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# Impact of Post Covid-19 Syndrome on Daily Living Activities in Elderly Patients without Previous Functional Loss

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## Abstract

*Background:* The COVID-19 infection that emerged in December 2019 has led to a high incidence of infection and caused significant morbidity and mortality, particularly among older adults. Post-COVID syndrome is believed to be a condition affecting multiple systems, encompassing physical symptoms such as breathlessness, fatigue, and anosmia and functional impairments leading to reduced activity levels, cognitive dysfunction, and psychological issues such as anxiety and depression.

*Aim of Study:* To assesses the impact of post-COVID syndrome on functional activity level in elderly patients without prior impairment to detect the effect of COVID-19 infection on the functional acivity especially ADL and LADL.

*Material and Methods:* Our study was a prospective cohort study conducted on 100 older adults who follow-up in the outpatient geriatric clinic of Ain Shams University using a standard questionnaire.

*Results:* Highly significant increase in anosmia, loss of taste, hospital and ICU admission, and post-covid complications in the severe and moderate post-covid group compared to other groups ($p$<0.05 respectively). Significant decrease in Vaccine status in the severe post-covid group compared to other groups ($p$=0.041). Highly significant decrease in ADL and IADL scores and dependency in severe post-covid group compared to other groups ($p$<0.05 respectively).

With highly significant increase in dependency rates in severe post-covid group compared to other groups ($p$<0.05 respectively) which reflected the significant effect of post-covid syndrome on the functional capacity of elderly patients.

*Conclusion:* Post-COVID-19 syndrome have a highly significant effect on functional capacities and daily living activities of elderly patients without previous functional loss with significant decrease in risk of post covid syndrome symptoms in vaccinated patients.

*Key Words: Post covid syndrome – ADL – IADL.*

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## Introduction

**COVID-19** was a terrible outbreak that has caused a worldwide emergency with high rates of morbidity and mortality in people who are more likely to get the infection **[1]**. Since its start in Wuhan, China, in December 2019, the SARS-COV-2 virus has quickly spread around the world **[2]**. The WHO called the disease a world pandemic in March 2020, and it has changed people's lives ever since **[3]**. COVID-19 is caused by a single-stranded RNA virus called SARS-CoV-2 **[4]**.

Studies have revealed that approximately 15% of COVID-19 patients have acute viral pneumonia symptoms, which are brought on by the spread of acute lung injury (ALI). Furthermore, because of the development of acute respiratory distress syndrome (ARDs), about 5% of these patients with COVID-19 infection need to be admitted to the intensive care unit and may require ventilator respiratory support **[5,6]**.

Based on CDC data, it has been estimated that 43% of people had both new and persistent symptoms four weeks or more after developing the acute infection **[7,8]**. The UK's National Institute for Health and Care Excellence (NICE) released guidelines on the long-term effects of COVID-19 in December 2020 **[9]**. The term "post COVID-19 syndrome" refers to a group of symptoms that appear during or following a COVID-19 infection, last for longer than 12 weeks, and have no other known cause. It's crucial to remember that a diagnosis may not require a positive PCR test result. Pathogenesis could include the virus's ability to persist in host cells, causing persistent hyper inflammation, immunological abnormalities brought on by molecular mimicry, epitope spreading, by stander activation, and haemostatic changes that are primarily characterized by abnormal coagulation **[10-18]**.

Post-COVID-19 syndrome may impact every bodily system, encompassing the cardiovascular,

musculoskeletal, dermatological, metabolic, anosmia, respiratory, gastrointestinal, and neurological systems causing widespread symptoms like chest pain, dyspnea, palpitations, coughing, anorexia, diarrhea, and nausea. In addition, there may be signs of weariness, persistent fever, generalized discomfort, and mental disorders (depression, anxiety, mental fog). Exhaustion, fever, discomfort, and arthralgia are possible additional indications and symptoms **[9].**

A primary feature of the post-COVID-19 syndrome is its association with disability and impairment of activities of daily living (ADL) and instrumental activities of daily living(IADL), which can have a major effect on care and rehabilitation initiatives **[19].** The symptoms of Post COVID-19 syndrome that result in long-term neurological problems are unique and not to be confused with neurological problems that could arise during the acute stage of the infection. Studies have indicated that at least 30% of these individuals have signs of mental health problems, such as anxiety and/or depression, during the recovery stage post-acute phase, which has a harmful impact on cognitive and mental health **[20,21].**

