

## Awareness of Patients with Systemic Lupus Erythematosus toward Prevention of COVID-19

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### Abstract

**Background:** Systemic Lupus Erythematosus (SLE) is a chronic autoimmune disease that can affect any organ in the body, and those affected are at risk of COVID-19 due to underlying immune conditions and immunosuppressive medications. **Aim:** Assess awareness of patients with Systemic Lupus Erythematosus toward prevention of COVID-19. **Study Design:** A descriptive exploratory design was utilized to conduct this study. **Setting:** The study was conducted at Rheumatology outpatient clinic at Desouk General Hospital which affiliated to Ministry of Health in Kafr El Sheikh Governorate. **Sample:** Simple random sample composed of 220 patients, were selected according to age from 15-60 which already have been diagnosed with SLE. **Tool of data collection:** A structured interviewing questionnaire that consisted of five parts, socio demographic characteristics, clinical history of patients, knowledge, Reported practices, and attitudes of patients about Systemic Lupus Erythematosus toward preventive measures of COVID-19. **Results:** The study results proved that 76.8% of study sample were female and 43.2% of sample's age ranged from. 30 to less than 45 years with mean = 37.2 & S. D  $\pm$ 10.9years, 31.8% of them had infected with COVID-19. According to Knowledge, 37.7% of them had a poor level of total knowledge about COVID-19 and 69.1% about Systemic Lupus Erythematosus. While 3.2% had negative attitude and 62.3% had inadequate reported practices towards COVID-19 prevention. **Conclusion:** there was a highly statistically significant relation between total knowledge, reported practices, and attitude toward preventive measures of COVID-19 and socio-demographic characteristics of patients with systemic lupus such as age, gender, educational level, and marital status with p value < 0. 001. **Recommendations:** Design a health education program about prevention of COVID-19 for patients with Systemic Lupus Erythematosus and disseminating it in autoimmune diseases clinics.

**Key words:** Awareness, COVID-19, Preventive measures, Systemic Lupus.

### Introduction:

Systemic Lupus Erythematosus (SLE) is a chronic autoimmune disease that can affect any organ in the body with a wide range of clinical manifestations resulting in systemic inflammation and damage of tissues. Organs that will be affected may include skin, joints, muscles, kidneys, and blood vessels that are the most affected organs (Zucchi *et al.*,2022).

SLE occurs with unknown causes, but several genetic, immunological, endocrine, and environmental factors play a role in the occurrence of the disease. Female sex and hormonal influence are a significant risk factor for Systemic lupus Erythematosus. The use of estrogen-containing contraceptives and hormonal replacement therapy

can cause flares in patients with SLE. Other potential risk factors include silica exposure, other viral infections, vitamin D deficiency ultraviolet rays sun exposure, and Smoking (Solhjo *et al.*, 2022).

Corona Virus Disease (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and started as a pandemic disease in Wuhan, Hubei, China in December 2019 with incubation period ranging from 2 to 14 days. It can be transmitted through breathing of infected droplets or contact with infected persons. The symptoms vary from asymptomatic, low-grade fever, dry cough, sore throat, breathlessness, tiredness, body aches, fatigue, myalgia, nausea, vomiting, diarrhea, to severe pneumonia, acute respiratory

distress syndrome (ARDS) and multiple organ dysfunction (*Madabhavi et al.,2020*).

The current outbreak of severe COVID-19 represents a source of concern for the care of patients with SLE who are at high risk for infection because of immune dysfunction, use of immunosuppressant agents, impairment from prior disease activity, presence of co morbidities and over expression of angiotensin-converting enzyme two receptor. The prevalence of COVID-19 infection varied between 0.0% and 18.1% in SLE patients (*Fu et al.,2022*).

Awareness is a process that seeks to inform and educate patients about a topic or issue with the intention of influencing their knowledge, attitudes, practices, and beliefs towards the achievement of a defined purpose or goal. The increased awareness about Systemic Lupus Erythematosus and focus on the importance of adherence to medications and follow-up. In addition, it includes awareness of the physical, emotional, and economic impact of lupus (*Mohamed et al.,2022*).

