Relation between Self- Efficacy and Adherence to Therapeutic Regimen among Patients with Post COVID-19 Syndrome

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Abstract

Background: Patients with post-COVID-19 syndrome continue to have symptoms related to COVID-19 after the acute phase infection, which require adherence to therapeutic regimen to improve self-efficacy. **Aim of the study:** Was to assess relation between self- efficacy and adherence to therapeutic regimen among patients with post Covid-19 syndrome. **Research design:** A descriptive correlation design was utilized**. Setting:** The study was conducted at Chest Outpatient Clinic at El-Demerdash Hospital Affiliated to Ain Shams University Hospital**. Subjects:** A convenience sample of all available patients (no= 133). **Tools:** Three tools were used in the current study: Patients' demographic characteristics, Self-Efficacy Survey and Therapeutic regimen adherence tool. **Results:** Revealed that 42.1% of patients under the study had high level of self-efficacy & 44.4% of them had high adherence level to the therapeutic regimen **Conclusion:** It can be concluded that there was highly positive significant correlation between total levels of self-efficacy and adherence to the therapeutic regimen among the studied patients with post Covid-19 syndrome. **Recommendation:** Developing health educational program for the patients with post Covid-19 syndrome based on their needs to improve their awareness, self-efficacy and adherence levels to therapeutic regimen.

Keywords: Post-COVID-19 syndrome, Self-efficacy, Adherence, Therapeutic regimen.

Introduction:

Coronavirus disease 2019 (COVID-19) is a respiratory infection caused by a novel type of coronavirus (SARS-CoV-2) that was first detected in Wuhan, Hubei province, China, in December 2019. People with COVID-19 have had a wide range of symptoms ranging from mild symptoms to severe illness. Symptoms may appear 2-14 days after exposure to the virus. COVID-19-related symptoms include fever, cough, shortness of breath, and malaise, while in severe cases the infection may lead to severe pneumonia and cause death **(Karademas & Thomadakis, 2021)**.

Although most patients have recovered from COVID-19 infections, it has been reported that over 70% of survivors have multiple complications in one or more organs up to 3 months after initial symptoms, this is called post-COVID-19 syndrome. Such syndrome is defined as the persistence of clinical symptoms for more than 12 weeks after infection with the COVID-19 virus that cannot be attributed to by an alternative diagnosis **(Ruggiero et al., 2022).**

The most common symptoms of post COVID-19 syndrome include general fatigue, dyspnea, cough, throat pain, neurocognitive symptoms as dizziness, loss of attention, confusion, gastrointestinal symptoms as diarrhea, abdominal pain, cardiac symptoms as chest pain, tachycardia, palpitations, musculoskeletal symptoms as myalgia, arthralgia. Patients with post COVID-19 syndrome may have difficulty functioning in everyday life. Their condition may affect their ability to perform daily activities **(Fernández-de-las-Peñas et al, 2021).**

The important roles of the nurses for patients with post COVID-19 syndrome are focus on promoting quick recovery and decreasing the duration of chronic illness and complications. The nurses should give knowledge and advice on recovery, practice positive thinking skills, become the center of coordinating the social support for the

patients and their families, as well as provide holistic care to decrease the physical, psychological, social, and spiritual illness **(Aiyegbusi et al, 2021).**

Self-efficacy has a major role in people's health-related behaviors. Self-efficacy beliefs in disease management refer to individuals' confidence and certainty in their ability to successfully perform specific health-related behaviors. A person's perception of self-efficacy is the strongest predictor of the ability to make changes in high-risk behaviors. People with higher self-efficacy are more likely to care themselves, deal with symptoms of post COVID syndrome and are more successful in its avoiding **(Dadfar &Sanadgol., 2021).**

Adherence is a crucial part of COVID-19 patient care and indispensable for reaching clinical goals. Adherence is defined as the extent to which a person's behavior for taking medication, following a diet & executing lifestyle changes corresponds with agreed recommendations from health care providers. Traditionally, adherence has been evaluated from the patient perspective, although more recent models have a more prominent role for healthcare professionals **(Kaplan& Price., 2020).**

