

REVIEW ARTICLE

The impact of lifestyle modification on the management of chronic gout: a systematic review

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ABSTRACT

Gout is a common type of inflammatory arthritis that is associated with poor quality of life. Lifestyle modifications were shown to be effective in managing gout and its associated comorbidities. In this systematic review, it was aimed to assess the impact of lifestyle modifications on the management of gout. The systematic literature was done through the PubMed database during the years 2013 and 2023. The search terms were “Lifestyle” and “Gout”. Afterward, the results were filtered to include the lifestyle factors associated with gout. Overall, 185 studies were obtained from the PubMed database. After the full-text inspection, 174 studies were excluded from the current study. Therefore, only 11 studies met the inclusion criteria for the present systematic review. The current study highlights the importance of lifestyle modifications and dietary interventions in managing gout and preventing its comorbidities. Further studies are recommended to address the effectiveness of lifestyle modifications in managing gout.

Keywords: Gout, uric acid, arthritis, lifestyle modification, review.

Introduction

Gout is a common type of inflammatory arthritis that is associated with poor quality of life [1,2]. Hyperuricemia or a high level of serum uric acid (SUA) is a prerequisite for the formation of gout [3]. For instance, the elevation of SUA results in the deposition of monosodium urate (MSU) crystals in and around joints leading to severe pain and inflammation of the joints [4].

Therefore, gout is diagnosed by the detection of the pathognomonic MSU crystals in tophi aspirate or by joint fluid aspiration [4]. Acute gout is identified by instant monoarthritis with severe pain affecting the big toe, ankle, foot, wrist, finger, elbow, and knee. Moreover, chronic gout is characterized by a recurrent attack of gout resulting in chronic inflammation of joints [5].

The global burden of disease reported that gout is the most prevalent reason for inflammatory arthritis globally, affecting about 41 million people [5]. The prevalence of gout is highest in Oceanic countries, where the prevalence might exceed 10% [6]. Furthermore, the prevalence of gout was reported to be 3.9% in the USA in 2016 [7].

Additionally, several studies conducted in Europe illustrated that gout prevalence was 1%-4% for the period of 2003-2014 [8]. In contrast, a study conducted in the United Arab Emirates revealed a gout prevalence of 0.1% in 2009 [9]. Overall, the gout prevalence is

higher in developed countries rather than in developing countries [10].

The high prevalence of gout is positively associated with elderly populations. In addition, males are more prone to gout disease than females. However, gout has equal sex distribution among the elderly due to the loss of estrogen's uricosuric effect in postmenopausal females [11].

Lifestyle modifications were shown to be effective in managing gout and its associated comorbidities. These modifications include weight loss, regular physical activity, dietary changes, and reduced alcohol intake [12]. Studies have shown that weight loss could reduce the risk of gout flares and improve joint function in patients with gout [13]. Regular physical activity has been shown to improve joint mobility, reduce inflammation, and

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improve overall health [14]. Dietary changes, such as reducing the intake of purine-rich foods and increasing the intake of fruits and vegetables, have been shown to reduce SUA levels and prevent gout flares [15]. Reducing alcohol intake has also been shown to be effective in managing gout and preventing gout flares [16,17].

Therefore, there is a need to evaluate the impact of lifestyle modifications on the management of chronic gout. Such a study would provide important insights into the effectiveness of lifestyle changes as a therapeutic approach for gout and help guide clinical practice.

Furthermore, lifestyle modifications are a low-cost and low-risk approach to manage chronic gout, making them an attractive option for patients who might have contraindications or are unable to tolerate traditional pharmacological treatments. Therefore, understanding the impact of lifestyle modifications on gout management could help to improve patient outcomes and reduce the burden of this disease on healthcare systems.

Thereby, this study aimed to assess the impact of lifestyle modifications on the management of gout.

Subjects and Methods

This systemic review of the literature was undertaken on the PubMed database between the years 2013 and 2023 to assess the effect of lifestyle modification on chronic gout.

All titles and abstracts including the terms “lifestyle” AND “Gout” were searched. All study titles with the abstracts that appeared from this search were screened systematically. Later, the results were filtered to include all original research articles investigating the effect of lifestyle modification on chronic gout.

Afterward, the selected trials were filtered to include 185 studies. Only studies available in English were included, which could be further evaluated in the second step.

Then, the subsequent step was determining and applying the inclusion criteria to select the studies that would be considered in the review. Abstracts were checked manually to choose the appropriate ones to be included. The inclusion criteria were the presence of sufficient details on lifestyle measures and the impact on gout. Lastly, the essential data were retrieved from the final record of included studies to be summarized.

Results

Overall, 185 studies were obtained from the PubMed database. After the full-text inspection, 174 studies were excluded from the current study. Therefore, only 11 studies met the inclusion criteria for the present systematic review. One-hundred seventy-four studies were excluded for the following reasons:

Eighty studies were reviews, case reports, and comments. Eighty-three studies were irrelevant studies to the study outcomes. Three studies were duplicated. Finally, five

studies were not found in English, and three studies were not free to access.

Regarding the included studies, the total population was 23,884 gouty patients (Table 1).

Discussion

Little studies emphasized the importance of lifestyle modifications in managing gout. For instance, Dehlin et al. [18] found that gout patients had a higher prevalence of comorbidities and unhealthy lifestyle factors compared to the general population. Therefore, the study highlights the importance of lifestyle modifications in managing gout.