Community Health Nurse (CHN) assigned for SLE patients should place a strong emphasis on patient education, physical modification, lifestyle, and emotional support. Patients with SLE should get a thorough education on the disease's pathophysiology, any probable organ involvement, the significance of therapy, and compliance monitoring. Exercise, excellent sleep, hygiene, stress management strategies, Limiting Glucocorticoid Exposure that provide rapid suppression of the immune system, avoid direct exposure to the sun that can induce flares of SLE (*Lazar &Kahlenberg., 2023*).

### **Significance of the study:**

Globally, North America has the highest incidence and prevalence of SLE, Australia reporting the lowest prevalence and Africa reporting the lowest incidence. The current incidence rate is 6.73 cases per 100.000 person in the Caucasian population and 31.4 cases per 100.000 person in the African American population. The prevalence rate among the U.S. black population is 517 per 100.000, while it is 134 per 100.000 among Caucasians and

Europeans. SLE is more prevalent in the female population during the childbearing age between 15-44 year with a female predominance of 9:1. (*Ameer et al., 2022*). The overall estimated prevalence of adult Systemic Lupus Erythematosus in Egypt was 6.1/100.000 population (1.2/100.000 males and 11.3/100.000 females). It affects female more than male during their childbearing period from the age 15-44 (*Gheita et al.,2021*).

### **Aim of the study:**

This study aims to assess awareness of patients with SLE toward prevention of COVID-19 through:

- 1-Assessing Knowledge of patients with SLE toward preventive measures of COVID-19.
- 2- Assessing Attitude of patients with SLE toward preventive measures of COVID-19.
- 3- Assessing Reported Practices of patients with SLE toward preventive measures of COVID-19.

### **Research Questions:**

- 1-Is there a relation between socio-demographic characteristics of patients with SLE and their total knowledge, attitude and Reported practices toward preventive measures of COVID-19?
- 2-Is there a relation between total knowledge, attitude, and Reported practices of patients with SLE toward prevention of COVID-19?

### **Subject and Methods**

This study was conducted under the following four main designs as the following:

- I- Technical Design
- II-Operational Design
- III-Administrative Design
- IV-Statistical Design

#### **I- Technical Design:**

Technical Design for this study included description of research design, setting, subjects and tools of data collection.

**Research Design:**

Descriptive exploratory design was utilized to achieve the aim of the study and answering research questions.

**Study Settings:**

This study was conducted at Rheumatology outpatient Clinic at Desouk General Hospital which affiliated to Ministry of Health in Kafr El Sheikh Governorate.

**Sample size:**

Simple Random sample composed of 220 patients with SLE was utilized to conduct this study at the previous mentioned setting, and the sample size was calculated by using Thompson sample size equation (Thompson., 2012).

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

**Which:**

- n=sample size 220 patients.
- N=total size which represented 1216 patients.
- Z: The standard score is 1.96.
- d: The error level is 10%.
- p: Property availability and neutral ratio 0.5.

The following inclusion criteria set for sample selection are as follows.

**Inclusive Criteria:**

- All patients which already diagnosed with Systemic Lupus Erythematosus from the age of 15 to 60 years old.
- Previously exposed to COVID-19 or not.

**Tool of Data Collection:**

Data was collected through using the following one tool: A structured Interviewing

questionnaire which was written in simple Arabic language and consisted of the following five parts.

**Part I:** This part was concerned with socio demographic characteristics of the study sample of patients with Systemic Lupus Erythematosus which included 8 closed ended questions such as sex, age, educational level, job, marital status, place residence, monthly family income and number of rooms to determine of household crowded index.

**Part (II):** This part included current history of patients with Systemic Lupus Erythematosus and COVID-19.it was added because it is important for those patients with Systemic Lupus Erythematosus and classified into two sections. The first section is composed of 9 questions about Systemic Lupus Erythematosus and the second one is composed of 11 questions about COVID-19.

**Part (III):** This part to assess Systemic Lupus Erythematosus patients' knowledge about Systemic Lupus and COVID-19 which was developed by the investigator after reviewing recent and relevant cite and included 25 questions that were closed and open questions. these questions were classified as the following:

- A- Knowledge about Systemic Lupus Erythematosus as (definition of disease, causes, signs and symptoms, high risk people, diagnostic measures, treatment, complications, and preventive measures) which included 11 questions.
- B- Knowledge about COVID-19 which included 14 questions.