Successful aging depends on the ability of a person to execute tasks independently. In fact, achieving the highest possible degree of functioning for an older adult depends on their ability to execute ADLs and IADLs **[22].** Activities of daily living (ADL) refers to the self-care tasks that are essential to one's survival and well-being as well as to interacting with others such as bathing, using the restroom, dressing, and eating are among them. Instrumental Activities of Daily Living (IADL) are meant to help and support an individual's living at home and in the community. These include managing finances, maintaining the home, going grocery shopping, making phone calls, and taking prescription drugs **[23].**

According to earlier research, COVID-19 infection may cause a reduction in one's capacity to carry out activities of daily living (ADL). Older patients and/or those who experienced difficulties throughout their hospital stay were the ones with the worse outcomes regarding functional loss. Limitations in functioning and dependence on other people in performing daily activities lead to a worse quality of life for older people and an increase in the social costs of care **[24-27].**

This study aims to examine the impact of post-COVID syndrome on functional activity level (using ADL and IADL assessment) in elderly patients without prior functional impairment or functional loss.

## Patients and Methods

This study was a cross-sectional study that was conducted on 100 elderly adults who were following-up in out-patient geriatric clinic of Ain Shams University (study lasted 6 months starting 5/2023 till around 12/023) Socio demographic data was collected (sex, age, education, vaccination status), presenting symptoms, treatment setting (home, ward, ICU), post COVID symptoms (shortness of breath during daily activity, fatigue, pain and problems with mobility) and their duration (symptoms develop during or after COVID-19 and continue for more than 12 weeks). The participants were assessed using standard ADL and IADL **[28,30]** questionnaires to evaluate functional activity after COVID-19 infection.

Diagnosis of COVID was based on confirmed acute respiratory syndrome corona virus (SARS-CoV-2) infection by a positive result on polymerase chain reaction (PCR) testing of nasopharyngeal samples **[31].** Disease severity was defined in four grades according to the WHO criteria for patients' chest computed topography (CT) scan images on the initial scan obtained at admission **[5].** This was based on the severity of changes in each lung zone (S0 = without lung involvement, S1 = involvement of maximum two lobes of lung with ground-glass opacity, nodule, or consolidation with less than one-third of each lobe, S2 = involvement of three or four lobes of lung with less than one-third or involvement of one or two lobes with more than one third, S3involvement of five lobes of the lung with less than one third or involvement of three lobes with more than one third, S4 = more lung involvement **[6].**

Functional assessment was done using Bar the l Index for ADL and IADL.

The Bar the l Index measures functional disability in 10 ADLs by quantifying patient performance. 5-point increments are used in scoring, with a maximal score of 100 indicating full independence in physical functioning whilst a lowest score of 0 indicating a patient with a complete bed-bound state.

The higher the score following the Bar the l Index assessment, the greater the likelihood for the patient to be able to live at home, independently, with varying degrees of help and care, following discharge from hospital.

*Results interpretation was done according to "The Sin off 1997 Interpretation":* **[32]**

- 80-100 = Independent
- 60–79 = Minimally dependent
- 40–59 = Partially dependent
- 20–39 = Very dependent.
- <20 = Totally dependent.

*Ethical approval:*

The study was approved by the Ethics Committee at Ain Shams University (FMASU R121/2023).

*Statistical analysis:*

Data entry, processing, and statistical analysis were carried out using Med Calc ver. 20 (Med Calc, Ostend, Belgium). Tests of significance (ANOVA, Chi square tests, logistic regression analysis, Pearson's correlation, and ROC Curve analysis) were used. Data were presented and suitable analysis was done according to the type of data (parametric and non-parametric) obtained for each variable. *p*-values less than 0.05 (5%) was considered statistically significant.

- *p*-value: level of significance
- $p>0.05$: Non-significant (NS).
- $p<0.05$: Significant (S).
- $p<0.01$: Highly significant (HS).

*Descriptive statistics:*

- Mean, Standard deviation (± SD) and range for parametric numerical data, while Median and Inter-quartile range (IQR) for non-parametric numerical data.
- Frequency and percentage of non-numerical data.

