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Diet and lifestyle related knowledge among sample of autoimmune arthritis Egyptian patients

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Abstract

Background An unhealthy diet, characterized by elevated consumption of fats and sugars, has detrimental effects on the incidence, progression, and treatment outcomes of arthritis. However, adherence to healthy dietary regimens among these patients remains low. This study aims to assess the knowledge of healthy diet and lifestyle among a cohort of autoimmune arthritis Egyptian patients.

Methods We conducted this cross-sectional study on 502 patients diagnosed with autoimmune arthritis, using 302 online and 200 printed questionnaire forms. The questionnaire comprised sections on socioeconomic status (five questions), information on autoimmune diseases (three questions), nutrition (15 questions), and lifestyle habits (four questions).

Results A total of 502 respondents were enrolled, with 64.5% having rheumatoid arthritis (RA). Only 26.9% of patients were aware of the lifestyle and dietary impact on their disease symptoms. Most patients (89.6%) had good knowledge about the importance of eating fresh fruits and vegetables, and 63.3% knew that consuming fish is beneficial. However, 55.7% were aware of the benefits of physical activity. The total knowledge score was 57.8%. Responses were classified as poor in 217 patients, primarily those unemployed and living in rural areas; moderate in 150 patients; and good in only 135 patients. Additionally, younger individuals demonstrated better knowledge scores.

Conclusions Egyptian patients with autoimmune arthritis exhibited fair to moderate knowledge regarding the impact of anti-inflammatory diets and exercise on the symptoms of autoimmune arthritis and the influence of nutrients on immunity and inflammation. It is essential to prioritize the therapeutic role of nutrition in proactive medical management, signifying the fundamental shift in healthcare management.

Keywords Knowledge, Diet, Rheumatoid arthritis, Autoimmune diseases, Lifestyle

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Introduction

Diet plays a crucial role in the quality of life of patients with autoimmune arthritis. Thus, dietary measures can effectively combat excessive inflammation linked to autoimmune diseases [1]. Patients diagnosed with connective tissue diseases with arthritis often reduce their nutrient intake while consuming high levels of carbohydrates and saturated fat, rendering them at risk for cardiovascular diseases [2].

These patients tend to have low albumin, folate, and iron levels with marked weight and muscle mass loss. Additionally, pro-inflammatory cytokines may be elevated due to increased energy consumption, attributed to elevation in Interleukin-1 and Tumer Necrosis Factor- α [3].

Nutrition and food metabolism are believed to strongly affect the pathophysiology of autoimmune diseases, particularly inflammation. [4]. Nutritional factors can affect the inflammatory condition of patients. Consequently, foods' pro- or anti-inflammatory characteristics and components have become prominent in nutrition sciences [5].

Several studies have indicated a lack of awareness and perception regarding the importance of a healthy diet and its impact on autoimmune arthritis disease symptoms and course [6]. In particular, there is a need for more information about the activity and progression of autoimmune diseases in relation to the Mediterranean diet [7].

Health education emphasizes dietary intervention for autoimmune diseases has the potential to yield significant benefits that may help design educational tools to promote the role of nutrition among these patients [6].

A healthy lifestyle involving engaging in physical activity, including exercise, is advantageous for overall health, regardless of chronic diseases such as rheumatic and musculoskeletal diseases (RMDs). In European Alliance of Associations for Rheumatology (EULAR) 2021, substantial evidence indicated that exercise interventions decreased pain and improved functionality in RMDs. Exercise was also linked to reductions in disease activity, leading EULAR to recommend advising these patients to engage in sufficient physical activity due to its advantageous effects on numerous outcomes [8].

The current study aimed to assess the knowledge of patients with autoimmune arthritis regarding the effects of diet and lifestyle habits on their symptoms and the disease course.

The study seeks to gain valuable insights into areas of education which aims to improve the patients' symptoms and their disease course through the specialized strategies.

