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Effect of Lifestyle Modifications in patients with Rheumatoid Arthritis

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KEYWORDS

Vertical molar heights, dentoalveolar compensation, hyper divergent skeletal patterns, linear vertical measurements.

ABSTRACT:

Background: Rheumatoid arthritis (RA) is a prevalent autoimmune disorder that not only affects the joints but also has significant extra-articular manifestations. The disease impacts patients' quality of life and poses substantial social and economic burdens. Early detection and lifestyle modifications are crucial for improving treatment outcomes and achieving drug-free remission.

Objective: This study aimed to evaluate the perceptions of patients with RA regarding lifestyle modifications and their perceived impact on treatment responses.

Methods: A cross-sectional study was conducted among RA patients at Prince Mohammed Bin Abdulaziz Hospital in Riyadh, Saudi Arabia, from April to October 2024 A pre-designed anonymous questionnaire was distributed to collect data on sociodemographics, lifestyle factors, and medication use. Descriptive statistics were employed to analyze the data, focusing on participants' awareness and adherence to lifestyle changes.

Results: A total of 52 RA patients participated, with a mean age of 31.6 years (SD = 10.1). The cohort was predominantly female (90.4%), only 42.3% engaged in regular physical activity, and 67.3% did not follow any specific diet. Statistical analysis revealed a significant correlation between weight management and lifestyle modifications (P=0.024). Participants reported mixed perceptions regarding dietary changes, with only 25% believing that diet alone could cure RA.

Conclusion: The findings indicate a gap between awareness and adherence to lifestyle modifications among RA patients. Despite recognizing the potential benefits of lifestyle changes, many patients struggle to implement them, underscoring the need for enhanced patient education and resources. Addressing this gap may improve treatment outcomes and overall quality of life for individuals living with RA. Future studies should explore the barriers to lifestyle adherence and develop targeted interventions to promote healthier behaviors among RA patients.

Introduction:

Rheumatoid arthritis is a systemic autoimmune disease, considered the most common inflammatory articular disease among the general population. However, not only the joints are affected; rheumatoid arthritis also has an extra-articular manifestation.

Rheumatoid arthritis (RA) is a common chronic inflammatory disease with a prevalence of 1% [1]. Both personally and socially, the illness has a profoundly detrimental effect [2]. Early detection and intervention improve the likelihood of drug-free remission and lower the risk of further joint injury and disability [3]. Consequently, there is currently a push to diagnose and treat patients as early in the course of the illness as feasible, possibly even prior to the development of joint swelling [4].

There are many risk factors contribute with RA. One's chance of acquiring RA is greatly increased by genetic

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factors [5]. A family history of RA raises the risk of acquiring RA by around three to five times, particularly if there are one or more first-degree relatives with the disease.

Lifestyle factors have been linked to the development of many chronic diseases such as cardiovascular disease and cancer. For example, the Centers for Disease Control and Prevention estimates that up to 25% of cardiovascular disease could be preventable with improved lifestyle [6]. Therefore, investigations have also focused on the potential impact of lifestyle factors on rheumatoid arthritis (RA) development.

As for many other chronic diseases, rheumatoid arthritis may be exacerbated by poorer lifestyle choices. In fact, recent studies emphasize the role of nutrition and physical activity in this disease. There is evidence that potentially modifiable lifestyle factors, such as dietary omega-3 fats, smoking status, and body mass index (BMI), have a role in rheumatoid arthritis (RA) outcomes. [7]

Many previous studies admitted the influence of lifestyle in RA modification. A double-blind randomized controlled trial (RCT) demonstrated a beneficial effect of dietary fish oil supplements on American College of Rheumatology (ACR)–defined remission in early RA. [8] In that study, plasma levels of eicosapentaenoic acid (EPA), the main omega-3 fatty acid in fish oil, were directly associated with ACR-defined remission [9] Another cross-sectional analysis of baseline data from a cohort study showed that increased fish consumption was associated with lower 28-

joint Disease Activity Score (DAS28) scores and C-reactive protein (CRP) levels. [7]

In order to develop effective recruitment strategies and potential future preventive strategies for RA patients we need to have a good understanding of the perceptions of lifestyle in the disease, and their willingness to engage with preventive approaches. In this study we will examine the effect of these lifestyle factors on the disease activity and response to treatment in RA patients.