Therapeutic regimen adherence is a multifactorial phenomenon that can be influenced by various factors, social and economic factors, therapy-related factors, disease-related factors, patient-related factors, and healthcare system-related factors. Treatment-related factors include the complexity of the treatment regimen and the difficulty of administration. Factors related to the organization of the health system include the cost of therapies, as well as the accessibility of medicines, facilities, and health personnel **(Olmastroni et al, 2023).**

Significance of the study:

COVID-19 constitutes a significant portion of the global burden of the diseases. The number of infected cases and deaths due to COVID-19 is rising alarmingly there are more than 672,686,930 confirmed cases with over 6,740,521deaths. In Egypt the reported cases exceeded 515,645 with more than 24,805 deaths **(WHO, 2023).**

This study was conducted because large proportion of patients with Coronavirus presented with post COVID-19 syndrome. There are many studies about self-efficacy or therapeutic adherence for patients with coronavirus but no studies about self-efficacy and therapeutic adherence among patients with post COVID-19 syndrome & relation between both variables. Hopefully, the finding of this study to be crucial for the health professionals, health facilities, health administration and researchers to halt the spread of COVID-19 & prevent / treat post covid-19syndrome for decreasing morbidity & mortality rate among such group of patients

Aim of the study:

The current study aimed to assess relation between self-efficacy and adherence to therapeutic regimen among patients with post Covid-19 syndrome through the following -:

1. Assessing self- efficacy level among patients with post Covid-19 syndrome.
2. Assessing adherence level to therapeutic regimen among patients with post Covid-19 syndrome.
3. Assessing relation between self- efficacy and adherence to therapeutic regimen among patients with post Covid-19 syndrome.

Study questions:

This study answered the following questions-:

1. What is level of self- efficacy among patients with post covid-19 syndrome؟
2. What is level of adherence to therapeutic regimen among patients with post covid-19 syndrome؟
3. Is there relation between self- efficacy and adherence to therapeutic regimen among patients with post covid-19 syndrome?

Subjects and Methods:
1-Technical Design:
The technical design included research design, setting, subject and tools of data collection.

Research Design: A descriptive correlation design was utilized to conduct this study. Descriptive research is research designed to provide a snapshot of the current state of affairs. Correlational research is research designed to discover relationships among variables and to allow the prediction of future events from present knowledge **(Stangor & Walinga, 2019).**

Setting: The study was conducted in Chest Outpatient Clinic at El-Demerdash Hospital affiliated to Ain Shams University Hospital. It provides service by many specialized doctors for patients suffering from Covid-19, post covid-19 syndrome and chest diseases. It receives adults patients from different governorates allover Egypt and socioeconomic standard. It locates on the ground floor and consists of one room with two partitions either for prescribing medications or for examining the patients.

Subjects: A convenience sample of 133 patients was included in the study. So, the sample size was calculated by adjusting the power of the test to 80% and the confidence interval to 95% with margin of error accepted adjusted to 5%.

Study tools: Three tools were used in current study for data collection as following:-

Tool I: Patients' interviewing questionnaire

This tool was developed by Investigator in an Arabic language after reviewing the recent and relevant literatures (Ghosn et al., 2021 and Vanichkachorn et al., 2021) and included two parts-:

Part 1: Patients' demographic characteristic included eight questions regarding (age, gender, level of education, marital status, occupational status, residence, living status, and financial status).

Part 2: Patients' clinical data included 13 questions and divided into three parts: Present history (five questions) Covid 19 onset of infection, symptoms, frequency of infection, hospital admission & received medication. Past history (six questions) suffering from chronic diseases, receiving medications, receiving Covid 19 vaccine, other vaccinations such as seasonal influenza, pneumococcus, allergies and smoking status. Family history (two questions) any family members suffering from chronic diseases and infected with Covid 19.