*Analytical statistics:*

- ANOVA test was used to assess the statistical significance of the difference between more than two study group means.
- Chi-Square test was used to examine the relationship between two qualitative variables.
- Correlation analysis (using Pearson's method): To assess the strength of association between two quantitative variables. The correlation coefficient denoted symbolically "*r*" defines the strength and direction of the linear relationship between two variables.
- Logistic regression: Useful in the prediction of the presence or absence of an outcome based on a set of independent variables. It is similar to a linear regression model but is suited when the dependent variable is qualitative (categorical).
- The ROC Curve (receiver operating characteristic) provides a useful way to evaluate the Sensitivity and specificity for quantitative Diagnostic measures that categorize cases into one of two groups.

## Results

The current study was a cross sectional observational study, involved 100 post-COVID syndrome patient aged 60 years and older, they were classified according to infection severity into 3 groups: Mild (79 patients), moderate (15 patients), Severe (79 patients). The mean age of all patients was (64.6±5.3) years. Regarding gender of the patients, the majority (66%) were females, while (34%) were males with no significant difference as regards age and sex of the patients ($p>0.05$). Considering past medical history (80%) of patients had multiple chronic illnesses, (70%) had DM, (64%) had HTN, (73%) had Hyperlipidemia, (16%) had Hypothyroidism. Comparative study between the 3 groups revealed no significant difference as regards socio demographic characteristics and past history ($p>0.05$).

Regarding Covid-19 symptoms; (94%) of patients had Upper respiratory symptoms, (91%) had Lower respiratory symptoms, (45%) had Anosmia and Loss of taste, regarding Place of treatment; (89%) of patients were treated at home, (8%) needed hospital admission, (3%) were admitted to the ICU. (79%) of patients had mild infection, (15%) had moderate illness, and (6%) had severe illness. As for vaccination status, (47%) of patients were vaccinated, with (20%) had 1 dose, and (27%) had 2 doses. (Table 1).

The results of functional assessment showed that the average ADL score was (88.5±14.5), with (80%) of patients were independent, (17%) were minimally dependent, and (3%) were partially dependent, on the other hand the average IADL score was (6.2±2), with (57%) of patients were independent and (43%) were partially dependent. (Table 2).

Table (1): Clinical characteristics of participants.

| Variables | Frequency (%) |
|---|---|
| *Upper respiratory symptoms:* | |
| +ve | 94 (94%) |
| *Lower respiratory symptoms:* | |
| +ve | 91 (91%) |
| *Anosmia:* | |
| +ve | 45 (45%) |
| *Loss of taste:* | |
| +ve | 45 (45%) |
| *Place of treatment:* | |
| Home | 89 (89%) |
| Ward admission | 8 (8%) |
| ICU admission | 3 (3%) |
| *Hospital and ICU admission:* | |
| +ve | 11 (11%) |
| *ICU admission:* | |
| +ve | 3 (3%) |
| *Vaccine status:* | |
| Vaccinated | 47 (47%) |
| *Vaccine doses:* | |
| 1 dose | 20 (20%) |
| 2 doses | 27 (27%) |
| *Severity of illness:* | |
| Mild | 79 (79%) |
| Moderate | 15 (15%) |
| Severe | 6 (6%) |

Table (2): Functional activity scores.

| Variables | Frequency (%)/ Mean ± SD |
|---|---|
| ADL score | 88.5±14.5 |
| *ADL Interpretation:* | |
| Independent | 80 (80%) |
| Minimally dependent | 17 (17%) |
| Partially dependent | 3 (3%) |
| IADL score | 6.2 ± 2 |
| *IADL Interpretation:* | |
| Independent | 57 (57%) |
| Partially dependent | 43 (43%) |

ADL : Activities of Daily Living.
IADL: Instrumental Activities of Daily Living Scale.

There was no significant difference between the 3 groups regarding upper, lower respiratory symptoms, but there was a highly significant increase in anosmia, loss of taste in moderate and sever groups. Hospital and ICU admissions were also significantly higher in those two groups. Severe COVID group had significantly lower vaccination status compared to other groups. (Table 3). Regarding functional assessment comparison between the 3 groups revealed that there was a highly significant decrease in ADL and IADL scores and higher dependency in the severe covid group compared to other groups. (Table 4).

