Effect of Targeted Nursing Instructions protocol on Knowledge and Therapeutic Adherence among Female Patients with Lupus Nephritis Flares

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Abstract:

Background: Poor adherence to drug is an important cause of not achieving treatment targets among female patients with lupus nephritis flares. **Aim:** to evaluate the effect of targeted nursing instructions protocol on knowledge and therapeutic adherence among female patients with lupus nephritis flares. **Research design:** A quasi experimental (pre-posttest) research design was utilized. **Sample:** A purposeful sample of (200) female patients with lupus nephritis flares with an age range from 20 to 65 years old . **Setting:** The study was conducted in the Internal Medical & Rheumatology Department at the Main Assiut University Hospital and its affiliated clinics. **Tools: Tools (I):** Patient Structured Interview Questionnaire. **Tool (II):** General Level Knowledge Structured Questionnaire **Tool (III):** Medication adherence scale. **Results:** There were a statistically significant difference was found between the pre and post implementation of the protocol regarding the total scores of knowledge level & medication adherence during (3 &6 months after implementing the target nursing instructions protocol with P = (0.001).
Conclusion: Targeted nursing educational protocol was effective in improving knowledge level and medication adherence for female patients with lupus nephritis flares**. Recommendation:** Targeted nursing program is effective on early prediction of complications among patients with lupus nephritis flares.

Keywords: Knowledge Level, Lupus Nephritis Flares, Medication Adherence & Targeted Nursing Instructions Protocol

Introduction:

Lupus nephritis (LN) is an inflammation of the kidneys caused by systemic lupus erythematosus (SLE), with manifestations such as kidney inflammation and eventual kidney failure. About (10-30%) of patient with lupus nephritis progress to kidney failure requiring dialysis **(Parikh, et al., 2020).**

Targeted nursing protocol focus on emphasis on specialization and individuation of nursing care, the best possible use of nursing resources, the provision of specialized nursing services to patients with LN, and significantly improved therapeutic compliance to all contribute of the advancement of LN. Lack of pertinent information, medical and nursing direction, chronic pathology, lack of social support, lack of financial resources, and a lack of financial means are all important factors influencing treatment compliance. Targeted nursing protocol is a patient-centered care and works to enhance patients' quality of life both while they're in the hospital and after they're released. The nurse should assess for preexisting kidney function, instruct patient with LN to monitor laboratory tests of serum creatinine and glomerular filtration rate frequently **(Georgopoulou et al., 2018).**

The nurses have a crucial role in educating, supporting, and delivering information to patient with LN during care. Also, nursing instruction have a beneficial impact on patients' attitudes, knowledge, illness course, and level of care. Nursing education for patient with LN could include; chronic nature of disease, risks, complications monitoring & prevention, proper adherence to the medications regimen, warning signs of exacerbation symptoms, skin-care, importance of accurate reporting of the signs and symptoms of complications, regular medical follow up and early detection of complications which enables prompt intervention to prevent serious tissue damage or dysfunction **(Feldman et al., 2019).**

By acquiring knowledge, the patient health states is improved through stimulation of independent sign/symptom monitoring, medication management,

enhancing problem-solving and decision-making skills for medical treatment management, and changing their physical activity, dietary, and/or smoking behavior. Nurses' education about the appropriate healthy diet for patients with LN is crucial in order to get benefit from the nutritionally balanced diet and adhere to the highly calorie diet with a moderate protein content. Polyunsaturated fatty acids are recommended, but saturated and trans fatty acids should be strictly prohibited. Vitamin D, fiber, and minerals like calcium and selenium should all be provided, but salt intake should be kept to a minimum level **(Jonkman, 2016)**.

Additionally, the nurse should instruct patients with LN about the proper mouth & skin care. This includes washing and cleansing the skin with mild soap, patting it dry rather than rubbing it, avoiding direct sunlight and other types of ultraviolet light, using sunblock, and checking the skin each day for rashes and open sores. **(Donna, et al., 2018).**

Medication adherences are a vital component of management among patient with LN flares. Non-adherence to the therapeutic drugs is multifactorial for most patients with lupus and varies according to unintentional or intentional causes, the rates ranged from 40% to 76%. Lack of relevant knowledge, psychological fear, obvious adverse reaction, with chronic pathogenesis, lack of financial resources, and lack of social support are all significant factors influencing treatment compliance. As well lack of counseling after a patient is discharged from the hospital, push the patient to become reluctance to continue medication after symptoms go away, failure to appear for reassessment, decreased use of prescribed medications or frequency, and switching medications or administration methods **(Haesuk, et al.,** **2017)**.