Tool II: Self-Efficacy Survey

It was developed by the investigator in an Arabic language after reviewing the recent and relevant literatures (Heo et al., 2021; Yang et al., 2021; Panc et al., 2012). It was used to assess the patient perceived self-efficacy in different areas of life and abilities to perform specific behaviors. It composed of 25 statements, & divided into three domains initiative (9 statements), effort (8 statements) and perseverance (8 statements). Each statement had five responses (completely able=5, able=4, neutral=3, unable=2 and unable completely=1.

❖ **Scoring system**

The total score ranged from 25-125 grades and classified as the following
- Low self-efficacy <50% (Score 25-<63)
- Average self-efficacy 50-75% (Score 63-94)
- High self-efficacy >75% (Score 95-125)

Tool III: Therapeutic regimen adherence tool:

It was developed by the investigator in an Arabic language after reviewing the recent and relevant literatures (Carlucci et al., 2020 and Fernandez-Lazaro et al., 2019), it was used to assess therapeutic regimen adherence level among the study patients. It composed of 51 statements & divided into eight components, symptoms management (4 statements), prescribed medication (9 statements), precaution measures (9 statements), exercise and physical activities (6 statements), nutrition (10 statements), follow-up (6 statements), diagnostic tests (4 statements) and warning sign & symptoms (3 statements). Each statement had five responses

(never=1, rarely=2, sometimes=3 often=4 and always= 5.

❖ **Scoring system**

The total score ranged from 51-255 grades :
• Low adherence <50% (Score 51-<127)
• Average adherence 50-75% (Score 128-191)
• High adherence >75% (Score 192-255).

2. Operational design: -

It included preparatory phase, tools validity & reliability, pilot study and fieldwork.

Preparatory Phase:

It included reviewing of related literatures and theoretical knowledge of various aspects of the study using books, articles, internet periodicals and magazines to develop the theoretical part of the study and data collection tools.

Tools validity & reliability:

Validity was tested through a jury of seven experts, two professors, four assistant professors and one lecturer from the Medical Surgical Nursing staff at the Faculty of Nursing Ain Shams University. The experts reviewed the tools for clarity, relevance, comprehensiveness and applicability. Modifications in phrasing and sequencing of some items were carried out.

Reliability was tested statistically for the developed tools using cronbach's coefficient alpha statistical test for measuring internal consistency of the tool items. Patients' Interview Questionnaire =0.791, self-efficacy = 0.74 and adherence to therapeutic regimen =0.814

Pilot Study:

Before starting the actual study, a pilot study was carried out on 10% from the study subjects (14 patients) to test applicability, clarity and efficiency of the tools, as well as to estimate the time needed to answer it. No modification was done on the study tool after

pilot study, so that, the patient who included in the pilot study were included in the main study group.

Field work:

The purpose of the study was simply explained to the patients who agreed to participate in the study prior to data collection. Data was collected in six months started from June 2022 until December 2022. Data collections, tools were fulfilled either by the investigator if patients were illiterate or from patients themselves if they were educated. The investigator visited the Outpatient Clinic at Ain Shams University Hospital three days per week (Sunday-Tuesday–Thursday), from 9.00 am to 1.00pm. The investigator interviewed about two or three patients during waiting their role in the clinic. The investigator selected quiet waiting area for interviewing the recruited patients to avoid interruption and ensure accuracy of the collected data. The time needed for completing the used tools was about 45-60 minutes for every patient .

Ethical considerations:

Approval of protocol was obtained from Ethical Committee in Faculty of Nursing at Ain Shams University before starting the study. The investigator clarified the objective and aim of the study to the patients included in the study. The investigator assured maintaining anonymity and confidentiality of the subject data. Patients were informed that they allowed choosing to participate or not in the study and that they had the right to withdraw from the study at any time without giving any reasons. Values, culture and beliefs were respected.