Table (5) showed that vaccination had a highly significant positive correlation with ADL and IADL scores. Where as anosmia, loss of taste, hospital and ICU admission, ICU admission, and severity of illness have a highly significant negative correlation with ADL and IADL scores.

By using ROC-curve analysis, ADL score at a cutoff point (≤70) predicted patients with severe covid with good (85%) accuracy, sensitivity=83% and specificity=84% ($p$=0.001) (Fig. 1). On the other hand ROC-curve analysis, IADL score at a cutoff point (≤5) predicted patients with severe post-covid illness with good (83%) accuracy, sensitivity= 100% and specificity=59% ($p$<0.001) (Fig. 2).

Table (3): Comparison between the 3 groups as regards Clinical characteristics.

| Variable | Mild covid Group (79) | Moderate covid Group (15) | Severe covid Group (6) | Chi square test $p$-value |
|---|---|---|---|---|
| *Upper respiratory symptoms:* | | | | |
| +ve | 73 (92.4%) | 15 (100%) | 6 (100%) | = 0.4281 |
| *Lower respiratory symptoms:* | | | | |
| +ve | 70 (88.6%) | 15 (100%) | 6 (100%) | = 0.2686 |
| *Anosmia:* | | | | |
| +ve | 30 (38%) | 11 (73.3%) | 4 (66.7%) | = 0.022* |
| *Loss of taste:* | | | | |
| +ve | 30 (38%) | 11 (73.3%) | 4 (66.7%) | = 0.022* |
| *Place of treatment:* | | | | |
| Home ttt | 78 (98.7%) | 10 (66.7%) | 1 (16.7%) | <0.0001** |
| Ward admission | 1 (1.3%) | 5 (33.3%) | 2 (33.3%) | |
| ICU admission | 0 (0%) | 0 (0%) | 3 (50%) | |
| *Hospital and ICU admission:* | | | | |
| +ve | 1 (1.3%) | 5 (33.3%) | 5 (83.3%) | <0.0001** |
| *ICU admission:* | | | | |
| +ve | 0 (0%) | 0 (0%) | 3 (50%) | <0.0001** |
| *Vaccine status:* | | | | |
| Vaccinated | 41 (51.9%) | 6 (40%) | 0 (0%) | = 0.041* |
| *Vaccine doses:* | | | | |
| 1 dose | 18 (22.8%) | 2 (13.3%) | 0 (0%) | = 0.1593 |
| 2 doses | 23 (29.1%) | 4 (26.7%) | 0 (0%) | |
| *Post-covid complications:* | | | | |
| +ve | 1 (1.3%) | 3 (20%) | 0 (0%) | = 0.0028** |

Table (4): Comparison between the 3 groups as regards Functional activity scores.

| Variable | Mild covid Group (79) | Moderate covid Group (15) | Severe covid Group (6) | ANVOA test |
|---|---|---|---|---|
| | Mean ± SD | Mean ± SD | Mean ± SD | *p*-value |
| ADL score | 93.1±11.5 | 72.6±8 | 66.6±17.2 | <0.001** |
| IADL score | 6.8±1.8 | 4±0.2 | 3.8±0.7 | <0.001** |
| Variable | Mild covid Group (79) | Moderate covid Group (15) | Severe covid Group (6) | Chi square test |
| | | | | *p*-value |
| *ADL Interpretation:* | | | | |
| Independent | 74 (93.7%) | 5 (33.3%) | 1 (16.7%) | <0.001** |
| Minimally dependent | 4 (5.1%) | 10 (66.7%) | 3 (50%) | |
| Partially dependent | 1 (1.3%) | 0 (0%) | 2 (33.3%) | |
| *IADL Interpretation:* | | | | |
| Independent | 57 (72.2%) | 0 (0%) | 0 (0%) | <0.001** |
| Partially dependent | 22 (27.8%) | 15 (100%) | 6 (100%) | |

Table (5): Correlation analysis for baseline Factors associated with ADL and IADL scores.

