

## Dietary restrictions in rheumatoid arthritis-what the patient's feel: A questionnaire based study.

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### Abstract

**Background:** There is increasing evidence for the role of diet in the etiopathogenesis of Rheumatoid Arthritis (RA) while it is not clear how it modifies the disease activity in view of inconclusive results of various dietary intervention studies. We intend to study the influence of diet on RA patients by a simple questionnaire.

**Methods and findings:** Descriptive cross-sectional study was carried out among 101 consecutive RA patients with simple questionnaire and analysed whether they had dietary restriction or not and how it affected their symptoms. There were 44 patients who restricted their diet and 57 who did not observe dietary restriction. Of the 44 dietary restrictors, 20 (44.5%) had reported worsening of joint pains after a particular food while 52 out of 57 non dietary restrictors (91.2%) did not feel a difference in the joint symptoms with food intake which was statistically significant ( $p < 0.0001$ ). Just like patient reported disease outcome measures which are less complicated and time consuming has emerged as a promising tool in the disease management, this study also observed that majority of our patients are right in restricting their diet based on their joint symptoms.

**Conclusion:** The patient has to decide on their own basis whether or not to restrict a particular food item based on their symptoms instead of imposing a specific dietary pattern until we get more evidence to prove the contrary.

**Keywords:** Dietary restriction for arthritis, Diet and rheumatoid arthritis, Diet in early rheumatoid arthritis, Diet in established rheumatoid arthritis, Questionnaire for diet in rheumatoid arthritis.

**Abbreviations:** DMARDS: Disease Modifying Anti-Rheumatic Drugs; RA: Rheumatoid Arthritis.

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### Introduction

Rheumatoid arthritis (RA) is one of the commonest debilitating arthritis which has seen a sea change in the diagnosis and management over the past few decades. While pharmacological therapies receive prime importance in the management plan, non-pharmacological measures are often neglected, but the scenario is changing, and more focus is made on the non-pharmacological intervention measures including diet, exercise and healthy life habits.

The pathogenesis of RA is complex which includes genetic and non-genetic factors. Non-genetic factors account for around 40% of the risk for RA [1]. Among the non-genetic factors cigarette smoking is a well-established risk factor for the development of inflammatory polyarthritis [2-5]. Diet is another well studied risk factor [6,7]; it can influence the body weight which has a bearing on the individual's mobility; also it can affect the inflammatory process by altering the gut micro flora, anti-oxidant activity. The presence of altered intestinal micro flora is implicated in the pathogenesis as well as the disease progression in RA [8-10]. Diet can have positive and negative impact on the disease. High protein diets is implicated in the disease pathogenesis [11,12] while low protein diets can improve RA related symptoms [13-16]. A very high prevalence of RA is noted in countries with greater consumption of red meat

[17]. Certain food items like fish [18,19], cooked vegetables, and  $\beta$  cryptoxanthin found in fruits and vegetables [20-22] have a possible protective effect while increased coffee intake is associated with the greater risk of RA [23,24]. Patients with RA were subjected to various dietary interventions to improve or lessen the burden of the disease. Studies done so far to find out the impact of the diet on disease activity and symptoms have shown variable results.

In a study by Proudman et al. [25], consumption of fish rich in omega 3 fatty acids, in combination with conventional Disease Modifying Anti-Rheumatic Drugs (DMARDS) is more likely to achieve remission than DMARDS alone. There are conflicting results with regard to protein intake. Pattison et al. [12] studied the intake of red meat and the occurrence of inflammatory polyarthritis and concluded that increased intake of red meat is associated with higher risk of developing inflammatory polyarthritis, whereas Nurses' Health Study [26] has given contradictory results.

In real life scenario, many patients with RA report that there is increase in their joint symptoms after taking a particular food and they adjust their dietary pattern based on their experience by restricting that particular diet in future and gets benefited by their own dietary manipulation. The question about the influence of diet on the occurrence of arthritis related symptoms remain

large for the patients. With this background, we intended to study the role of diet in RA patients and its impact on the arthritis related symptoms as perceived by the patients themselves using a simple questionnaire in their own language.

