EFFECT OF NURSING INTERVENTION PROGRAM FOR NURSES ON CLINICAL OUTCOMES FOR PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Abstract

Systemic lupus erythematosus is chronic autoimmune disease that is associated with overproduction of autoantibodies resulting in inflammation, tissue destruction and life threatening complications. Nurses have a fundamental role in the whole management of lupus patients. **Aim of the study** was to evaluate the effect of nursing intervention program for nurses on clinical outcomes for patients with systemic lupus erythematosus. **Subjects and method**; A quasi- experiment research design was implemented at Rheumatology and Clinical Immunology Unit affiliated to Tanta University. The sample was composed of (35) nurse and a convenient sample of (40) patients with systemic lupus erythematosus distributed randomly into two groups; **Study group**: (20 patients) who received nursing care according to the nursing intervention program. **Control group**: (20 patients) who received nursing care according to the routine hospital program. **Data collection tools**: Tool (I): Nurses' Assessment Sheet, **Tool (II):** Nurse's practice observational checklist, **Tool (III):** Structured interview questionnaire for patient and **Tool (IV):** Lupus Patient Reported Outcomes. **Results**; There was a highly significant statistical improvement in the nurses' knowledge and practice scores immediately and two months post program. Also, there was significant statistical difference in Morisky medication adherence scale and in Lupus Patient Reported Outcomes scale between two groups of the studied patients. **Conclusion:** The implementation of the program had a positive influence on enhancement of nurses' knowledge and practice and thus improvement of the patient's outcome. **Recommendation:** Participation in training programs regarding lupus for acquiring efficient knowledge and practice.

Index Terms: Systemic lupus erythematosus, Morisky medication adherence scale and Lupus Patient Reported Outcomes.

INTRODUCTION

Systemic lupus erythematosus (SLE) is one of the most common autoimmune diseases; that is associated with over activation of the immune system and deposition of the immune complexes. It can affect any body parts as joints, skin, brain, lungs, kidneys, heart and blood vessels [1].The exact cause of SLE is not totally understood. However, there are risk factors for developing SLE as hormonal, genetic and environmental factors as exposure to ultraviolet rays, certain medications, infections, physical and emotional stress

[2]. SLE can affect individuals of all ages. But, it is more likely to affect females in the childbearing age. Common lupus symptoms include fatigue, arthralgia, joint swelling, headaches, a butterfly rash, hair loss, anemia and photosensitivity [3]. Concerning diagnosis of SLE, it is challenging because of complexity of disease and mimicking of the lupus symptoms to the symptoms of other illnesses. SLE is diagnosed depending on patient's history, physical examination, laboratory investigations [4]. On the other hand, there is no existing cure for SLE. Controlling lupus flare and managing lupus symptoms is the goal of SLE treatment through immunosuppressive drugs, corticosteroids and non-steroidal anti-inflammatory drugs (NSAIDs). SLE can progress to fatal outcome as pericarditis, heart attack, vasculitis, lupus nephritis, kidney failure, infections, stroke and seizures [5]. Nurses have a fundamental role in the whole management of lupus patients. Nursing role in caring of SLE patient are exclusive including; biological, psychological and societal aspects of patient to ensure integrated, effective, continuous nursing care with a positive impact in patient's prognosis [6]. The main goals of nursing interventions in care of SLE patient include ensuring regular assessment and treatment, improving quality of patient's life and health enhancement [7].

SIGNIFICANCE OF THE STUDY

(SLE) is a systemic autoimmune disease that is associated with significant morbidity and mortality. The total estimated prevalence of adult SLE in Egypt was 6.1/100,000 population [8]. Nurses have a vital role in caring of lupus patients, so enhancement of nurses' knowledge and practice are required to achieve comprehensive and effective nursing interventions. Nursing intervention program was implemented to improve nurses' knowledge and practices and thus clinical outcomes of patients [9].

AIM OF THE STUDY

To evaluate the effect of nursing intervention program for nurses on clinical outcomes on clinical outcomes for patients with systemic lupus erythematosus.

SUBJECTS AND METHODS

A- Research Design

The present study was a quasi- experiment research design.

B- Setting

The study was implemented at Rheumatology and Clinical Immunology Unit. The unit is located on the sixth floor of Internal Medical Hospital which is affiliated to Tanta University.

