

## Nutritional Status and Life Style among Rheumatoid Arthritis Clients at Zagazig University Hospitals

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### Abstract

**Background:** Rheumatic diseases are a usual cause of disability and a large public health burden. Good nutrition and healthy lifestyle lead to improving pain and symptoms of rheumatoid arthritis. **Aim of the study:** was to assess nutritional status and lifestyle among rheumatoid arthritis clients attending the outpatient rheumatoid clinic at Zagazig University Hospitals. **Subjects & Methods:** **Research design:** A cross sectional descriptive design was utilized. **Setting:** The study was conducted in rheumatoid out client clinic at Zagazig university hospitals. **Subjects:** The study sample included of 150 rheumatoid arthritis clients, aged from (18 to 60), both sexes, first degree and free from chronic diseases. **Tools of data collection: Tool (I)** Client interview questionnaire for collecting data pertaining to socio-demographic characteristics, medical history, and food frequency questionnaire. **Tool (II):** Rheumatoid Arthritis Lifestyle questionnaire and **tool (III),** psychological distress scale. **Results:** The highest recommended dietary intake is the legumes (63.3%), while the lowest is the meat (2.0%). Meanwhile the most had unbalanced diet (94.7%). Overall, 80% of them had poor total lifestyle habits and 88.7% of them had high abilities and 84.7% independent in activities of daily life. Additionally, 48% among rheumatoid arthritis clients were high stress. **Conclusion:** the highest recommended dietary intake is the legumes, while the lowest is the meat. The most of them had unbalanced diet. Additionally, less than half of them were obese. Moreover, the clients with rheumatoid arthritis had poor total lifestyle habits. Furthermore, the findings showed that their highest independency is in the areas of activities of daily life and abilities, and about half of them had stress. **Recommendation:** Develop an educational program on nutritional status, lifestyle modifications, and psychological support to reduce stress among clients with rheumatoid arthritis. **Key words:** Rheumatoid Arthritis, Clients, Nutritional Status, Lifestyle.

### Introduction

Rheumatoid arthritis (RA) is one of the most common dangerous forms of the inflammatory rheumatic disease<sup>(1)</sup>. It is a chronic systemic autoimmune disease. Autoimmune diseases are illnesses that occur when the body's tissues are mistakenly attacked by their own immune system<sup>(2)</sup>. Usually manifests with signs of inflammation, which include joint swelling, pain, stiffness and weakness. These features are more evident or aggravated in the morning or after prolonged inactivity. The most common cutaneous manifestation seen in RA clients is rheumatoid nodule<sup>(3)</sup>.

Rheumatoid arthritis affecting approximately 1.3 million people in the United States. The prevalence rate of RA in Egypt is not well documented. However, by extrapolation using the worldwide reported prevalence of 1%, about 800000 Egyptians may be affected<sup>(4)</sup>. The disease is three times more

common in women as in men. It afflicts people of all races equally. The disease can begin at any age and even affects children (juvenile idiopathic arthritis), but it most often starts after 40 years of age and before 60 years of age<sup>(5)</sup>.

Rheumatoid arthritis affects people differently; for some people, symptoms last only a few months or years and go away without causing any noticeable damage. Other people have mild or moderate forms of the disease, with periods of worsening symptoms (called flares) and periods in which they feel better (called remissions). Others may have a severe form of RA that is active most of the time, lasts for many years or a lifetime, and leads to serious joint damage and disability<sup>(6)</sup>.

There is no cure for RA but there are three general classes of drugs commonly used in the treatment of RA: Non-Steroidal Anti-Inflammatory Drugs

(NSAIDs), corticosteroids, and Disease Modifying Anti-Rheumatic Drugs (DMARDs) <sup>(7)</sup>. Additionally, RA clients are recommended to consume a healthy, balanced diet to maintain a healthy weight. The recommendations suggest eating a variety of foods, balancing healthy eating habits with physical activity, consuming plenty of grains, fruits, and vegetables, sticking to a low-fat diet, which is also low in saturated fat and cholesterol, and moderating sugar intake <sup>(8)</sup>.

