

## Impact of Designed Nursing Guidelines about Tophi Gout's Lifestyle Modification on Patients' Outcomes

Mohamed Goda Elbqry<sup>1</sup>, Maha Abd El Fattah<sup>2</sup>, Amira Ahmed Hassanein<sup>3</sup> & Fatma Mohamed Elmansy<sup>4</sup>

<sup>1</sup> Lecturer of Medical Surgical Nursing, Faculty of Nursing, Suez Canal University, Egypt

<sup>2</sup> Lecturer of Rheumatology and Rehabilitation Medicine, Faculty of Medicine, Suez Canal University, Egypt

<sup>3</sup> Professor of Medical Surgical Nursing, Faculty of Nursing, Mansoura University, Egypt

<sup>4</sup> Lecturer of Medical Surgical Nursing, Faculty of Nursing, Suez Canal University, Egypt

### Abstract

Tophi gout is a noticeable, and painful inflammatory arthritis that is associated with a lump of monosodium urate deposition in the joint or/and other body parts. Nursing care is a cornerstone of the management process that plays a vital role in its prevention and management. **Purpose:** This study aimed to evaluate the impact of designed nursing guidelines about tophi gout's lifestyle modification on patients' outcomes. **Sample:** A purposive sample (136) of patients were recruited. **Design:** A quasi-experimental research design (one group pre-posttest) was used at Rheumatology and Rehabilitation department. **Tools:** Utilizing two tools; (1) Daily lifestyle health assessment is a structured interviewing questionnaire to assess demographic characteristics, health history, and lifestyle habits. (2) Structured interviewing patients' outcomes questionnaire to assess the patients' outcomes. **Results:** More than half the studied patients (55.7%) were male. Implementation of designed nursing guidelines about tophi gout had significant improvement of patients' healthy lifestyles and outcomes at the study phases. There was significant correlation between the total lifestyle modifications and pain perception score at the study phases with  $p \leq 0.05$ . **Conclusions:** Productively designed nursing guidelines about tophi gout's lifestyle modification enhanced a healthy lifestyle and patients' outcomes. **Recommendations:** Endorsement and support patients with designed nursing guidelines about tophi gout to early prevention from its flares.

**Keywords:** *Lifestyle modification, Nursing guidelines, Patients' outcomes & Tophi gout.*

### Introduction

Gout is a disease that affects the human joints, described by ancient Egyptians as early as 2640 BC (Stromberg, 2020). It was described as a disease of the kings in past decades when aristocrats, kings, and other powerful people overindulged in rich food and drinking of alcohol, while in recent times it has become a complaint of both men and women, usually because of a change in socioeconomic status, aging of the population, and sedentary lifestyle (Ayoub, Rajamohan, Acharya, Gross, & Patel, 2021). Globally, it is accounted that more than 41.2 million people have gout; 1.3 million live with impairment, which in industrialized countries includes 2% of men and 1% of women but developing countries prevalence appears to be lower with less than one percent (Romero, Johnson, & Kirkpatrick, 2021). Several previous studies have shown an increase of gout with a dramatic rise in those living with the disability, tophi gout is lumps of microcrystals of uric acid that have accumulated in and around joints (Elfishawi, et al. 2020).

Tophi episodes have been associated with recurrent gout episodes, presented as painful nodules leading to a bulbous and disfigured joint, moreover there is bone

erosion over the tophus area (Sahai, Kumar, Misra, & Dutta, 2020). Tophi gout is diagnosed by physical examination, radiological scan, and needle aspiration for tophus contents analysis thus, treatment involves both pharmacological emphases on anti-inflammatory, urate-lowering drug strategies, and surgical excision for larger tophi to avoid further damage or restriction of joints (Latif, Nakafero, Jenkins, Doherty, & Abhishek, 2019).

