# Effect of Online Distance Learning on COVID19 Patients' Knowledge, Self-monitoring and Self-care at Assiut City

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**Abstract:**

**Background:** The COVID-19 is spread by human-to-human through droplets, feco-oral, and direct contact with patients during 2-14 days. Therefore, applying preventive measures to control COVID- 19 infection is the most critical intervention. **Aim:** To evaluate the effect of online educational program on COVID19 patients' knowledge, self-monitoring, and self-care. **Subjects and methods: Design:** A quasi-experimental (Pre & Post-test) study was conducted on 112 COVID-19 patients; online pretest during their staying at isolation areas and online posttest one month later after discharge from isolation areas. **Setting:** Isolation area at Assiut university dorms, in addition to isolation areas in all Assiut university hospitals which include Main University Hospital, Urology University Hospital and Al-Rajhi University Hospital , moreover online posttest from patients' homes .**Tools**: Three tools were used which conducted by on line way, on-line self-reported COVID -19 knowledge questionnaire, daily self-monitoring form and self-care questionnaire. **Results:** there was a significant statistical difference between pre, post online education regarding patients' self-care toward COVID-19 in physical, mental, professional, and social well-being domains with p.value (0.0001, 0.004, 0.0001,and 0.0001) respectively. Also, there was a positive correlation between patients' knowledge and patient self-care post online education. **Conclusion:** Online distance learning has a great effect on COVID19 patients' knowledge, self-monitoring, and self-care in isolation units. **Recommendations**: Providing a printed copy of the educational brochure in outpatient clinics for patients and their relatives.

**Keywords:** COVID-19; Patients' Knowledge, Self-Monitoring & Self-care.

## Introduction:

Corona virus disease 2019 (COVID-19) is an infectious disease caused by a serious acute respiratory syndrome corona virus 2 (SARS-CoV-2). The disease was first recognized in December 2019 in Wuhan, the capital of China's Hubei province, and has since spread globally, the ongoing 2019–20 corona virus pandemic resulting in **(Hui et al., 2020).**

The COVID-19 is transmitted by human-to-human through droplets, feco-oral, and direct contact with an incubation period of 2-14 days. Until this point, no antiviral treatment or immunization has

been recommended explicitly for COVID-19. Hence, applying the preventive measure to control COVID-19 infection is the basic intervention (**World Health Organization, 2020).**

Patients' clinical manifestations include fever, nonproductive cough, dyspnea, myalgia, fatigue, normal or decreased counts of leukocytes, and radiographic evidence of pneumonia. Dysfunction of the organs (e.g., shock, acute respiratory distress syndrome [ARDS], acute heart failure, and acute renal failure) and death can occur in serious cases **(Huang &Wang, 2020).**

COVID19 is mainly reported in terms of clinical signs, on vital parameters (temperature, pulse oximetry saturation) and radiological settings (X-ray, chest CT scan). Laboratory findings could frequently show lymphopenia and high LDH. Nasopharyngeal and oropharyngeal swab, enabling isolation of the virus, and confirm the diagnosis **(Wang et al., 2020).**

Considering that no effective treatment is accessible for viral infectious diseases, preventive measures including monitoring the source of infection, early patient detection, cutting off the transmission and protecting susceptible populations are crucial, while medical institutions and staff are the key force in the battle against the pandemic **(Simon and Schuster, 2020).**

Distance learning, also called distance learning, e-learning, and online learning, a type of education in which the primary component involves physical separation of teachers and students during teaching, and the use of different technologies to promote contact between student-teacher and student-student. With Covid-19's escalation, educators around the world are encouraged to switch to providing online and distance learning as schools and universities are forced to close down campuses **(Berg and Simonson, 2016).**

Self-care has been defined as, "a multidimensional, multifaceted process of purposeful engagement in strategies that promote healthy functioning and enhance well-being. Unfortunately, however, many people view self-care as a luxury, rather than a priority. Consequently, they're left feeling overwhelmed, tired, and ill-equipped to handle life's inevitable challenges **(Dorociak et al., 2017).**

## Significance of the study:

On half of February, 2020, Egypt announced the first case of COVID-19 in Africa and needed about three months to record 10 000 cases, which was almost double the time that Italy and the USA took to reach the same number of cases **(Tuite et al., 2020).** 219 patients admitted to all isolation units in the Assiut University Hospitals from March till 15$^{th}$ April 2020 **(Assiut University Hospitals Records, 2020).** As this is a new pandemic disease and patients need knowledge that helps them for managing the disease which reflects later on their self-monitoring and self-care.