**❖ Scoring system of knowledge:**

It was categorized into 3 levels as follow:

- **Poor level** =< 50% for incorrect answers.
- **Average** = 50%: < 75% for correct and incomplete answers.
- **Good**= ≥75 for correct and complete answers.

**Part (VI):** This part was developed to assess reported practices of patients with Systemic Lupus Erythematosus toward preventive measures of COVID-19which included 97 questions divided

into 11 sections such as hand washing that included 13 questions from, Rubbing hand with alcohol 8 questions, wearing mask 8 questions, taking off the mask 8 questions, sneezing and coughing etiquette 4 questions, follow social distancing 10 question, social distancing at home 9 questions, preventive measures at home 6 questions, steps of clean and disinfectant 9 questions, isolation at home in case of infection 10 questions, and general practices 12 questions.

#### Scoring system for practices:

It was categorized into 2 levels as followed:

Inadequate  $\geq 60\%$

Adequate  $< 60\%$

**Part (IV):** this part was developed to assess Attitudes of patients with SLE toward preventive measures of COVID-19 which included 18 questions.

#### Scoring system of Attitude

A scoring system was followed to assess attitude of patients with Systemic Lupus Erythematosus toward preventive measures of COVID-19 which was categorized into 3 levels as followed:

**Negative**  $< 50\%$

**Neutral** =  $50\% : < 75\%$

**Positive** =  $\geq 75\%$

#### II- Operational Design:

The Operational design included preparatory phase, validity, reliability, ethical consideration, pilot study, and field work.

#### Preparatory phase

A literature review was done regarding current and past available literature, covering the various aspects of the problem, using textbooks, articles, magazines, and internet sites through research gate.

#### Content validity:

To achieve the criteria of trust worthiness of the tool of data collection in this study. It was

tested and evaluated for face and content validity by three expertise in community health nursing department of faculty of nursing, Ain shams university for comprehensiveness, ascertain relevance, clarity, and completeness of the tools while the expertise elicited responses that either agree or disagree regarding the face and content validity.

#### Reliability of tool:

The developed tool was tested for reliability on all of each part. The reliability process was assessed through measuring their internal consistency by using the Cronbach alpha coefficients. it was including the following:

Items	Cronbach's alpha coefficients
Questionnaire about Knowledge	0.710
Questionnaire about Attitude	0.870
Questionnaire about Practices	0.851

#### Pilot study:

A pilot study was conducted at the beginning of the study for 22 cases at outpatient clinics in Desouk general hospital in Kafr El Sheikh Governorate which represents 10% of the total sample, to test the feasibility, applicability of tools, content, clarity of included questions, and simplicity. It took about one month from beginning of April 2022, the time needed to fill out the tool was 15-20 minutes, and the appropriate modification was done so subjects were included in the pilot study were excluded from the actual study sample.

#### Field Work:

The actual process of data collection was carried out in three months consequently the period from the beginning of May 2022 until the end of July 2022, two days per week (Saturday & Tuesday) nearly about 5 hours daily from 8 am to 1pm in order to collect the total sample of 220 of patients with Systemic Lupus Erythematosus. The investigator was seeing 9-10 cases per day and the maximum time needed to fill out the tool was 30 -35 minutes for every patient. The investigator introduced herself to the previously

mentioned setting directors, nurse supervisors and the other health team workers and also explained the aim of the study to all of them.

### III- Administration Design:

Formal letter from the Dean of the Faculty of Nursing, Ain Shams University, undersecretary of ministry of health directed to the general director of outpatient clinic, and director of Desouk General Hospital which affiliated to ministry of health in Kafr El Sheikh Governorate to get permission and help for data collection.

### Ethical Considerations:

This study protocol takes agreement of Ethical Committee affiliated to Faculty of Nursing Ain Shams University then the purpose and nature of the study was explained for the participants and written consent and voice notes through what's up for illiterate patients was taken and being informed that each study subject is free to withdrawal at any time through the study without given any reasons.

### IV- Statistical Design:

Data collected from the studied sample was analyzed and tabulated using the Statistical Package for Social Science (SPSS) version 19. Qualitative data was presented as number and percentage. The statistical tests used chi-square test, means, slandered deviation, and Correlation test which showed good internal consistency construct validity.

