Changes in Health Related Quality of Life in Rheumatoid Arthritis Patients, Zagazig University Hospital; An interventional study

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Abstract: Rheumatoid arthritis is a chronic systemic autoimmune disease, strike during the most productive years of adulthood, between the ages of 20 and 40 years, the main aim of management is to suppress disease activity, prevent loss of function, control joint damage, maintain pain control and enhance self-management and to evaluate the impact of the condition on the patient's quality of life. Self-management programs are effective non-drug treatments of Rheumatoid Arthritis, patients' education about its treatments, exercise and relaxation approaches, joint protection, foot care and nutritional recommendation is being of crucial importance. **The study** was done to assess functional status, disease activity and quality of life in rheumatoid arthritis patients and to design, implement and evaluate a health education program for rheumatoid arthritis patients about self-management for better quality of life through application of transtheoritical model. This interventional study was carried out on a sample of 54 rheumatoid arthritis patients attending the outpatient clinic of rheumatology and rehabilitation department, at Zagazig University hospital during academic year (2015-2016). The Study carried out through 3 phases: **1st phase (pre-intervention)** which was conducted through the following tools; Questionnaire for sociodemographic characteristics, medical history of the disease, knowledge about rheumatoid arthritis, practice of self-care and Staging of behavior change readiness, World health organization group Quality of life instrument (WHOQOL-BREF), The modified health assessment questionnaire (MHAQ) and Disease activity score 28 (DAS-28) for measuring disease activity, **2nd phase (intervention phase)**: Self-management rheumatoid arthritis educational program included the disease overview, overview of medications, exercise, nutritional recommendations and joint protection techniques. **3rd phase (Post intervention):** Post-test was done after 3 months of intervention and Follow up test after 6 months of intervention. **Results**: The total RA patient's knowledge had changed throughout the program to be (72.2%) after 3 months and 97.5% after 6 months of the program, also total practice among RA patients was 34.04% before program and increased to be 97.66% by the end of the educational program. The education program had also positive effect on improving the patient's health status through improving their quality of life, as knowledge had statistical significant positive correlation with practice throughout the program, and with quality of life at post program (r= 0.429), Also practice had statistical significant positive correlation with quality of life at post program and during follow up. **In conclusion**: Continuous use of self-management behaviors plays an important role in controlling RA patients; therefore, should be considered in designing, planning, implementing programs.

[Mona S. Hamed, Amal A. El badawy; Hanan M. ELtokhy; Mona M. Aboserea; Heba A. Seliem. **Changes in Health Related Quality of Life in Rheumatoid Arthritis Patients, Zagazig University Hospital; An interventional study.** *J Am Sci* 2017;13(5):40-54]. ISSN 1545-1003 (print); ISSN 2375-7264 (online). http://www.jofamericanscience.org. 7. doi:10.7537/marsjas130517.07.

Keywords:quality of life, behavioral change, health education, rheumatoid arthritis, transtheoritical model, stages of change, self-management care practices, exercise, dietary recommendation for RA, Arthritis care.

1. Introduction

Rheumatoid Arthritis is a chronic systemic disease that affects the joints, connective tissues, muscle, tendons, and fibrous tissue. It tends to strike during the most productive years of adulthood, between the ages of 20 and 40, and is a chronic disabling condition often causing pain and deformity **(WHO, 2014).** It is one of the most common forms of autoimmune disease and affects over 21 million people worldwide **(Davis et al., 2010)**. The prevalence varies between 0.3% and 1% and is more common in women and in developed countries **(WHO, 2014). It affects** 1.3 million U.S. adults **(Helmick et al., 2013)**. **In Egypt**, prevalence was estimated to be 0.28% in al Minia governorate rural areas (**Abdel-Nasser et al., 2009).** The main aim of management in early disease is to suppress disease activity, prevent loss of function, control joint damage, maintain pain control and enhance self-management **(Luqmani et al., 2006),** however, in established disease there is a need to address complications and associated co morbidity and evaluate the impact of the condition on the patient's quality of life **(Kobelt et al., 2005).** The primary consequences of RA, in both established and early disease, are more restricted employment opportunities, increased social dependency, a shift in family roles, reduced recreational activities, and an inability to perform daily activities in what is considered to be a normal manner **(Wikstrom and Jacobsson, 2005).** The impact of RA is wide-ranging, causing not only physical problems but also significant negative impact on quality of life. Twice as many women are generally affected by RA than men, and the disease also impacts on the average life expectancy, shortening it by three to seven years **(WHO, 2000).** Within 10 years on onset, at least 50% of patients in developed countries are unable to hold down a full-time job **(WHO, 2014).** Although health care professionals can prescribe or recommend treatments to help patients manage their rheumatoid arthritis, the real key to live well with the disease lies with the patients themselves. Research shows that people who take part in their own care report less pain and make fewer doctor visits. They also enjoy a better quality of life **(NIH, 2013).**

Objectives: this study aimed to improve the quality of life in Rheumatoid Arthritis patients through the following objectives: 1-To assess functional status, disease activity and quality of life in rheumatoid arthritis patients in Zagazig university hospital before and after intervention. 2- To design, implement and evaluate a health education program for rheumatoid arthritis patients in Zagazig university hospital about self-management for better quality of life through application of transtheoritical model. 3- To apply the transtheoritical model of change to the studied group.