## Aim of the study:

To evaluate the effectiveness of online distance learning on COVID19 patients' knowledge, self-monitoring and self-care.

**Research hypotheses:** It is hypothesized that:-

- COVID-19 patients will have adequate knowledge about COVID-19 disease and how to deal with it.

- Improvement of patients' knowledge and self-care will be recognized after application of online educational brochure.

- A positive correlation will be exist between COVID-19 patients' knowledge and their self- care after application of the educational brochure.

**Subjects and Methods:**

**Design**: A quasi-experimental (Pre & Post-test) research design was used; online pretest during their staying at isolation areas and online posttest one month later after patients discharge from isolation areas.

**Setting**:

The study was conducted in isolation area at Assiut university dorms, in addition to isolation areas in all Assiut university hospitals which include Main University Hospital, Urology University Hospital and Al-Rajhi University Hospital, moreover online posttest from patients' homes.

**Sampling:**

A convenient sampling technique was used in this study. The total number of the studied sample was selected by the equation according to **Thompson**,**(2012).**

$$n=\frac{N\times p(1-p)}{[N-1\times(d^2\div z^2)]+p(1-p)]}$$

N=total number of patients who admitted to all isolation units in the Assiut University Hospitals from March till 15th April 2020 which was 219 patients (Assiut University Hospitals records, 2020), after excluded of critical cases which admitted in ICU and death cases from the total number.

Z = confidence levels is 0.95 and is equal to 1.96

D= the error ratio is = 0.05

P= the property availability ratio and neutral = 0.50

*The result was 140 participants but after the drop out only 112 patients who met the inclusion criteria filled the questionnaire.

**Inclusion criteria**: Eligible participants age 18 – 65 years, educated and able to deal with Smartphone and WhatsApp application, stable, non-critical conditions**.**

**Tools of the study:**

**Tool I: On-line Self-reported COVID-19 knowledge questionnaire:**

The questionnaire comprised of two parts:

- **Part 1: demographic characteristics** as age, gender, marital status, level of education, occupation, and residence.

- **Part 2: Knowledge about COVID-19disease**:

The tool was developed by the researchers after reviewing national and international literatures. It was designed in Arabic, the native language in Egypt; the tool contains questions about the mode of transmission, incubation period, symptoms, prevention, and complications. It consists of 5multiple-choice questions; Questions were given 2 points for correct complete response, 1 point for incomplete response and zero point for incorrect answered questions or not answered. A cutoff level of less or equal 6 (≤ 60%)

was considered as an inadequate knowledge level whereas more than 6 (> 60%) was considered as adequate knowledge level aboutCOVID-19.

**Tool II: On-line COVID-19 Daily Self-Monitoring Form:** it was prepared by **Government of Northwest Territories, (2020)**; which help patient to keep track of his daily symptoms while self- monitoring, monitor or watch himself for the following symptoms of COVID-19: fever, new or worsening cough, shortness of breath, muscle aches, runny nose, sore throat, nausea/ vomiting, diarrhea, headache, loss of sense of smell and or taste, chills, generally feeling unwell. The patient monitors him-self for at least 14 days from entering the isolation units daily recording the symptoms if present or not.

**Tool III: On-line Self-Care Questionnaire:** it was developed by **The Institute for Functional Medicine, (2016).**A tool that helps the patient to see what he is doing to care for himself. The questionnaire consisted of 4 Parts; physical wellbeing (10 questions), mental/emotional/spiritual wellbeing (10 questions), professional life/work/career (10 questions), and social life/family/relationships (10 questions).

**Scoring system:**

Each statement scored using a 6 points Likert scale (0 – 5). As **(**0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = regularly, and 5 = always). The higher the score, the better patient may take time for self- care and wellness in each aspect of life. Consider response for each item 3 or lower was as poor self-care practices, however more than 3 as good. Total score 200, those who obtained less than (60%) were considered having unsatisfactory level. More than or equal (60%) were considered to have a satisfactory level.

**Validity and Reliability**:

For assessing the validity of tools, three faculty members who experts in medical and nursing sciences were asked to assess the degree to which items in the questionnaires are relevant and can correctly measure knowledge and self-care of the Egyptian patients regarding COVID-19. Afterward, the final form of the tool was designed and tested for reliability by using internal consistency for the tools measured using Cronbach's alpha (tau-equivalent reliability) coefficient for tool II (r= 0.817) and (r= 0.85) for tool III.