Nurses care for patients of all ages, as well as their families or caregivers, which play many roles in restoring patients their lives so they can regain their freedom and independence after tophi gout attacks (Hinkle, & Cheever, 2018 & Sedelius, et al. 2021). They are educators, collaborators, advocates, care coordinators, and change agents, as well as work with other healthcare team members including physiatrists, neuropsychiatrists, speech therapists, and many specialists to create comprehensive care plans based on patient goals includes education-based needs, therapy for a lifestyle change, physical, psychosocial, spiritual, and occupational counseling (Hagler, Harding, Kwong, Roberts, & Reinisch, 2019). These involved through designed nursing guidelines about tophi gout lifestyle modifications that were

intended to improve patients' level of a healthy lifestyle and a better outcome by reducing tophi gout attacks in the future, reducing economic cost and hospital staying as well as the burden on healthcare workers (Stamp, et al .2019 & FitzGerald, et al. 2020).

### Significance of the study

Nationally, the prevalence of tophi gout occurrence rate in Egypt has been raised day after day at the hospital, despite the pathophysiology and well-known treatment modalities. Moreover, globally 70% of patients with gout experienced recurrent episodes of flares, joint injury, functional physical limitations, psychological disturbance, unfortunately, these put a significant burden not only on health care members but also on the family (Kumar, Manley, & Mikuls, 2021).

In the United States, direct costs of gout were estimated reaching 6179\$ per person, and an annual estimated total burden of > 6 \$ billion and mean duration of hospitalization was 14.7 days (Flores, Nuevo, Klein, Baumgartner, & Morlock, 2019 & Romero, et al. 2021). Relied on statistical records of the Rheumatology and Rehabilitation department and the researcher's experience in the study setting; the cases of patients with tophi gout were dramatically elevated in last recent years. So that in the current study; evaluate the impact of designed nursing guidelines about tophi gout's lifestyle modification on patients' outcomes were considered.

### Aim of the study:

This study aimed to evaluate the impact of designed nursing guidelines about tophi gout's lifestyle modification on patients' outcomes. The aim of this study was achieved through:

- Assess the level of the studied patients' adherence to a healthy lifestyle.
- Assess the level of the studied patients' outcomes regarding tophi gout.
- Design and implementation of nursing guidelines about tophi gout's lifestyle modification.
- Evaluating the impact of designed nursing guidelines about tophi gout's lifestyle modification on patients' outcomes.

### Research hypothesis

The research hypothesis was formulated to fulfill the aim of this study: -

**H1:** Implementation of designed nursing guidelines about tophi gout's lifestyle modification will improve patients' healthy lifestyles.

**H2:** Implementation of designed nursing guidelines about tophi gout's lifestyle modification will improve patients' outcomes.

### Operational definition

**Patients' outcomes:** refers to significantly the impacts by designed nursing guidelines about tophi

gout's lifestyle on patient's conditions, which includes serum uric acid, subcutaneous tophus measurement, pain perception, and disability index (Leonardo, Lester, Whittle, & Rischmueller, 2020).

### Subject & Methods

**Study Design:** A quasi-experimental research design was used in this study (one group pre-posttest).

**Study Setting:** This study was conducted in the Rheumatology and Rehabilitation Department at Suez Canal University hospitals.

**Participants:** A purposive sample of (136) patients were recruited and completed the study during the period of the study implementation. The sample was calculated by sample size and power, using an Epidemiological Information system with (95%) a confidence level, 10% dropout for each group, and (90%) the power of the study.

Patients were recruited based on the inclusion criteria: a patient with tophi gout; ambulatory and able to communicate; greater than 20 years of age; are receiving routine medical treatment and ready to participate in the study, while exclusion criteria included: pregnant women; patients who had a debilitating medical condition; patients with fractures and who have had recent surgery.