Finally, the nursing instructions protocol improves patients with LN flares knowledge & medication compliance during hospitalization and after discharge; by combining oral and written communication, formal interactions between nurses and patients, as well as other techniques of identifying patients with difficulties through nursing intervention based on their current conditions (**Ana, et al., 2015**)

Operational definitions:

Adherence: In this study, this variable refers to "the extent to which a patient's behavior coincides with medical, nursing or health advice." this was supported by **(Mehat et al., 2017).**

Nursing instructions: refers to the provision of organized learning strategies for patients that enables them to improve their capacity for self- care, knowledge & drug compliance this was supported by **(Feldman et al., 2019)**

Significance of the study:

From the researcher's review of literatures, it was found that patients who have LN frequently endure a deteriorating in health states leading to recurring hospitalizations and incapacitating symptoms. Also poor adherence to therapeutic regimens is a common and expensive problem associated with a higher risk of flares, morbidity, and poor renal outcome .Significant understanding of their disease will help them to know how to be compliance with the treatment and follow precautions that will be helpful on decreasing the expected renal complications, So patients with LN are in need for nursing education protocol to improve their knowledge level about their disease in order to overcome the lupus complications & to stabilization of LN pathogenic condition and to control recurrence.

Aim of the study:

General aim: Evaluate the effect of targeted nursing instructions protocol on knowledge and therapeutic adherence among female patients with lupus nephritis.

Specific objectives:

1. Assessing the baseline of knowledge and therapeutic adherence level among females' patients with lupus nephritis flora.
2. Designing, implementing & evaluating the effect of the target nursing instructions protocol on knowledge and therapeutic adherence level among females' patients with lupus nephritis flora.

Hypothesis:

The following research hypothesis was formulated to achieve the aims of this study:

1. Studied females patients' knowledge level regarding lupus nephritis will be improved after implementing the target nursing protocol compared to before.
2. The therapeutic adherence level among the studied females' patients will be improved than pre target nursing instructions protocol application.
3. 3-Positive correlation will be found between knowledge and therapeutic adherence levels among female patients with lupus nephritis flora.

Patients and Method:

Research design: In this study, a quasi-experimental research design including pre, post, and follow-up assessment were applied. The researcher utilize the analysis of the pretest to identify the studied patients' needs to be the base for the content of the target nursing instructions protocol. As well pre- and post-test result was used to identify changes occur over time in this form of quasi-experiment study. Furthermore, in a pre & post research study, a series of observations are made over time for one

group of participants. The researcher in this study use pretest-posttest to assess the participants prior to the experimental manipulation, then test the participants after the manipulation posttest by 3 months & follow-up after 6 months, in order assess the occurred after application of the targeted nursing educational protocol (**John, 2018).**

Setting:
The study was conducted in the Internal Medical &Rheumatology Department at main Assiut University Hospital and its affiliated clinics.

Sample:
The study recruited purposeful sample of (200) female patients with lupus nephritis flares . The inclusion criteria were; adult female patients with lupus nephritis, age ranged from 20 to 65 years old, and admitted in the Rheumatology Department at main Assiut University Hospital.

Sample size is determined by using the following equation:

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

N is the total number of (400) patients who were hospitalized in the Internal Medical and Rheumatology departments at the main hospital affiliated with Assiut University. In the year (2019) with (200) participants, Z = confidence levels is 0.95, equals 1.96, D = error ratio is 0.05, and neutral is 0.50. **(Steven, 2012).**

Tools:
The researchers used three tools to collect data to achieve the purposes of this study:

Tool (I): Patient Structured Interview Questionnaire:
It was developed by the researchers based on the current national and international literature, **Donna et al., (2018) &Elsayed, &Mesbah (2018),** with the following parts:

1st part: Patient's demographic data: To assess patient's demographic, it includes (5) items which are age group, marital status, work, educational level, and residency.