Problem statement

Lifestyle factors have been linked to the development of many chronic diseases such as rheumatoid arthritis. RA is believed to develop in discrete preclinical phases: genetic risk, asymptomatic RA-related autoantibody positivity, systemic inflammation, arthralgias, undifferentiated inflammatory arthritis (IA), and eventually clinical RA. Studies have reported that lifestyle factors are associated with overall risk, and some have reported that behaviors may affect transitions between these preclinical RA phases, however rheumatoid arthritis may be exacerbated by poorer lifestyle choices. In fact, recent studies emphasize the role of nutrition and physical activity in this disease. Lifestyle modifications can also widely affect the treatment outcome of rheumatoid arthritis however, in some cases; healthy suitable lifestyle would be helpful more than medication treatment.

Justification

There is no risk to the participants because it is a descriptive study. There is no direct benefit for the participants. However, it might have an indirect benefit for them.

Definition of Lifestyle Modification:

A healthy lifestyle includes activities and habits that encourage the development of total physical, mental, and spiritual fitness, and which reduces the risk of major illness.

changing lifestyle factors. This desire is fostered by the plethora of media reports that describe the influence of nutrition, body weight, physical fitness and stress level on health and life expectancy (9) , in our study lifestyle Modifications will include physical activity ,Eating habits and Smoking Cessation and will measure the patient perception of their response to the treatment after the Modification in their lifestyle .

Objectives:

Primary objective:

We looked for the Perception of the patient who has Rheumatoid arthritis of lifestyle Modifications and their effect on their response to the treatment.

Secondary objective:

This study discussed the perception of the patient who has Rheumatoid arthritis of lifestyle Modifications

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including dietary habits ,physical activity, smoking cessation and their effect on their response to the treatment.

Methods:

Study design

This study was a cross-sectional study. The respondents was all patients who were previously diagnosed with rheumatoid arthritis in the Outpatient Setting in Prince mohammed bin Abdulaziz hospital in Riyadh city.

Study area/setting

This study was conducted in the Outpatient Setting in Prince Mohammed Bin Abdulaziz hospital in Riyadh, Saudi Arabia, in April to October 2024.

Study population/subjects

This study included Saudi and non Saudi patients ,who speak Arabic male and female who are above 18 years old , and are being treated in the outpatient clinic in Prince Mohammed Bin Abdulaziz Hospital and living in Riyadh city, who were previously diagnosed with rheumatoid arthritis and agree to complete the survey. All respondents who met the inclusion criteria (has rheumatoid arthritis and were willing to participate in the study by signing informed consent) will be included. We excluded those who have cognitive problems or are unable to respond to the questionnaire and those who refuse to participate in the study.

Sample size

We estimated a sample size using the Raosoft® calculator, with a 5% level of significance, 5% margin of error, 95% confidence, and expected response distribution of 50%. Data analysis will be done using SPSS.

Study variables

The Dependent Variable

The questionnaire contains 25 dependent variables which are the data regarding rheumatoid arthritis disease includes , disability status ,medication usage and the lifestyle habits like dietary habits, physical activity, Smoking cessation , and the assessment of this study depended on the patient perception of lifestyle Modifications and their effect on the response to the treatment.

The Independent Variable:

The questionnaire contains 5 independent variables which are the sociodemographic data includes the age, gender, height, weight and BMI .

Data collection

The study was conducted through pre designed questionnaire prepared to cover all the sociodemographic, lifestyle and medication use data after reading and accepting the informed consent and distributed via an anonymous paper survey instrument.

Data analysis plan

The data was in SPSS and stored with no attempts to identify the subjects because the questionnaire does not include any personal information such as the name, ID number or any kind of specific personal information that can specify the participant.