### Tools of Data collection:

**Tool (I): Daily lifestyle health assessment:** It is a structured interviewing questionnaire developed by the researcher based on related literature and previous studies, filled at the time of interviewing the studied patients (Hinkle, & Cheever, 2018; Perez-Ruiz, Perez-Herrero, Richette, Stack, 2020; Liu, Song, Man, Li, & Gao, 2021). It consisted of the following: (1) It was used to assess patients' demographic characteristics, such as age, gender, marital status, and literacy. (2) It was used to assess the studied patients' health history (current, and past). (3) It is used to assess the level of daily healthy lifestyle habits, involved: medication compliance (four items), hydration and dietary changes (four items), exercise (four items), smoking and alcohol cessation (three items), and follow-up (three items).

**Scoring system:** The scores ranged from 18 to 54 grades and each item answered consisted of three options: were always = 3, sometimes = 2, and never = 1, while the level of a healthy lifestyle is considered  $\geq 60\%$ .

**Tool (II): Structured interviewing patients' outcomes questionnaire:** It adapted by the researcher based on related literature and previous studies, filled based on patients' findings (Harding, Kwong, Roberts, Hagler, Reinisch, 2019 & Elfshawi, et al. 2020). It consisted of: (1) serum uric acid monitoring, which was a routine test for gout. (2) It is used to

measure the subcutaneous tophus area (length × width). (3) It is used to assess the study patients' level of pain perception (4) is used to assess disability index adopted from Maska, it is twenty items in eight components to assess daily function: (one item) dressing and grooming, (four items) rising, (three items) eating, (four items) walking, (five items) hygiene, (six items) reach, (seven items) grip, and (eight items) activities.

**Scoring system:** The normal level of blood serum uric acid ranges from 2.5 to 7.0 mg/dL. Using numeric rating scales, a patient-rated their pain on a scale of 0 to 10, where zero = no pain, 1: 3 = mild, 4: 6 = moderate, 7: 10 = severe. While, at part (4) each response was scored on a four-point scale of ability, ranging from 0 = no difficulty, 1 = some difficulty, 2 = much difficulty, and 3 = unable to perform. A total score of each component is added together and was estimated as 0 =without disability, 0–20 =some disability, 21–40 =much disability, and 41–60 = complete disability (Maska, Anderson, & Michaud, 2011).

**Content validity and reliability of tools:** Validity was tested by a panel of seven experts in Medical-Surgical nursing, and Rheumatology & Rehabilitation medicine who revised the tools for relevance, comprehensiveness, clarity, applicability. The reliability test by Cronbach's  $\alpha$  were (0.83) and (0.80) which indicate high internal consistency of recruited tools.

**A pilot study:** It was established on 10% of patients (14) to test applicability, clarity, feasibility, and time to fill with the designed tools. There were no required modifications among the piloted sample to be done, so that this sample was recruited in the study.

**Ethical considerations:** An official letter for data collection was obtained from the Institutional Review Board (IRB), the head of the department, and the director of the hospital. The aim of the study was clarified to the studied patients before beginning, they were assured of maintaining confidentiality and anonymity of collected data as well as they have the right to withdraw without plenty or award.

**Protocol and procedure:**

The designed nursing guidelines about tophi gout's lifestyle modification were implemented through four phases:

**Assessment phase:** Researchers assessed available place, time, equipment, supplies, and instructional materials for implementation of the designed nursing guidelines, as well as reviewed literature on different aspects based on prerequisite needs. The patients were interviewed, greeted, introduced themselves, and provided with the purpose of the study within 20 to 25 minutes during hospitalization using

preconstructed tools and assessed regarding actual educational needs.

**Planning phase:** At this phase; The designed nursing guidelines about tophi gout's Lifestyle Modification were adapted from 2020 American College of Rheumatology Guidelines for preventions and management of tophi gout by translation into simplified Arabic language for clarity, understanding, comprehension, and applicability as well as from related literature reviews (Elfishawi, et al. 2020; FitzGerald, et al. 2020; & Romero, et al. 2021). The content was revised and validated according to the general objectives of the experts in Medical-Surgical nursing and Rheumatology medicine. The designed nursing guidelines were intended to improve patients' levels of Lifestyle modifications and a better outcomes by adherence to healthy lifestyle as well as consequently reduction episodes of tophi gout flares. It consisted of knowledge about the concept of tophi gout, prevalence, incidence, causes, manifestation, treatment, adverse health impacts, in addition to crucial measures to improve and promote a healthy lifestyle through enhancing medication compliance, hydration, and dietary changes, maintaining daily exercise, smoking and alcohol cessation, and follow-up. Appropriate teaching methods as lecture and interactive lecture selected based on a patient's suitability and nature of guidelines with suitable teaching media, which was in the form of a PowerPoint presentation, daily exercise, audiovisual material, and use of other materials such as medications, syringe.