Materials and methods

Study design and setting

The current exploratory cross-sectional study was conducted among Egyptian patients with autoimmune arthritis to evaluate their understanding of the benefits of a healthy diet and lifestyle from September 2022 to June 2023. The research adhered to the Checklist for Reporting Results of Internet E-Surveys [9] and compiled with the guidelines outlined in the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement [10].

Pilot test

A preliminary study assessed the degree of knowledge among patients with autoimmune diseases who had arthritis regarding a healthy diet and lifestyle. According to its findings, 44% of patients demonstrated good knowledge. For a two-sided 97% confidence interval for a single proportion using the large sample normal approximation with a 5% margin of error from the expected proportion, a sample size of 465 participants was needed. This number was increased by 8% to account for possible refusals to participate in the study. Thus, the total required sample size was 502 participants.

Sample size and sampling

The researchers carried out patient recruitment using a consecutive convenience sampling strategy. The recruitment started in September 2022, and patients aged ≥ 18 with autoimmune diseases (Rheumatoid arthritis, SLE, and Behcet disease, the diagnosis was confirmed by the patients through the online questionnaires) associated with articular manifestations who expressed willingness to participate in the study were included. Meanwhile, osteoarthritis patients were excluded. This information was mentioned on the electronic survey cover page before the participants completed the survey. Two hundred printed questionnaires and 329 online applications were obtained through a Google Form link shared on social media. With a high acceptance rate of 91.8%, 302 final online forms were collected, resulting in 502 questionnaires. Epi Info statistical package was used for sample size estimation [11].

Data collection tool

The authors developed a pre-designed structured anonymous questionnaire based on previous studies [5–7] to gather data from eligible participants (Appendix A). The team consisted of 8 authors (2 nutritionists, one public health specialist, 2 internists and 3 rheumatologists). The questions were translated into Arabic. Two

independent researchers reviewed the questionnaire, which comprised the following sections: i-Socio-demographic characteristics: age, sex, occupation, governorate, residence (five questions); ii-Information about autoimmune diseases (three questions); iii-Nutritional knowledge of the patients regarding the relationship between a healthy diet and the disease condition (15 questions); iv-knowledge about a healthy lifestyle concerning disease symptoms (4 questions).

Participants' knowledge about the relationship between a healthy diet and the disease condition consists of a total of 19 parameters (the total knowledge score for the questions was 19, with a value of 1 assigned to each correct answer (Yes) and a value of 0 for each incorrect answer (No or Don't know)). We utilized Bloom's original cutoff points to categorize knowledge as good (> 75%), moderate (50%–75%), or poor (< 50%). Overall, we categorized participants who scored less than 50% as having inadequate knowledge, while those who scored 50–100% had adequate knowledge [12]. The questions utilized in these sections were collected from the available literature. [13–20]. Two language experts translated the questions into Arabic, and then two independent language experts back-translated them into English.

The study involved 200 collected printed questionnaire forms distributed in Cairo University hospitals and Ministry of Health hospitals in several governorates (Giza, Cairo, Monufia, Qalyubia, and Gharbia) outpatient rheumatology clinics among patients who could not access the Google link, as well as another 329 online forms distributed through social media such as Facebook and WhatsApp. Participants were briefed on the research purpose, how to complete the questionnaire, and the time required. They were then asked to provide online informed consent. Participation in the study was voluntary.

To minimize inter- and intra-observer bias, the data collection team (two researchers) received training on the questionnaire and underwent a post-test to ensure their preparedness and reporting quality.

Statistical analysis

SPSS Win (statistical package of social science) version 28 was utilized to analyze the data. Numerical data were presented as means, standard deviation, median, and ranges as appropriate. Categorical data were presented as frequencies and percentages. Numerical data were compared using the Student's t-test or the non-parametric Mann–Whitney test. For comparing numerical data between more than two groups, the ANOVA test or non-parametric Kruskal–Wallis H test was used. Comparisons of categorical data were conducted using the Chi-Square or Fisher's exact test as deemed appropriate. A *p*-value equal to or less than 0.05 was considered significant.