3- Administrative design

An official letter was issued from the Faculty of Nursing Ain Shams University to the director of El–Demerdash Hospital. Which the study was conducted, explaining the purpose of the study and requesting the permission for data collection from the studied patients.

4- Statistical design

Data were organized, categorized, analyzed through a personal computer using Statistical Package for Social Sciences (SPSS version 20). Data were presented in tables and graphs. The statistical analysis included; percentages (%), the arithmetic mean ($\bar{x}$), standard deviation (SD), Chi-square test ($\chi2$),) and Correlation coefficient (r).

Results:

Table (1): shows that, 30.1% of studied patients' their age were ≥ 50 years with mean age was 42.75±11.14, and 60.2% of them were females, As regards to marital status 63.9% of them were married, and 48.2% were highly educated. Also, 52.6% of the studied patients' were employees, 63.9% of them lived in urban areas, 90.2% of them lived with family, and 55.6% had enough monthly income.

Figure (1): This figure shows that, 42.1% of the studied patients had high level of self-efficacy, 36.1% of them had average level of self-efficacy, and 21.8% had low self-efficacy.

Figure (2): This figure reveals that, 44.4% of the studied patients had high adherence level to the therapeutic regimen, 30.1% of them had low adherence level to the therapeutic regimen, and 25.6% of them had average adherence level to the therapeutic regimen.

Table (2): This table reveals that, there was a highly statistically significant relation between patients' total level of self-efficacy and their educational level & residence place P value <0.001.While, there was no statistically significant relation with the patients age, gander , marital status as well as occupational status, living status and family's monthly income P value > 0.05.

Table (3): This table reveals that, there was a highly statistically significant relation between patients' total level of adherence to the therapeutic regimen and their educational level & residence place P value <0.001.While, there was no statistically significant relation with the patients age, gander , marital status as well as occupational status, living status and family's monthly income P value > 0.05.

Table (4): This table reveals that, there was highly positive significant correlation between total levels of self-efficacy and adherence to the therapeutic regimen among the studied patients at r = 0.572 at P value = 0.001.

Table (1): Numbers and percentage distribution of the studied patients regarding their demographic characteristics (N =133).