Furthermore, Ellmann et al. [19] investigated the effect of lifestyle modification on MSU crystal deposits. The study found that lifestyle interventions led to a reduction in crystal deposits, which might help prevent gout flares and joint damage. In addition, Chiu et al. [20] conducted two separate prospective cohort studies and found that a vegetarian diet was associated with a lower risk of gout. The study suggested that dietary modifications might be an effective approach to prevent and manage gout. In addition, Manara et al. [24] investigated the lifestyle and dietary habits of patients with gout followed in rheumatology settings. The study found that dietary modifications and weight loss were important components of gout management.

Furthermore, Zykova et al. [25] conducted a cross-sectional analysis of nutrition and SUA in two Caucasian cohorts. The study found that a higher intake of purine-rich foods was associated with higher SUA levels. Another study conducted by De Oliveira et al. [27] illustrated that dietary factors, particularly, purine-rich foods and alcohol, were the main predictors of UA levels.

Moreover, Katayama et al. [21] investigated factors associated with therapeutic failure in Japanese men treated for hyperuricemia/gout. The study illustrated that higher BMI and WC were significantly more likely to have high SUA levels and therapeutic failure. Additionally, another study conducted by Latourte et al. [22] investigated factors associated with poor control of urate levels in patients receiving urate-lowering therapy. The study found that dyslipidemia, alcohol consumption, and obesity were the main factors associated with poor control of urate levels.

Patient self-management was also found to be an important aspect of gout management. Singh et al. [23] found that lifestyle changes and adjustments, such as eating a healthy diet and being physically active, were associated with better self-management of gout. In addition, the study illustrated that a decrease in shell seafood, red meat, fried food, and alcohol intake led to a decrease in gout flare. Another study conducted by Rees et al. [28] illustrated the impact of a nurse-led intervention, including lifestyle advice and patient education on the SUA level and management of gout. The study demonstrated that 92% of the participants achieved the therapeutic target (SUA

≤ 360 μmol), and 85% reached SUA less than 300 μmol/l at 12 months of the trial. On the other hand, Cottrell et al. [26] showed that the provision of lifestyle modification seemed uncommon among gouty patients.

Overall, the studies reviewed and shed light on various aspects of gout management, including lifestyle factors, comorbidities, diet, and patient self-management. These findings have important implications for the prevention and management of gout and its associated comorbidities.

Conclusion

This study highlights the importance of lifestyle modifications and dietary interventions in managing gout and preventing its comorbidities. Further studies are recommended to address the effectiveness of lifestyle modifications in managing gout.

List of Abbreviations

BMI	Body mass index
MSU	Monosodium urate
SUA	Serum uric acid
WC	Waist circumference

Conflict of interest

The authors declared that there is no conflict of interest regarding the publication of this article.

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Consent to participate

Not required.

Ethical approval

Not required.

Table 1. Summary of included studies.

Study ID	Population	Outcome assessment	Results
Dehlin et al. [18]	N = 728	- Identify lifestyle factors associated with gout in gouty patients.	- Gouty patients were significantly more likely to be overweight or obese. - Male gouty patients reported lower levels of physical activity.
Ellmann et al. [19]	N = 83	- Analyze the effect of lifestyle measures on MSU deposits in patients with gout	- Lifestyle intervention significantly decreases the MSU deposit in participants.
Chiu et al. [20]	N = 4,903	- Assessment of the association between a vegetarian diet and the risk of gout.	- Vegetarian diet is associated with a lower risk of gout.
Katayama et al. [21]	N = 2,103 men	- Assessment factors related to therapeutic failure for gout	- Higher body mass index (BMI) and waist circumference (WC) were significantly more likely to have higher SUA levels and therapeutic failure.
Latourte et al. [22]	N = 1,995	- Assessment of lifestyle impact on the control of SUA levels	- High total cholesterol level, increased WC, and alcohol consumption led to poor control of SUA.
Singh et al. [23]	N = 35	- Assessment impact of lifestyle changes on gout	- lifestyle changes and adjustments, such as eating a healthy diet and being physically active, associated with better self-management of gout - Decease shell seafood, red meat, fried food, and alcohol intake led to a decrease in gout flare.
Manara et al. [24]	N = 446	- Assessment of dietary and lifestyle habits of participants.	- Gouty patients showed a higher prevalence of obesity and a higher consumption of alcohol. However, gouty participants were with a lower rate of smoking.
Zykova et al. [25]	AusDiab study (N = 9.734) Tromsø study (N = 3.031)	- Assessment of dietary intake of participants	- Higher consumption of carbohydrates, calcium, vitamin B2, dairy products, high-fiber bread, cereals, and fruits was associated with low levels of SUA. - Higher consumption of fat, meat, eggs, and beer was associated with high levels of SUA.
Cottrell et al. [26]	N = 305 of patients diagnosed with gout	- Assessment of the approaches to lifestyle modification and medical management of gout.	- More than 50% of patients were with evidence of advice regarding lifestyle (diet, fluid intake, and alcohol); however, provision of lifestyle modification seemed uncommon.
De Oliveira et al. [27]	N = 415	- Estimation of BMI (obesity) and dietary intake.	- Obese participants (BMI ≥ 25 kg/m ²) showed a greater chance of high uric acid (UA) levels leading to gout. - Dietary intake had no association with the level of UA.
Rees et al. [28]	N = 106	- Impact of nurse-led intervention, including lifestyle advice, education, and urate-lowering therapy on SUA level and management of gout	- About 92% of the respondents achieved the therapeutic target (SUA ≤ 360 μmol/l), and 85% reached SUA less than 300 μmol/l at 12 months of the trial.

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