Lifestyle changes can't cure rheumatoid arthritis (RA), but can help manage the condition, and decrease discomfort and disability. It's important to find a balance to maintain as much of a normal life as possible. Lifestyle recommendations include; quit smoking, a healthy diet, exercise, reduce stress, and returning to everyday life <sup>(9)</sup>. Clinicians should first consider suggesting changes in lifestyle, before prescribing pharmacological therapies in order to prevent insurgence of RA, reduce burden of disease and improve quality of clients' life <sup>(10)</sup>.

The role of Community Health Nurse (CHN) is a basic part of public health nursing, client education is critical which the nurse provide them information concerning nutrition, lifestyle habits, symptoms of RA to promote early diagnosis and management strategies that increase self-efficacy and self-confidence to meet the physical and emotional challenges posed by the illness <sup>(11)</sup>.

### Significance of the study

Rheumatoid arthritis often has a major impact on many areas of an individuals' life. The unpredictability of the prognosis as well as the day-to-day symptoms makes it challenge to plan ahead. Additionally, life expectancy is somewhat shorter for people with RA than for the general population. RA can be associated with many complications and treatment-related side effects that can contribute to premature death <sup>(12)</sup>. The complications can occur in many parts of the body. Furthermore, the autoimmune process that wreaks havoc

on the joints, also can affect the eyes, lungs, skin, heart, blood vessels, and other organs <sup>(13)</sup>. Clients with RA are considered to be at nutritional risk for many reasons. One cause of poor nutritional status in this client population is thought to be the result of the weight loss <sup>(14)</sup>. Consequently, this study is attempted to assess nutritional status and lifestyle among rheumatoid arthritis clients at Zagazig University Hospitals.

### Aim of the study

**The aim of the study was to:**

Assess nutritional status and lifestyle among rheumatoid arthritis clients attending the out client rheumatoid clinic at Zagazig University Hospitals.

### Research questions

- What are dietary intake and body mass index among rheumatoid arthritis clients?
- What are lifestyle habits among rheumatoid arthritis clients?
- What are the abilities, independence in activities of daily life, and stress among rheumatoid arthritis clients?

### Subjects and methods:

#### Research Design:

A cross sectional descriptive design was used in conducting the study.

#### Study Setting:

The study was conducted in rheumatoid outpatient clinic at Zagazig university hospitals.

#### Study Subjects:

A purposive sample of 165 rheumatoid arthritis clients, 15 clients who shared in the pilot study was excluded from the sample. Therefore, the total number of rheumatoid arthritis clients was 150

#### Tools of data collection:

Three tools were used to collect the necessary data for achieving the study objectives.

#### Tool I:

Client's interview questionnaire was prepared by the researcher based on review of literature and consisted of four parts:

**Part A:** This was for collecting data pertaining to socio-demographic

characteristics of client's with rheumatoid arthritis. It composed of 9 questions as age, gender, marital status, education level, job, live with, residence, income and smoking years.

**Part B:** This part collected information about client's medical history. It composed of 9 questions (9Qs). It included questions about duration of illness, positive family history, symptoms, number of joints affected, remission, relapse, treatment source and treatment forms

**Part C:** Anthropometric measurements (Weight, Height & Body Mass Index) to determine body mass index among rheumatoid arthritis clients. Weight was measured by an electronic digital scale with light clothing and no shoes to the nearest 0.1 kg. Height (H) was also measured in standing position without shoes using a wall mounted height meter. Feet were put together with heels, buttocks, shoulder and back of the head touching the wall. The Body Mass Index (BMI) of each clients was calculated by the  $(\text{BMI} = \text{weight (kg)} / \text{height (m}^2\text{)})$ . The World Health Organization classified adults as obese ( $\text{BMI} >30$ ), overweight ( $\text{BMI} = 25\text{--}29.99$ ) and normal ( $\text{BMI} = 18.50\text{--}24.99$ ) (World Health Organization) <sup>(15)</sup>.

**Part D:** Food frequency questionnaire adapted from Ijarotimi & Keshinro <sup>(16)</sup>, to determine dietary intake among rheumatoid arthritis clients. It composed of eight groups (8Qs) as (meat, dairies, cereals, legumes, Vit D rich, Vit A rich, fruits, and vegetables).