Data was analyzed using SPSS (version 26). Testing the association was by Chi Square test. Qualitative variables represented as percentage and numbers (mean, Frequency…etc) and showing them in the figures. A 0.05 level of significance will be used in all tests used in the study.

Ethical consideration

The patient's confidentiality and the privacy of their data are the priority. Nothing leads to ethical issues were used such as names of the participants. The ethical clearance was given by the ethical committee of Prince Mohammed Bin Abdulaziz Hospital

Results:

Table (1) displays various demographic parameters of the participants with a total number of (52). In fact, nearly all of the participants are in the age bracket of 30 years to 50 years with 53.8 percent of the sample population. Additionally, there is a pronounced gender disparity with females accounting for an overwhelming 90.4% of the cohort. i) From weight distributions it is evident that a significant number of participants (42.3%) weigh from 70 to 85 kg; ii) From height data nearly half (46.2%) was

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found between 155 and 164 cm. An alarming 50% fall into the overweight category (30 - 39.9).

Table (1): Sociodemographic characteristics of participants (n=52)

Parameter		***No.***	***Percent (%)***
Age	less than 30	5	9.6
	30 - 50	28	53.8
	50 - 60	11	21.2
	more than 60	8	15.4
Gender	Female	47	90.4
	Male	5	9.6
Weight (Mean:76.7, STD:19.0)	Less than 70 kg	17	32.7
	70 to 85 kg	22	42.3
	More than 85 kg	13	25.0
Height (Mean:158.1, STD:7.9)	Less than 155 cm	16	30.8
	155 to 164 cm	24	46.2
	165 cm or more	12	23.1
BMI	18.5 -24.9	12	23.1
	25 -29.9	12	23.1
	30-39.9	26	50.0
	> 40	2	3.8

As shown in figure 1, Figured data on the exercise habits of a sample of 52 people. A full 40.4 percent (21 individuals) responded that they exercised at least three times per week for one hour per session, which was an exercise commitment of active regular physical activity. On the contrary, 38.5% (20 individuals) said that they don't exercise regularly indicating that a major chunk of the population does not strain to be physically fit. In addition, 21.2% (11 individuals) responded that they exercised sometimes.

Figure (1): Illustrates if participants exercise at least 3 times a weak.