**Online educational brochure-:**

The brochure was developed by the researchers based on the review of relevant literature accordingtotheguidelinesofWHO,whichcanhelppatientstoachievehealthregardingCOVID 19.The brochure includes knowledge about COVID 19 as meaning, modes of transmission, symptoms, good practices for Corona patients with isolation units as (good nutrition, drink enough water every day, eat low amounts of fats and oils, eat less salt and sugars, sunlight exposure, sports during isolation, provide psychological & social counseling and support). Each member participating in the study was received their own brochure online.

**Field work and data collection:**

Official permission to conduct the proposed study was obtained from the director of Assiut University Hospitals. Online questionnaire portal, Google Form was created. At the initial online contact, the researchers introduce themselves to initiate a line of communication and explain the nature and purpose of the study to the patients and invited them to complete and submit the form by a link sent

to them throw their WhatsApp numbers. The data were collected from May 2020 to August 2020, and included 112 patients through an online questionnaire sheet before applying the educational brochure using tool (I) (II) & (III). The educational brochure was administered to the participants directly after submitting the questionnaire and every patient was given an ID number.

Continuous follow-up every two - three days for every patients for monitoring their condition , progress and their commitment to apply the instructions and advices in the educational brochure and for answering any questions or clarifying any unclear information.

One month later after patients' discharge and returned to their homes , each patient was asked to fill the same questionnaire for the second time posttest from their home by the same link using his ID number to evaluate the effectiveness of the teaching brochure on patients' knowledge and self-care.

**Pilot study:** It was conducted on 10 randomly selected patients who were excluded later from the study sample. The goal of the pilot study was to assess clarity, relevance, acceptability, feasibility and the time needed to complete the questionnaire

**Statistical analysis:**

The data obtained had been reviewed, prepared for computer entry, coded, analyzed, and tabulated. Descriptive statistics (frequencies and percentages, mean and standard deviation) were done using computer program (SPSS) version (20). Pearson coefficient correlation (r) test and Chi-square tests were used in the relationship between the study variables. It's considered significant when P. value less than (0.05).

**Ethical consideration:**

This study was approved by the ethical guidelines of clinical research according to the principles of **the Helsinki Declaration, (1996)** for medical research, confidentiality and anonymity were guaranteed. Subjects had the freedom to participate in or withdraw from the study whenever they want.

**Results**:

**Table (1):** shows that more than half of the studied sample (52.7%) were females, and (51.8%) of them were in the age group of 18 - 35 years with mean 36.4 ± 10.402 yrs., the highest percentage of them (66.1%) had a university education, more than three-quarters of them (76.8%) were married, According to residence and occupation, more than two-thirds of patients lived in urban areas and were employed with (70.5%, 72.3%) respectively.

**Fig. (1):** reflects that there was an increase in the number of patients who had an adequate knowledge level post educational brochure application comparing to their number pre brochure application.

**Table (2):** shows that there was a significant decrease in the patients' symptoms presentation in the last days of isolation compared to its presence on the first day of isolation.

**Table (3):** founds that there was a statistical significant difference between pre, post educational brochure applications regarding patients' self-care toward COVID-19 in all domains.

**Fig. (2):** shows that there was a positive correlation between patients' knowledge and patient self- care management as patients' knowledge increased their ability to self-care increased also.

**Table 1: Distribution of studied sample according to their demographic characteristics (N=112).**

| Item | (N. 112) No. | % |
|---|---|---|
| **Gender:** | | |
| • Male | 53 | 47.3 |
| • Female | 59 | 52.7 |
| **Age** | | |
| • 18 - 35yrs. | 58 | 51.8 |
| • > 35 yrs. | 43 | 38.4 |
| • >50yrs. | 11 | 9.8 |
| **Mean± SD** | **36.4 ± 10.402** | |
| **Educational level** | | |
| • Read and write | 6 | 5.4 |
| • Primary | 9 | 8.0 |
| • Secondary | 23 | 20.5 |
| • University | 74 | 66.1 |
| **Marital Status** | | |
| • Single | 24 | 21.4 |
| • Married | 86 | 76.8 |
| • Divorced | 2 | 1.8 |
| **Residence** | | |
| • Urban | 79 | 70.5 |
| • Rural | 33 | 29.5 |
| **Occupation** | | |
| • Employee | 81 | 72.3 |
| • Literal | 3 | 2.7 |
| • Free work | 6 | 5.4 |
| • Retired | 2 | 1.8 |
| • Don't work | 20 | 17.9 |