Results

In the present study, 502 participants were enrolled, with 87.9% being females and a mean age of 39 ± 12 years. Among the respondents, 64.5% had rheumatoid arthritis (RA), this predominance because pathogenesis of rheumatoid arthritis is synovitis which affects synovial joints, so the first presentation in RA patients which is pathognomonic for rheumatoid arthritis. SLE and Behcet disease related arthritis represent 35.5% of our patients (arthritis in both diseases is less common than RA) as shown in Table 1 and Fig. 1. We noticed that other autoimmune arthritis patients (e.g.: scleroderma, dermatomyositis or Jorgen) did not contribute to the online questionnaires.

A total of 78% of patients were not compliant with treatment, and 48.1% did not receive calcium and vitamin D regularly. Table 1 illustrates all sociodemographic characteristics of the subjects. The participants' knowledge was classified as poor (if the response was < 50%),

Table 1 Sociodemographic and baseline characteristics of study participants

	n (%)
Age (years)	
Mean ± SD	39 ± 12
Age groups	
< 45 years	341 (71)
≥ 45 years	139 (29)
Sex	
Female	435 (87.9)
Male	60 (12.1)
Job	
Not working	279 (56.5)
Retired	14 (2.8)
Working	201 (40.7)
Residence	
Rural	177 (36.3)
Urban	311 (63.7)
Type of Autoimmune arthritis	
Rheumatoid arthritis (RA)	324(64.5)
Behcet related arthritis	90 (18)
SLE related arthritis	88 (17.5)
immunosuppressive drugs or cortisone intake	
No	108 (22)
Yes	383 (78)
Regular Calcium and vitamin D supplement	
No	238 (48.1)
Yes	257 (51.9)

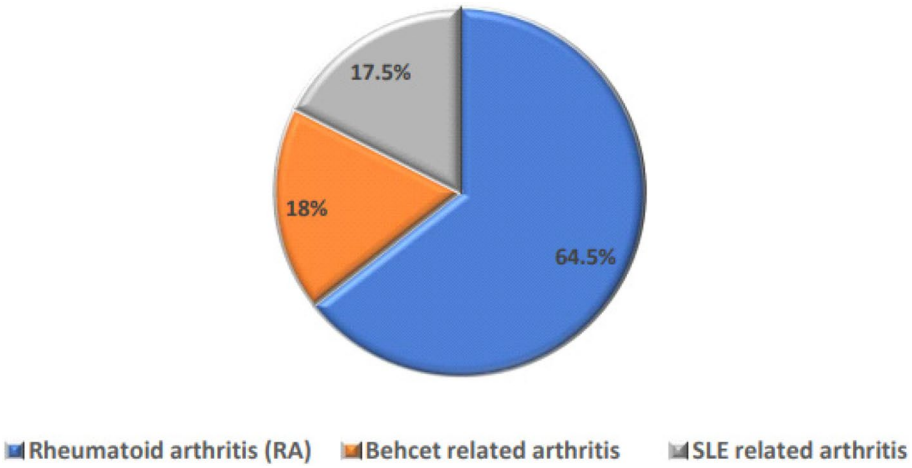

Fig. 1 Pie graph representing type of arthrisis

Table 2 Knowledge score among the autoimmune arthritis participants

	Median (range)
Knowledge score	11 (0–19)
Knowledge score %	57.8 (0–100)
Knowledge classification	**n (%)**
Poor (< 50%)	217 (43.2)
Moderate (50–75%)	150 (29.9)
Good (> 75%)	135 (26.9)
Knowledge classification	
Poor	217 (43.2)
Moderate to good	285 (56.8)

moderate (50–75%), or good (> 75%), according to this classification we found that 43.2% of the participants expressed poor knowledge, but 56.8% showed moderate to good knowledge about diet and lifestyle habits as mentioned in (Table 2 and Fig. 2).