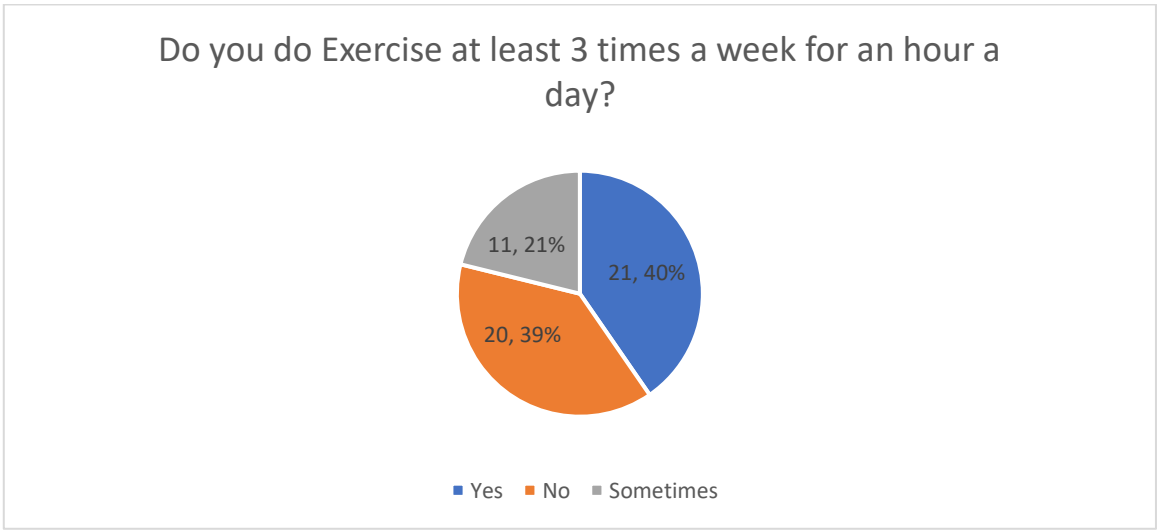

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Table 2 presents the data for patient diagnosed with rheumatoid arthritis (RA), which help to understand the lifestyle modifications and how they were perceived to influence the treatment responses. Notably, a substantial number of respondents have been living with RA for a long period of time, 36.5% reporting diagnosis in the 4–9 years and ≥ 10 year range. An impressive 96.2% of participants continue to be treated and nearly 92.3% are seen by a rheumatology specialist consistently. Regular exercise appears to have an important role, because 42.3 work out regularly but only 40.4 exercise regularly. Adherence less to a specific diet aimed at alleviating RA symptoms is 67.3%.

Table (2): Parameters related to perception of the patient who has Rheumatoid arthritis of lifestyle Modifications and their effect on their response to the treatment (n=52).

Parameter		***No.***	***Percent (%)***
Rheumatoid arthritis time of diagnosis	3 years or less	14	26.9
	4 to 9 years	19	36.5
	10 years or more	19	36.5
Do you have Rheumatoid Arthritis?	Yes	52	100.0
Are you in a wheelchair?	No	47	90.4
	Yes	5	9.6
Are you on RA Treatment?	No	2	3.8
	Yes	50	96.2
Are you compliant to RA Medications with a Rheumatology doctor Regularly?	No	4	7.7
	Yes	48	92.3
Are you a smoker?	No	51	98.1
	Yes	1	1.9
Are you Ex smoker?	No	46	88.5
	Yes	6	11.5
If you were an Ex-smoker, does quitting smoking had a benefit in improving RA?	I have never smoked before	46	88.5
	No	4	7.7
	Yes	2	3.8
Do you do Exercise at least 3 times a week for an hour a day?	Yes	21	40.4
	No	20	38.5
	Sometimes	11	21.2
Did you find A benefit after Regular Exercise 3 times a week for an hour a day?	Yes	22	42.3
	No	11	21.2
	I don't Exercise	19	36.5
What kind of Exercise do you do?	Resistance Exercise	1	1.9
	Swimming	1	1.9
	Walking	32	61.5
	I don't Exercise	18	34.6
Do you follow a Specific diet to help improving RA Symptoms?	No	35	67.3
	Yes	17	32.7
If you are following a specific diet, please answer this Question *	Keto diet	1	1.9
	Less carbohydrates	7	13.5
	Intermittent fasting	5	9.6
	Balanced diet	2	3.8
	Others	4	7.7

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	I don't follow Specific diet	35	67.3

Results may overlap

As shown in figure (2), In analyzing the data derived from a sample of 52 individuals regarding the impact of weight loss on the improvement of rheumatoid arthritis (RA) symptoms among those classified as overweight, several notable trends emerge. Out of the total sample, 30.8% (16 individuals) reported that they did not lose weight, while 19.2% (10 individuals) indicated that they are not overweight. A significant portion, constituting 28.8% (15 individuals), affirmed that weight loss had positively influenced their RA symptoms, whereas 21.2% (11 individuals) stated that weight loss did not confer any benefits.

Figure (2): Illustrates if losing weight improved RA symptoms among participants.