**Implementation phase:** The Designed nursing guidelines about tophi gout's lifestyle modification were implemented over nine months within groups. Implementation took a total of 73 sessions and 31 hours. The designed guidelines were presented at each session in a clear, understandable, and comprehensive manner using preferable teaching methods and media, with a summary of what was given through the previous session. At the end of each session, the participants greeted and informed about the content of the next session, its time, and asked to give feedback.

**Evaluation phase:** preliminary evaluation before implementations of designed nursing guidelines, while the second immediately after implementation before a patient's discharge from the inpatient unit, and the third during a follow-up visit at the clinic after six months, by using the same coded constructed tools.

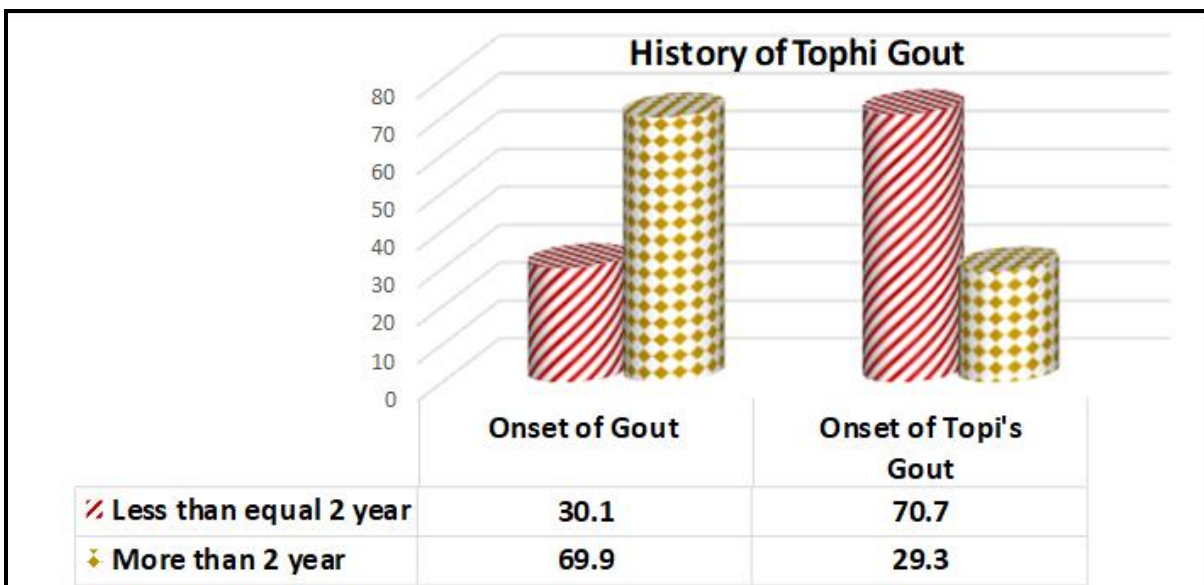
**Statistical design:**

The raw data was handled, coded, tabulated, and entered SPSS system files (Version 22). The normality test was done using the Kolmogorov-Smirnov test and was significant at  $\leq 0.05$ , clarified nonparametric data. Data were analyzed using the following statistical measures: frequency and distribution, to describe different characteristics. The Spearman coefficient test, McNemar test, and Mann Whitney test were used to evaluate a correlation of variables, and significant is considered with  $p \leq 0.05$ .

