problem. Long COVID 19 patients have multisystem involvement and multi-speciality team is needed for their management and rehabilitation.

Keywords: COVID 19, COVID YRS TOOL, Long COVID

Introduction

Persistence of symptoms beyond acute COVID 19 infection has now been recognized. WHO has defined long COVID-19 as post COVID-19 condition occurs in individuals with history of probable or confirmed SARS CoV_2 infection, usually 3 ms from the onset of COVID-19 with symptoms and that last at least 2 ms and cannot be explained by an alternative diagnosis[1].Common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others and generally have an impact on everyd functioning.[2] There is multi-system involvement and without any well described pathophysiology.[3-4]

In a COVID 19 symptoms study, 13.3% of COVID 19 patients had symptoms lasting 28 d and 2.3% for more than 12 weeks.[2] Meanwhile a study in Wuhan found 49.6% recovering patients having at least one symptom at 12 weeks.[5] Persistent COVID 19 was common among both hospitalized and non-hospitalized patients.[6] A study among health care workers found 32% still having symptoms mainly fatigue, shortness of breath and sleep disturbances.[7] A study in Northern India among general population found 12.1% of patients having symptoms beyond 12 weeks and reported myalgia, fatigue, cough shortness of breath as common symptoms.[8] A study in Kathmandu found 82% of patients having persistent symptoms mainly dyspnea, fatigue, chest heaviness and cough.[9]

We tried to find the prevalence of long COVID 19 of healthcare workers at Patan Academy of Health Science.

Method

This is a prospective, Cross sectional descriptive study done at Patan Hospital and Patan Academy of Health Science (PAHS), Lalitpur, Nepal. The study was approved by Intuitional Review Committee of PAHS. Covid-19 Yorkshire Rehabilitation Screening Tool updated 27.11.20 version was used in the study which is validated screening tool for long covid detection and rehabilitation.[10] The COVID YRS Tool was initially designed to assess long COVID symptoms and rehabilitation needs by a simple phone call. It consists of eighteen domains and covers all aspect of WHO International Classification of Functioning, Disability and Health Framework (ICF). In each domain user is asked to rate their symptoms from zero to ten. Users record their precovid status and post Covid status in each domain. Each score was graded for severity as mild for score zero to three, moderate for score four to six, and severe for score more than six. This grading was based on previous studies using COVID YRS Tool. Further, the increase in scores from pre-Covid baseline to post Covid was arbitrarily graded as mild for increase in one to three, moderate for increase in four to six and severe for increase in greater than six. The questionnaire was coded in Google drive and sent by Viber group of different departments and also the email on notice board of PAHS. First the participants had to give consent and then further questions were available. Any Doctor, nursing staff or Faculty member of PAHS who had COVID-19 PCR or Antigen positive was included in the study. We excluded those who refuse to participate in study. Those who respond after the duration of study or respond with incomplete data were excluded. Those who have recent COVID-19 infection defined as within 3 ms of study were excluded from the study.

Our working definition included

Long COVID-19: Any symptoms acquired after covid-19 infection that persists beyond 12 weeks period and not explained by any other disease either already present or acquired after COVID-19 infection. Also used synonymously as Post COVID syndrome.[1]

Asymptomatic COVID-19: Any PCR or antigen positive COVID 19 patient without any symptom.

Mild COVID-19: Any PCR or antigen positive patients who have symptoms but do not require supplemental Oxygen.

Severe COVID-19: Any PCR or antigen positive COVID 19 cases that need supplemental Oxygen.

Mild Long COVID-19: Increase in COVID YRS Tool score post COVID score from pre COVID score but none of domains which shows increase by 4 or more (i.e. moderate or severe excluded).

Moderate Long COVID-19: Increase in COVID YRS Tool Score 4-6 in at least one domain of questionnaire.

Severe Long COVID-19 Symptom: Increase in COVID YRS Tool Score greater than 6 in at least one domain of questionnaire.

Data was collected from 20 May to 20 July 2022. Data collected by Google form was imported into spreadsheet file and analysed in Microsoft Excel. Statistical analysis was done using EZR software (R based programming software, version 1.50). Kolmogorov Smirnov (KS) test was used to test for distribution. WIlcoxon's signed rank test was used to test the significance of difference between present and precovid level. Spearman's rank correlation test was used to calculate correlation coefficient when required. The overall score was calculated adding scores in all domains except question related to global perceived health as reasoned in results below. The difference between overall score post COVID and pre COVID was used in analyzing significance of association between different baseline variables and long COVID severity. Assumption is made that such difference predicts the COVID severity.