2nd part: Assessment of patient's medical history& disease characteristics data: To assess patient's medical history, the following (7) items included; (family history, onset of disease past medical history, medical follow up, actual nursing diagnosis according to current problem) .

3rd part: Assessment of patient's present complaints and physical symptoms as (weight gain, shortness of breath, edema \ swelling in lower limbs, change in urine color foamy urine, & proteinuria**)**

-In addition to assessment of the most common nursing diagnoses   which including (3 items) risk for excess fluid volume, fatigue & malaise related to disease process & activity intolerance related to arthralgia.

Tool (II): General Level Knowledge Structured Questionnaire (LKQ): It was created by **Shelbi Sullivan (2016)** with the goals of evaluating patients with 'LN general knowledge which covered topics including, definition of the disease, predisposing risk factors, clinical manifestations, methods of diagnosis, medication types & uses, and complications of lupus, and lupus prognosis which include (36) questions . The questions, answered by (yes or no) choices.

Scoring system for knowledge Questionnaire: A correct response received (1) score o, while incorrect response received (0) score. The scores added together, and the result is a score of 36 degree. Score was converted into percentage . The overall level of knowledge was rated as –satisfactory level (> 75%), moderate level from (50-75%), and unsatisfactory level if below (50%).

Reliability of the knowledge tool:
Internal consistency indicates how well the items on a measure fit together conceptually and ensures the level of consistency of answers item by item the score values was (0.0 to 1.0) .

Face validity: A bilingual group of five   experts was selected to test the content and face validity of the tool, (3 professors in the field of Medical – Surgical nursing faculty of nursing, Assuit University and 2 professors in Rheumatology medicine) faculty of medicine , Assuit University; they reviewed the tools for clarity, relevancy, comprehensiveness, understanding, applicability, time need to fill it and easiness for administration. Minor modifications were required and carried out accordingly.

Tool (III): Medication Adherence Scale among patients with lupus nephritis flora:
It is used to investigate the factors associated with medication compliance in patients with lupus nephritis.by using Morisky adherence medication scale (MMAS-8). It is developed by **(Morisky, et al., 2008).** The scale was applied to research medication compliance. The measure is an eight-item with two yes/no response options for items from 1 to7 and a 5-point Likert scale for item 8. The overall score is between 0 and 8.

Scoring system of medication adherence scale:
Each (no) response was rated as (1score) and each (yes) was rated as (0 score) except for item (5), in which each response (yes) is rated as (1score) and each (no) was rated as (0 score).

-The scores of the MMAS-8 range from (0 to 8):
A score below (<6) indicated low adherence.
A score between (6<8) indicated medium adherence.
A score of (8) indicated high adherence.

Reliability of the tool:
A cutoff score of 6 is advised. The scale is straightforward and practical, and it has strong reliability and validity, according to previous studies. In this research, the scale's Cronbach's alpha coefficient was 0.81 **Berlowitz et al., (2017)**

Operational Design:
Technique for data collection: this study was carried out on three phases:

Phase1: -Preparatory phase:
The researcher reviewed the related literature of the current study, local & international, using textbooks, articles, and scientific magazines. **Shahnaz et al., (2016), Christopher et al, (2018)& Morales et al., (2021)** The proposed study setting was assessed for the flow rate of female patients, this phase ended with the pilot study.

Administrative Design:
An official permission to carry out the study was obtained from the responsible hospital authorities of the Rheumatology department & Internal Medicine at Assiut University Hospital.

Ethics approval:
The Nursing Faculty's Ethical Committee has authorized a research proposal. During the implementation of the research, there was no risk to the study participants. Common ethical standards for clinical research were followed during the investigation. After discussing with the patient, the nature and goal of the study, oral consent was sought from participants . Anonymity and confidentiality were guaranteed. The study subjects always had the option of declining to participate or withdrawing from the study without giving a reason. Data collected from the study subjects treated confidentially and used only for the study purpose.