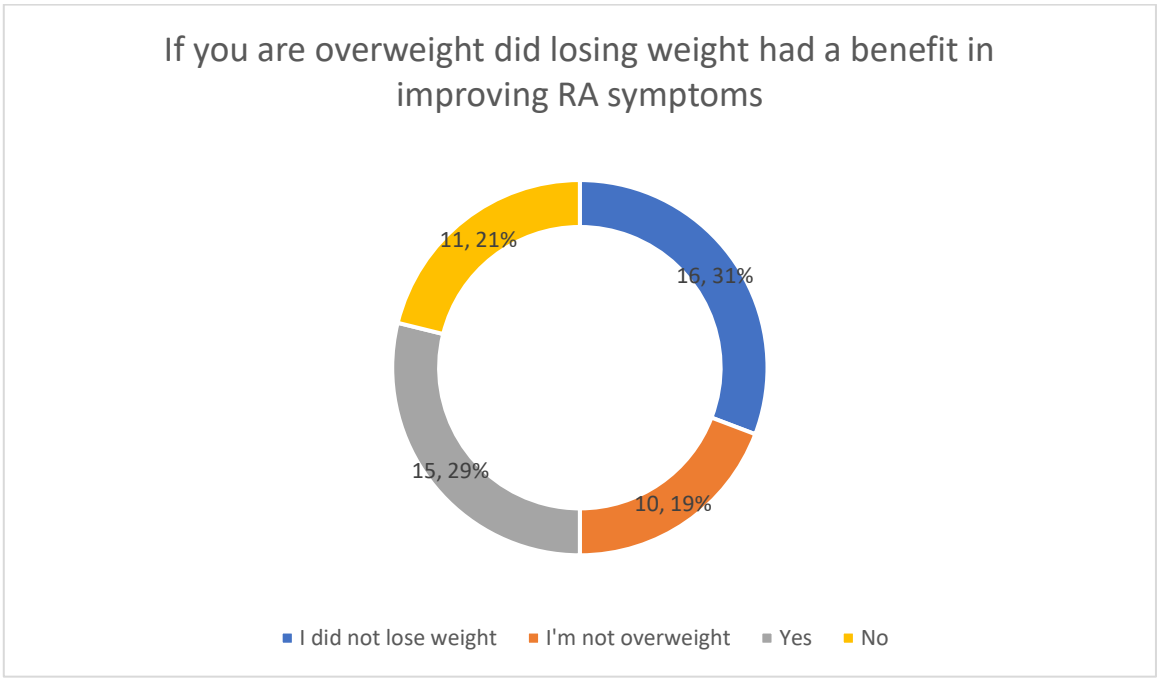

Table 3 presents data on dietary habits, physical activity and efforts at smoking cessation among participants in relation to their response to rheumatoid arthritis (RA) treatment. A large majority (67.3%) of participants reported not following a particular diet questionably how dietary interventions can impact symptom management. Half of those on a low-fat diet felt benefited, though only 25 per cent did when diets alone were not the cure. Additionally, although 75% of participants indicated they were overweight, only 50% had been actively attempting to lose weight. No (69.2%) had made lifestyle modifications.

Table (3): participants' dietary habits, physical activity, smoking cessation and their effect on their response to the treatment (n=52).

Parameter		***No.***	***Percent (%)***
Did you find any benefit in RA symptoms after following your Specific diet?	Yes	16	30.8
	No	1	1.9
	I don't follow specific diet	35	67.3
Do you follow low fat diet to improve your RA symptoms?	No	35	67.3
	Yes	17	32.7

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Did you find any benefit in RA symptoms after following a low-fat diet?	Yes	13	25.0
	No	4	7.7
	I don't follow low fat diet	35	67.3
Do you follow (cutting out sugar diet) to help in RA symptoms?	no	34	65.4
	yes	18	34.6
Did you find a benefit in RA symptoms after following (cutting out sugar) diet?	No	2	3.8
	Yes	16	30.8
	I didn't follow (cutting out sugar) diet	34	65.4
Are you over wight?	No	13	25.0
	Yes	39	75.0
If you are overweight, did you try to lose weight?	No	13	25.0
	Yes	26	50.0
	I'm not overweight	13	25.0
How many Kilograms did you lose?	Less than 10 kg	12	23.1
	10 kg or more	9	17.3
	I didn't lose weight	20	38.5
	I'm not overweight	11	21.2
If you are overweight did losing weight had a benefit in improving RA symptoms	I did not lose weight	16	30.8
	I'm not overweight	10	19.2
	Yes	15	28.8
	No	11	21.2
Have you done any lifestyle modification to improve your RA condition?	No	36	69.2
	Yes	16	30.8
What did you modify in your lifestyle? *	Aerobic exercise	3	5.8
	Resistance exercise	3	5.8
	Swimming	3	5.8
	Healthy diet	6	11.5
	Compliance on medication	3	5.8
	Others	5	9.6
	I did not do any lifestyle modification	37	71.2
in general, in your current RA disease condition after following a specific lifestyle modification in a scale from 1-10 ***1- no symptoms like (stiffness, joint pain, joint swelling)*** ***10- Severe Symptoms like (pain, joint Swelling, joint stiffness, difficulty in movement, on wheelchair)***	1	9	17.3
	2	12	23.1
	3	7	13.5
	4	2	3.8
	5	8	15.4
	6	4	7.7
	7	5	9.6
	8	2	3.8
	9	3	5.8