A total knowledge score among the autoimmune arthritis participants was 57.8% and the median was 11 as mentioned in (Table 2 and Fig. 3).

Their knowledge about diet was assessed by 15 questions, and their lifestyle was assessed by four questions, as shown in Table 3.

The patients demonstrated poor knowledge about the benefits of consuming brown bread (made from

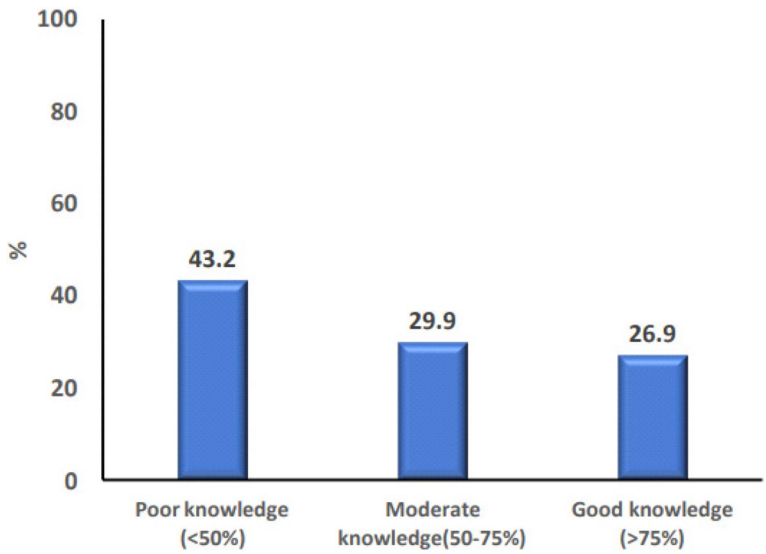

Fig. 2 Bar graph representing knowledge classification

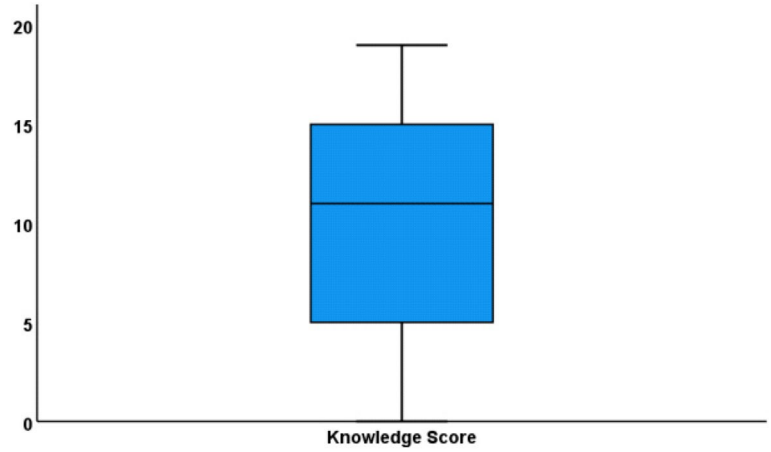

Fig. 3 Box plot representing knowledge score

mix of white and brown flour, bran, and yeast) (40%), whole grains (27.7%), sesame and flaxseed (33.1%), spices (42.2%), benefits of gut normal flora (45%), and drinking green tea (47.6%). Additionally, (32.1%) were unaware that eating a lot of dairy products worsens their symptoms.

However, they showed moderate knowledge about the benefits of eating fish (63.9%), fish containing omega 3 (63.5%), and raw nuts (51.4%). Also, participants exhibited moderate knowledge about the detrimental effects of eating baked foods (54.1%), red meat (67.3%), and hydrogenated oils (transferred to trans fats by repeated boiling which is very dangerous) (70.7%). Most of them (89.6%) had good knowledge about the benefits of eating fresh vegetables and fruits.