Pilot study:
The pilot study performed in January (2020) on 10% of the sample (20 patients) to evaluate the clarity, simplicity, relevancy, comprehensiveness, and applicability of the study tools. Additionally, it estimates time needed for completing the tools.

Phase (2): Implementation phase:
1. Data were collected from the Internal Medicine & Rheumatology Department at Assiut University Hospital for 8 months period from January 2020 to August 2020.
2. The data collection was carried out at morning and afternoon shifts for all available females' patients, the majority of patients were followed up at Outpatient clinic, some of them was followed by telephone.
3. The researcher established a line of communication by introducing herself, explaining the study's nature and goals to the chosen patients who were willing to participate in the study, and

administer (tool 1) to them to gather information about their demographic's characteristics and medical history.
4. The researcher assessed patient's general knowledge regarding lupus nephritis and drug adherence which was measured by using (LKQ), (MMAS-9); Questionnaire (tool II, III).
5. The nursing education protocol was developed and implemented based on patients' needs, and their levels of understanding.
6. The protocol was delivered to the patients by the researchers, patients were divided into small groups each of (2-3 patients).

Contents of the targeted nursing protocol:
There were two sessions in the protocol. Depending on the subject identified needs and the demands of the patient, each session lasted between(40 and 50 minutes)

Planning of action:
1. The first session started by introducing the researcher to himself flowed by explaining the aim of the study.
2. Each of the following sessions usually started by a briefing about what had been discussed in the previous session, using simple Arabic language.
3. Each session ended by a summary of what has been taught during the session and the objectives of the new session.
4. Feedback and reinforcement of the nursing protocol content was performed according to patient's needs to ensure their understanding.
5. Giving recognition to the interested patients was emphasized for motivation during the teaching sessions. Each patient obtained a copy of the nursing education booklet that included the content of the nursing protocol

Nursing protocol sessions:
The first protocol session:
In this session the researcher explain to the patient knowledge related to the following items (Definition of the diseases, nature, causes, symptoms, complications diagnostic measures, skin care, mouth care, methods to avoid and minimize infection and how to monitor intake and output accurately. Also, teaches the patients how to measure and record abdominal girth daily. Instruct patients to maintain fluid restrictions as indicated, explain to the patients that the amount of fluid allowed per day depending on the level of kidney function, patients should ask for consultation to develop a meal plan with low in sodium, potassium, and protein, also, meal should include the preferred foods as the proper diet plays a vital part in controlling the symptoms, maintaining the nutritional stat as well in managing the LN disease.

The second session: the researcher gave the patient instructions about the treatment types as diuretics and immunosuppression drugs, importance of medications adherence and how be adherence to medications, contraception at unstable pathogenic condition, importance to be consistent with the treatment plan, and special clinical service appointment, the importance of continuous education following discharge from hospital, regular treatment and health enhancement through regular reassessment.

Methods of education:
Teaching methods selection was control by some consideration as patient characteristics and the protocol contents.

Teaching aids:
The teaching aids used in the explaining the content of targeted nursing protocol were booklet handouts, power point and videos. Also, the researchers used pictures and diagram to help patients to retain the difficulties learning content.

The 3rd. sessions.
It was conducted in the Outpatient Rheumatology clinic after 3 months from the first interview with the patient. It was done to assess the effect of the protocol on patient's level of knowledge, and therapeutic adherence using tool (1I) and tool (III)

Phase3: Evaluation phase: (4th session):
It was done for evaluating patient's level of knowledge, and therapeutic adherence in the outpatient rheumatology clinic post application of the nursing protocol (after 6 months period) using tool (1I) and (III)

Statistical design:
The data was revised, made ready for computer entry, coded, analyzed, and tabulated. A computer program was used to perform descriptive statistics (frequencies and percentages, mean and standard deviation), Pearson chi-square (cross tabulation) between pre- and post-test after three and six months, correlation, and one-way a nova test were used (SPSS).