C- Subjects

The sample of this study was involved of

1- Thirty five (35) nurses from Rheumatology and Clinical Immunology Unit who provide nursing care for patients with SLE.

2- A convenient sample of forty (40) patients with systemic lupus erythematosus in Rheumatology and Clinical Immunology Unit. The sample was distributed in a random way into two equivalent groups; each group was comprised of twenty patients as follows:

-Group 1: (Study group): It was involved of twenty patients who were receiving nursing care by nurses basing on the nursing intervention program.

-Group 2: (Control group): It was involved of twenty patients who were receiving nursing care by nurses according to the routine hospital program.

*Inclusion criteria for the patients:

- Adult patients of both sexes with SLE.

- Age (from 21 years to 60 years).

- Preparedness to contribute in the study.

- Collaborator patient.

*Exclusion criteria for the patients:

- Patients with severe complications and predicted fatal prognosis were excluded from the study.

D- Tools of data collection:

Tool (I): Nurses' Assessment Sheet: It was consisted of two parts:

Part (A): Socio-demographic characteristics of nurses: It was developed by the researcher and comprised of nurses' code, age, gender, marital status, education level, occupation, their experience years and their previous training regarding care of patients with SLE.

Part (B): Nurses' knowledge assessment sheet:

The sheet was developed by the researcher into Arabic language after reviewing of the related literatures [10, 11]; to assess nurses' knowledge pre and post implementation of nursing intervention program concerning SLE. It included knowledge about autoimmune disease and its types, definition of SLE, causes, pathophysiology, clinical features, diagnosis, medical therapy and complications, nursing assessment and management of patient with SLE.

Tool (II): Nurse's practice observational checklist:

This tool was developed by the researcher after reviewing relevant literatures [12] to assess nursing practices pre and post implementation of nursing intervention program concerning SLE, it comprised of nursing assessment and nursing interventions which included pain management, administration of intravenous fluids and medications, skin care, improving of physical activity, improving patient's adherence with medications, effective communication, stress reduction, discharge instructions and follow up schedule.

Tool (III): Structured interview questionnaire for patient: It involved two parts:

Part (A): Patient's bio-socio-demographic characteristics:

It was comprised of patient code, age, gender, marital status, educational level, occupation, income sufficiency, residence area, past medical history, family history, disease onset, assessment of vital signs and disease clinical features as mucocutaneous manifestations, pain and fatigue.

Part (B): Morisky Medication Adherence Scale (MMAS):

It was developed by Morisky et al., in (2008) and was composed of eight elements. It was used to assess the patient's degree of medication adherence. It was modified by the researcher after reviewing of the related literature **[13, 14]** into simple Arabic language.

Tool (IV): Lupus Patient Reported Outcomes (Lupus PRO) Tool:

Lupus PRO is a specific tool for SLE that was developed by Jolly M. and Pickard S. in (2012). It was used to assess the patient's reported outcomes related to the impact of SLE and its treatment on their health. The tool was classified into 12 domains including lupus symptoms, cognition, lupus medication, physical health, pain-vitality, emotional health, procreation, body image, desires-goals, social support, coping and satisfaction with care. It was modified by the researcher after reviewing of the related literature **[15, 16]** into Arabic language.

Method:

The study was accomplished through four phases:

A- Assessment phase:

a- Nurses' assessment: It was accomplished pre implementation of the program through using tool (I) part A to gather baseline data and part B; to assess nurses' knowledge regarding autoimmune disease and its types, definition of SLE, causes, pathophysiology, clinical features, diagnosis, medical therapy, complications, and nursing assessment and management of patients with SLE. Also, tool (II) was used pre implementation of the program to assess practice of nurses regarding nursing assessment and intervention regarding SLE.

b- Patients' assessment: It was accomplished through using Tool (III) part A pre implementation of the program to gather baseline data which included; socio-demographic characteristics, past medical history, family history, disease onset, assessment of vital signs and disease clinical features.

B- Planning Phase: It included; setting objectives of the program was the initial step of the planning phase and preparation of the content and the environment. The content of the program was formulated by the researcher to meet the predetermined objectives. Nursing intervention program was designed to be implemented by the researcher in six sessions for the nurses. An illustrative booklet reinforced with

descriptive pictures was designed by the researcher for nurses into simple Arabic language.