**Scoring system:**

**Dietary habits:** The food frequency scores were categorized according to the corresponding Recommended Daily Allowance (RDA) for each group. A subject was considered to have a balanced diet if RDA was taken from all food groups.

**Tool III:** Life style questionnaire developed by the researcher and guided by Rakumakoe <sup>(17)</sup>, to identify lifestyle habits among rheumatoid arthritis clients. It composed of six categories as food habits (12Qs), exercise habits (5Qs), compliance to treatment (Q18-22), smoking habits (4Qs). As well as; assess abilities,

independence in activities of daily life among rheumatoid arthritis clients. Questions regarding abilities (9Qs) and activities of daily life (9Qs).

**Scoring system:**

**Lifestyle habits:** The items of each group were scored 0, 1, and 2 for the responses never, sometimes, and always, respectively. For each, the scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into percent scores. The total score was 52. The lifestyle was considered to be present good if the percent score was 60% or more and poor if less than 60% based on statistical analysis.

**Abilities scale:** This scale has 9 items on a 4-point Likert scale from "able without difficulty" to "unable." These were scored from three to zero so that a higher score indicates better ability. The total score was 27. The scores were summed, and converted into a percent score. They were categorized into "high: 60%+," and "low: <60%." based on statistical analysis.

**Activities of Daily Life (ADL):** This scale has 9 items on a 4-point Likert scale from "able without difficulty" to "unable." These were scored from three to zero so that a higher score indicates more independence. The total score was 27. The scores were summed so that a higher score indicates more independence in DLAs. The scores are categorized into "independent: 60%+" and "dependent: <60%." based on statistical analysis.

**Tool III:** Psychological distress scale was adopted by (Kessler et al) to assess level of psychological distress among rheumatoid arthritis clients. The scale consists of ten questions asking about certain distressful feelings during the last 4 weeks such as nervousness, hopelessness, depression, worthlessness.

**Scoring system:**

**Stress scale:** This tool has 10 statements on a 5-point Likert scale scored 0, 1, 2, 3, and 4 for the responses never, rarely, sometimes, often, and always, respectively. The

total score was 40. The scores of the items were summed-up and the total divided by the number of the items, giving a mean score, which was converted into a percent score. The stress was considered to be high if the percent score was 60% or more and low if less than 60%.

#### **Content validity & Reliability:**

The validity of data collection tools was tested by five experts from the Community Health Nursing and Medical Surgical Department, Faculty of Nursing, Zagazig University and experts from Chemical Biology, Faculty of Medicine to assess clarity, relevance, application, comprehension, and understanding of the tools, all recommended modifications on the tools were done. Reliability of the proposed tools was done by Cronbach's Alpha test; it was 0.979 for tool (I), 0.980 for tool (II), and 0.780 for tool (III).

#### **Field work:**

Upon securing all official permissions, the process of data collection was started from October 2016 to January 2017. The researcher first introduced herself and explained the purpose of the research briefly to all clients at rheumatoid outpatient clinic at Zagazig university hospitals. Each client was interviewed individually in the rheumatoid outpatient clinic after explanation the purpose of the study and takes their oral consent, and the researcher read each item of the study questionnaire. The time consumed for answering the study questionnaire ranged from 30-40 minutes. The researcher performed the fieldwork three days weekly (Saturday, Monday and Wednesday).

#### **Pilot study:**

Before performing the main study, a pilot study was carried out on 10% (15 clients) of the study sample. The purpose of pilot study was to test the questions for any ambiguity, practicability, applicability, and feasibility of the tool and then the necessary modification were done. It also helped the researcher to determine the time needed for filling out the forms. Those who shared in the pilot were excluded from the main study sample.