Demographic data	No.	%
Age (years)		
20-<30 years	22	16.5
30-<40 years	34	25.6
40-<50 years	37	27.8
50 -63 years	40	30.1
Mean±SD	42.75±11.14	
Gender		
Male	53	39.8
Female	80	60.2
Marital status		
Married	85	63.9
Not married	48	36.1
Education level		
Neither read nor write	21	15.8
Read and write	22	16.5
Secondary education	26	19.5
High education	64	48.2
Occupational status		
Employee	70	52.6
Not employee	63	47.4
Residence		
Rural	48	36.1
Urban	85	63.9
Living status:		
Live alone	13	9.8
Live with family	120	90.2
Family's monthly income		
Not enough for treatment cost	59	44.4
Enough for treatment cost	74	55.6
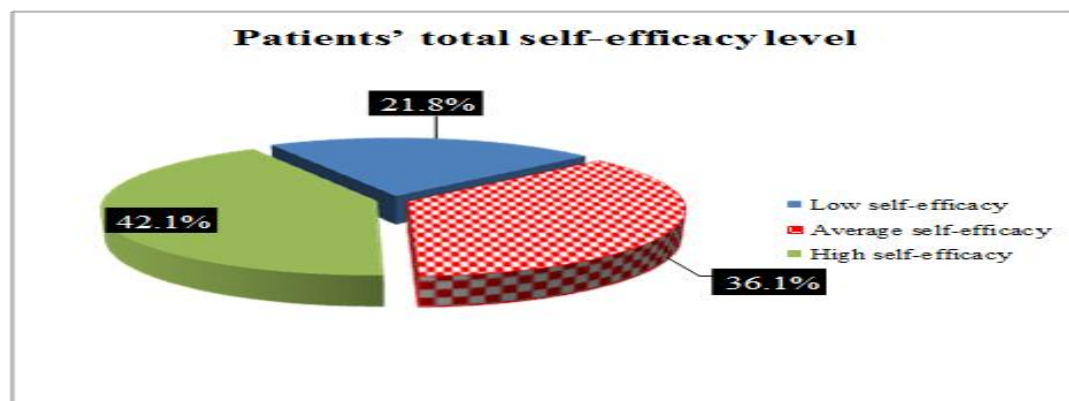
Figure (1): Percentage distribution of total level of self-efficacy among the studied patients (No=133).
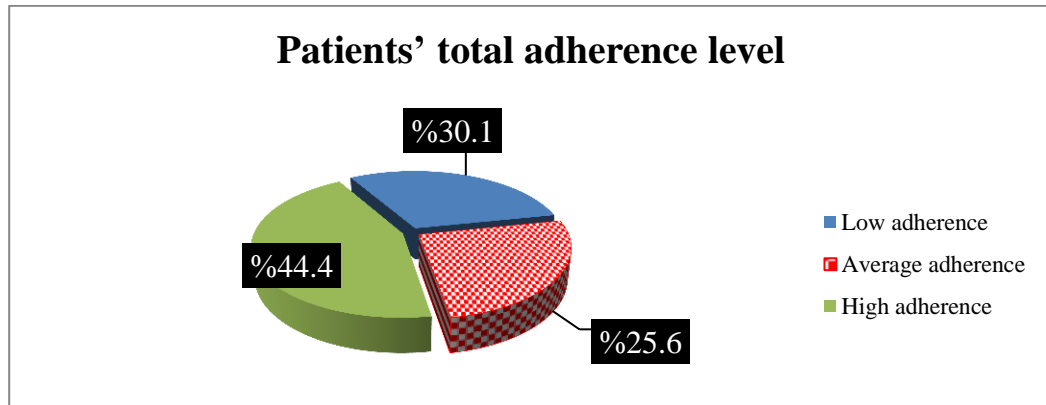
Figure (2): Percentage distribution of total adherence level to therapeutic regimen among the studied patients (No=133).

Table (2): Relation between total level of self-efficacy and demographic data among the studied patients (N=133).

Demographic data	Total levels of patients self-efficacy						Test of significant	
	Low self-efficacy (n=29)		Average self-efficacy (n=48)		High self-efficacy (n=56)			
	No.	%	No.	%	No.	%	x2	p-value
Age (years)								
20-<30 years	4	13.8	5	10.4	13	23.2		
30-<40 years	10	34.5	12	25.0	12	21.4	9.944	0.127
40-<50 years	11	37.9	15	31.3	11	19.6		
50 -63	4	13.8	16	33.3	20	35.7		
Gender								
Male	13	44.8	21	43.8	19	33.9	1.424	0.491
Female	16	55.2	27	56.3	37	66.1		
Marital status								
Married	19	65.5	35	72.9	31	55.4	3.497	0.174
Not married	10	34.5	13	27.1	25	44.6		
Education level								
Neither read nor write	21	72.4	0	0.0	0	0.0		
Read and write	8	27.6	14	29.2	0	0.0	192.525	<0.001**
Secondary education	0	0.0	26	54.2	0	0.0		
High education	0	0.0	8	16.7	56	100.0		
Occupational status								
Employee	17	58.6	26	54.2	27	48.2	0.901	0.637
Not employee	12	41.4	22	45.8	29	51.8		
Place of residence								
Rural	18	62.1	21	43.8	9	16.1	19.436	<0.001**
Urban	11	37.9	27	56.3	47	**83.9**		
Living status								
Live alone	5	17.2	4	8.3	4	7.1	2.386	0.303
Live with family	24	82.8	44	91.7	52	92.9		
Family's monthly income								
Not Enough	13	44.8	22	45.8	24	42.9	0.096	0.953
Enough	16	55.2	26	54.2	32	57.1		

P-value >0.05 NS;   **p-value <0.001 HS

Table (3): Relation between total of adherence level to the therapeutic regimen and demographic data among the studied patients (N=133).