### Results:

**Table (1):** shows that, 76.8% of study sample were female and 39.1 out of them are housewife and 43.2% of all sample's age ranged from. 30 to less than 45 years with mean = 37.2 & S.D  $\pm$ 10.9. 41.9 % of them were secondary educated. Regarding social status, 59.6% of them married and 55.9% lived in rural areas while all of them (100%) suffered from

insufficient income and lived in crowded homes for 90%.

**Figure (1):** Illustrates that total knowledge level about COVID-19 for study sample was poor level for 37.7% while just 6.4% of them had good level of knowledge.

**Figure (2):** Illustrates that total knowledge level about SLE for study sample was 69.1% of them had poor level of knowledge while just 1.8% of them had good level.

**Figure (3):** Illustrates that total attitude level towered prevention of COVID-19 for study sample was 3.2% negative attitude while 89.5% of them had positive attitude.

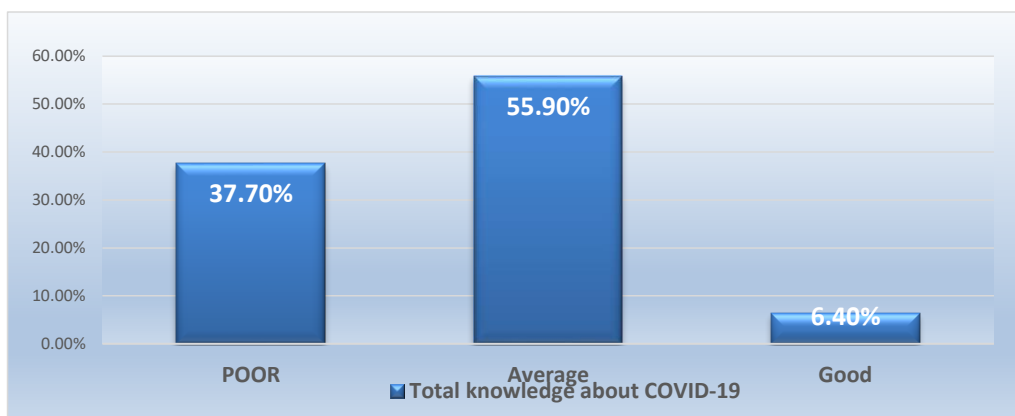
**Figure (4):** Illustrates that there 95.5% of study sample did not follow the main steps of sneezing and coughing etiquette, and 90.9% of them did not do the preventive reported practices such as follow social distance or preventive measures inside home or clean and disinfect the house.

**Table (2):** Proves that there was a highly statistically significant relation between socio-demographic characteristics of patients with SLE and total knowledge about SLE, total knowledge about COVID-19, and total Reported practices and there was no statistically significant relation between total attitude towards preventive measures of COVID-19 and all socio-demographic characteristics of patients with Systemic Lupus Erythematosus except residence.

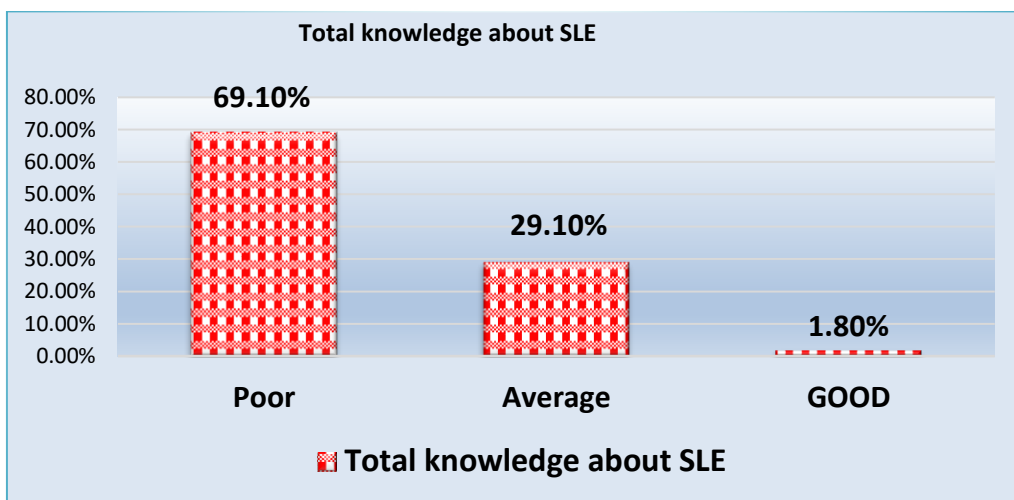
**Table (3):** Proves that there was positive statistically significant correlation between total knowledge about COVID-19 and total knowledge about SLE, and there was negative statistically significant correlation between total knowledge about SLE and total Reported practices of patients with Systemic Lupus Erythematosus toward COVID-19 prevention with p value < 0.001.