#### **Administrative and ethical considerations:**

An official request to conduct the study was directed from faculty of Nursing, Zagazig University to director of Outclient Clinic. It was done by obtaining an official permission from the directors of Zagazig University Hospitals in which the study will be conducted. A simple explanation about the aims of the study was illustrated to them. Oral consent notifying client's agreement to share in this study. The researcher emphasized in the consent that the participation was voluntary, and any clients can withdraw at any time without any need to justify his/her decision, any raised question will be answered, and the collected data will be treated confidentially and will be used only in the current study.

#### **Statistical design:**

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations and medians for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the scales through their internal consistency. Qualitative categorical variables were compared using chi-square test. Whenever the expected values in one or more of the cells in 2x2 tables cross-tables, no test could be applied whenever the expected value in 10% or more of the cells was less than 5. Spearman rank correlation was used for assessment of the inter-relationships among quantitative variables and ranked ones. In order to identify the independent predictors of the various scores, multiple linear regression analysis was used, and analysis of variance for the full regression models done. Statistical significance was considered at p-value <0.05.

#### **Results:**

**Table 1:** Socio-demographic characteristics of clients in the study sample (n=150), revealed that the age

ranged from 18 to 60 years, with median 45.0 years. Additionally 64.7% of them were females. Furthermore 68.0% of them were married. Regarding the education, 35.3% of clients with rheumatoid arthritis were illiterate and 30.7% were worker.

**Table 2:** Shows that 78.0% of clients' lives with their families. In addition, 83.3% of them belonged to rural areas. Considering clients income 64.0% of clients had sufficient income, and 96.0% of them were nonsmokers.

**Table 3:** Regarding rheumatoid arthritis manifestation among clients in the study sample table 4 reveals that the number of symptoms ranged between 0-3 with median 2.0. The most common symptom was pain 82.7% and 58% with stiffness. The median number of joints affected was 6.0. Furthermore, 61.3% of clients reported that the remission of their illness occur every more than two weeks, whereas 69.3% had relapse every two weeks.

**Table 4:** Dietary intake and body mass index (nutritional status) of clients, reveals that the highest recommended dietary intake is the legumes (63.3%), while the lowest is the meat (2.0%). Moreover, 94.7% of clients with no balanced diet. As well, the body mass index of them ranged between 17.2-45.4 and 46.7% of them were obese.

**Table 5:** lifestyle habits of RA clients shows that 71.3% had good food habits, 95.3% had poor exercise habits. Additionally, 72% of them had poor compliance to treatment, 66.7% had smoking, and 80% of total lifestyle habits were poor.

**Table 6:** Abilities, independence in activities of daily life, and stress among clients in the study sample table 8 indicates that 88.7% with high abilities, 84.7% of them was independent to activities of daily life, and 48.0% with high stress.

**Table 7:** Relations between clients' food habits and their socio-demographic characteristics, demonstrates that only a statistically significant relation between clients' food habits and residence ( $p < 0.001$ ). It is evident that the percentages of

clients with poor food habits were higher among those in urban areas.

**Table 8:** Illustrates that urban residence was statistically significant independent positive predictor of stress score, while income was the statistically significant independent negative predictor. They explain 6% of the variation in this score, while none of the other clients' characteristics had a significant influence on it.

#### **Discussion:**

Autoimmune diseases represent increasing threats to public health around the world because their prevalence is rising in developing as well as more developed countries, Quah<sup>(18)</sup>. Regarding socio-demographic data, the targeted population in the current study was the rheumatoid arthritis clients aged 18-60 years. This age group was selected because early symptoms begin at this age and the immune aging process is accelerated with rheumatoid arthritis. Many of the similar studies involved clients in the same age range such as the study of Santos et al<sup>(19)</sup>.

Considering socio-demographic characteristics of clients in the study sample, their age ranged from 18 to 60 years, with median 45.0 years. Additionally the majority of them were females. Furthermore the majority of them were married. Regarding the education, less than half of clients with rheumatoid arthritis were illiterate and nearly the half were worker whereas 56.7% were unemployed/house wife. The majority of them belonged to rural areas, and most of them were nonsmokers. The most common symptom was pain and stiffness. Furthermore, 61.3% of patients reported that the remission of their illness occur every more than two weeks, whereas 69.3% had relapse every two weeks.