**Figure 1: Distribution of the studied sample regarding the knowledge level pre and post educational brochure application toward COVID-19 disease**

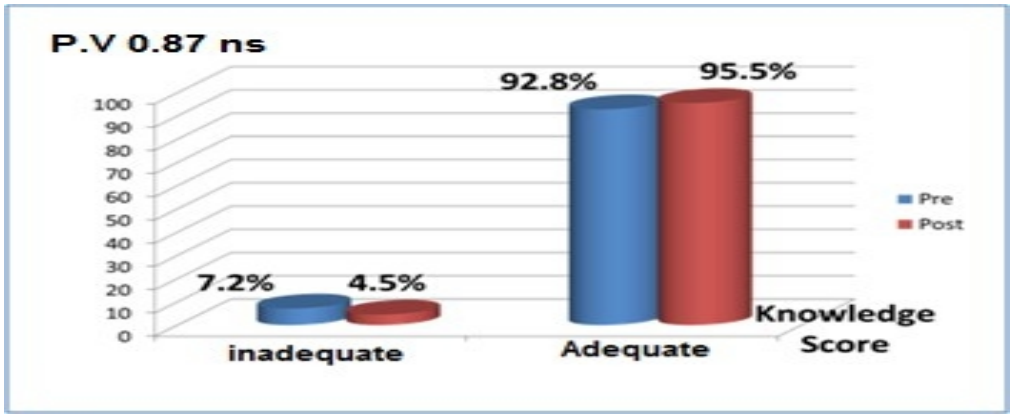


**Table 2: Frequency distribution of symptoms self-monitoring of patients during 14 days at isolation units:**

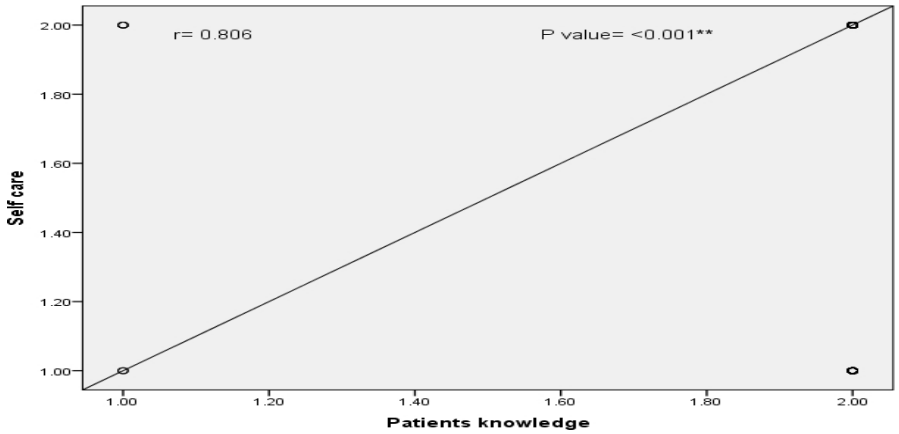
| | Patients self-monitoring( N.112) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Symptoms** | **1st day** | **2nd day** | **3rd day** | **4th day** | **5th day** | **6th day** | **7th day** | **8th day** | **9th day** | **10th day** | **11th day** | **12th day** | **13th day** | **14th day** |
| **Temperature** (Mean ±SD) | 39.8±.7 | 39.7± .6 | 39.18 ±.7 | 38.7 ±0.7 | 37.9± 0.4 | 37.8±0.2 | 37.3± 0.2 | 37.2±0.2 | 37.0 ±0.2 | 36.9 ±0.0 | 36.8 ±0.2 | 36.7 ± 0.0 | 36.8 ±0.0 | 36.9 ±0.1 |
| **Chills/feverish (yes %)** | 105(46.0 %) | 50(44.6) | 37(33.0) | 22(19.6) | 7(6.3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Difficulty breathing (yes %)** | 41(36.6% ) | 31(27.7) | 29(25.9) | 41(36.6) | 54(48.2) | 46(41.1) | 77(68.8) | 42(37.5) | 30(26.8) | 15(13. 4) | 8(7.1) | 0 | 0 | 0 |
| **Cough (yes %)** | 105(93.8) | 67(59.8) | 45(40.2) | 25(22.3) | 10(8.9) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Runny nose (yes %)** | 35(31.3) | 32(28.6) | 28(25.0) | 37(33.0) | 52(46.4) | 50(44.6) | 63(56.3) | 33(29.5) | 18(16.1) | 9(8.0) | 0 | 0 | 0 | 0 |
| **Nausea/Vomiting/Diarrhea (Yes %)** | 37(33.0) | 29(25.9) | 27(24.1) | 37(33.0) | 53(47.3) | 45(40.2) | 53(47.3) | 32(28.6) | 13(11.6) | 4(3.6) | 0 | 0 | 0 | 0 |
| **Sore throat (yes %)** | 35(31.3) | 32(28.6) | 28(25.0) | 37(33.0) | 52(46.4) | 52(46.4) | 50(44.6) | 63(56.3) | 40(35.7) | 13(11. 6) | 6(5.4) | 0 | 0 | 0 |
| **Tiredness (yes %)** | 35(31.3) | 32(28.6) | 28(25.0) | 37(33.0) | 52(46.4) | 50(44.6) | 50(44.6) | 40(35.7) | 1(0.9) | 0 | 0 | 0 | 0 | 0 |
| **Muscle aches yes %)** | 37(33.0) | 29(25.9) | 27(24.1) | 37(33.0) | 53(47.3) | 45(40.2) | 23(20.5) | 6(5.4) | 0 | 0 | 0 | 0 | 0 | 0 |
| **Headache (yes %)** | 38(33.9) | 34(30.4) | 30(26.8) | 37(33.0) | 43(38.4) | 31(27.7) | 25(22.3) | 10(8.9) | 3(2.7) | 0 | 0 | 0 | 0 | 0 |
| **Loss of sense of smell and or taste (yes %)** | 37(33.0) | 29(25.9) | 25(22.3) | 39(34.8) | 54(48.2) | 44(39.3) | 31(27.7) | 2(1.8) | 0 | 0 | 0 | 0 | 0 | 0 |
| **Generally feeling unwell (yes %)** | 36(32.1) | 29(25.9) | 23(20.5) | 35(31.3) | 54(48.2) | 44(39.3) | 39(34.8) | 22(19.6) | 9(8.0) | 4(3.6) | 0 | 0 | 0 | 0 |