Result

Out of 147 responses received one did not consent, 19 (13%) did not have COVID and were excluded. Two of them had COVID within 3 ms and were excluded. A total of 125 responses met inclusion criteria and were analysed. The baseline characteristics are listed in Table 1. Respondents were mostly young with inter-quartile range of 25-34 y. No statistical significance observed between males and females (p= 0.474). Most of the respondents were doctors 85(68%); 25(20%) of respondent had some comorbidities, a few had multiple; 124(99.2%) respondents were vaccinated and majority were vaccinated 3 times or more; 115(95% of 121) of them had mild infection defined as those not requiring Oxygen supplementation; Median duration of last Covid infection was 9 ms or later with inter quartile range 6 – 14 ms.

The estimated prevalence of long COVID was based on increase in overall scores and was found in 69(55.3%) of patients (Table 2). As there were no described cut-offs for grading of severity based on overall scores, severity of individual scores was used to estimate prevalence of moderate and severe long COVID symptoms. Prevalence of moderate or severe COVID was thus 16(12.8%).

Different types of long COVID symptoms are listed in Table 3. Except voice and swallowing related complications all other domains were statistically increased from baseline precovid levels. Fatigue, anxiety and depression were more severely increased.

Although some respondents reported getting better from precovid baseline in some domains (Table 4), none of those domains reached statistical significance. 22 (17.6%) of respondents had impairment of memory, 27(21.77%) of 124 (1 response had both yes and no ticked) had impairment of concentration post COVID. Among those with continence problems, 4(3.2%) respondents had problems controlling bowel, 2(1.6%) problems controlling bladder and 3(2.45%) had both.

There was no significant correlation between duration after last covid infection and overall severity score. Spearman correlation coefficient was -0.0694 with p value of 0.442.

Other symptoms reported in open label questions were hair loss, continuous coughing, sneezing, asthma, diabetes, arthralgia, loss of taste, backache, deranged

lipid profile, insomnia and decreased confidence level.

However, despite being in the validated COVID YRS tool and our questionnaire, we have not included global perceived health related question in above analysis as we believe the responses were misleading due to poor design of question. Instead of 0 as best score for health overall used in previous questions, 0 was the worst health and 10 as perfect health. This reversal led to confusion and inconsistent responses and hence was not included in any of above analysis and overall scores. As in bar graph (Figure 2), the responses are inverted with 0 and 10 as most selected scores. If data were valid score would be either progressively increasing or decreasing.

Table 1. Baseline characteristics of Post Covid prevalence in health care workers survey

Parameter		Value (N=125)
	Age in y(Median, Range)	29 (20-62)
Sex	Male	67(53.6%)
	Female	58(46.4%)
Profession	Doctors	85(68%)
(n,%) N=125	Nursing staff	11 (8.8%)
	Students	16 (12.8%)
	Others	13 (10.4%)
Comorbidities*	CKD/COPD/Asthma/IHD	7 (5.6%)
(n,%) N=125	Depression/Anxiety	4 (3.2%)
	Diabetes/Thyroid disorder /Hypertension	15 (12%)
	Others	2 (1.6%)
	None	100 (80%)
Vaccination status	None	1 (0.8%)
(n,%)	Vaccinated	124 (99.2%)
COVID Severity**	Mild	115(95%)
n(%), N=121	Severe	6(5%)
No of times of having	1	81(64.8%)
COVID infection (n, %)	2	35 (28%)
	3	9(7.2%)
Last COVID Infection (median, Range) (ms)		9 (4-36)

* Three of them had multiple categories of comorbidities.
** Only 121 respondents had replied to query regarding COVID severity.