Results may overlap

Table (4) shows that doing lifestyle modification to improve Rheumatoid arthritis condition has statistically significant relation to weight (P value=0.024). It also shows statistically insignificant relation to gender, age, height, BMI, Rheumatoid arthritis time of diagnosis.

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Table (4): Relation between doing lifestyle modification to improve Rheumatoid arthritis and sociodemographic characteristics.

Parameters		***Have you done any lifestyle modification to improve your RA condition?***		***Total (N=52)***	***P value****
		No	**Yes**		
Gender	Female	33	14	47	0.638
		91.7%	87.5%	90.4%	
	Male	3	2	5	
		8.3%	12.5%	9.6%	
Age	less than 30	5	0	5	0.323
		13.9%	0.0%	9.6%	
	30 - 50	19	9	28	
		52.8%	56.3%	53.8%	
	50 - 60	6	5	11	
		16.7%	31.3%	21.2%	
	more than 60	6	2	8	
		16.7%	12.5%	15.4%	
Weight	Less than 70 kg	16	1	17	0.024
		44.4%	6.3%	32.7%	
	70 to 85 kg	13	9	22	
		36.1%	56.3%	42.3%	
	More than 85 kg	7	6	13	
		19.4%	37.5%	25.0%	
Height	Less than 155 cm	13	3	16	0.401
		36.1%	18.8%	30.8%	
	155 to 164 cm	16	8	24	
		44.4%	50.0%	46.2%	
	165 cm or more	7	5	12	
		19.4%	31.3%	23.1%	
BMI	18.5 -24.9	10	2	12	0.281
		27.8%	12.5%	23.1%	
	25 -29.9	9	3	12	
		25.0%	18.8%	23.1%	
	30-39.9	15	11	26	
		41.7%	68.8%	50.0%	
	> 40	2	0	2	
		5.6%	0.0%	3.8%	
Rheumatoid arthritis time of diagnosis	3 years or less	12	2	14	0.110
		33.3%	12.5%	26.9%	
	4 to 9 years	10	9	19	
		27.8%	56.3%	36.5%	
	10 years or more	14	5	19	
		38.9%	31.3%	36.5%	

P value was considered significant if ≤ 0.05.

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Table (5) shows that following low fat diet to improve Rheumatoid arthritis symptoms has statistically significant relation to weight (P value=0.006) and BMI (P value=0.025). It also shows statistically insignificant relation to gender, age, height, Rheumatoid arthritis time of diagnosis.

Table (5): Following low fat diet to improve Rheumatoid arthritis symptoms in association with sociodemographic characteristics.