Regarding lifestyle knowledge assessment, our participants showed good knowledge about the risks of taking antibiotics without consulting a doctor (76.8%) and moderate knowledge about the positive effects of getting eight hours of non-interrupted sleep on the activity of beneficial bacteria (53.5%), and the impact of doing regular exercise on symptom reduction (55.7%). However, they had poor knowledge about how regular exercise improves the activity of beneficial bacteria (49.8%). Table 4 illustrates knowledge classification in relation to different factors, revealing that the rural residents and unemployed persons showed significantly poorer knowledge compared to urban and employed individuals ($p < 0.001$). When combining moderate to good scores for comparison against poor knowledge, the results indicated that younger age, working patients, and urban residency were associated with a significantly better overall score.

Discussion

Diet can either increase the risk of disease or act as a preventive measure, depending on certain foods. Certain dietary habits, such as dairy products and red meat intake, can have pro-inflammatory effects. Conversely, consuming fruits, fatty fish, and oil can reduce inflammation. There is ample evidence indicating a link between exercise lifestyle and disease course, as reported by EULAR 2018, which developed lifestyle recommendations in RMDs, highlighting that lifestyles can affect disease progression. Therefore, we aimed to assess the knowledge of autoimmune arthritis patients about the effects of diet and lifestyle habits on their symptoms and the disease course [21–23].

The main results showed that most of our participants were females, and more than half had RA. We concur with El-dadamony et al., whose study aimed to assess RA patients' nutritional and lifestyle habits. They found that 64.7% of participants were females [24]. Additionally, Amon et al., reported that 65.5% of their patients were females [25]. Pham et al., showed that most of the patients were females, and 60% had RA. Their findings indicated that patients prioritize nutrition as an essential element of their disease management [26].

Vitamin D is essential in immunomodulation as it has an anti-inflammatory action. Its deficiency may be related to several autoimmune disorders [27]. Unfortunately, over half of the participants did not receive calcium and vitamin D supplements.

Whole grains, such as whole wheat, are rich in carbs and fiber. As plant foods, they also contain anti-inflammatory phytochemicals. The fiber from these foods may have similar anti-inflammatory effects. Fiber is a prebiotic

Table 3 Knowledge assessment about healthy diet and lifestyle in autoimmune arthritis participants

	n (%)
Do you know that some food can affect arthritis and increase or improve disease activity?	
No	282 (56.2)
Yes	220 (43.8)
Do you know that eating baked foods made of white flour daily (cake—pate—fino—unleavened bread) is harmful?	
No	230 (45.9)
Yes	271 (54.1)
Do you know that eating brown bread (baladi) improves arthritis?	
No	299 (60)
Yes	199 (40)
Do you know that eating whole grains such as (Balila, corn and oats) improve arthritis?	
No	362 (72.3)
Yes	139 (27.7)
Do you know that eating fresh vegetables and fruits daily is beneficial?	
No	52 (10.4)
Yes	450 (89.6)
Do you know that regular daily drinking of green tea is beneficial?	
No	263 (52.4)
Yes	239 (47.6)
Do you know that eating sesame, flaxseed or hot oil daily is beneficial?	
No	335 (66.9)
Yes	166 (33.1)
Do you know that eating red meat in abundance is harmful?	
No	164 (32.7)
Yes	338 (67.3)
Do you know that eating a lot of dairy products daily (milk, yoghurt, white cheese) increases the severity of the disease?	
No	341 (67.9)
Yes	161 (32.1)
Do you know that using hydrogenated oils exposed to high temperatures, such as those used for frying, as well as industrial vegetables such as (Rawabi, Jannah, Hanim, and others) in cooking is harmful?	
No	147 (29.3)
Yes	354 (70.7)
Do you know that eating fish and poultry regularly and repeatedly weekly is beneficial and improves arthritis?	
No	181 (36.1)
Yes	320 (63.9)
Do you know that there are certain types of fish that contain omega 3 and improve the severity of arthritis (such as salmon, sardines, and tuna)?	
No	183 (36.5)
Yes	318 (63.5)
Do you know that eating nuts, especially raw nuts (such as peanuts, pulp, almonds, etc.) is useful and improves arthritis as it contains anti-inflammatory agents?	
No	244 (48.6)
Yes	258 (51.4)
Do you know that using these spices in cooking regularly, for example (curry—ginger—turmeric—black pepper) improves the severity of the disease?	
No	288 (57.8)
Yes	210 (42.2)
Do you know that there are beneficial gut normal flora and have an effect on improving the health of the body and reducing inflammation?	
No	275 (55)
Yes	225 (45)