Table 2. The prevalence of long COVID among health care workers

Parameter	Value (N=125)
Number of eligible respondents(N)	125
Number of respondents with overall increase in post-COVID scores from preCOVID scores,n1	69(55.3%)
Number of respondents with overall Decrease in post-COVID scores from preCOVID scores,n2	8 (6.4%)
Number of respondents with increase of post COVID scores by more than 3-6 points in at least one domain of COVID YRS Screening Tool,n3	13(10.4%)
Number of respondents with increase of post COVID scores by more than 6 points in at least one domain of COVID YRS Screening Tool, n4	3(2.4%)
Number of respondents with mild COVID19	n1-n3-n4 = 53 (42.4%)
Prevalence of long COVID	n1/N*100 = 55.3%
Prevalence of moderate post COVID Symptoms in at least one domain	N3/N*100 = 10.4%
Prevalence of Severe post COVID Symptoms in at least one domain	N4/N*100 = 2.4%

Table 3. Different type of long Covid symptom and grading of disability among health care workers

Symptoms	Pre-COVID Severity (Median)	Post COVID Severity (Median)	Statistical significance of increase in symptoms(P value)	No of respondent increase by 0-3 (%), (Mild) N=125	No of respondent increase by 4-6 (%), (Moderate) N=125	No of respondent increase by >6 (%), (Severe) N=125
Breathlessness	0(0-1)	1(0-2)	<0.001	29 (23.2%)	6 (4.8%)	1 (0.8%)
Laryngeal/ airway complications	0(0-0)	0(0-0)	0.02	19 (15.2%)	4 (3.2%)	0
Voice	0(0-0)	0(0-0)	0.1	6 (4.8%)	3 (2.4%)	0
Swallowing	0(0-0)	0(0-0)	0.58	4 (3.2%)	0	0
Nutrition	0(0-0)	0(0-0)	<0.001	18 (14.4%)	2 (1.6%)	0
Mobility	0(0-0)	0(0-0)	0.001	27 (21.6%)	1 (0.8%)	0
Fatigue	0(0-0)	0(0-1)	<0.001	39 (31.2%)	4 (3.2%)	1 (0.8%)
Personal-Care	0(0-0)	0(0-0)	0.015	14 (11.2%)	1 (0.8%)	0
Usual Activities	0(0-0)	0(0-0)	<0.001	23 (18.4%)	0	0
Pain/ discomfort	0(0-0)	0(0-0)	<0.001	21 (16.8%)	1 (0.8%)	0
Communication	0(0-0)	0(0-0)	0.005	9 (7.2%)	1 (0.8%)	0
Anxiety	0(0-0)	0(0-2)	<0.001	35 (28%)	5 (4%)	1 (0.8%)
Depression	0(0-0)	0(0-0)	<0.001	19 (15.2%)	1 (0.8%)	1 (0.8%)
Overall Score	1(0-4)	3(0-10)	<0.001	25 (20%)	20 (16%)	24 (19.2%)

Table 4. Post Covid worsening or improvement scores among health care workers

Symptoms	Number(%) who worsened from pre-covid baseline, N=125	Number(%) who got better, N=125
Breathlessness	36 (28.8%)	6(4.8%)
Laryngeal/ airway complications	23 (18.4%)	6 (4.8%)
Voice	9 (7.2%)	3 (2.4%)
Swallowing	4 (3.2%)	1 (0.8%)
Nutrition	20 (16%)	1 (0.8%)
Mobility	28 (22.4%)	1 (0.8%)
Fatigue	44 (35.2%)	2 (1.6%)
Personal-Care	15 (12%)	2 (1.6%)
Continence	9 (7.2%)	Not assessed
Usual Activities	23 (18.4%)	1 (0.8%)
Pain/ discomfort	22 (17.6%)	1 (0.8%)
Cognition	32 (25.6%)	Not assessed
Communication	10 (8%)	0 (0%)
Anxiety	41 (32.8%)	3 (2.4%)
Depression	21 (16.8%)	2 (2.4%)

Discussion

The prevalence of Long COVID 19 using YRS tool long COVID 19 was seen in 55.3% of patients. Mild long COVID 19 was seen in 42.4% patients**.** Moderate Long Covid-19 was seen in 13 (10.4%) of patients and Severe Long Covid-19 was seen in 3 (2.4%) of patients. 8 (6.4%) reported that their symptoms got better after getting COVID 19 infection. A study done in Italy found out that 87% patients who were discharged from hospital had 1 symptom even after 60 d, 55% had three or more persistent symptoms. Our patients had less Long COVID 19 symptoms as most of them were managed as outpatients. Our study population was predominantly younger people with median age of 29 y (20-62).