Results:

Table (1): Frequency & percentage distributions of the studied sample regarding demographic characteristics (n= 200)

Characteristic	n	%
Age group (years)		
20 - < 35 years.	81	40.5
35 - < 45 years.	115	57.5
45 – to above.	4	2.0
Marital status:		
Married	112	56.0
Single	49	24.5
Widow	11	5.5
Divorced	28	14.0
Work:		
Student	3	1.5
Working	18	9.0
Not working	179	89.5
Educational level:		
Not educated	4	2.0
Educated	196	98.0
Residence:		
Rural	149	74.5
Urban	51	25.5

Table (2): Frequency & percentage distribution of the studied sample regarding medical history (n= 200)

Items	n	%
Lupus family history		
No	199	99.5
Yes	1	0.5
Onset of the disease		
Less than one year	59	29.5
1 to less than 5 years.	133	66.5
More than 5 years	8	4.0
Follow up		
Regular	78	39.0
When necessary	122	61.0
Actual current nursing diagnosis;		
Fatigue & malaise related to disease process	187	93.5
Activity intolerance related to arthralgia.	199	99.5
Fluid volume excess related to decreased renal function	75	37.5

Table (3): Frequency & percentage distribution of the studied patients regarding their physical symptoms (n=200)

| Items	Absent		Present	
	n	%	n	%
General appearance				
Weight gain	45	22.5	155	77.5
Skin				
Pallor	64	32.0	136	68.0
Malar rash	41	20.5	159	79.5
Eyes				
Sensitivity to light	17	8.5	183	91.5
Inflammation	158	79.0	42	21.0
Cardiorespiratory				
Shortness of breath	117	58.5	83	41.5
Abdomen (GIT)				
Distension	197	98.5	3	1.5
Abdominal pain	189	94.5	11	5.5
Nervous system				
Headache & dizziness	114	57.0	86	43.0
Musculoskeletal				
Edema \ swelling in lower limbs	7	3.5	193	96.5
Muscles pain & tenderness	8	4.0	192	96.0
Urinary system				
Change in urine color (Foamy urine)	175	87.5	25	12.5
Proteinuria	125	62.5	75	37.5
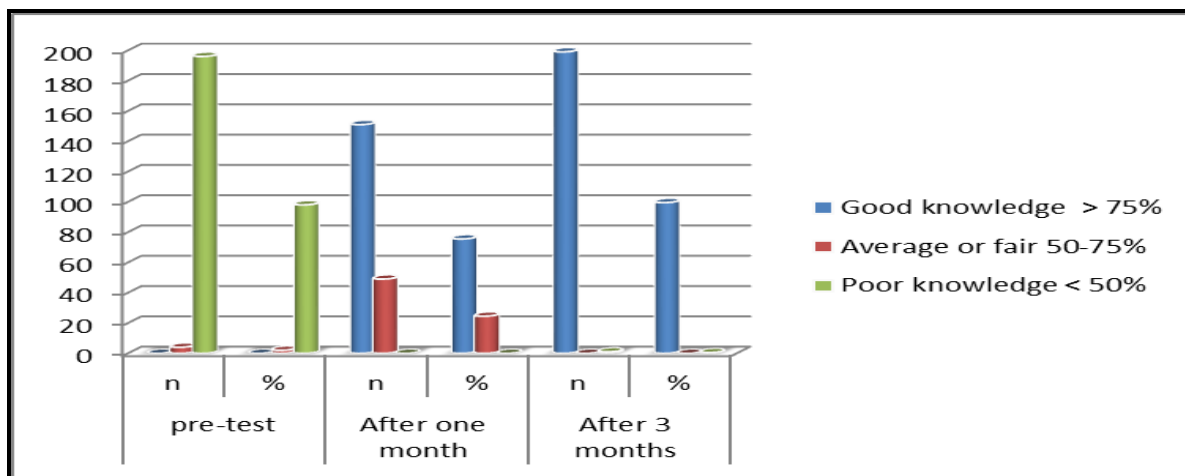
Figure (1): Relationship between patients with lupus nephritis knowledge level pre-post-application of the nursing education protocol.