Table 3 (continued)

	n (%)
Do you know that taking a lot of antibiotics without consulting a doctor is harmful?	
No	116 (23.2)
Yes	384 (76.8)
Do you know that sleeping continuously at night from 7 to 8 h a day improves the activity of beneficial bacteria in the intestine?	
No	233 (46.5)
Yes	268 (53.5)
Do you know that exercising regularly improves the activity of beneficial bacteria in the intestine?	
No	251 (50.2)
Yes	249 (49.8)
Do you know that exercising according to the severity of the disease and the recommendations of the treating physician such as (walking or riding a bike (wheel)) about 150 min per week (20 min per day) is beneficial and reduces arthritis?	
No	222 (44.3)
Yes	279 (55.7)

Table 4 Knowledge classification in relation to different factors in autoimmune arthritis participants

	Knowledge classification			*P* value
	Poor (< 50%)	Moderate (50–75%)	Good (> 75%)	
	n (%)*	n (%)*	n (%)*	
Age (years)				
Mean ± SD	41 ± 12	37 ± 10	39 ± 13	0.015**
Age groups				
< 45 years	138 (40.5)	114 (33.4)	89 (26.1)	0.007
≥ 45 years	76 (54.7)	29 (20.9)	34 (24.5)	
Sex				
Female	191 (43.9)	130 (29.9)	114 (26.2)	0.838
Male	25 (41.7)	17 (28.3)	18 (30)	
Job				
Not working	157 (56.3)	57 (20.4)	65 (23.3)	< 0.001
Retired	3 (21.4)	4 (28.6)	7 (50)	
Working	55 (27.4)	86 (42.8)	60 (29.9)	
Residence				
Rural	120 (67.8)	30 (16.9)	27 (15.3)	< 0.001
Urban	94 (30.2)	114 (36.7)	103 (33.1)	

SD Standard deviation, *p* value < 0.05 is considered significant, *Percentages were calculated within row, ** Participants with moderate knowledge were significantly younger than those with poor knowledge (*P* value: 0.012)

that may help decrease inflammation. Additionally, green tea is rich in various phytochemicals and antioxidants that may offer anti-inflammatory benefits. Probiotics are healthy bacteria that help regulate inflammation [28–30]. The current study showed poor knowledge among the studied patients about the benefits of eating brown bread, made from mix of white and brown flour, bran, and yeast) [31], whole grains, sesame, spices, gut normal flora, and drinking green tea in relation to their symptoms.

Consumption of many dairy products has been linked to increased inflammation due to their saturated fat content [32, 33]. However, patients in the current study showed poor knowledge about these data. Polyunsaturated oils, including fish oil and different plant oils (plant oils high in omega 3), demonstrate anti-inflammatory and anti-arteriosclerotic properties. Several studies have indicated a noticeable trend emphasizing the protective role of fish, particularly species rich in omega-3 fatty acids [34]. Surprisingly, the studied patients expressed perfect knowledge about the benefits of eating omega-3 fish and poultry.

Hatami et al., highlighted the harmful effects of red meat and its association with the progression of some rheumatic diseases. Fortunately, our participants expressed moderate awareness regarding these harms [35]. Fresh vegetables and fruit consumption are linked to a decreased risk of inflammation [36], and interestingly, most of our patients had a good background regarding these data.