| Associated Factor | ADL score | | IADL score | |
|---|---|---|---|---|
| | *r* | *r* | *p*-value | *p*-value |
| Age (years) | –0.06675 | 0.001533 | =0.9879 | =0.5093 |
| Multiple chronic illnesses | –0.1983 | –0.2280 | =0.022* | =0.048* |
| Upper respiratory symptoms | –0.05518 | –0.05402 | =0.5935 | =0.5856 |
| Lower respiratory symptoms | –0.1289 | –0.1373 | =0.1732 | =0.2011 |
| Anosmia | –0.2669 | –0.2599 | =0.009** | =0.0073** |
| Loss of taste | –0.2669 | –0.2599 | =0.009** | =0.0073** |
| Hospital and ICU admission | –0.5367 | –0.4266 | <0.0001** | <0.0001** |
| ICU admission | –0.3861 | –0.2562 | =0.01** | =0.0001** |
| Vaccine status | 0.3047 | 0.2783 | =0.005** | =0.0021** |
| Vaccine doses | 0.2990 | 0.2825 | =0.004** | =0.0025** |
| Severity of illness | –0.3804 | –0.3047 | =0.0021** | =0.0001** |

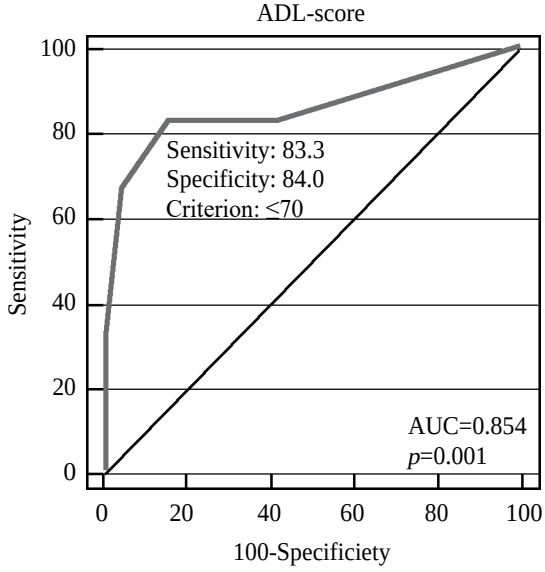


Fig. (1): ROC curve of ADL score (Severe post-covid illness).

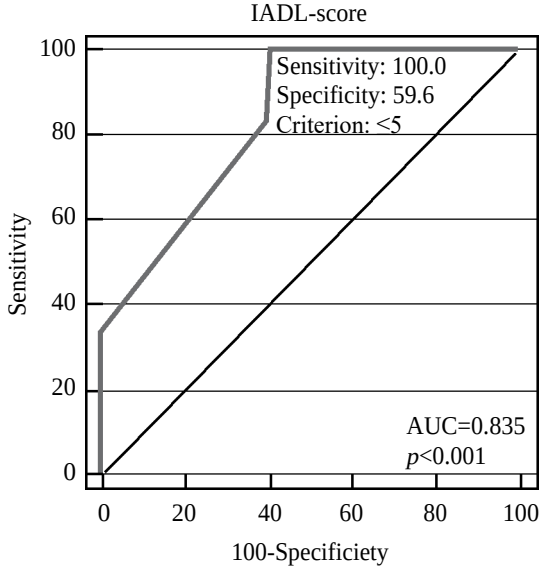


Fig. (2): ROC curve of IADL score (Severe post-covid illness).

## *Discussion*

It has been reported that patients suffering from mild or severe COVID-19 infection, regardless of the severity of their presenting symptoms during the infection acute phase, may experience many symptoms of post-COVID-19 syndrome for 12 weeks or more as reflected between 10% and 65% of mild/moderate COVID-19 infection survivors *[33]*.

Our study was a cross-sectional study on 100 patients with post-COVID-19 syndrome evaluating their functional activity after COVID-19 infection using ADL and IADL questionnaires. Participants were classified according to infection severity into 3 groups: Mild (79 patients),moderate (15 patients), Severe (79 patients). The mean age of all patients was (64.6±5.3) years. Regarding gender of the patients, the majority (66%) were females, while (34%) were males with no significant difference as regards age and sex of the patients.