**Table (1):** Distribution of Socio-demographic characteristics of the study sample of patients with Systemic Lupus Erythematosus (n=220).

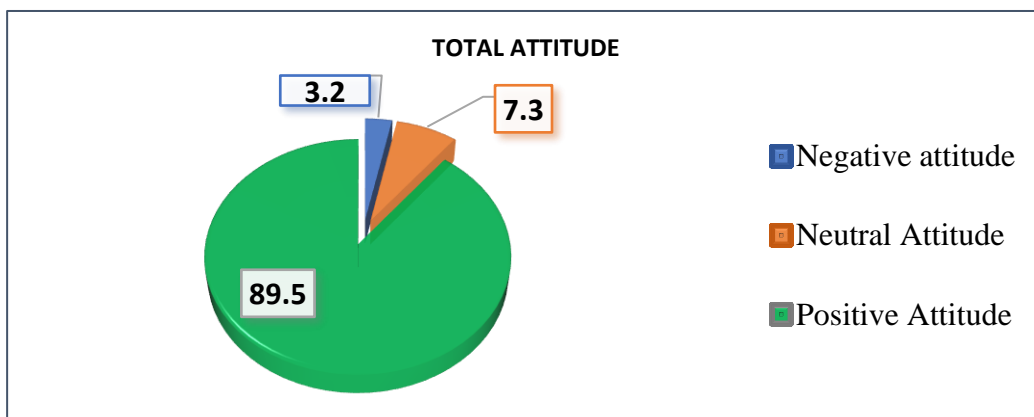
Items	No	%
<b>Gender</b>		
Male	51	23.2
Female	169	76.8
<b>Age</b>		
15: <30 years	59	26.8
30:<45 years	95	43.2
45: 60 years	66	30.0
<b>Mean = 37.2 S. D ±10.9 Minimum= 20 Maximum= 59 years</b>		
<b>Educational level</b>		
Not Read and write	43	19.5
Primary	7	3.2
Preparatory education	9	4.1
Secondary education	92	41.9
Undergraduate	63	28.6
Postgraduate	6	2.7
<b>Job</b>		
Employee	54	24.5
Handcraft	16	7.3
Housewife	86	39.1
Jobless	48	21.8
Student	16	7.3
<b>Marital status</b>		
Single	48	21.8
Married	131	59.6
Divorced	4	1.8
Widow/ widower	37	16.8
<b>Residence</b>		
Urban	97	44.1
Rural	123	55.9
<b>The monthly income from the patient point of view</b>		
Insufficient	220	100.0
<b>Household crowding index</b>		
Un crowded (<1)	11	5.0
Crowded (1-2)	198	90.0
Overcrowded (> 2)	11	5.0



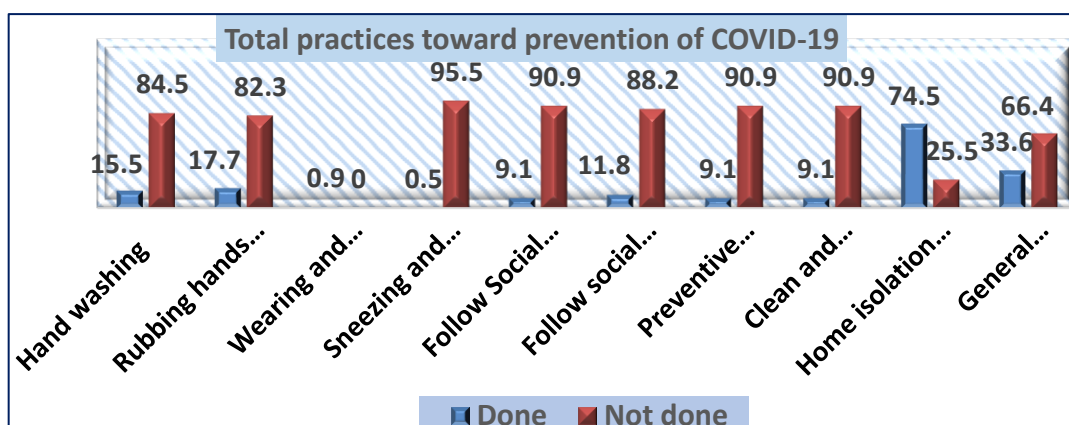
**Figure (1):** Distribution of the studied sample According to their Total knowledge about COVID-19(n=220).