### Aim

To study the influence of diet on the joint related symptoms in patients with Rheumatoid arthritis as perceived by them.

### Methodology

Descriptive study was carried out among 101 consecutive Rheumatoid arthritis patients attending the out-patient services of Rheumatology Department during September 2012-March 2013 in a tertiary care centre, Coimbatore, Southern India. Patients aged more than 17 years of age with a diagnosis of RA as per American College of Rheumatology 2010 criteria and on standard DMARDS (Methotrexate 10 -25 mg/week; Hydroxychloroquine 200-400 mg/day; Leflunomide 10-20 MG/day; Prednisolone <7.5 mg/day) were included in the study however among them subjects were excluded if other Connective tissue diseases like Systemic lupus erythematosus, Fibromyalgia and Spondyloarthropathies, those who require frequent change in dose of DMARDS and not willing to participate in the study.

The study design was approved by the Institutional Ethics committee. After getting the consent, the participants were given a questionnaire in their local language which includes key details like disease duration, dietary pattern, history regarding co-morbidities and exposure to alternative medicine therapy; their regular diet patterns, whether they are restricting any particular food item; have they felt any change in the joint symptoms (new onset pain or stiffness, involvement of multiple joints) after a particular food intake and if so, they were asked to list down the name of food items which they think is responsible for the change in symptom.

### Statistical analysis

Disease duration was calculated from the time of first symptom occurrence till the date of sampling and categorised as  $\leq 6$  months and  $>6$  months. Diet restriction was categorised as diet restrictors and non-diet restrictors.

Descriptive statistics were reported using mean with standard deviation for continuous variables and percentages for categorical variables. Independent t test was used to compare the mean age between two groups. Chi-square test was used to test the association between diet restriction and disease duration with other study variables. P value less than 5% was considered as statistically significant. All the analyses were done using SPSS version 23.0 software.

### Results

The characteristics of the study population are listed in Table 1. There were 85 female patients and 16 were male with ratio of 5.3:1. Mean age of the study subjects was  $48.3 \pm 11.6$  years. The average disease duration of the study population was  $50.2 \pm 65.4$  months. When we divided the patient into early with disease duration of  $\leq 6$  months and established RA with more

than 6 months there were 80 with established disease while 21 had early disease.

Of the 101 patients 40(39.6%) had been exposed to complementary therapies in the past in the form of Ayurveda, Siddha and Homeopathy. 18 patients had associated co-morbid illness; most commonly reported was Systemic hypertension which was seen in 12 patients and 5 patients had diabetes while one had both Diabetes mellitus and Systemic hypertension. The diet pattern of the patient population is quite variable with 66 of them taking mixed diet (both vegetarian and non-vegetarian) and 35 were lacto-vegetarians.

There were a total of 44 patients (43.6%) who were following some kind of dietary restriction which was self-imposed in 5; by relatives and friends in 7 while 32 were advised by their primary care physicians itself. The remaining 57(56.4%) did mention that they did not follow any dietary restriction.

Of the total 101 patients, only 25 (24.8%) felt there was a change in the joint symptoms on taking particular diet, of this 20 were following diet restriction and the remaining 5 belonged to the non-diet restrictors group. The list of food items which worsened the joint symptoms is mentioned in the Table 2.

### Disease duration and diet restriction

The mean disease duration in the early RA was 4.28 months and in established RA was 62.68 months. Although not statistically significant, the proportion of patients who had been exposed to alternative medicine was more in established RA (42.5%) than in early RA (28.6%).

In the early RA subgroup, seven patients (33.3%) had felt a need for diet restriction; the remaining fourteen (66.7%) did not have any restriction in the food intake. Eighteen among the early disease group (85.7%) did not observe any change in their joint symptoms after a particular food while three (14.3%) noticed worsening of their symptoms.