Regarding Covid-19 symptoms; (94%) of patients had Upper respiratory symptoms, (91%) had Lower respiratory symptoms, (45%) had Anosmia and Loss of taste, regarding Place of treatment; (89%) of patients were treated at home, (8%) needed hospital admission, (3%) were admitted to the ICU. As for vaccination status, (47%) of patients were vaccinated, with (20%) had 1 dose, and (27%) had 2 doses. There was no significant difference between the 3 groups regarding upper, lower respiratory symptoms, but there was a highly significant increase in anosmia, loss of taste in moderate and sever groups. Hospital and ICU admissions were also significantly higher in those two groups. Severe COVID group had significantly lower vaccination status compared to other groups. Our comparative study between the 3 groups revealed that there is a highly significant increase in anosmia, loss of taste, hospital, and ICU admission, in Severe and moderate post-covid-19 group compared to other groups.

In a similar study, it was found that many patients who needed hospitalization for COVID-19 experienced lingering symptoms over time. Garrigues et al., conducted a study on 120 patients who were admitted with severe COVID-19 and evaluated them again 110 days later *[34]*. A separate study involving 100 patients similarly observed that a numerous persistent symptoms 7 weeks after discharge, including dyspnea, fatigue, pain, dysphagia, cough, post-traumatic stress symptoms, anxiety/depression, and memory/concentration impairments *[35]* and the prevalence of symptoms of post-COVID-19 was higher among patients with history ICU admission compared to ward patients, including dyspnea (65.6% vs. 42.6%), fatigue (72% vs. 60.3%), post-traumatic stress (46.9% vs. 23.5%), swallowing and language disorders (68.7% vs. 42.6) and attention and memory disorders (52% vs. 33.8%) *[35]*.

The findings of a previous prospective cohort study conducted by Augustin et al., *[36]* revealed that non-hospitalized patients with mild COVID-19 exhibited symptoms and predictors for post-COVID syndrome (PCS). The most common symptoms observed at the onset of the disease were cough (64.4%), ageusia (59.1%), and anosmia (54.3%). After a median follow-up of four months, the most common symptoms observed were anosmia (12.4%), loss of sense of taste (11.1%), fatigue (9.7%), and difficulty in breathing (8.6%).

In a large prospective study of 958 individuals who had recovered from SARS-CoV-2, it was found that most of them had mild or no symptoms during their initial presentation, out of these, 27.8% (123 out of 442) reported experiencing long-term health issues after a period of four months. These long-term symptoms included fatigue, shortness of breath, anosmia (loss of sense of smell) and ageusia (loss of sense of taste) *[37]*.

In addition to this, a previous prospective observational study by D'Cruz et al., analyzed that among the 119 patients who had previous history of hospital admission with severe pneumonia, only 11% were free of chronic symptoms 60 days after discharge *[49]*. 39% had persistent cough or dyspnea, 68% had persistent fatigue; 57% had sleep disorders and 25% had post-traumatic stress symptoms. Furthermore, a cross-sectional study conducted in Milan similarly found persistent physical symptoms (52%), anxiety (29%), and cognitive complaints (17%) after suffering from pneumonia due to COVID-19 and being discharged from the hospital 1-3 months after *[38]*.

A similar study found that the prevalence of post-COVID symptoms is linked to the severity of the disease *[39]*. However, other studies have reported that these conditions are more common in home-isolated young adults with mild COVID-19. Studies *[40-41]* have observed that shortness of breath, fatigue anosmia and ageusia may persist as long-term symptoms even in home treated patients at 4- and 7-months post-infection. Furthermore, another study has concluded that initial COVID-19 hospitalization and initial symptomatic COVID-19 are significant risk factors for developing post-COVID-19 syndrome *[42]*.

It has been found in a previous study that individuals who were hospitalized due to COVID-19 are more likely to experience post COVID syndrome (PCS) compared to those who were not hospitalized. The study found that the hospitalized survivors had a higher incidence of various symptoms such as peripheral neuropathy, depression, anxiety disorder, dyspnea, tachycardia, restrictive lung disease, anemia, proteinuria and the need for insulin therapy compared to the non-hospitalized group, even one month after recovering from the acute COVID-19 illness *[43]*.

Similarly, six studies with a vaccine-infection-post-COVID-syndrome design, enrolling over 17 million people, found that vaccination is associated with the reduction of developing post-COVID symptoms *[44]*.