C- Implementation Phase:

The program was implemented in six sessions for nurses; who were distributed into 5 equal groups; each group included 7 nurses, 4 days per week, and the duration of each session was about 30 minutes. The program included both theoretic and practical sessions.

1- Theoretical sessions were comprised of (3) sessions that were included:

The first session: The researcher interviewed the nurses' group to deliver knowledge concerning definition of autoimmune disease, types of autoimmune disease, definition of SLE, causes and pathophysiology of SLE.

The second session: The researcher informed nurses with knowledge concerning clinical features of SLE, diagnosis, medical therapy and complications of SLE.

The third session: The researcher explained knowledge concerning the nursing assessment and management of patient with SLE to control pain, maintain skin integrity, administer medications, improve patient's adherence with medications and reduce stress; and to deliver the discharge instructions.

2- Practical sessions were consisted of (3) sessions that were included:

The fourth session: Demonstration of the practice was implemented by the researcher for nurses training concerning nursing assessment of SLE patient.

The fifth session: Nursing intervention was demonstrated by researcher to train nurses regarding management of pain, skin management, administration of intravenous fluids and medications and improving of physical activity.

The sixth session: The researcher implemented the nursing intervention regarding improving of patient's adherence with lupus medications, achieving of effective communication, stress reduction, and delivering of discharge instructions and routine follow up.

D- Evaluation Phase:

Evaluation phase included evaluation of both nurses and patients post implementation of the nursing intervention program.

a- Nurses' evaluation: It was carried out through using of Tool I part B to evaluate nurses' knowledge regarding SLE immediately and 2 months post implementation of nursing intervention program. Also, tool II was used to evaluate the practice of nurses regarding SLE immediately and 2 months post implementation of nursing intervention program to determine the impact of the program on the nurses' knowledge and practice.

b- Patients' evaluation: It was achieved through using of Tool III part B to evaluate the degree of enhancement in the patient's adherence with lupus medications. And, tool IV

was used to evaluate the extent of the improvement of patient's clinical outcomes regarding lupus disease; immediately and 2 months post implementation of the nursing intervention program in the study group. However, regarding control group, tool III part B and tool IV were used to evaluate patients of the control group immediately and 2 months after routine hospital program.

RESULTS

Table 1: Distribution of the Studied Nurses Regarding their Socio-Demographic Characteristics

Characteristics	The studied nurses (n=35)	
	N	%
Age (in years)		
(21- <30)	12	34.3
(30 - <40)	6	17.1
(40- <50)	15	42.9
(50 - <60)	2	5.7
Range	(22-58)	
Mean ± SD	36.91±10.251	
Gender		
Male	4	11.4
Female	31	88.6
Marital status		
Married	28	80.0
Single	7	20.0
Educational level		
Diploma	14	40.0
Institute	15	42.9
Bachelor	6	17.1
Occupation		
Bed side nurse	29	82.9
Nursing supervisor	6	17.1
Experience (in years)		
(<10)	13	37.1
(10 -<20)	5	14.3
(20 -<30)	16	45.7
(≥30)	1	2.9
Range	(2-39)	
Mean ± SD	16.69±10.223	
Previous training about care of SLE patients		
No	35	100.0

Table (1) clarified that approximately one half of the studied nurses were in the age group (40 < 50) years, where more than one third of them were in the age group (21 < 30) years. More than three quarters of the studied nurses were females and married. The majority of the studied nurses had nursing diploma and nursing institute. Additionally, more than three quarters of the studied nurses were bed side nurse. Regarding nurses' experience;