**Table 1.** Characteristics of the study population.

Characteristics	Number	Percentage
Age in years	48.3 $\pm$ 11.6	
Sex		
Female	85	84.2
Male	16	15.8
Duration of disease		
$\leq 6$ months	21	20.8
$>6$ months	80	79.2
Alternative medications		
Yes	40	39.6
No	61	60.4
Co morbid conditions		
Yes	18	17.8
No	83	82.2
Diet Restriction for co-morbid		
Yes	8	7.9
No	93	92.1
Diet restriction for Arthritis		
Yes	44	43.6
No	57	56.4
Any difference in arthritis		
Yes	25	24.8
No	76	75.2
Type of food		
Vegetarian	35	34.7
Mixed	66	65.3

**Table 2.** Food items reported to worsen the joint symptoms.

Chicken, Meat, Raw rice		
Bajji (snack item made of gram flour deep fried in oil)	Uzhundu vada (snack item made of Bengal gram flour deep fried in oil)	Lemon pickles
Potato	Pumpkin	Unripe banana
Curd	Milk	Egg

**Table 3.** Comparison of characteristics by disease duration: Reported as number within parenthesis percentages; p value using chi-square test; \* - p value using independent t test.

	Disease Duration		P value
	≤ 6 months n=21	>6 months n=80	
Age in years	44.1 ± 10.6	49.4 ± 11.8	0.06*
Sex			
Female	17 (81.0)	68 (85.0)	0.65
Male	4 (19.0)	12 (15.0)	
Alternative Medications			
Yes	6 (28.6)	34 (42.5)	0.24
No	15 (71.4)	46 (57.5)	
Co morbid conditions			
Yes	5 (23.8)	13 (16.3)	0.32
No	16 (76.2)	67 (83.8)	
Any difference in arthritis			
Yes	3 (14.3)	22 (27.5)	0.21
No	18 (85.7)	58 (72.5)	
Diet restriction			
Yes	7 (33.3)	37 (46.3)	0.28
No	14 (66.7)	43 (53.8)	
Type of food			
Veg	5 (23.8)	30 (37.5)	0.49
Mixed	16 (76.2)	50 (62.5)	

In established RA, thirty seven (46.3%) had diet restriction; while the remaining forty three (53.8%) did not. A majority of them (72.5%) did not feel any influence of diet on their joint symptoms while change in their symptoms in response to some dietary habits was observed in twenty two patients (27.5%). The results are summarised in Table 3.

**Diet restrictors versus non restrictors**

There were a total of 44 patients who restricted their diet while 57 of them have been not on any kind of diet restriction for arthritis.

Of the diet restrictors majority was female (81.8%); majority of them (84.1%) had established disease more than 6 months; 50% had been exposed to alternative medicine. The exposure to alternative form of medicine was slightly higher in diet restrictor as compared to non-restrictor groups (p=0.06). A majority (77.3%) of the diet restrictor group did not have any co-morbidities.

A significant association was observed between diet restriction and any difference/worsening of joint symptoms (p<0.0001). Twenty of the 44 patients who restricted their diet (45.5%) felt a difference in joint symptoms on exposure to particular diet while the remaining 24 patients (54.5%) did not feel so. 52 out of 57 (91.2%) non restrictors did not experience any influence of diet on their symptoms while 5 (8.8%) felt a change in symptoms even though they did not restrict any dietary foods in particular. The results are summarised in Table 4.

**Discussion**

In this study we analysed the influence of diet on joint symptoms in a group of patients by a simple questionnaire.

The mean age of our study population was 48.33 ± 11.74 years which is in comparable with the RA study population worldwide. Although our study did not target on established disease alone, we had more number of patients with established disease by consecutive picking. The mean disease duration in the study group was 50.22 ± 65.39 months which is important because this gives enough time for the patients to test various foods and to arrive at a conclusion regarding the influence of diet on their disease pattern.

The percentage of patients with associated co-morbid diseases like diabetes and hypertension requiring dietary restriction was less in our study population making this observation more relevant.

Almost all the alternative form of therapies mandates a specific dietary restriction. In our study, 50% of dietary restrictors had alternative therapy exposure previously; although this association is not statistically significant which indicates that alternative medicine exposure does not influence the dietary patterns for our study population.