**Table 3: Distribution of the studied sample according to their self-care management toward COVID-19 Pre and Post educational brochure**

| **Self –care** | **Physical wellbeing (112)** | | **N.Mental wellbeing (112)** | | **N.Professional wellbeing (112)** | | **Social wellbeing (112)** | |
|---|---|---|---|---|---|---|---|---|
| | **Pre** | **Post** | **Pre** | **Post** | **Pre** | **Post** | **Pre** | **Post** |
| ● Well- tended | 46 | 76 | 41 | 62 | 43 | 70 | 46 | 76 |
| ● Unwell | 66 | 36 | 71 | 50 | 69 | 42 | 66 | 36 |
| **P-value** | **0.0001**** | | **0.004*** | | **0.0001**** | | **0.0001**** | |

Chi-square-test *** statistically significant at p≤0.05** ****= high significance p≤0.01**

**Figure 2: correlation between patients' knowledge and self-care management Post educational brochure.**




## Discussion:

Over the past two decades, corona viruses (CoVs) have been associated with significant disease outbreaks in East Asia and the Middle East. The severe acute respiratory syndrome (SARS) and the Middle East respiratory syndromes (MERS) began to emerge in 2002 and 2012, respectively. At present, a novel corona virus, the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), causing the Corona virus Disease 2019 (COVID-19), has emerged in late 2019, which has posed a global health threat with its ongoing pandemic in many countries and territories (**Rodriguez-Morales et al., 2020).** The present study aimed to evaluate the effect of online distance learning on COVID19 patients' knowledge, self- monitoring, and self-care in isolation areas.

Regarding demographic characteristic of the studied sample, the present study revealed that more than half of patients, their ages ranged between 18 to 35 years with a mean age (36.4±10.402 years)**,** they were females and married. Nearly two -thirds of patients had higher education, employee, and lived in urban areas. **Rios-Gonzalez ,2020 and Wolf et al., 2020**were agreeing with the present study results as revealed that; the mean age of the patients was between 35 to 55 years, more than half of them were women, and had a university education. **(Labban et al., 2020)** who performed a study titled "Assessing the Level of Awareness and Knowledge of COVID 19 Pandemic among Syrians" was disagreeing with the current study results as reported that more than half of the respondents were males, aged between 35 to50 years old.

In general, patients in the present study had adequate knowledge level about the disease, its methods of spread, and prevention. There was an increase in the mean score of patients' knowledge and perception post educational brochure application than their pre brochure mean score but not reached a significant statistical difference.