nearly one half of the studied nurses had (20 < 30) years of experience. In addition, all studied nurses did not have previous training regarding SLE.
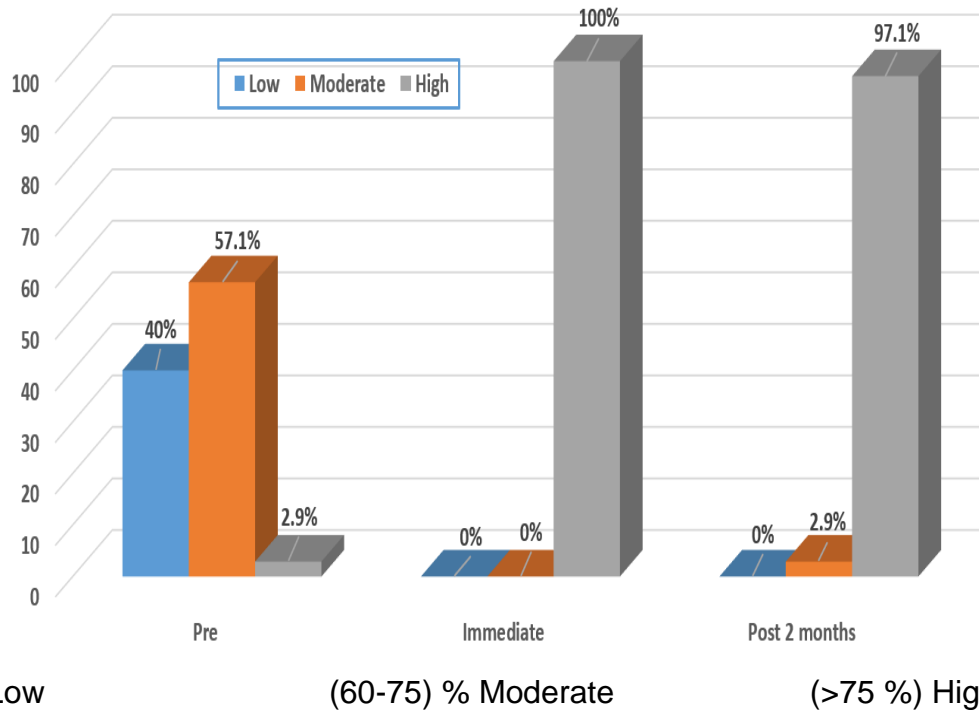

(<60%) Low   (60-75) % Moderate   (>75 %) High

Figure 1: Distribution of the Studied Nurses Regarding their Total Knowledge Level about Systemic Lupus Erythematosus throughout Periods of Study

Figure (1) showed that there was statistical significant improvement in the total knowledge level of the studied nurses immediately and two months post program. Where, only (2.9%) of the studied nurses had high knowledge level, more than one half (57.1%) of them had moderate knowledge level and more than one third of them (40%) had low knowledge level pre-program. While, all of them had a high knowledge level immediately post program and majority of them (97.1%) had a high knowledge level two months post program.

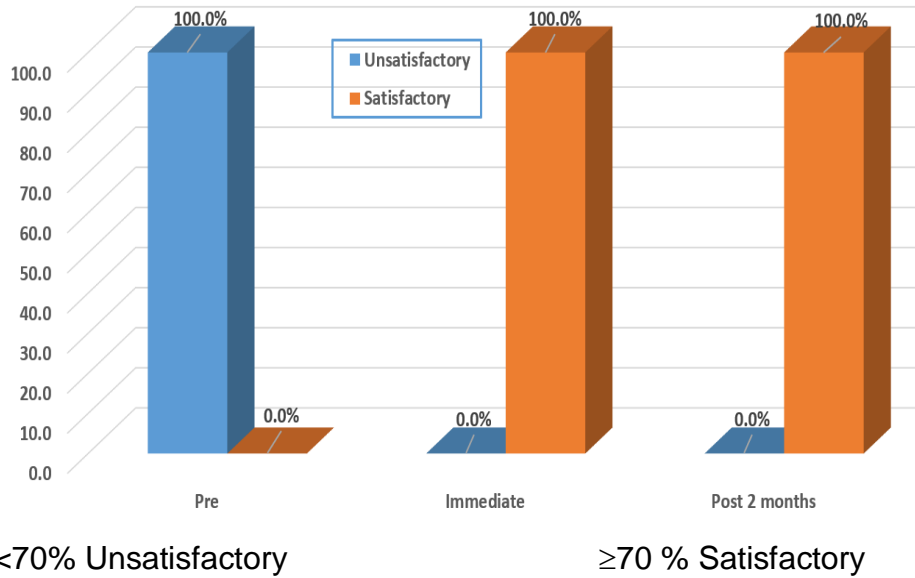<70% Unsatisfactory   ≥70 % Satisfactory

Figure 2: Distribution of the Studied Nurses Regarding their Total Practice Level about Care of Patients with Systemic Lupus Erythematosus throughout Periods of Study

Figure (2) showed that there was a highly statistical significant improvement in the total level of nurses' practice for care of patients with SLE throughout periods of the study. Where, all of the studied nurses had unsatisfactory practice level pre - program. While, all of them had a satisfactory practice level immediately and two months post program.