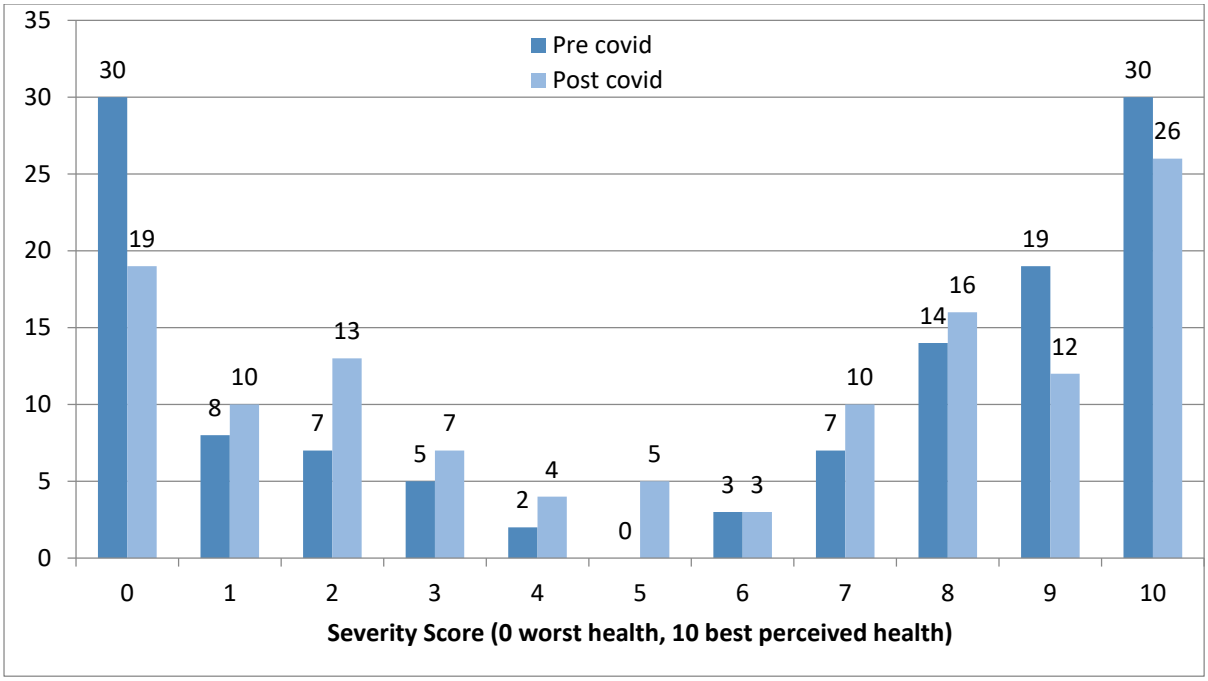

Figure 1. PreCovid and PostCovid global perceived heath in health care workers

Fatigue was the most common problem reported by 44%.41% had increased anxiety, 36% had increased shortness of breath. Swallowing difficulty was observed by only 4% and 9% has incontinence and voice problem. Although 4.8%(n=125) of patients in our study reported that their shortness of breath and airway complication got better after COVID 19 infection, none of them had improvement by more than 3 points on 10-point scale. The prevalence of long COVID 19 in pre COVID 19 and post COVID 19 was statically significant in shortness of breath, nutrition, fatigue, usual activity, pain, anxiety, depression and overall activity. Only 5% of our patients were severe COVID 19 requiring oxygen. Not included in our study questionnaire but commonly reported was hair fall and anosmia. These findings are similar to study by Anup Bastola et al in Kathmandu and further clarifies on severity of Long COVID symptoms[9].A study done by T A-Z K Gaber et al[7] which was also done among health care workers shows fatigue as most common reported symptom(39%) followed by shortness of breath, anxiety and sleep disturbance. A systematic review by Michelen M et al found weakness in 41%, malaise in 33%, fatigue in 31%, concentration in 26% and breathlessness in 25% which is similar to our study[11]. The review included predominantly hospitalised patients whereas our study included predominantly those with mild COVID. Another study by Manoj Sivan et al[10] using COVID YRS tool similar to ours reported fatigue as predominant symptom(95%) followed by anxiety(90%), pain or discomfort (89%), breathlessness (85%) and cognitive difficulties (85%). The higher prevalence may be due to older respondents (mean age 47 y), more hospitalised cases (18%) and also due to difference in methodology. However, a study by Karen B. Jacobson et al[6] found long COVID symptoms to be at similar level between hospitalised and non-hospitalised patients. A study done by Richard Evans et al[12] stated that the severity of mental health also was closely related to recovery. Our patients had anxiety but we didn't analyze the severity of mental health. We have included only increase in post covid scores from precovid baseline whereas they have included only post covid scores. Lower than our and other studies, UK Office of National Statistics (ONS)[13] estimates fatigue to be present in 11.9% after 5 weeks of COVID 19. ONS estimates 4.6% prevalence after 5 weeks reflecting differences in methodology of data collection. A study done by COMEBAC study group[14]found out that 51% had at least 1 new

symptom after Covid 19. Fatigue, shortness of breath and cognitive symptoms were the leading cause same like our study.