Concerning the answering research question regarding the dietary intake and body mass index (nutritional status) among rheumatoid arthritis clients, the finding of the present study revealed that the highest recommended dietary intake is the legumes. In the

same line, consumption of legumes has been shown to reduce levels of inflammatory markers Lefevre & Jonnalagadda<sup>(20)</sup>. Moreover, the results of the present study interpreted by Berube et al<sup>(21)</sup> assess the diet quality of individuals with rheumatoid arthritis and found that 66.7% of them met the maximum score for legumes. Standard serve of recommended intake of legumes is 500KJ Australian Dietary Guidelines<sup>(22)</sup>. This finding might be due to the most of studied sample live in rural area where legumes available. As well as, legumes are basically a family of vegetables or plants and it hold significant quantity of iron, zinc, and magnesium.

The present study revealed that the minority of the study sample compliance to recommended intake of meat. This study finding highlighted the urgent need for implementing of educational intervention about nutritional status for RA clients. Meat triggers or worsens the symptoms of RA, high intake of red meat and total protein associated with a risk of developing inflammatory RA Mclaughlin<sup>(23)</sup>. This result contrary with Di Giuseppe et al<sup>(24)</sup>, found that the prevalence of RA is also higher in countries with higher consumption of red meat (>58 vs <25.5 g/day). Additionally, Australian Dietary Guidelines<sup>(22)</sup> reported that the recommended intake of meat is 500-600kJ. In the same context, Clinton et al.<sup>(25)</sup> found that the majority of RA clients in the study compliance to recommended intake of meat. The contradiction with this study might be due to differences of settings.

Concerning the intake of dairies, less than one fifth of client's compliance to recommended intake of dairies. This finding was in agreement with Olayiwola et al<sup>(26)</sup>, found that only 7% of RA client's compliance to recommended intake of dairy product. Furthermore, a study conducted by He et al<sup>(27)</sup> found that the lower intakes of dairy products may associate with RA development. This finding might be due to lack of awareness about dairies recommended intake.

The current study revealed that about one fifth of clients' compliance to recommend of vitamin D rich, This finding was congruent with Rai et al<sup>(28)</sup> who evaluate the vitamin D status in rheumatoid arthritis clients and found that 16% of them were significantly recommended to vitamin D levels. Similarly, Holick<sup>(29)</sup> mentioned that vitamin D has been implicated in a decreased risk of autoimmune disease especially RA. This finding might be due to more than two thirds of the studied sample exposure to relapse every two weeks. Consequently, active disease would be less likely to be outside, and would get less sun exposure.

In the present study, less than one fifth of client's compliance to recommended intake of fruits & vegetables. This result was in agreement with AL-Qauhiz<sup>(30)</sup> reported only 17.2% consumed fruit & vegetables. Similarly, AL-Otaibi<sup>(31)</sup> found that 22% of them consuming fruits & vegetables. In the same line fruits and vegetables play an important role in diet owing to their protective action against autoimmune diseases especially RA disease Di Giuseppe et al<sup>(24)</sup>. This finding might be due to lack of information about the role of fruits & vegetables for reducing the inflammation and prevent the development of RA..

Additionally, experts have recommended a daily intake of least 400g of fruit and vegetables, Augodu<sup>(32)</sup>. A serve of fruit is approximately 150g (350kJ) according to Australian Dietary Guidelines<sup>(22)</sup>. Moreover, consumption of the highest amounts of fruit and vegetables combined (more than 275 g a day), fruit (more than 176 g a day), and vegetables (more than 113 g a day), in addition, increased consumption of cooked vegetables might reduce the risk of rheumatoid arthritis, Bokhari<sup>(33)</sup>.

In the present stud the majority of studied RA had not balanced diet. This finding is to some extent consistent with Sharma<sup>(34)</sup> reported that nutritional imbalance has been observed with the clients with rheumatic diseases. Conversely, AL-Nohair<sup>(35)</sup>, who assess the dietary /habits, physical activity and body mass index, and mentioned that

68% of them were eating healthy food. Additionally, this finding was in agreement with Australian Dietary Guidelines<sup>(22)</sup>, emphasized that there is no diet that can cure RA, a healthy balanced diet is the best. Furthermore, Arthritis Foundation National Office<sup>(36)</sup> reported that RA diet should be centered on plant-based foods. Approximately two-thirds of diet should come from fruits, vegetables and whole grains. The other third should include low-fat dairy products and lean sources of protein. This finding might be due to the lack of educational intervention about healthy diet regarding RA.