Table 2: Distribution of the Studied Patients regarding their Sociodemographic Characteristics among the Studied Groups.

Characteristics	The studied patients (n=40)				χ^2 P
	Study group (n=20)		Control group (n=20)		
	N	%	N	%	
Age (in years)					
(21-<30)	8	40.0	7	35.0	
(30-<40)	10	50.0	5	25.0	5.401
(40-<50)	1	5.0	5	25.0	0.145
(50-60)	1	5.0	3	15.0	
Range	(22-55)		(21-60)		F=2.445
Mean ± SD	31.35±8.356		36.50±12.129		P=0.126
Gender					
Male	0	0.0	2	10.0	FE
Female	20	100.0	18	90.0	0.487
Marital status					
Married	12	60.0	15	75.0	
Single	5	25.0	3	15.0	1.033
Divorced	3	15.0	2	10.0	0.597
Educational level					
Illiterate	1	5.0	3	15.0	

Read and write	2	10.0	2	10.0	1.667
Secondary school	13	65.0	13	65.0	0.644
High education	4	20.0	2	10.0	
Occupation					
Office work	1	5.0	0	0.0	
Manual work	0	0.0	1	5.0	2.487
Housewife	12	60.0	14	70.0	0.478
Not working	7	35.0	5	25.0	
Income sufficiency					
Sufficient	5	25.0	5	25.0	FE
Insufficient	15	75.0	15	75.0	1.00
Residence area					
Rural	12	60.0	16	80.0	FE
Urban	8	40.0	4	20.0	0.301

FE: Fisher' Exact test

Table (2) showed that half of study group were in the age group (30 < 40) year. While, (35%) of control group were in the age group (21 < 30) years. All of study group and the majority of control group were females. More than one half of study group and three quarters of control group were married. Approximately two thirds of both study and control group had secondary school education. (60%) of study group and (70%) of control group were housewife. Three quarters of both study and control group had insufficient income. According to residence area, more than one half of study group and more than three quarters of control group were resident in rural area. In general, there was no significant statistical difference between study group and control group regarding their socio–demographic characteristics.

Table 3: Distribution of the Studied Patients Regarding their Clinical Data among the Studied Groups

Clinical data	The studied patients(n=40)				χ^2 P
	Study group (n=20)		Control group (n=20)		
	N	%	N	%	
# Past medical history					
abdominal tumors	1	5.0	0	0.0	
DM	2	10.0	1	5.0	
FMF	0	0.0	1	5.0	
HTN	3	15.0	4	20.0	1.905
RA	3	15.0	1	5.0	0.168
RF	1	5.0	0	0.0	
Hypothyroidism	4	20.0	1	5.0	
Splenomegaly	1	5.0	0	0.0	
Family history of SLE					
Yes	3	15.0	1	5.0	FE
No	17	85.0	19	95.0	0.605
Family history of any other autoimmune disease					
Yes	3	15.0	2	10.0	FE

No	17	85.0	18	90.0	1.00
Disease Onset (in years)					
<5	8	40.0	13	65.0	
(5-10)	9	45.0	3	15.0	4.333
>10	3	15.0	4	20.0	0.115
Range	(1-11)		(1-30)		F=0.114
Mean ± SD	5.50±2.982		6.10±7.362		P=0.737
Duration of hospital stay (in weeks)					
<1	15	75.0	6	30.0	
(1-2)	4	20.0	10	50.0	8.229
>2	1	5.0	4	20.0	0.016*
Range	(2-16)		(4-30)		F=12.268
Mean ± SD	5.30±3.358		11.10±6.601		P=0.001*

More than one answer was chosen   FE: Fisher' Exact test   * Significant at level P<0.05

Table (3) illustrated that (20%) of study group had history of hypothyroidism and (20%) of control group had history of hypertension. Regarding to family history of SLE, (85%) of study group and (95%) of control group; had no family history of SLE. In addition, (85%) of study group and (90%) of control group; had no family history of any other autoimmune disease. In relation to disease onset, (45%) of study group had disease onset between 5 to 10 years ago. While (65%) of control group had the onset of the disease less than 5 years ago. In the context of duration of hospital stay, about three quarter of study group stayed in the hospital for less than one week. While, one half of control group stayed in the hospital for one to two weeks.