Table (4): Relation between patient's medication adherence pre-post-application of the nursing education (n=200)

Medication adherence Total score 0-9	Pre-test		Follow up				P. value
			After 3 months		After 6 months		
	n	%	n	%	n	%	
Low adherence (< 6)	186	93.0	78	39.0	21	10.5	
Medium adherence (6 < 9)	11	5.5	112	56.0	167	83.5	0.001**
High adherence (9)	3	1.5	10	5.0	12	6.0	
Mean± SD	5.28± 1.15		7.08± 1.14		7.44± .76		

Table (5): Relation between patient's demographic data, knowledge level and therapeutic adherence (n=200)

Correlation		knowledge	Therapeutic adherence
Age group	Correlation Coefficient	-0.054	-0.083[*]
	Sig. (2-tailed)	0.190	0.041
Marital status	Correlation Coefficient	-0.003	-0.015
	Sig. (2-tailed)	0.941	0.720
Occupational level	Correlation Coefficient	0.052	0.117[**]
	Sig. (2-tailed)	0.206	0.004
Level of education	Correlation Coefficient	0.227[**]	0.393[**]
	Sig. (2-tailed)	0.0001	0.0001
Living area	Correlation Coefficient	0.143[**]	0.312[**]
	Sig. (2-tailed)	0.0001	0.0001
Knowledge	Correlation Coefficient	----------	0.788[**]
	Sig. (2-tailed)	--------------	0.0001

Correlation is significant at the 0.01 level (2-tailed)
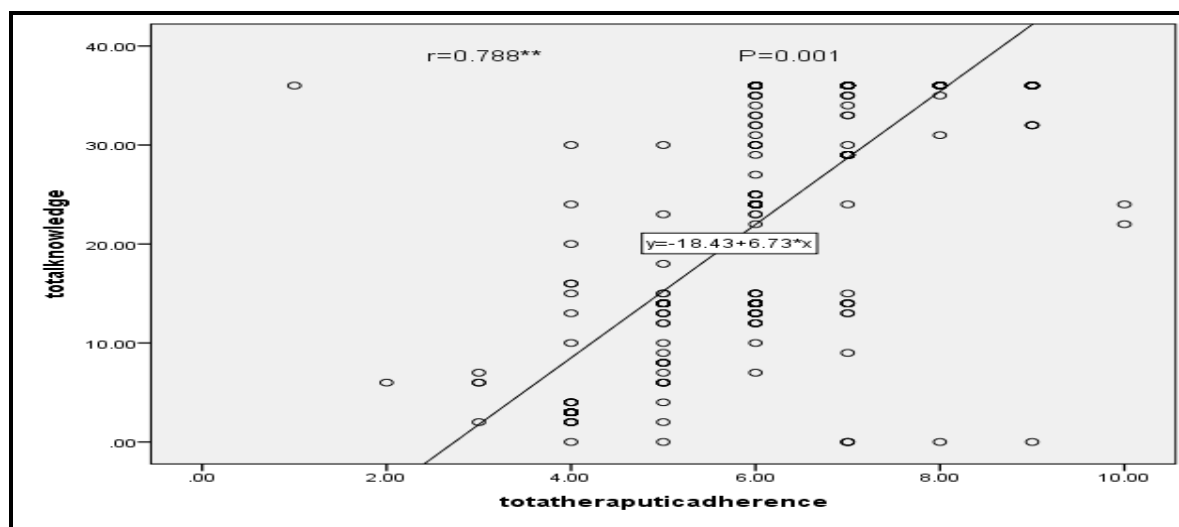
Figure (2): Relation between the studied sample's total knowledge and therapeutic adherence(n=200) .

Table (1): Revealed that the highest percentage of the studied sample (56 %) were married, (57.5%) their age ranged from (35 to less than 45) years old, (89.5%) were not working, (98 %) were educated, and (74.5%) living in rural area.

Table (2): Showed that the majority of the studied sample don't have a family history of the disease (99.5%), while (66.5%) of the studied patients their disease started since one to less than 5 years ago, and (60.5%) of them go for follow up only when necessary. As regarding nursing diagnoses according to physical symptoms (93.5 %) of the patients with LN suffering from general fatigue and malaise, while (99.5%) compiling from activity intolerance related to arthralgia and only (37.3 %) suffering from impaired skin integrity.