**Figure (2):** Distribution of the studied sample According to their Total knowledge about SLE (n=220).



**Figure (3):** Distribution of the studied sample According to their Total Attitude about SLE patients toward preventive measures of COVID-19 (n=220).



**Figure (4):** Distribution of the studied sample According to their Total Reported practices about SLE patients toward preventive measures of COVID-19 (n=220).

**Table (2):** Relation between socio-demographic characteristics of patients with SLE and their total knowledge of COVID-19, total knowledge of SLE, total attitude and total Reported practices toward preventive measures of COVID-19 (n=220).

Items		Total knowledge of COVID-19		Total knowledge of SLE		Total attitude of SLE		Total Reported practices	
		$\chi^2$	P value	$\chi^2$	P value	$\chi^2$	P value	$\chi^2$	P Value
Gender	Male	28.188	0.000**	7.535 <sup>a</sup>	0.023*	157	0.925	17.687	0.000**
	Female								
Age	15: < 30 years	79.964	0.000**	21.062	0.000**	5.764	0.217	5.272	0.072
	30:<45 years								
	45: 60 years								
Educational level	Not Read and write	79.964	0.000**	62.516	0.000**	16.309 <sup>a</sup>	0.091	43.505	0.000**
	Primary								
	Preparatory education								
	Secondary education								
Job	Undergraduate	22.050	0.005*	23.193	0.003*	6.752 <sup>a</sup>	0.564	8.074	0.089
	Postgraduate								
	Employee								
	Handcraft								
Marital status of parents	Housewife	10.735	0.097	6.094	.413	3.412	.756	20.738	0.000**
	Divorced								
	Widow/ widower								
	Single								
Residence	Married	10.771	0.029*	11.449	0.022*	7.339 <sup>a</sup>	.0119*	6.196 <sup>a</sup>	0.045*
	Rural								
Household crowding index	Uncrowded (<1)	9.108	0.058	32.274	0.000**	1.761	0.780	9.586	0.008*
	Crowded (1-2)								
	Overcrowded (> 2)								

**Table (3):** The correlation between total knowledge, attitude, and practices of patients with Systemic Lupus Erythematosus toward COVID-19 prevention (n=220).

		Total Knowledge about COVID-19	Total Knowledge about SLE	Total Attitude	Total Reported Practices
Total Knowledge about COVID-19	Pearson Correlation	1			
	Sig.				
Total Knowledge about SLE	Pearson Correlation	.592	1		
	Sig.	.000**			
Total Attitude	Pearson Correlation	-.062	-.025	1	
	Sig.	.359	.713		
Total Reported Practices	Pearson Correlation	.016	-.238	.059	1
	Sig.	.819	.000**	.383	

\*\* Correlation is significant at the 0.01 level

**Discussion:**

Regarding to socio-demographic characteristics of the study sample of patients with

Systemic Lupus Erythematosus, the study results demonstrated that, more than three quarter of study sample were female, and less than half of total sample their age ranged from 30 to less than



45 years old (**Table 1**).

The demographic of current study agrees in many aspects with those of many other studies among Systemic Lupus Erythematosus patients. In term of gender more than three quarter of study sample were female, and less than half of all sample's age ranged from 30 to less than 45 years old. These results were similar to the result of study in Tanta University performed by *Said et al. (2022)* who conducted their study entitled "Effect of Tele-nursing Instructions on Improvement of Awareness among Systemic Lupus Erythematosus Patients" including 90 patients diagnosed with Systemic Lupus Erythematosus and found that more than half of the studied sample was in the age group of 20-< 35 years, most of the studied sample were female. Also, this result comes in the same line with *Tharwat et al. (2021)* who conducted their study in Mansoura University about "Challenges of Egyptian patients with Systemic Lupus Erythematosus during the COVID-19 pandemic, including 200 SLE patients aged > 18 years from Egypt and proved that majority of study sample were female, with mean: SD age 30.1 ±8.4.