Patients who observed any changes in the joint symptoms on exposure to a particular diet adapt dietary restriction and we observe this association as statistically significant in our study (p<0.0001). This emphasise the influence of diet on the disease activity as noted in other studies. 20 out of the 44 and 52 out of 57 patients in either groups were rightly deciding what to eat and what not to eat.

When we searched for similar studies, we could find one such questionnaire based study [27] which assessed diet and disease symptoms in rheumatic diseases. The study included a total of 742 patients which consisted of 290 patients with RA; 51 with Juvenile Rheumatoid arthritis, 87 with Ankylosing spondylitis, 51 with psoriatic arthropathy, 65 with primary fibromyalgia and 34 with osteoarthritis. The median disease duration of RA patients in this study was 11 months (0-55) which is shorter than our present study (50.22 ± 65.39 months). One third of

**Table 4.** Comparison of characteristics by diet restriction for arthritis: Reported as number within parenthesis percentages; p value using chi-square test; \* - p value using independent t test.

	Diet Restriction for Arthritis		P value
	Yes n=44	No n=57	
Age in years	49.9 ± 11.3	47.1 ± 11.9	0.22*
Sex			
Female	36 (81.8)	49 (86.0)	0.57
male	8 (18.2)	8 (14.0)	
Duration of disease			
≤ 6 months	7 (15.9)	14 (24.6)	0.28
>6 months	37 (84.1)	43 (75.4)	
Alternative Medications			
Yes	22 (50.0)	18 (31.6)	0.06
No	22 (50.0)	39 (68.4)	
Co morbid conditions			
Yes	10 (22.7)	8 (14.0)	0.26
No	34 (77.3)	49 (86.0)	
Any difference in joint pains			
Yes	20 (45.5)	5 (8.8)	<0.0001
No	24 (54.5)	52 (91.2)	
Type of food			
Veg	19 (43.2)	16 (28.0)	0.15
Mixed	25 (56.8)	41 (72.0)	

Rheumatoid arthritis patients reported worsening of symptoms after a particular food intake which is comparable to our observation (one fourth). But there was not any definite answer for the same.

Understanding the association between diet and RA disease activity, numerous studies had been conducted in various parts of the world to ascertain whether dietary manipulation is rewarding in the management of RA patients in terms of improvement in joint pain, stiffness and physical function. Dietary intervention measures followed in various studies include fasting followed by vegetarian diet [14,28], vegan diet [16,29], elemental diet [30,31], Mediterranean diet [32,33], Elimination diet [34] and the results were compared with those put on ordinary diet but the results of these studies were variable.

Hagen et al. [35] did a systemic review of all these dietary intervention studies which included 14 randomised controlled trials, 1 case control study with a total of 837 patients and concluded that the effect of various forms of dietary manipulation on RA patients is uncertain. It was also noted that there was a high risk of dropout rates and weight loss in those subjected to dietary manipulation or restriction which can cause adverse potential effects.

Our study is one of its kinds which assessed the real life situation of patients with RA and their ever burning question of the influence of diet on the disease. It is easier to assess the role of drugs in the disease management and various trials can be formulated for the same while it is tough to assess the role of dietary factors and its influence on the disease course. Since RA as such has a variable course and each patient behaves in a different manner with periods of spontaneous remissions and exacerbations. Not all patients with RA are capable of sticking to a particular diet regimen. Most of the real life patients are in the lower to middle socio-economic class and following a special diet pattern will only add to the financial burden for their families.

We did make out from our study that the patients are the best judges of their symptoms and the influence of diet on their disease pattern. Our advice for the patients is to decide on their own basis whether or not to restrict a particular food item based on their symptoms instead of giving a dietary pattern for them.

So, till we have convincing data regarding the benefits of dietary manipulation in Rheumatoid arthritis patients, we encourage them to have a healthy, balanced diet with individual modifications in their diet pattern based on their own judgement regarding the influence of diet on their joint related symptoms.

### **Limitations of our Study**

This is a cross-sectional study; we have not objectively assessed the influence of diet on the disease activity; instead our study was based on the assessment on arthritis related symptoms by patients themselves.

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### **Competing and Conflicting Interest**

The authors disclose no conflicting or competing interest.

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