Demographic data	Low adherence (n=40)		Average adherence (n=34)		High adherence (n=59)		Test of significant	
	No.	%	No.	%	No.	%	x2	p-value
Age (years)								
20-<30 years	4	10.0	5	14.7	13	22.0		
30-<40 years	13	32.5	6	17.6	15	25.4	7.827	0.251
40-<50 years	13	32.5	13	38.2	11	18.6		
50-63	10	25.0	10	29.4	20	33.9		
Gender								
Male	17	42.5	16	47.1	20	33.9	1.726	0.422
Female	23	57.5	18	52.9	39	66.1		
Marital status								
Married	29	72.5	25	73.5	31	52.5	5.949	0.051
Not married	11	27.5	9	26.5	28	47.5		
Education level								
Neither read nor writes	21	52.5	0	0.0	0	0.0		
Read and writes	13	32.5	9	26.5	0	0.0	194.83	<0.001**
Secondary education	1	2.5	25	73.5	0	0.0		
High education	5	12.5	0	0.0	59	100.0		
Occupational status								
Employee	22	55.0	20	58.8	28	47.5	1.246	0.536
Not employee	18	45.0	14	41.2	31	52.5		
Residence								
Rural	22	55.0	15	44.1	11	18.6	14.937	0.002**
Urban	18	45.0	19	55.9	48	81.4		
Living status:								
Live alone	7	17.5	2	5.9	4	6.8	3.891	0.143
Live with family	33	82.5	32	94.1	55	93.2		
Family's monthly income								
Not Enough	19	47.5	14	41.2	26	44.1	0.301	0.860
Enough	21	52.5	20	58.8	33	55.9		

P-value >0.05 NS;   **p-value <0.001 HS

Table (4): Correlation between total scores of self-efficacy and adherence to the therapeutic regimen among the studied patients (N=133).

		Total level of patients self-efficacy	Total level of patients adherence
Total level of patients self-efficacy	r		0.572
	p-value		< 0.001**
	N		133
Total level of patients adherence	r	0.572	
	p-value	<0.001**	
	N	133	

r-Pearson Correlation Coefficient;   **p-value <0.001 highly significant

Discussion:

The COVID-19 pandemic is a continuing crisis for everyone in the society. Since the beginning of such pandemic, many individuals have reported persistent symptoms or complications lasting beyond 4 weeks, which is now called post-COVID-19 syndrome. Self-efficacy has been found to affect individual responses and cope with the anti-pandemic measures. Adherence to therapeutic regimen is importance to control or prevent post Covid 19 syndrome. Recent evidence suggests ensuring that a patient is both motivated and empowered is critical to improve adherence persistence **(Hassan et al., 2021).**

Regarding to age of the studied patients the result of the current study indicated that, less than one third studied patients, their age were ≥ 50 years with mean age of 42.75±11.14. From investigator's point of view, this age group may be more susceptible/ less resistance to infection due to aging process because their immune systems are weaker.

This study finding goes in the same line with study conducted by **Ziauddeen et al. (2022)** entitled " Characteristics and impact of long Covid: findings from an online" which revealed that, the mean age of studied patients was 46.5 ± 11.0.

Regarding gender of the studied patients, the present study result revealed that, about three fifths of the studied patients were females. This could be attributed to differences in how women's immune system respond to infection compared to those of men. This result goes in the same line with **Anaya et al. (2021)** who did study about " Post-COVID syndrome a case series and comprehensive review" who found that, more than half of studied patients were females.

Regarding patients' marital status the present study showed that, about two third of the studied patients were married. This could mean that married people would experience more of a cumulative health benefit during the pandemic relative to non-married. This finding is in agreement with a study done by **Leigh et al. (2020)** entitled " A national cross-sectional survey of public perceptions of the COVID-19 pandemic: self-reported beliefs, knowledge, and behaviors" who found that, near three fifths of the studied patients were married.