Our study's findings align with another study that also found a link between vaccination and lower risks of long-COVID *[45]*. Moreover, preliminary evidence indicates that getting two doses of the vaccine is more effective than getting just one. Although our study did not find any significant difference in terms of the number of vaccine doses ($p$>0.05), our inconsistent findings may be due to the smaller sample size of our study compared to the larger sample size of the other study.

Various studies have indicated that receiving a COVID-19 vaccine may lower the chances of individuals with mild to moderate cases experiencing lasting symptoms from the virus. This implies that vaccines may serve as a preventative measure against long-term symptoms of COVID-19. Nevertheless, the majority of the studies conducted thus far have solely examined the short-term effects of the vaccines. Typically, these studies have featured patients who contracted COVID-19 within one week to one month of being vaccinated. Only two studies have analyzed the vaccine's effects over a longer timeframe of six months *[46,47]*.

A potential reduction in long-COVID risk in people who have previously been vaccinated is unknown. Two hypotheses are offered. A vaccine may reduce the severity of acute SARS-CoV-2 infection, resulting in a lower likelihood of developing systemic or organic derangements, thereby reducing the onset or duration of symptoms *[48]*. There is still disagreement about the relationship between long-COVID and COVID-19 severity.

In a second hypothesis, vaccines could reduce the exaggerated inflammation and/or immune response associated with long COVID (viral remnant hypothesis of long COVID) or accelerate the clearance of the remaining SARS-CoV-2 virus (immune/inflammatory hypothesis of long COVID) *[49]*. To clarify these issues, future studies examining vaccines' influence on long-COVID would be necessary.

The results of functional assessment showed that the average ADL score was (88.5±14.5), with (80%) of patients were independent, (17%) were minimally dependent, and (3%) were partially dependent, on the other hand the average IADL score was (6.2±2), with (57%) of patients were independent and (43%) were partially dependent. Comparison between the 3 groups revealed that there was a highly significant decrease in ADL and IADL scores and higher dependency in the severe covid group compared to other groups. IT also showed that vaccination had a highly significant positive correlation with ADL and IADL scores. Whereas anosmia, loss of taste, hospital and ICU admission, ICU admission, and severity of illness have a highly significant negative correlation with ADL and IADL scores. Our comparative study between the 3 groups revealed that there is a highly significant decrease in and ADL and IADL scores and dependency in severe post-COVID-19 compared to other groups.

Body functional and structural impairments such as difficulty of breathing, lethargy, muscle pain, and other aching sensations may limit the ability of a person to execute ADL and IADL. Activities of Daily Living encompass personal care and mobility (ability to dress, eat, ambulate, perform hygiene). On the other hand, IADL includes the ability of a person to have synergy with the environment. Limitations in performing activities of daily living (ADLs) can lead to dependency on others, negatively affecting the quality of life for both the individual in need and their caregiver *[50]*.

Aside from being a physical function parameter *[51]*, ADL performance can serve the purpose of an indicator for patient's prognosis that could precede to a vital impact on the patient's life. The relationship between low functional capacity or dependence and short- and medium-term mortality highlights the importance of ADL as a prognostic factor *[52]*.

Similarly, a study showed that 34% or more than one-third in CARP (COVID-19 Activity Rehabilitation Program) complained to have difficulties in performing ADLs and some (84%) stated to have problems in doing IADLs. Several patients have been observed to not be able to perform work in their previous capacities and employment is delayed even months after post-COVID-19 infection. At the time of presentation to CARP, only 46% out of 63 patients who have resumed their jobs had returned to unrestricted work duty. Of employed patients, 31% (28 of 91 patients) had not returned to work in any capacity after their SARS-CoV-2 infection *[53]*.

Furthermore, Herridge et al's studyrevealed that the elderly population has the greatest risk of dependency after an extended ICU stay *[75]* and a significant decline in the level of ADL independence has been inclined to worse recovery post-COVID-19 infection *[54,55]*.

However, another study found that there was no significant difference in mean ADL and IADL prior the infection and at 90 days post recovery. They suggested that the elderly patients can attain near-baseline capacities post-COVID19 recovery *[56]*.