In general, there was no significant statistical difference between study group and control group regarding to their clinical data except in duration of hospital stay; as there was significant statistical difference between study group and control group at P value = 0.016*.

Table 4: Correlation between total mean score of Morisky medication adherence scale (MMAS) and total mean score of Lupus Patient Reported Outcomes (Lupus PRO) of the studied patients immediately and two months post program

Total Lupus Patient Reported Outcomes (Lupus PRO) score	Total Morisky medication adherence score (MMAS)			
	Study group		Control group	
	Immediately post program	2 months post program	Immediately routine care	2 months post routine care
r	-0.672	-0.267	0.236	0.077
P	0.001**	0.254	0.316	0.746

r: Pearson' correlation coefficient   * Significant at level P<0.05 ** Highly significant at level P<0.01

Table (4): Concerning to study group, there was negative high significant statistical correlation between Morisky medication adherence scale (MMAS) and total mean score of Lupus Patient Reported Outcomes (Lupus PRO) of the studied patients immediately

post program at P value= 0.001*. While, there was negative non-significant statistical correlation between Morisky medication adherence scale (MMAS) and total mean score of Lupus Patient Reported Outcomes (Lupus PRO) of the studied patients two months post program. Regarding to control group, there was positive non-significant statistical correlation between Morisky medication adherence scale (MMAS) and total mean score of Lupus Patient Reported Outcomes (Lupus PRO) of the studied patients immediately and two months post program.

Table 5: Correlation between both total knowledge and total practice scores of the studied nurses and Morisky medication adherence scale (MMAS) of the studied patients immediately and two months post program

| The studied nurses | Morisky medication adherence score (MMAS) | | | |
| | Immediately post program | | 2 months post program | |
	r	P	r	P
Total knowledge score	-0.200	0.398	-0.181	0.444
Total practice score	-0.254	0.280	-0.019	0.936

r: Pearson' correlation coefficient

Table (5) illustrated that there was no significant statistical correlation between both total knowledge and total practice scores of the studied nurses and Morisky medication adherence scale (MMAS) of the studied patients immediately and two months post program.

Table 6: Correlation between both total knowledge and total practice scores of the studied nurses and total mean score of Lupus Patient Reported Outcomes (Lupus PRO) of the studied patients immediately and two months post program.

| The studied nurses | Total Lupus Patient Reported Outcomes (Lupus PRO) score | | | |
| | Immediately post program | | 2 months post program | |
	r	P	r	P
Total knowledge score	0.414	0.070	0.252	0.283
Total practice score	0.328	0.159	0.467	0.038*

r: Pearson' correlation coefficient   * Significant at level P<0.05

Table (6) illustrated that there was significant statistical correlation between both total practice scores of the studied nurses and total mean score of Lupus Patient Reported Outcomes (Lupus PRO) of the studied patients two months post implementation of the program.

DISCUSSION

Concerning nurses' socio–demographic characteristics, the results clarified that the mean age of studied nurses was about 37 years. This may be related to the age of the highest proportion of the studied nurses was above 40 year; because majority of newly graduated nurses were distributed to other units as intensive care units. According to gender and marital status, more than three quarters of the studied nurses were females and married.

This finding was agreed with **Costa et al (2022) [17]** who reported that mean age of the studied nurses was about 39 years and majority of them were female and married. Concerning to educational level, the results showed that the majority of the studied nurses were less than bachelor's level. This finding was in the same line with **Ahmed et al (2022) [18]** who reported that about two thirds of the studied nurses graduated from nursing institute. In context of occupation, more than three quarters of the studied nurses were bed side nurse. This may be related to the nature of the nursing and care that provided for these cases; requires a large number of nurses as caregivers and fewer nurses as supervisors. Regarding nurses' experience; nearly one half of the studied nurses had more than 20 years of experience. This may be because the largest percentage of the studied nurses were in their forties, they were graduates of nursing institutes and technical nursing diplomas, and were not turned over from department to another; therefore, years of experience of nearly one half of them in this nursing specialty are not less than 20 years. In relation to their previous training about SLE, all studied nurses did not have previous training. This finding was in the same line with **Ahmed et al (2022) [18]** who reported that all the studied nurses did not have training course regarding the management of autoimmune diseases.