These results approved with the study performed by *Alvina et al. (2020)* who conducted their online survey entitled "Factors related to knowledge, perception, and practices towards COVID-19 among 685 patients with Systemic Lupus Erythematosus," and indicated that most of the respondents were female with median age between 29-45 years old.

From the investigator point of view female gender was in accordance with the fact that women had higher incidence and prevalence of SLE diseases than men. The onset age of autoimmune disease varied widely depending on the disease, but most commonly occurred between 15-55 years old.

Regarding marital status, the study found that more than half of the studied sample were married, lived in rural area while all of them suffered from insufficient income, and majority of them lived in crowded home (**Table 1**).

These results were similar to the result of study performed by *Said et al. (2022)* who mentioned that more than three quarters of sample were married, more than two fifths of the sample

were employed and had insufficient monthly income.

Also, these results approved with the study in Ain Shams University performed by *Abd El-Azeem et al., (2018)* who carried out a study about "Effect of Health Promotion Program on Quality of Life for Patients with Systemic Lupus Erythematosus" among 70 patients, diagnosed with SLE and found that more than half (40%) of the studied sample resided in rural areas, about two thirds(46.6%)of them were unemployed and suffered from insufficient income.

From the investigator point of view several possibilities may explain this difference accessibility of health care services in rural area, financial barrier in some Egyptian regions may lead to poor diagnosis of autoimmune diseases. Moreover, in some regions there were unavailable laboratory investigations related to autoimmune diseases.

Regarding total knowledge about COVID-19, the study findings demonstrated that more than half of the studied sample had an average level of total knowledge about COVID-19. While less than one quarter had a good level of total knowledge about COVID-19 (**Figure 1**).

These results were matched with *Sisay et al. (2021)* who carried out a study in Northeast Ethiopia about "Knowledge, attitude and practice of patients with chronic diseases towards COVID-19 pandemic, Northeast Ethiopia" that more than half of the studied sample had average level of total knowledge about COVID-19.

Regarding total knowledge about SLE, the studied sample demonstrated that more than two thirds of the studied sample had poor level of total knowledge about SLE (**figure 2**).

These results were agreed with *Hassan et al. (2022)* who carried out a study at Tanta University about "Effect of Self- Care management on Health Outcomes and Symptoms for Females with Systemic Lupus Erythematosus" that most of studied sample had unsatisfactory level of total knowledge about SLE.

Regarding the total attitude toward prevention of COVI-19, the studied sample demonstrated that the majority of studied sample had positive total attitude toward prevention of

COVID-19 (**Figure: 3**).

The result of the study was agreed with *Omar & Amer (2020)* who reported that, the majority of the participants had a positive attitude toward the inquired preventive measures items also, these results were matched with *Sisay et al. (2021)* who mentioned that the majority of participants had good attitude toward prevention of COVID-19.

Regarding total practices toward prevention of COVID-19, the studied sample demonstrated that, more than half of the studied sample had inadequate level of total practices toward prevention of COVID-19 (**Figure 4**).

This comes in accordance with *Abd-Alla et al. (2022)* who reported that nearly three-quarters of the studied sample had poor practice toward coronavirus disease. This result comes in the same line with *Mohammed et al. (2020)* who carried out the study at Sudia Arabia about "Knowledge, Attitude and Practice toward COVID-19 among the Public in the Kingdom" and found that half of the studied sample had inadequate level of total practices toward prevention of COVID-19.

From the investigator point of view to the fact that this study was conducted during the height of the spread of the epidemic, and therefore the practices of the population were not yet developed well, and bad practices may be related to the poor knowledge about coronavirus disease, and this will lead to inadequate practice toward it.

In our study the results presented that, there was a highly statistically significant relation between total knowledge about preventive measures of COVID-19 and socio-demographic characteristics of patients with Systemic Lupus Erythematosus such as age, educational level, job, and residence (**Table 2**).

This result was matched with *Samir et al. (2020)* who carried out the study in Tanta University about "Knowledge, Perceptions, and Attitude of Egyptians towards the Novel Coronavirus Disease (COVID-19)" who reported that, there was highly statistically significant relation between total knowledge about preventive measures of COVID-19 and socio-demographic characteristics of patients with Systemic Lupus

Erythematosus such as gender and residence.