The importance of measuring the activities of daily living (ADL) is vital because it determines a fundamental framework on the functional state of the individual and the prerequisites for treatment and rehabilitation *[57]*.

The findings of our study are consistent with the results of two previous studies which mentioned that there is a significant relationship between the ADL score tool used to measure functional ability status in the elderly patients, prognostic factors, and the association with COVID-19 infection mortality **[54,55]**. At the start of hospitalization, the studies assessed the functional ability status of patients in accordance with the six basic tasks related to ADL such as bathing, feeding, dressing, transferring, toileting, and continence **[55]**. Moreover, IADLs were evaluated as well using the four basic tasks such as using the telephone, taking medications, riding transportation, and managing finances. The results showed significant difference between survivors and non-survivors among the elderly patients affected by COVID-19 with a median of 4.5 (IQR 2-6) and 3 (IQR 1-6) ADL respectively. It was shown that 50% and 63% of patients had at least one ADL and IADL altered respectively. The results indicated that short-term mortality precedes decreasing functional status and dependency among elderly patients. The score for each ADL was not reported in both studies. However, the results indicate that the ADL score can be used to determine the impact of ADL functional ability status in elderly patients and highlight the negative outcomes associated with high patient vulnerability **[54]**.

Our study also consistent with another study that among all the studies included, it was revealed that there is a decline in ADL performance post-COVID-19 infection regardless of the scale applied. According to the findings of study, the elderly patients and/or the patients who experienced complications during hospitalization (ICU admission) had the worse results **[58]**.

*Conclusion:*

Post-COVID-19 syndrome poses a significant negative effect on the functional capacity ADL and IADL of elderly patients. Post-COVID-19 syndrome has a highly significant association with the severity of infection in addition to history of ICU admission, anosmia, and loss of taste. Vaccination had a highly significant positive correlation with ADL and IADL scores.

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## تأثير متلازمة ما بعد الكوفيد على انشطة الحياة اليومية لدى المرضى المسنين دون فقدان سابق فى أى من الانشطة

**المقدمه:** يعتبر وباء الكورونا الذى بدا من ديسمبر عام ٢٠١٩ وباء ذو معدل انتشار سريع وكذلك معدل عالى من الوفيات.

ويمكن تعريف متلازمه ما بعد الكوفيد بوجود اعراض وعلامات مرضيه اثناء او بعد عدوى الكوفيد والذى يستمر لاكثر من ١٢ اسبوع مع عدم وجود تفسير او تشخيص اخر.

وتشمل متلازمه ما بعد الكوفيد مجموعه من الاعراض المختلفه التي توثر علي مختلف اعضاء الجسم مثل الجهاز التنفسي (صعوبه بالتنفس– ضعف عام– فقدان حاسه الشم)، الانشطه الوظيفيه مثل عدم المقدره على اداء الانشطه اليوميه والانشطه المهاريه والتاثير على الناحيه النفسيه مثل الاصابه بالتوتر او الاكتئاب.

**الغرض من البحث:** دراسه تأثير متلازمه ما بعد الكوفيد على انشطه الحياه اليومية لدى المرضى المسنين دون فقدان سابق فى أى من الانشطه.

**طريقه البحث:** سيتم عمل البحث علي ١٠٠ حاله من مرضى متلازمه ما بعد الكوفيد وسيتم استثناء المرضى الذين لديهم أى امراض اخرى تسبب اعراض مشابهه لمرض متلازمه ما بعد الكوفيد.

**حيث سيتم عمل التالى:**

– اخذ التاريخ المرضى كاملا.

– عمل استبيان لمرض متلازمه ما بعد الكوفيد وتاثيره على انشطه الجياه اليوميه.

– وسيتم استبعاد المرضى التاليين من البحث المرضي الذين لديهم أى امراض اخرى تسبب اعراض مشابهه لمرضه متلازمه ما بعد الكوفيد سواء كانت امراض حاده او مزمنه.

**نتائج الدراسة:** متلازمة ما بعد كوفيد–١٩ لها تأثير كبير للغاية على القدرات الوظيفية وأنشطة الحياة اليومية للمرضى المسنين (دون فقدان وظيفى سابق) مع انخفاض كبير فى خطر ظهور أعراض متلازمة ما بعد كوفيد لدى المرضى الذين تم تطعيمهم.