Regarding to distribution of the studied nurses regarding their knowledge levels, the results illustrated that only (2.9%) of the studied nurses had high knowledge level, while more than one half of them had moderate knowledge level pre- program. This result was in accordance with **Alrashdi et al (2022) [19]** who reported that about only (4.5%) of the studied health care providers had good knowledge regarding SLE and about half of them had poor knowledge. While, post implementation of the nursing intervention program, all of the studied nurses had a high knowledge level immediately post program and majority of them had a high knowledge level two months post program.

In context of distribution of the studied nurses regarding their practice level, the present study results illustrated that all of the studied nurses had unsatisfactory practice level pre implementation of the program. It may be related to all the studied nurses didn't attend any training regarding care of lupus patient previously. This result was in accordance with **Ahmed et al (2022) [18]** and **Ibrahim (2017) [20]** who shown that about two third of the nurses had incompetent practice level regarding care of lupus patient. While, all of them had a satisfactory practice level immediately and two months post program. Moreover, the study results illustrated that there was a highly statistical significant improvement in the total level of nurses' practice post program.

Concerning to patients' socio-demographic characteristics, the study results showed that mean age of study group was about 31 years. This confirmed that the disease is common in females during the childbearing age. This finding was in the same line with **El Said et al (2021) [21]** who reported that the mean age of the studied patients was about 32 years. Also, this result was agreed with **Taheri et al (2018) [22]** who showed that the mean age of the studied patients was 37 years.

Concerning to patients' gender, the study results showed that all of study group and the majority of control group were females. This result was consistent with **Kamel et al (2020) [23]** who reported that majority of the studied patients were females. Also, this result was consistent with **Abdul-Sattar and El Magd (2017) [24]** who showed that majority of the studied patients were females. Also, this finding was consistent with **Bartels et al (2020) [25]** who showed that majority of the studied patients were women. In relation to marital status, the study results showed that more than one half of study group and about three quarters of control group were married. This result was in the same line with **Sliem et al (2010) [26]** who reported that about three quarters of study group and control group were married. On the other hand, this finding was in contrast with **El Amir et al (2019) [27]** who reported that majority of the studied patients were single.

In relation to patients' educational level, the results presented that about two thirds of both study and control group had secondary school education. This finding was in similarity with **Sliem et al (2010) [26]** and **El Amir et al (2019) [27]** who reported that about two thirds of the studied patients had moderate education. Concerning to occupation, the study results illustrated that about two thirds of both study and control group were housewife. This result was in the same line with **Permana et al (2019) [28]** who reported that about two thirds of patients were housewife. Regarding to income sufficiency of the studied patients, the results reported that about three quarters of both study and control group had insufficient income. This result was in the same line with **El Zayat et al (2022) [29]** who reported that about half of the studied patients had insufficient income.

According to residence area, the results showed that more than half of study group and more than three quarters of control group were resident in rural area. This result was in similarity with **Abdul-Sattar and El Magd (2017) [24]** who reported that more than three quarters of the studied patients were resident in rural areas. On other hand, this result was in contrast with **Bartels et al (2020) [25]** who reported that more than three quarters of the studied SLE patients were resident in urban area. Additionally, the present results showed that there was no significant statistical difference between study group and control group regarding their socio–demographic characteristics. This result is consistent with **Chow et al (2021) [30]** who reported that there was no significant statistical difference regarding demographic characteristics between the two studied groups.

Concerning to distribution of the studied patients regarding their clinical data, about one fifth of study group had past medical history of hypothyroidism. This result was in the same line with **Wang et al (2022) [31]** who reported that about one fifth of the SLE patients had history of hypothyroidism. Also, this result was consistent with **Li et al (2021) [32]** who reported that about three quarters of the SLE patients had history of hypothyroidism. Comparing to control group, about one fifth of patients had history of hypertension. This result was in the same line with **Realpozo et al (2019) [33]** who studied association of SLE and hypertension and reported that prevalence of hypertension in SLE patients was ranging from 14% to 60%.