In the present study regarding body mass index the current study revealed that the highest of RA clients were obese;. This finding was in agreement with Lombard et al<sup>(37)</sup>, found that 45.9% of the population with RA was classified as obese. Additionally, Association of UK Dietitians<sup>(38)</sup> mentioned that the most important relationship between diet and RA is weight. Excess weight is harmful to joint health. So lose the excess weight by combining healthy eating with regular exercise. this might be due to the minority of them had recommended intake of cereals. Furthermore, the majority of them had poor exercise habits. As well, excess body weight increases the load on joints and can make movement more difficult, and a voiding being active because of pain can lead to muscle loss and weight gain overtime.

On the contrary, the result was in disagreement with Ajeganova et al<sup>(39)</sup>, found that 15.8% of people with RA the classified as obese. The contradiction with this study might be due to differences of culture. Concerning the answering research question regarding lifestyle habits among rheumatoid arthritis clients, the findings of the present study revealed that more than two thirds of RA clients had good food habits; this finding is consistent with Tirodimos et al<sup>(40)</sup>, assessed the eating habits and some health-related behaviors, and found that the study group had higher score of food habits. Additionally, Çitozi et al<sup>(41)</sup> evaluated eating habits and behaviors and reported

that 62% of clients had satisfactory eating habits. On the contrary, this finding were disagreement with the study by Awosan et al<sup>(42)</sup>, who assess dietary pattern, lifestyle and nutrition status, and demonstrated high prevalence of unhealthy eating habits.

As regards to exercise habits, the current study results revealed that the majority of RA clients had poor exercise habits; This finding was in agreement with Lang et al<sup>(43)</sup>, who found that 78.9% of RA clients were physically inactive. Similarly, a study conducted by AL-Nohair<sup>(35)</sup>, who reported a high prevalence of poor exercise habits among clients. This was supported by Sandberg et al<sup>(44)</sup> reported that physically active individuals seem to present with milder rheumatoid arthritis, which adds to the evidence of beneficial effects of physical activity on inflammatory diseases. this might be due to most of RA clients in the present study suffering from pain and more than half of them had stiffness of their joints that prevent exercise.

Regarding compliance to treatment, the present study revealed that RA clients had poor compliance to treatment, This finding consistent with Xia et al<sup>(45)</sup> who assess treatment adherence to disease-modifying anti rheumatic drugs in Chinese and found that 62% of clients with RA were not compliant to their treatment this might be due to high percentage of relapses occurrence of them. As well, the high percentage of them was low educated. Moreover, fear of side effects, non-availability of free drugs in hospital pharmacy and cost of medications, lack of awareness about the disease and lack of belief in medication effectiveness.

Additionally, Gadallah et al<sup>(46)</sup> who assess RA clients' adherence to treatment, and found that 90.6% low adherent to treatment. On the other hand, this study disagreement with Ragab et al<sup>(47)</sup> who evaluate the effect of early treatment with disease-modifying anti-rheumatic drugs and treatment adherence on disease outcome in RA clients, and found that 62.5% of clients adherent to treatment. The contradiction

with this study might be due to differences of study sample.

Concerning the total lifestyle among RA clients in the present study, the majority of them had poor lifestyle habits. This finding in agreement with Awosan et al<sup>(42)</sup>, found that the high prevalence of unhealthy lifestyle among RA clients. Furthermore, Younis<sup>(48)</sup>, assessed the healthy lifestyle habits and relationship between client's characteristics and healthy lifestyles habits, and found that low score in the total healthy lifestyle habits among RA clients. In addition to that, a study conducted by Lang et al<sup>(43)</sup> mentioned that 79% of clients with RA had insufficient physical activity and poor total lifestyle habits. This might be due to poor exercise habits, poor compliance to treatment, and no balanced diet.