A study done by Anushri, et al.[15] found that pulmonary, neuropsychiatric and cardiovascular symptoms were more predominant same as our findings. The Greek Collaborative Long Covid Study[16] found out that patients who had mild symptoms during COVID 19 infection suffer from same persistent symptoms as patients who were hospitalized. In our study we included both hospitalized and out patients too, although they were predominantly outpatients. Study done at Saudi Arabia by Mohammad A, et a.l[17] also had significant long COVID 19 and has stressed the long term management of these patients with special clinics and rehabilitation. Study done by Robart Kozak, et al.[18] showed that patients who met the criteria for long COVID had no relation with past medical history or laboratory examination during presentation. Study done by Aqsa Mumtaz et al[19] has found improvement in long COVID 19 symptoms in vaccinated people. Although, 99.2% of respondents in our study were vaccinated but still significant percentage had long COVID 19. Moreover, among 124 respondents who were vaccinated, Kruskal-Walis test revealed no significant difference between number of vaccination and increase in post COVID overall severity score (p value 0.735). However, our study did not ascertain whether vaccine was taken before having COVID or after having COVID. In our study, no statistical significance was observed between number of COVID infections and overall pre and post COVID score difference (Kruskal Walis test, p value 0.373), possibly suggesting more frequent COVID infections may not be related to severity of long COVID sequale.

A study done by David Tak Wai Lui, at el.[20] concluded that long COVID 19 was more common in females and those with high viral load. We didn't look at the viral load of patients, but comparing the overall score difference between post covid score and pre covid score among male and female sex using Mann-Whitney U test showed that female sex had more score than males (p value = 0.009). This suggests long COVID could be more severe and common in females than males. However another study by Oscar Moreno-Perez et al[21] found no statistical difference between male and female. Study by Yasue et al[22] stated long COVID symptoms improved after 3 m of initial visit in more than half of patients. Although our study was cross-sectional, we did not find any correlation between last Covid infection and severity of long COVID (Figure 1). However, a longitudinal study would be required to further validate this finding.

Our study is one of few studies done among health care workers for long COVID surveillance and suggests that long COVID is a significant problem similar to previous studies. The limitation of this study was that prior sample size was not done due to uncertainty in prevalence. As questionnaire was in English and so those who didn't understand English language were unable to participate. As the questionnaire was self-administered, there was less opportunity to clarify the questions compared to phone in method for which the questionnaire was analyzed. This is reflected in the responses to global perceived health related question as discussed above (Figure 2). This was due to worst health status given to higher score as compared to lower score done in all other question. Hence we suggest this slight amendment to COVID YRS Tool when used in further research. Hair loss, insomnia, lipid profile changes were other reported symptom not scored in this study. As there no any global precise definition of long COVID severity, results may vary depending upon definition of severity, methodology and questionnaire used. Hence a universal definition is necessary.[23]

Conclusion

Long COVID is common sequale among healthcare workers. Fatigue is most common symptom. Other problems are related to shortness of breath, nutrition, fatigue, usual

activity, pain, anxiety, depression and overall activity. Prevalence of long COVID was 55.3%. 12.8% of respondents had moderate to severely increased symptoms. The number of patients is likely to increase so we must plan for their specific management and rehabilitation.

Conflict of Interest

None

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None

Author Contribution

Concept, design, planning: All (BP, SK, SG, ML, KRS, NH); Literature review: (BP, SK, SG, KRS); Data collection: (BP, SG, NH); Data analysis: All (BP, SK, SG, ML, KRS, NH); Draft manuscript:(BP, SG, ML); Revision of draft: All (BP, SK, SG, ML, KRS, NH); Final manuscript: All (BP, SK, SG, ML, KRS, NH); Accountability of the work: All (BP, SK, SG, ML, KRS, NH).

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