Regarding to family history of SLE, the results demonstrated that majority of study group and control group; had no family history of SLE. This result was consistent with **Chebbi et al (2020) [34]** who reported that majority of the studied SLE patients; had no family history of SLE. Also, this result was in similarity with **Wong and Tsao (2006) [35]** who reported that only one tenth of the studied SLE patients; had family history of SLE. Regarding to family history of any other autoimmune disease, majority of study group and control group; had no family history of any other autoimmune disease. This result was consistent with **Tavangar et al (2014) [36]** who reported that one tenth of the studied SLE patients; had family history of other autoimmune disease.

In relation to disease onset, the present study results showed that mean of disease onset of study group was about 5.5 years and it was about 6 years in patients of control group. This result was consistent with **Mohammed et al (2022) [37]** who reported that mean of SLE duration in the studied patients was about 5 years. Also, this result was in the same line with **Mahmoud et al (2018) [38]** who reported that mean of lupus duration was about 6 years. This result was in contrast with **Cabas et al (2012) [39]** who stated that mean of disease duration was about 15 years.

In the context of duration of hospital stay, the study results showed that about three quarter of study group stayed in the hospital for less than one week. This result was in the same line with **Levy et al (2018) [40]** who reported that the average of the hospitalization stay of the studied SLE patients was less than 7 days. Comparing to control group, about one half of patients stayed in the hospital for one to two weeks. This finding was in the same line with **Lee et al (2013) [41]** who reported that the average of the hospitalization stay of the studied SLE patients was more than two weeks.

In context of correlation of Morisky medication adherence scale (MMAS) and Lupus Patient Reported Outcomes (Lupus PRO) of the studied patients, concerning to study group, the study results showed that there was negative high significant statistical correlation between (MMAS) and (Lupus PRO) of the studied patients immediately post program. While, there was negative non-significant statistical correlation between (MMAS) and (Lupus PRO) two months post program. This finding was in similarity with **Nicorici et al (2018) [42]** who reported that high therapy adherence was correlated to low lupus patient reported outcomes scores. Regarding to control group, there was positive non-significant statistical correlation between (MMAS) and (Lupus PRO) of the studied patients immediately and 2 months post program. This finding was in similarity with **Xie et al (2018) [43]** who reported that patients with enhanced physical health might be at increased risk for medication non-adherence.

Concerning to correlation between both knowledge and practice scores of the studied nurses and Morisky medication adherence scale (MMAS) of the studied patients, the study results illustrated that there was no significant statistical correlation between both knowledge and practice scores of the studied nurses and (MMAS) of the studied patients immediately and two months post program. This finding agreed with **Panahi et al (2022) [44]** who reported that healthcare provider's knowledge and practices were not

associated with patient's adherence with medication. On the other hand, this finding was in contrast with **Hawash et al (2022) [45]** who found that health care system, healthcare provider-patient relationship and nursing instructions regarding lupus medications were factors that can affect patient's medication adherence.

Concerning to correlation between both knowledge and practice scores of the studied nurses and total mean score of Lupus Patient Reported Outcomes (Lupus PRO) of the studied patients, the results illustrated that there was significant statistical correlation between both total practice scores of the studied nurses and (Lupus PRO) two months post implementation of the program. This finding was in similarity with **El said et al (2019) [46]** who found that nursing practices can significantly enhance clinical outcomes of lupus patients. Also, this finding agreed with **Zhang et al (2016) [47]** who reported that there was significant association between targeted nursing practices and lupus patient outcomes.

CONCLUSION

Depending on the results of the present study, it was concluded that nursing intervention program had a positive influence on enhancement of knowledge and practice of nurses regarding care of lupus patients and thus improvement of patient's outcome.

RECOMMENDATION

Depending on the results of the present study, it was recommended that:

- Participation in training programs regarding SLE for acquisition of efficient knowledge and practice.

- Effective communication, counseling and patient education assist in clarifying treatment options and improving patients' prognosis.

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