Concerning the answering of research question regarding abilities, and independence in activities of daily life, and stress among rheumatoid arthritis clients, the current study revealed that the majority of them had high abilities. This finding was in agreement with Verma et al<sup>(49)</sup> who observe the functional ability of the hand with upper limb function and quality of life in clients with rheumatoid arthritis, and found that 46.7% of them were in class I of disease completely able to perform usual activities of daily living. This is might be due to the majority of them from rural residences that try to adjust with their disease.

Conversely, this finding was disagreement with Natalia et al<sup>(50)</sup> in Argentina, who analyze the prevalence of work disability in RA Argentinian clients, and found that high prevalence of RA had low ability. In the same line, Sokka et al<sup>(51)</sup> who reported that work disability rates remain high among people with RA. In addition, Abogamal et al<sup>(52)</sup> who assess disability among Egyptian female clients with rheumatoid arthritis, and found that high prevalence of low ability among rheumatoid arthritis.

Concerning the relation between clients' food habits and their socio-demographic characteristics, the current study revealed that a statistically significant relation between clients' food

habits and residence. This finding was in agreement with Krige et al<sup>(53)</sup> found that significant relationships between food habits and socio-demographic factors as residence. This findings might be due to rural people were with regular eating time.

The present study revealed that statistically significant relation of good compliance to treatment with married clients, which could be explained by family support to help the client to comply with medications. This finding was in agreement with Joho<sup>(54)</sup> found that married RA clients (61.0%) were more compliant than single clients. Similarly, a study was conducted by Salam & Siddiqui<sup>(55)</sup> who studied the socio-demographic profile and assessed the socio-demographic determinants of compliance among clients and found that married peoples were more compliant to treatment. In the same line, a study conducted by Majeed<sup>(56)</sup> who determine factors affecting treatment compliance among respondents and found that 68% of the them were married who had highest ratio of acquiescence toward therapy compliance.

#### **Conclusion:**

The study findings indicated the highest recommended dietary intake is the legumes, while the lowest are the meat and vitamin -A rich. Meanwhile the majority of them are unbalanced diet. Additionally, less than half of them were obese. Moreover, majority of them had poor exercise, and poor total lifestyle habits. As well, nearly three quarter had low compliance to treatment. Furthermore, the findings showed that their highest independent is in the areas of activities of daily life and abilities, and more than two fifths of rheumatoid arthritis participants have stress. Statistically significant relations between participants' stress and their food habits, participant's food habits and residence. Urban residence is a positive predictor of disability score, while income is a negative predictor. The female gender and lifestyle habits are negative predictors of the score of dependence

#### **Recommendations:**

In the light of the main study findings, the following recommendation is proposed.

- Elaborate an educational program on nutritional status and lifestyle for rheumatoid arthritis clients.
- Develop an exercise program to improve joint function ability and reduce pain regarding clients with rheumatoid arthritis.
- Psychological support to reduce stress among clients with rheumatoid arthritis.
- Further study to improve the effectiveness of such client educational program on compliance to recommended dietary intake, lifestyle and therapeutic management.

**Table 1:** Frequency Distribution of Socio-demographic characteristics of clients in the study sample (n=150)

Socio-demographic characteristics	Number	Percent
Age:		
<40	44	29.4
40-50	53	35.3
50+	53	35.3
Range	18.0-60.0	
Mean±SD	44.4±10.4	
Median	45.0	
Gender:		
Male	53	35.3
Female	97	64.7
Marital status:		
Unmarried	48	32.0
Married	102	68.0
Education:		
Illiterate	53	35.3
Read/write	19	12.7
Basic	18	12.0
Secondary	44	29.3
University	16	10.7
Job:		
Employee	19	12.6
Worker	46	30.7
Unemployed/housewife	85	56.7

**Table 2:** Frequency Distribution Of Socio-economic characteristics of clients in the study sample (n=150)

Items	Number	Percent
Live with:		
Alone	7	4.7
With children	26	17.3
With family	117	78.0
Residence:		
Rural	125	83.3
Urban	25	16.7
Income:		
Insufficient	54	36.0
Sufficient	96	64.0
Smoking:		
No	144	96.0
Yes	6	4.0
Smoking years: 3	6	100.0