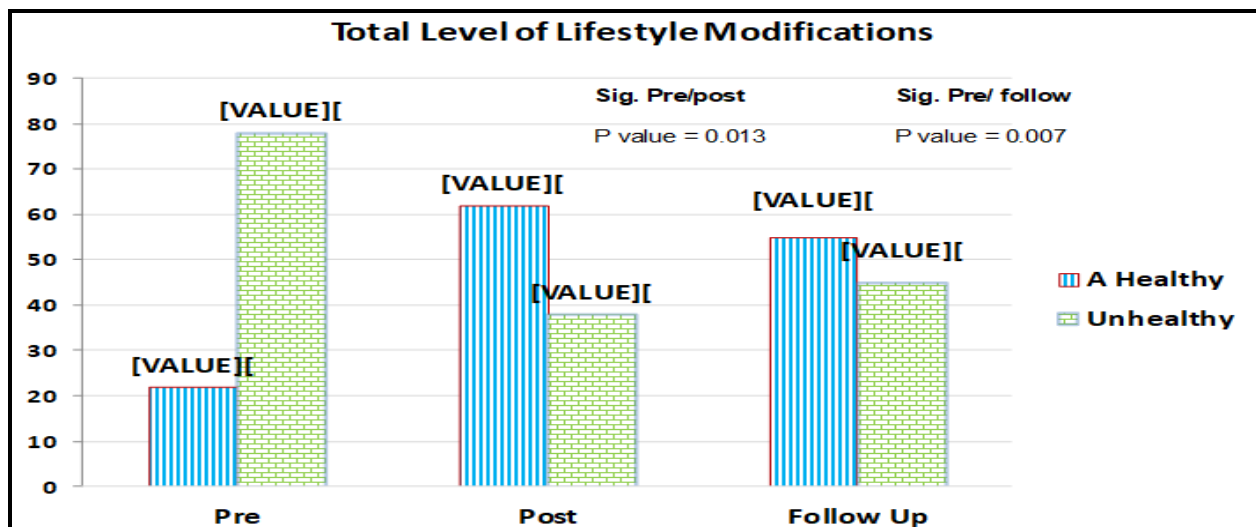
**Results**

**Table (1): Frequency and distribution of the studied patients' demographic characteristics (n = 136)**

Variables	Frequency	%
<b>Age</b>		
20–29	7	5.1
–39	34	25.0
–49	39	28.7
$\geq 59$	56	41.2
<b>Median</b>	51	
<b>Gender</b>		
Male	76	55.7
Female	60	44.3
<b>Marital status</b>		
Married	95	69.9
Divorced	11	8.1
Widowed	21	15.4
<b>Literacy</b>		
Unable to read or write	34	25.0
Able to read and write	102	75.0



**Figure (1): Frequency and distribution of the studied patients' gout history. (n = 136)**



McNemar test

\*Significant at  $p \leq 0.05$

Figure (2): Level of the studied patients' total lifestyle modifications and their correlation at the study phases (n = 136)

Table (2): Level the studied patients' outcomes and their correlation at the study phases (n = 136).

Outcomes' Variables	Pre		Post		Follow-up		P-value	
	N	%	N	%	N	%	Pre/ post	Pre/ follow
<b>Blood uric acid level</b>								
Normal	19	14.0	77	56.6	64	47.1	0.001*	0.009*
Above normal	117	86.0	59	43.4	72	52.9		
<b>Tophi measurement (L*W)</b>								
≤1.00*1.00	43	31.6	55	40.4	50	36.8	0.003*	0.096
>1.00*1.00	93	68.3	81	59.5	86	63.2		
<b>Pain perception</b>								
No	1.00	0.7	31	22.8	22	16.2	0.011*	0.002*
Mild	25	18.4	74	54.4	77	56.6		
Moderate	83	61.0	30	22.1	32	23.5		
Severe	27	19.9	1	0.7	4	2.9		
<b>Disability Index</b>								
Without disability (0)	91	66.9	100	73.5	97	71.3	0.002*	0.012*
Some disabilities (1-20)	36	26.5	31	22.8	33	24.3		
Much disability (21-40)	7	5.1	3	2.2	4	2.9		
Complete disability (41-60)	2	1.5	2	1.5	2	1.5		

McNemar test

\*Significant at  $p \leq 0.05$

Table (3): Correlations between the studied patients' level of lifestyle modification score and outcomes score at the study phases (n = 136).