One of the noticeable findings of the study was that, around half of the studied patients were highly educated. This may be to the place where the study sample collected is in the outpatient clinics of Demerdash Hospital affiliated to Ain Shamsh University, and the sick staff goes to the clinic for examination and treatment. This result is consistent with **Bileviciute-Ljungar et al. (2022)** who done study about " Pain burden in post-COVID-19 syndrome following mild COVID-19 infection" and found that, near three fifths of studied patients' sample had higher education.

In concern to the studied patients' occupation, the study result showed that, more than half of them were employees. From the investigator's point of view, this may be due to; most of studied patients were in middle age no retirement age this helps them to work. This finding is in agreement with the finding of study carried out by **Kayaaslan et al. (2021)** entitled " Post-COVID syndrome: A single-center questionnaire study on 1007 participants recovered from COVID-19 " and found that, near two thirds of studied patients were employees.

Regarding residence, the current study showed that less than two thirds of the patients under study were living in urban areas. This may be due to the location of the selected setting of data collection where easy access for patients in urban area to get treatment for illness. This result is in accordance with **Czeisler et al. (2020)** who conducted a study entitled " Public attitudes, behaviors, and beliefs related to COVID-19, stay-at-home orders, nonessential business closures, and public health guidance " and found that, most of the studied patients were residing in urban areas.

Regarding living status, the current study showed that, most of the studied patients lived with their family. This may be due to more than three fifths of the studied patients' were married. This result is in

agreement with **Carlucci et al. (2020)** who conducted a study entitled "Demographic and attitudinal factors of adherence to quarantine guidelines during COVID-19: The Italian model most live with family " and found that, majority of the studied subjects were lived with their family.

As well as, this study finding is congruent with the study performed by **Xiong et al. (2020)** about " The psychological status and self-efficacy of nurses during COVID-19 outbreak: a cross-sectional survey. Inquiry: The journal of health care organization, provision, and financing " and found that, near two thirds of studied patients lived with their family.

Regarding patients' family's monthly income, the study results revealed that, more than half of studied patients' had income enough for treatment cost. From the investigator's point of view this result may be due to near half of the studied patients' were employees had health insurance coverage unexpected high medical costs. This finding is incongruent with the study done by **Zomalheto et al. (2021)** about "Impact of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) infection and disease-2019 (COVID-19) on the quality of life of rheumatoid arthritis patients in Benin" who found that, most of studied patients family's monthly income was not enough for treatment cost.

Regarding patients total self-efficacy level, the current study showed that more than two fifths of the patients under study had high level of self-efficacy, around one third of them had average level of self-efficacy and near one fifth of them had low self-efficacy. These finding reflects that self-efficacy enables people to face challenges better & highly engaged in positive behavior like managing their own health and care. This result goes in the same with **Dadfar and Sanadgo. (2021)** who conducted a study entitled "Self-efficacy on the coronavirus disease-2019 (COVID-19)" and found that, less than two thirds of study samples had high level of self-efficacy, near one fifth of them had average level of self-efficacy and less one fifth of them had low level of self-efficacy.

Regarding the studied patients' total level of adherence to all therapeutic regimen components the study result displayed that, more than two fifths of them had high level of adherence, less than one third of them had low adherence level and more than one quarter of them had average adherence level. This study result reflects the need of studied patients to continuous health education program based on their needs to enhance adherence of all patients with post covid-19 syndrome to therapeutic regimen to decrease morbidity and mortality rate .This result is contradicted with the study result performed by **Kumar, et al. (2021)** entitled " Knowledge, attitudes, and perception towards COVID-19 vaccination among the Adult population: A Cross-sectional study in Turkey " who found that, three fifths of studied patients had poor adherence to the therapeutic regimen.