**Table 3:** Frequency Distribution of rheumatoid arthritis manifestations among clients in the study sample (n=150)

Items	Number	Percent
Symptoms: <sup>@</sup>		
Pain	124	82.7
Stiffness	87	58.0
No. of symptoms:		
	Range	0-3
	Mean±SD	2.0±0.8
	Median	2.0
No. of joints:		
	Range	1-12
	Mean±SD	6.4±2.3
	Median	6.0
Remissions:		
None	1	0.7
2 weeks	57	38.0
More	92	61.3
Relapses:		
2 weeks	104	69.3
One-month or longer	46	30.7

**Table 4:** Frequency Distribution of dietary intake and body mass index (nutritional status) of clients in the study sample (n=150)

Items	Number	Percent
Recommended intake of:		
Meat	3	2.0
Dairies	16	10.7

Cereals	7	4.7
Legumes	95	63.3
Vit-D rich	27	18.0
Vit-A rich	12	8.0
Fruits	7	4.7
Vegetables	17	11.3
Balanced diet:		
Yes	8	5.3
No	142	94.7
Body mass index (BMI):		
Normal (<25)	30	20.0
Overweight (25-<30)	50	33.3
Obese (30+)	70	46.7
Range	17.2-45.4	
Mean±SD	30.2±6.3	
Median	29.6	

**Table 5:** Frequency Distribution of lifestyle habits of clients in the study sample (n=150)

Items	Number	Percent
Food habits:		
Good	107	71.3
Poor	43	28.7
Exercise habits:		
Good	7	4.7
Poor	143	95.3
Compliance to treatment:		
Good	42	28.0
Poor	108	72.0
Smoking habits: (n=6)		
Yes	4	66.7
No	2	33.3
Total lifestyle habits:		
Good	30	20.0
Poor	120	80.0

**Table 6:** Frequency Distribution of abilities, independence in Activities of Daily Life (ADL), and stress among clients in the study sample (n=150)

Items	number	Percent
Abilities:		
High	133	88.7
Low	17	11.3
Activities of Daily Life (ADL):		
Independent	127	84.7
Dependent	23	15.3
Stress:		
High	72	48.0
Low	78	52.0

**Table 7:** Relations between clients' food habits and their socio demographic characteristics

Items	Food habits				X <sup>2</sup> test	p-value
	Good		Poor			
	No.	%	No.	%		
Age:						
<40	33	75.0	11	25.0		
40-50	37	69.8	16	30.2	0.41	0.81
50+	37	69.8	16	30.2		
Gender:						
Male	33	62.3	20	37.7		
Female	74	76.3	23	23.7	3.30	0.07
Marital status:						
Unmarried	84	70.8	14	29.2		
Married	73	71.6	29	28.4	0.01	0.93
Education:						
None	50	69.4	22	30.6		
Basic/Secondary	48	77.4	14	22.6	--	--
University	9	56.3	7	43.8		
Job:						
Employee	10	52.6	9	47.4		
Worker	31	67.4	15	32.6	5.26	0.07
Unemployed/housewife	66	77.6	19	22.4		
Live alone:						
No	102	71.3	41	28.7		
Yes	5	71.4	2	28.6	Fisher	1.00
Residence:						
Rural	97	77.6	28	22.4		
Urban	10	40.0	15	60.0	14.40	<0.001*
Income:						
Insufficient	40	74.1	14	25.9		
Sufficient/saving	67	69.8	29	30.2	0.31	0.58
Smoking:						
No	104	72.2	40	27.8		
Yes	3	50.0	3	50.0	Fisher	0.35

**Table 8:** Best fitting multiple linear regression model for clients' disability score

Items	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	15.69	4.44		3.537	0.001	6.92	24.46
Urban residence	9.25	3.39	0.22	2.727	0.007	2.55	15.96
Income	-4.92	2.46	-0.16	-2.002	0.047	-9.78	-0.06

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