Table (3): Regarding assessment of patient's present complain & physical symptoms among LN flora; (77.5 %) of the studied patients suffering from weight gain, (68 %) combining from pallor, (91.5 %) have sensitivity to light, and (41.5%) compline from shortness of breath. While (43 %) of the sample suffer from headache and (96.5 %) have musculoskeletal system symptoms as edema/swelling in lower limbs and (96.0 %) suffer from muscles pain & tenderness. And (37.5%) have a proteinuria in their urine.

Figure (1): Showed that there was a highly statistically significant difference between the knowledge level result of patients with lupus nephritis pre-post application of the nursing education protocol (after 3& 6 months) with p. value = <0.01.

Table (4): Illustrated that there was a highly statistically significant difference between patient's medications adherence pre-post-application of the nursing education protocol (after 3 & 6 months) with P value = 0.001**.

Table (5): Showed that there was positive correlation between patients' therapeutic adherence and their occupational level, level of education, living area, and knowledge level as the following (0.117, 0.312 and 0.788) respectively.

Also, there was positive correlation between level of education, living area & knowledge level with Correlation Coefficient equal (0.227&0.143) respectively.

Figure (2): Illustrate that there are positive correlation between total knowledge and patient's therapeutic adherence with (P= 0.001) and (r = 0.788).

Discussion:

The present study investigated the effective of applying a structured nursing education protocol on knowledge and therapeutic adherence levels among female patients with lupus nephritis. The present study was conducted on female patients as the admission during the study period was females only. This comes in the same line with **Tsokos, (2019),** who stated that LN affects women nine times more than men and also agree with **Abd-Ellatif et al., (2018)**, who mention that the majority of the LN rates occur among females, frequently started at childbearing age. Also, **Sanz, (2020)**, explained the reason for high occurrence of lupus among women than in men because of this predominance of the biggest difference between them as women experience highest exposure to estrogen hormone, and is possible also that the male hormone (androgen) may have a protective role against lupus. As lupus symptoms appear to get worse during pregnancy and before monthly periods when estrogen levels are

higher. However, the results of this study contradict the study conducted by **Parikh**, **et al.,   (2020),** who mentioned that; Men with LN are more likely to have more severe cases of lupus nephritis, which could advance to end-stage kidney disease. From the researcher point of view; this disparate gender difference is likely to be due to several factors, including environmental factors such as exposure to the sun & UV light, some minerals such as mercury, silica, in the soil and agriculture, also exposure to, viruses as herpes zoster and stress.

Regarding age group of the studied patients, the highest prevalence was between 35 to 45 years old. This is in agreement with **Galindo et al. (2016)**, who stated that; the most common age for LN is between 15-45 years old which is the age bearing group, this supports the opinion that in this period hormonal changes influences the vulnerability to catch the disease.

The results of the current study showed that; the majority of the studies sample was married. This finding was consistent with **Doran &Connolly (2017),** who found that all participants were females, and the majority was married. According to patients' occupational level, the majority were not working which comes in agreement with **Mostafa, & Abd-Elrehem (2017**) who stated that the majority of patients in their study were not working. Regarding the educational level and living area, most of the studied patients were educated, and more than half of them were living in rural areas, this is agree with **Elsayed, and Mesbah, (2018)**, who stated that the majority of the patient in their study were living in rural areas.

As regards to the onset of the disease; the present study findings showed that the majority of patients started from less than one year to less than five years. This result is in congruent with **Lee   et al., (2016)**, who found that the onset of the disease among their study participants was from 1-5 years.

Regarding to how the patients in the study were distributed in relation to their current symptoms; patients with LN reported weight gain, this finding in the same line with **Kazi et al., (2020)**, who reported that LN diseases is characterized as a progressive worsening of glomerular filtration function those results in accumulations of fluid in the body leading to weight gain and fatigue

As regard to the musculoskeletal system symptoms, the vast majority of the study sample developed swelling in the lower limbs, muscles pain & tenderness. Also this agree with the study done by **Ikhlas et al., (2020) & Aringer et al., (2020)**, who describe that lower limb edema, as symptom of LN

The current study finding verify that; there was a statistically significant difference among patient with

LN flora regarding knowledge score level pre & post demonstrations of the nursing protocol (after 3 and 6 months), this similar to the study conducted by **Farahani, et al., (2017)**,who reported statistically difference between knowledge score of the studied group pre /post educational protocol application, also they mentioned that, the continuous educational guidelines significantly improve patients with flora knowledge level and awareness regarding their disease process. This is in the same line with (**Mohamed & Kamel, (2018),** who revealed that the health education-based intervention had a significant effect on improving patients with LN knowledge level. This result support the study hypothesis which suggested that patient's knowledge level will improve after implementing the targeted nursing instructions protocol.