Level of Lifestyle Modification Score	Patients' Outcomes			
	Blood uric acid level	Tophi measurements (L×W)	Pain perception	Disability index
<b>Pre-phase</b>				
R	-0.15	-0.30	-0.309	-0.111
P	0.080	0.730	0.000**	0.20
<b>Post phase</b>				
R	-0.126	-0.120	-0.240	-0.097
P	0.144	0.164	0.005**	0.263
<b>Follow-up phase</b>				
R	-0.140	-0.73	-0.287	-0.166
P	0.103	0.397	0.001**	0.053

r: Spearman Rho correlation coefficient

\*\*Significant at  $p \leq 0.05$

**Table (4): Relation between total lifestyle modification score and demographic characteristics of the studied patients at the study phases. (n = 136).**

Demographic characteristics	Total lifestyle modification score						
	No	Pre		Post		Follow-up	
		Mean±SD	Sig.	Mean±SD	Sig.	Mean±SD	Sig.
<b>Age (years)</b>							
20–29	7	18±1.4	Z=2.9 P=0.081	40±5.2	Z=2.1 P=0.006*	39±1.9	Z=2.29 P=0.066
–39	34	18±3.4		41±2.4		40±3.1	
–49	39	19±1.1		39±2.2		35±3.1	
≥59	56	20±5.4		38±6.4		33±1.4	
<b>Gender</b>							
Male	76	22.3±10	Z=2.99	42.3±11	Z=2.212	40.2±8	Z=2.533
Female	60	19±6.3	P=0.031*	39±6.2	P=0.002*	39.9±2	P=0.001*
<b>Marital status</b>							
Married	95	21±13.1	Z=3.95 P=0.776	45.5±1.1	Z=6.121 P=0.099	41.0±0.9	Z=3.11 P=0.656
Divorced	11	22.3±8		43.7±8		41.9±1	
Widowed	21	18.1±9		40±1.8		38±1.1	
<b>Literacy</b>							
Unable to read or write	34	25.3±3	Z=4.12	44.3±4	Z=2.24	49.3±8.1	Z=1.52
Able to read and write	102	19.1±2.9	P=0.986	42.1±1	P=0.899	46.3±4.9	P=0.610

Z: Mann Whitney test

\*Significant at  $P \leq 0.05$ 

**Table (1):** Identified that there is more than one-third (41.2%) of the study patients aged  $\geq 59$ , while more than half (55.7%) were male. About less than three-quarters (69.9%) were married. Moreover, two-thirds of them (75%) were able to read and write.

**Figure (1):** Portrayed that less than two-thirds (70.7%) of the study patients had an onset of tophi gout within less than or equal to 2 years, whereas more than one-quarter had less than or equal to a 2-year onset of gout.

**Figure (2):** Showed that less than one-quarter (22%) of the study patients had a healthy lifestyle, whereas less than three-quarters (62%) had a healthy lifestyle at the post phase. More than half (55%) had a healthy lifestyle at the follow-up phase regarding tophi gout. There was a significant correlation between the study patients' total level of lifestyle modification at the study phases, and  $p \leq 0.05$ .

**Table (2):** Identified that there less than one quarter (14%) had a normal level of uric acid at pre-phase, while less than half (47.1%) at the follow-up phase. Less than half (68.3%) had topi measurement  $>1.00*1.00$  at pre-phase, while less than two quarters (63.2%) had topi measurement  $>1.00*1.00$  at the following phase. Regarding pain perception, less than a quarter (19.9%) had a severe level at pre-phase, while less than (56.6%) had a mild level at the follow-up phase. Concerns with disability index less than a quarter (66.9%) without disability at pre-phase, while more than (71.3%) without disability at follow-up phase. In the same trend, there was a significant correlation between the study patients' outcomes at the study phases, and  $p \leq 0.05$ .