The current study revealed that, there was highly statistically significant relation between the studied patients' level of self-efficacy and their demographic characteristics including educational level & residence place P value <0.001. While, there was no statistically significant relation with the patients age, gander, marital status as well as occupational status, living status and family's monthly income P value > 0.05. The investigator's opinion is that, increasing the people education level leads to increasing their awareness and self-efficacy levels to cope with the challenges they are facing with this crises. Besides, people lived in urban are more contact with technology and media that help them to acquiring more information about disease and its management regardless of other mentioned variables.

This finding is in agreement with study conducted by **Najjuka et al. (2022)** entitled "Health care workers' perceived self-efficacy to manage COVID-19 patients in central uganda: a cross-sectional study" who found that, patients with a high education showed the highest score of self-efficacy among the other at p<0.001.While, no statistically significantly relation between residence and levels of self-efficacy.

The current study revealed that, there was highly statistically significant relation

between patients' level of adherence to the therapeutic and their demographic characteristics including educational level & residence place P value <0.001. While there was no statistically significant relation with the patients age, gander, marital status as well as occupational status, living status and family's monthly income P value > 0.05.The investigator's opinion is that, this relation may be due to patients with high educational level should have better knowledge about the disease and it's management and therefore be more compliant.. This finding emphasizes the importance of patients education to enhance their adherence regardless of other stated variables. As well as place of residence helps them attending follow up visits because less than two thirds of the patients under study were living in urban areas.

This finding is in the agreement with a study conducted by **Carlucci .et al. (2020)** who found that, patients with a high education showed the highest scores of adherences among the other levels of education p < 0.001. Also, patients from the urban area showed statistically significantly higher level of adherence (p < 0.01) compared to the rural area.

Regarding correlation between level self-efficacy and level of adherence to the therapeutic regimen among the studied patient, the study result revealed that, there was highly positive significant correlation. From the investigator's point of view this result may be due to, patients with post-covid-19 syndrome that had high self-efficacy would had better adherence to the therapeutic regimen. Whereas people are more likely to engage in certain behaviors when they believe they can execute those behaviors successfully (self-confidence).

This finding is in consistent with a study conducted by **Chen .et al. (2023)** entitled "Relationship between self-efficacy and adherence to self-management and medication among patients with chronic diseases in China: A multicenter cross-sectional study" who found that, there was positive significant correlation between level of self-efficacy and level of adherence to the therapeutic regimen among studied patients.

Conclusion:

Based on this study finding, it can be concluded that, more than two fifths of the studied patients had high level of self-efficacy and around one third of them had average level of self-efficacy. Also, more than two fifths of the studied patients had high adherence level of therapeutic regimen and around one quarter of them had average adherence level of therapeutic regimen. There was highly positive significant correlation between total levels of self-efficacy and adherence to the therapeutic regimen among the studied patients with post Covid-19 syndrome.

Recommendation:

Based on the results of the present study, the following recommendations are suggested:

- Developing health educational program for the patients with post Covid-19 syndrome based on their needs to improve their awareness, self-efficacy and adherence to therapeutic regimen.
- Suggesting evidence based guideline of post Covid-19 syndrome management to enhance the studied patient's self-efficacy and adherence levels.
- Availability of a simplified and comprehensive Arabic booklet/ illustrated pamphlets about post Covid-19 syndrome and its management to improve the patients' self-efficacy and adherence to therapeutic regimen.
- Continuously evaluating levels of self-efficacy and adherence to therapeutic regimen for the patients with post Covid-19 syndrome are recommended.
- Replication of the current study on a larger sample and in different hospital settings in order to generalization of the results.
- Further study for assessing factors affecting the patients' self-efficacy and adherence to therapeutic regimen post Covid-19 syndrome.
- Further study to evaluate the impact of implementing health education/ evidence based suggested guideline about post Covid-19 syndrome management on the patients' self-efficacy and adherence levels.

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