EULAR strongly recommends regular physical exercise for rheumatic patients, as it improves muscle strength and decreases pain [23]. Our findings indicated that our patients expressed moderate knowledge of the importance of exercise.

Exercise and uninterrupted sleep for 8 h can determine changes in the gut microbial composition, having beneficial implications in energy homeostasis and regulatory processes. In contrast, excessive use of antibiotics may harm microbiota, which is important in reducing inflammation [37–39]. Unfortunately, the studied patients had limited knowledge about these lifestyle habits.

Rural residents and unemployed persons expressed significantly poor knowledge compared to urban residents and employed counterparts. This may be attributed to the relatively high illiteracy rate in Egypt, which was reported as 25.8% in 2017, according to the Central Agency for Public Mobilization and Statistics. To account for this, we did not rely solely on online forms, and the printed form was explained to them by the physician or their relatives [40].

Conclusion

Egyptians with autoimmune arthritis demonstrated fair to moderate knowledge about the impact of anti-inflammatory diets and exercise on disease symptoms and the beneficial impact of nutrients on immunity and inflammation. Disparities in knowledge were identified across different demographic groups, such as gender, education level, residence, and occupation.

Limitations

Our findings should be interpreted in light of the following limitations:

Firstly, using non-probability sampling techniques. However, we conducted the current study to explore this novel area of inquiry and generate hypotheses, given the limited information available about the knowledge of diet and lifestyle habits of autoimmune arthritis patients. Nevertheless, the study provides valuable insights into a poorly researched area and contributes to guiding future nutrition and exercise education programs. We do recommend conducting further studies on a national basis.

Secondly, in a cross-sectional observational study, recall bias is inevitable. However, we have implemented strategies such as piloting the questionnaire and reducing the recall period to mitigate its influence.

Thirdly, sampling bias was a concern; however, we attempted to minimize the bias by using both printed and online forms to reach different population strata.

Recommendation

Autoimmune arthritis patients are required to enhance their knowledge about the impact of diet and lifestyle on disease activity and symptoms. They need to be motivated and adhere to a healthy diet and lifestyle. Understanding the implications of diet and lifestyle factors on autoimmune arthritis severity requires collaboration among rheumatologists, nutritionists, physiotherapists, and general practitioners (GPs), as well as a public health effort focused on knowledge improvement among these groups of rheumatic and musculoskeletal diseases (RMDs) patients.

Educational strategies and campaigns, including media initiatives, should be used to promote knowledge about lifestyle habits emphasizing the healthy diet and their impacts on the disease severity and symptoms. Physician guidance plays a crucial role in enhancing pain management, reducing disability, and improving the quality of life for individuals with RMDs. Advising these patients to uphold a healthy diet and lifestyle can be pivotal in achieving these outcomes.

Abbreviations

EULAR	European Alliance of Associations for Rheumatology
IL	Interleukin
RA	Rheumatoid Arthritis
RMDs	Rheumatic and musculoskeletal diseases
SLE	Systemic Lupus Erythematosus
SPSS	Statistical Package of Social Science
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology
TNF	Tumor Necrosis Factor

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Authors' contributions

M.H and M.E did the study conception D.A performed the statistics and the questionnaires. S.A.S, S.A.A, O.M.M and A.A.A collected the data H.R and M.E wrote the manuscript M.H, M.E and H.R did the critical revision of the manuscript All authors revised the manuscript.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

This study complied with the principles outlined in the Declaration of Helsinki, and all procedures involving patients were approved by the Ethical Review Board of Faculty of Medicine, Kasr alainy School of Medicine, Cairo University,

with number N-56–2022. All subjects/patients provided written informed consent before participation. An electronically signed informed consent was collected for the online form, and patients who agreed to participate completed the submission process.

Consent for publication
Not applicable.

Competing interest
The authors declare no competing interests.

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