**Table (3):** Revealed that there was a significant correlation between the studied patients' level of

lifestyle modification score and pain perception at the study phases, and  $p \leq 0.05$ .

**Table (4):** Clarified that there was a significant relation between total lifestyle modification score and age, at post phase with P value  $\leq 0.05$ , while there was a significant relation between total lifestyle modification score and gender at the study phases with P value  $\leq 0.05$ .

## Discussion

Tophi gout is nodules that progress in people with unmodifiable chronic gout, that can become inflamed, causing pain, and leading to malfunction. Tophi can be managed with urate-lowering drugs, surgical or/and other interventions. Nurses involved patients with a holistic assessment, discussion their perceptions of gout, causes, consequences of tophaceous, help patients to share in decisions about management (Ho, Pillinger, Toprover, 2021 & Sedelius, et al. 2021).

Regarding demographic characteristics, the present study revealed that of more than one-third of the individuals studied aged more than or equal to 56 years, more than half were male. Less than three-quarters were married, approximately two-thirds of them could read and write. From the researchers' point of view, this demographic criterion may be the result of the nature of disease prevalence and unhealthy lifestyle of the study patients. This is supported by (Elfishawi, et al. 2020, Singh, Neogi, & FitzGerald, 2020) they revealed a similarity to these findings in their study. This finding is incongruent with Heggy, Galal, Shrief, and Elalem reported that approximately half of the patients with gout flares were females (Heggy, Galal, Shrief, &

**Elalem, 2018).**

Regarding the health history of the studied patients regarding gout: stated that this study showed that more than half of the study patients had more than a 2-year onset of gout, but less than three-quarters of them had less than or equal to a 2-year onset of tophi gout. Moreover, the researchers' point of view of these findings of history was the result of advanced age and poor adherence to a healthy lifestyle modality. This study finding supported by Oh, & Moon & Ma, et al. they presented that the incidence of gout has more than doubled since the year 2000 and there were distinct clinical characteristics in early- and late-onset gout patients (**Oh, Moon, 2021 & Ma, et al. 2021**). Furthermore, **Latif, et al.** disagreed with these results who clarified that most of the studied patients had more than 3 years of gout onset as comorbidity with the studied patients (**Latif, et al. 2019**).

Concerned with the level of healthy lifestyle modifications, these findings portrayed that more than two-thirds of the study patients showed an improvement in a healthy lifestyle at the post- and follow-up phases when compared with pre-phase. This may be related to the adherence of the study patients with lifestyle modifications guidelines, effective presentation skills methods, and/ or media in addition to cooperation and support of health care workers in the study setting. In the same context, **Perez-Ruiz** found that when the study patients are empowered, patients with gout exhibit high rates of adherence (**Perez-Ruiz, et al. 2020**). High rates of adherence to lifestyle modifications' guidelines are correlated with successful follow-up and fewer comorbidities.

Another study carried out by Ho in the United States, found that comprehensive gout care protocols developed effective adherence enhancement strategies in the study, including health care providers to coordinate urate-lowering titration of therapy and serum urate monitoring by having more frequent outpatient visits to focus on direct patient care and education (**Ho, et al. 2021**). **Safiri, Kolahi, Cross, & Smith** contradicted these findings because many of the study patients with comorbidities proved to be unsatisfactory in the study because of current directives for behavioral improvements that challenged these results (**Safiri, Kolahi, Cross, & Smith, 2020**).

Regarding the study patients' outcomes, most of the study patients had a noticeable improvement in their outcomes at the post- and follow-up phases when compared with the pre-phase. Although this may concern highly motivated individuals to adhere to provided guidelines, the efficient treatment plan, and fewer comorbidities. This was agreed with **Yokose**

illustrated a substantial improvement in the rate of achieving the aim of the study among patients with gout post-treatment protocol implementation (**Yokose, et al. 2020**).