From the researchers' point of view, this could be because of the huge amount of information provided by the WHO and the Egyptian Ministry of Health (MOH) to the public; as the knowledge provided to patients increased their mean knowledge score. Also, now people can access news in various ways,

the timely reporting of official media, and the transparency and timeliness of modern multimedia platforms. Additionally, **Wilding et al., (2019)**support this explanation as they reported that **"**the most significant sources of knowledge were novel channels like social media networks and the Internet, at the expense of more conventional media outlets; namely: newspapers. Face book and WhatsApp are the most common social media platforms used by Egyptians in recent years".

Also **Keifi et al., (2016)** mentioned that "patient education is one core part of the nursing role when its implementation leads to low costs, length of hospital stay, and patient worry and raises patients' satisfaction with the provided healthcare services" .The study findings are significant because the researchers make efforts to convey the education to these groups of patients, which may have technical and/or financial difficulties accessing the communication channel (WhatsApp application).

Regarding self-monitoring of COVID-19 symptoms, the current study revealed that there were many symptoms disappear in the $11^{th}$ to $14^{th}$ days which reflect the high level of medical services which provided in isolation areas at Assiut University hospitals. **O'Moore et al., (2020)** were in the same line with the study results as they reported that "COVID-19 positive patient needs quarantine and self-isolation for at least two weeks. Most people diagnosed with COVID-19 can be managed in the community with primary care support. This can be an anxiety-provoking period and may require more medical treatment or hospitalization for symptom changes. Tools that can help people diagnosed with COVID-19 monitor physical symptoms can provide additional support to people isolating and can be used to assist clinical decision making about appropriate levels ofcare".

The present study revealed that; there was a significant statistical difference between pre, post educational brochure applications regarding patients' self-care toward COVID-19 in physical, mental, professional, and social wellbeing domains. From the researchers' point of view these results are accepted as the patients gain knowledge and information that enabling them manage their disease, deal with their symptoms and skills that improve their self-care.

**WHO, (2020)** supported the study findings as it revealed that **"**physical distance, good respiratory hygiene, wearing face mask and hand washing are effective examples of self-care behaviors that can be taken daily to protect against COVID-19, and there are many other ways where self-care during the coronavirus pandemic can make a difference to health and well-being**.**

The present study reported that there was a positive correlation between the patients' knowledge and their self-care. From the researchers' point of view, as the patients' knowledge increased, their ability to manage the disease and control the medical condition increased. **Ghannadi et al., (2016) and Kassahun et al., (2019)** were in the same line with the present study results as they reported that "a positive correlation was detected between knowledge scores and attitude, practice, and self-care as well as the attitude with quality of life and practice with self-care".

Also, **Chase, (2020)** reported that "the patient protection and affordable care act includes several provisions that increase the role of patients in managing

their care. These include increasing the use of health services, improving the role of patients in selecting health insurance, and publishing data to help patients make informed choices. To make these programs effective, patients need to recognize their role in improving health outcomes and have the required resources to make improvements. Over the past few years, health programs delivery networks, and researchers have developed patient engagement approaches that effectively enhance patient awareness, confidence, and trust — all of which have been shown to increase care self-management".

Finally, we concluded that education and learning even by direct contact or indirect using new technology and different applications is still the corner stone for improving patients' conditions, managing their disease and decreasing their suffering.

## Conclusions:

Patients had an adequate knowledge level about the disease, its methods of spread, and prevention of COVID19.In addition, there was a positive correlation between the patients' knowledge and their self-care. Moreover, online distance learning has a great positive effect on COVID19 patients' knowledge, self- monitoring, and self-care.

## Recommendations:

* Establishing an education center in Assuit University Hospitals provided with recent technical support and online network that enabling the health care team track the patients and closely monitoring and educating them at isolation units and even after discharge.

* Providing a printed copy of the educational brochure in outpatient clinics for all COVID 19 patients and their relatives.

* Approval of using social media platforms in providing distance learning and education to all groups of patients and different diseases in the hospitals.

* Conducting further researches concerning COVID19 on larger probability areas for generalizing the results.

**Limitations of the study:**

- The high level of illiteracy in society was an obstacle to applicate the research on a larger number of patients and only the educated patients were selected.

- Few patients have smart phones and were able to deal with new social media platforms and WhatsApp application.

- Limited research numbers that discussed the new disease (COVID 19) and that concerned with patients' knowledge and self-care as the majority of them focused on health care workers and public populations.

## Declaration of conflicting interests:

The authors declare that there is no conflict of interest

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