Also, these results were approved with *Zhong et al. (2020)* Who carried out a study in China about "Knowledge, attitudes, and practices towards COVID-19 among 6910 Chinese residents during the rapid rise period of the COVID-19 outbreak" and found that, there was a highly statistically significant relation between total knowledge about preventive measures of COVID-19 and socio-demographic characteristics of patients with Systemic Lupus Erythematosus such as age job, and residence.

The current study result was also supported by that *Mohamed & Kamel (2018)* who conducted a study in Asuite University about "Effect of health education-based intervention on self-care among systemic lupus erythematosus clients", who stated that statistically significant associations with demographic variables such as patients' education, gender and their age were detected at posttest of knowledge. In addition, *Rinaldi et al. (2018)* in Italy, who studied "Health-related quality of life in Italian patients with systemic lupus erythematosus", reported that patient with lower education had lower level of knowledge.

From the investigator point of view the lack of access to information in rural areas, where internet and electricity access limitation present that restricts them to update their knowledge about COVID-19 pandemic, Participants who had not taken primary education were less likely to had good knowledge about COVID-19 as compared to those who had graduated or post graduated education at college and above level. The possible justification might be illiterate, and lower level of educated people have reduced ability to understand health information and health promotion activities to prevent COVID-19 so that they would have less knowledge.

Regarding to total attitude the studied sample of our study results demonstrated that, there was no statistically significant relation between total attitude towards preventive measures of COVID-19 and all socio-demographic characteristics of patients with Systemic Lupus Erythematosus except residence (**Table 2**).

These results were matched with *Mollaeian et al. (2020)* who carried out a study in Nigeria about "COVID-19 Prevalence and

Outcomes among Individuals with Rheumatoid Arthritis and Systemic Lupus Erythematosus Taking Hydroxy-chloroquine”, reported that no statistical difference was observed in demographic features and total attitude towards preventive measures of COVID-19.

This result also, comes in the same line with *Hammad et al. (2019)* who carried out a study in Cairo University about “Impact of coronavirus disease 2019 (COVID19) pandemic on attitude, behavior, and mental health of patients with Systemic Lupus Erythematosus” reported that there was no statistically significant relation between total attitude towards preventive measures of COVID-19 and all socio-demographic characteristics of patients with Systemic Lupus Erythematosus.

The study results reflected a highly statistically significant relation between total practices towards preventive measures of COVID-19 and socio-demographic characteristics of patients with Systemic Lupus Erythematosus such as gender, educational level, and marital status (**Table 2**).

This result comes in the same line with *Said et al. (2022)* who mentioned that there was a statistically significant relation between total practices towards preventive measures of COVID-19 and gender, educational level. The current study result was also supported by *Abd-Alla et al. (2022)* who reported that, there was statistically, significant differences are found in the study sample's age, sex, residence, education, occupation, and the type of family.

The current study result was also supported by that *Mohamed & Kamel., (2018)* who conducted a study in Asuite University about “Effect of health education-based intervention on self-care among Systemic Lupus Erythematosus clients”, who stated that statistically significant associations with demographic variables such as patients’ education, gender and their age were detected at posttest of attitudes, and practices towards preventive measures of COVID-19.

### **Conclusion:**

Based on the results of the current study the following conclusion can be drawn: 76.8% of study sample were female and 37.7% of them had a poor level of total knowledge about

COVID-19 and 69.1% about Systemic Lupus Erythematosus. While 3.2% had negative attitude and 62.3% had inadequate practices towards COVID-19 prevention.

There was a highly statistically significant relation between total knowledge, practices, and attitude toward preventive measures of COVID-19 and socio-demographic characteristics of patients with systemic lupus such as age, gender, educational level, and marital status with  $p$  value  $< 0.001$ . Furthermore, there was positive statistically significant correlation between total knowledge about COVID-19 and total knowledge about SLE, while negative correlation between total knowledge about SLE and total practices of patients with Systemic Lupus Erythematosus.

### **Recommendations:**

Based on the results of the current study and research questions the following recommendations are suggested:

1. Design a health education program about prevention of COVID-19 for patients with Systemic Lupus Erythematosus and disseminate it in rheumatology clinics and autoimmune diseases clinics.
2. Community health nurses should conduct training sessions for patients with SLE about preventive measures of COVID-19 in outpatient clinics.

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