In the same regard (**Ramsubeik, Ramrattan, Kaeley, Singh, 2018; Sheng, Fang, Zhang, Sha, & Zeng, 2017**). They portrayed an enhancement of patients' outcomes because of following effective lifestyle modification interventions at the time of implementation. An opposing view by **Qaseem, et al.** clarified that the evidence was insufficient for gout-specific advice or therapies (such as reduced intake of red meat, fructose, exercise, alcohol, and follow-up) to improve symptomatic outcomes among the study patients (**Qaseem, Harris, Forciea, & Clinical Guidelines Committee of the American College, 2017**)

The result of the present study support that there is a highly statistically significant difference between pre- and post-implementation, and follow-up between the study patients' outcomes. In the same context, there was also highly statistical significance between the studied patient lifestyle modifications guidelines at the study phases, and  $p \leq 0.05$ . This may be related to patients guided and instructed with achieved effective lifestyle modifications guidelines that showed the valuable concern in increasing their level of maintaining and acquiring a healthy lifestyle.

The findings of the study are consistent with **Fuller, Jenkins, Doherty, & Abhishek** where satisfaction, gout awareness, medication compliance, and flares were investigated in participants receiving nurse-led gout guidelines (**Fuller, Jenkins, Doherty, & Abhishek, 2020**). It was discovered that patient acceptability, long-term adherence, and flares preferred nurse-led care, which included individualized patient education and involvement and a treat-to-target approach.

Context of correlation between patients' level of healthy lifestyle modifications and patients' outcomes showed that there was a significant correlation between the study patients' total level of lifestyle modification scores and pain perception at the study phases, and  $p \leq 0.05$ . This may be a result of comorbidities of diseases and the needs of the study patients to enhance their level of health status. This was confirmed with **Perez-Ruiz** found that the study patients with gout present high rates of adherence and relied on effective guidelines at the study phases (**Perez-Ruiz, et al. 2020**).

Active follow-up and comorbidity are associated with high rates of adherence, which is strongly associated with higher rates of achievement of therapeutic targets. This is supported by **Gill, Dalbeth, Ofanoa, and Goodyear-Smith** portrayed that a nurse-led approach focusing on patient understanding

therapeutic guidelines included patient education and follow-up components about gout and its tophi flares are mostly correlated in achieving improved patient adherence and lowered SU levels among patients (Gill, Dalbeth, Ofanoa, & Goodyear-Smith, 2020).

**Limitations of the study:** Within the research process, some limitations were recognized and involved as four nurses have left the study for varied causes as well as limited studies about tophi gout's topic and/or with a similar purpose.

### Conclusion:

Based on the findings of the current study; Concluded that implementation of designed nursing guidelines about tophi gout's lifestyle modification had significant improvement of the studied patients' healthy lifestyle and outcomes at the post and follow-up phases. There was a significant correlation between the study patients' total level of lifestyle modification score and patients' pain perception outcomes at the study phases with p-value  $\leq 0.05$ .

### Recommendations:

The results of this study recommended that; Endorsement and support patients with designed nursing guidelines about tophi gout to early prevention from its flares. Conducting periodic in-services specialized unit to educate patients to acquire a healthy lifestyle "medication, weight, diet & drinks, exercise, smoking cessation, and follow-up". Further studies to generalize the data and evaluate the burden of the condition.

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**Authors' contribution:** Within-group dynamic, the first author contributed from the conception of the research, development of tools, statistical analysis, commentary on the tables, wrote the discussion and references, develop & implementation guidelines, data collection, and critical appraisal. The second and third authors contributed to the translation of the tools and booklet into Arabic, references sorting, data collection, and revision. The fourth author contributed to the sample collection, guidelines' implementation, data collection, analysis of data, reference organizing, and critical appraisal.

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