Parameters		***Do you follow low fat diet to improve your RA symptoms ?***		***Total (N=52)***	***P value****
		No	**Yes**		
Gender	Female	32	15	47	0.714
		91.4%	88.2%	90.4%	
	Male	3	2	5	
		8.6%	11.8%	9.6%	
Age	less than 30	5	0	5	0.343
		14.3%	0.0%	9.6%	
	30 - 50	19	9	28	
		54.3%	52.9%	53.8%	
	50 - 60	6	5	11	
		17.1%	29.4%	21.2%	
	more than 60	5	3	8	
		14.3%	17.6%	15.4%	
Weight	Less than 70 kg	16	1	17	0.006
		45.7%	5.9%	32.7%	
	70 to 85 kg	10	12	22	
		28.6%	70.6%	42.3%	
	More than 85 kg	9	4	13	
		25.7%	23.5%	25.0%	
Height	Less than 155 cm	13	3	16	0.349
		37.1%	17.6%	30.8%	
	155 to 164 cm	15	9	24	
		42.9%	52.9%	46.2%	
	165 cm or more	7	5	12	
		20.0%	29.4%	23.1%	
BMI	18.5 -24.9	12	0	12	0.025
		34.3%	0.0%	23.1%	
	25 -29.9	7	5	12	
		20.0%	29.4%	23.1%	
	30-39.9	14	12	26	
		40.0%	70.6%	50.0%	
	> 40	2	0	2	
		5.7%	0.0%	3.8%	
Rheumatoid arthritis time of diagnosis	3 years or less	11	3	14	0.221
		31.4%	17.6%	26.9%	
	4 to 9 years	14	5	19	
		40.0%	29.4%	36.5%	
	10 years or more	10	9	19	

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		28.6%	52.9%	36.5%	

P value was considered significant if ≤ 0.05.

Discussion:

Rheumatoid arthritis is a chronic autoimmune disease that seriously affects the quality of life of people with the disease. The objective of this work was to evaluate the perception of patients with RA of lifestyle modifications and of their impact on treatment response. The results show that even though most participants were aware of the possible benefits from changing lifestyle, the adherence to those modifications was exceedingly low. This is consistent with previous research that has found that despite knowledge of their importance, patients have difficulty making lifestyle changes [17]. This demographic characteristics analysis of the study cohort shows a skewed gender, with females at 90.4% of participants. This finding is consistent with the literature, which indicates that RA predominantly affects women, with a female-to-male ratio ranging from 2:1 to 4:1 [16]. In addition, we noted the high prevalence of overweight individuals (50%) in our study population of RA. Previous studies have shown obesity worsens the severity of RA and decreases the benefit from the treatment [12, 13]. The statistical significance observed between lifestyle modifications and weight management (P=0.024) reinforces the notion that weight control is a critical component of managing RA symptoms [12, 13]. Interestingly, the study found that only 42.3% of participants engaged in regular physical activity, and adherence to dietary modifications was low, with 67.3% not following any specific diet. This is concerning, as previous research has shown that physical activity can improve functional outcomes and overall well-being in RA patients [17]. Moreover, dietary interventions have been linked to symptom relief in RA, with certain diets, such as the Mediterranean diet, showing promise in reducing inflammation [14]. The low adherence to dietary changes in this study may reflect a lack of awareness or accessibility to appropriate dietary resources, which is echoed in the literature [15]. The findings regarding the perception of dietary modifications are particularly noteworthy. While half of the participants on a low-fat diet reported feeling some benefits, only 25% believed that dietary changes alone could serve as a cure. This highlights a potential gap in patient education regarding the role of diet in managing RA. Previous studies have emphasized the importance of patient involvement in developing educational materials that address lifestyle modifications, as patients often prefer self-management information over biomedical data [15]. Despite the significant insights gained from this study, several limitations must be acknowledged. The cross-sectional design limits the ability to establish causal relationships between lifestyle modifications and treatment responses. Additionally, the sample size of 52 participants may not be representative of the broader RA population, potentially affecting the generalizability of the findings. Furthermore, the reliance on self-reported data may introduce bias, as participants may overestimate their adherence to lifestyle modifications [11].

Conclusion:

In conclusion, this study contributes to the understanding of the impact of lifestyle modifications on treatment responses in patients with RA. The findings suggest that while patients recognize the potential benefits of lifestyle changes, actual adherence remains low. This underscores the need for enhanced patient education and support to facilitate lifestyle modifications that can improve treatment outcomes. Future research should focus on longitudinal studies to better understand the causal relationships between lifestyle factors and RA management.

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