Looking at patient's medications adherence; the current study verified that the vast majority of the study sample was classified as low adherent score by using MMAS-8 cutoff criteria for medications non-adherence in pre application of the target nursing protocol, which agrees with the study done by **Tetiana, et al., (2017)**, who showed that; adherence rates for long-term chronic conditions, such as LN medications, are even lower in developing nations. As many patients worldwide had trouble adhering to therapy treatment. Also in the same lines with the current study a study conducted by **Xia et al., (2018),** who mention that a high prevalence of medication non adherence among patients with LN flora, and the factors associated with the non-adherence are mainly multifaceted.

There was a highly statistically significant difference regarding patient's medication adherence between pre/post application of the protocol (after 3 & 6 months). This result agree with **Tetiana, et al., (2017),** who reported that medication adherence improved in all   items . The percentage of patients with LN intervention group adherence was significantly improved. And agree with the study conducted by**, Cunha et al., (2018)**, who explain that application of nursing instruction was effective for increasing drug treatment adherence among patients with LN. It is of particular importance for lupus and other systemic patients with autoimmune disease as such group of diseases remain incurable, necessitating lifelong medications to control or to slow down the disease process progressive.

This result supports the study hypothesis which suggested that therapeutic adherence level will be better than pre the application of the target nursing instructions protocol.

From the researcher point of view, the study's findings showed that there are measures to reduce adherence predictors, such as proper adjusting by

patients with lupus to the resources service in the remote locations and enhanced communication between health care professionals and patients, in order to improv the therapeutic adherence of patients with LN.

Regarding to the correlation between patient's demographic data and therapeutic adherence; the present study explore   that there are a appositive correlation between patient's medication compliance, level of education, and residency. This in the same line with study done by **Xu et al., (2016),** who demonstrate that patients with LN at high risk for non-adherence to medication therapy in relation to who are with low education, or who live in a rural region.

 The present study showed that there was appositive correlation between patient's therapeutic adherence and knowledge level, this agrees with the study conducted by **Ali et al., (2020)**, who documented significant relation between knowledge and the tendency to adhere to long-term treatments, among immune diseases and also agree with a study done by **Beena & Jose (2017),** who reported that patient level of education is the key to improve medication compliance.

This result supports the study hypothesis which suggested that a positive correlation between level of knowledge and therapeutic adherence among patients with lupus nephritis flora.

There are various adherence approaches for patient with LN that offer perceptions into patient attitudes and actions. The nursing and medical relation is crucial to fostering adherence, and health care providers' instructions could have a positive effect on patient behavior with increase their drug adherence level **Cunha et al., (2018)**

From researcher's opinion, poor adherence to treatment plans may be due to expensive of the medications, lack of patient knowledge about the effect of drug adherence on the disease process, as well as the protracted illness management, which could erode the patient's resilience.   Finally, this study indicated that knowledge level and therapeutic adherence of the studied patients post application of the nursing education has improved. There was a highly significant difference between pre and post-test scores of the study group indicating the positive effect of the nursing instructions protocol on improving patient's knowledge and therapeutic adherence level.

Conclusion:
Based on the results of the present study, it can be concluded that knowledge score and therapeutic adherence level has improved significantly post-

application of the targeted nursing protocol (after 3 and after 6 months).

Recommendations:
In the light of the findings of the current study the following recommendations were suggested:
-   Impact of early mentoring of renal warning signs on improved health outcomes among patients with lupus nephritis flares
-   Positive effect of targeted nursing program on early   prediction of complications   among patients with lupus nephritis flares.

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