2. Subjects and methods

Study design and setting: Quasi experimental interventional study conducted in outpatient clinic of rheumatology and rehabilitation department, at Zagazig University hospital during the Academic year 2015-2016.

Target population: The study included RA patients with the following **inclusion criteria**:

Above 16 years old and less than 50 years old, both sexes, diagnosed with Rheumatoid arthritis according to 2010 criteria of American College of Rheumatology. With duration of disease from 2-10 years.

The exclusion criteria were: Patients with complication and Patients with co-morbidities.

Sample size and Sampling technique: The sample size was calculated to be **54** patients using OPEN EPI I program (Epidemiological information package) software version 6.1, according to the following data: The mean of performing self-management behavior among treatment group before intervention was 5.31±3.35 and after intervention was 8.34±3.48 (**Andrew and Dominic, 2004**). At 95% confidence interval and 90 % statistical power of test. Systematic random sampling was used. Average number of patients attending to the clinic daily about 20 patients, the investigator attended to the clinic two days per week, accordingly the K interval which was determined after a random selection, then every 2 nd patient coming to the clinic in those days and fulfilling the inclusion criteria was enrolled in the study.

Study Description and tools:

1-Preparation stage: Based on review of literature at this stage the tools used in the study were constructed to fit the use on Egyptian patients. Before the start of the study, the tools have been pre-tested several times to ensure that the wording, format, length, and sequencing of questions are appropriate. The assessment tools were translated in Arabic then using back translation by the help of 3 language experts. The dummy tables for results was prepared.

2-Pilot study: it was conducted on 10 patients, to evaluate the content of the tool, as well as to estimate the time needed for data collection and clarity of the tools, the necessary modifications were done, namely rephrasing, utilizing simpler semantic for the statements, finally the scoring system was tested and results of pilot sample were presented in tables and graphs.

3- Study description: 3 phases.***1st phase (pre-intervention): for*** 2 months with applying the assessment tools which composed of the following: **A.** Sociodemographic characteristics and socioeconomic status was calculated according to **El-Gilany et al., 2012**. **B.** Assessment of functional status and disease activity by the modified health assessment questionnaire (MHAQ) scales for evaluation of the functional status **(Maska et al., 2011). And** Disease activity score 28 (DAS-28) for measuring disease activity **(Heegaard et al., 2013).**

C. World health organization group Quality of life instrument (WHOQOL-BREF), generic for quality translated in Arabic and previously validated for use in Arab populations **(Ohaeri and Awadalla, 2009). D.** A designed questionnaire to measure: medical history of the disease (duration of disease, family history, type of current treatment regimen, frequency of health service utilization, adherence and compliance to treatment), Knowledge about rheumatoid arthritis definition, causes, factors aggravating symptoms, symptoms of disease, complications and various treatment regimens **(Hennell et al., 2004).** Knowledge about rheumatoid arthritis specific diet, attitude towards following diet **(Kennedy, 2015)** or practicing exercise for arthritis and arthritis care practice of patients **(Arthritis Foundation, 2015).** Staging of behavior change readiness for exercise **(Pekmezi et al., 2010).**

2nd phase (intervention phase): *7 Months.*

Self-Management Rheumatoid Arthritis Educational Program with on learning about the disease; overview of medications and compliance to ttt and blood tests; tolerance of daily activity; activity and exercise; nutrition and healthy eating; joint protection techniques; Health service utilization; psychological status in RA**.**

3rd phase: (Post intervention): All patients were subjected to the assessment tools to evaluate the program 2 times: 1- Post-test was done after 3 months of intervention.2- Follow up test after 6 months of intervention. And six cases were missed during follow up.

Data Management: Tools for data collection and scoring system for each was done as follow:

1-*Socioeconomic status (SES) according to El-Gilany et al., 2012:* Total scoring of the following 7 domains (cultural - family - Economic - Occupation – Family possessions - Home sanitation - Health care) were done. **SES was** classified into 4 classes depending on the quartiles of the score calculated into Very low (1 st quartile ≤ 21), Low (2 ndquartile ≤ 42), Middle (3 rd quartile ≤ 63) and High level (4 thquartile ≤ 84).

2- *Functional disability using Modified Health Assessment Questionnaire (MHAQ):* Eight items regarding daily activity, such as; Dressing, washing, walking, and getting in and out of bed were rated on a 4-point Likert scale where The MHAQ may be calculated by hand or with a calculator by adding all scored items together (at least 6 of the 8 items are required) and dividing by the total Number of items answered to obtain the final score **(Pincus et al., 2005).** MHAQ scores according **(Maska et al., 2011)** were: From0.0 to ≤ 0.3 was considered normal. And **Functional disability** categories were:

- Mild (MHAQ < 1.3),
- Moderate (1.3 ≤ MHAQ < 1.8) and
- Severe (MHAQ ≥ 1.8) functional losses.

3- *Disease Activity Score 28 (DAS-28):* The DAS28 is a composite score derived from Count the number of swollen joints, Count the number of tender joints, Measure the erythrocyte sedimentation rate (ESR), and 'global assessment of health'. **Scoring:** These results are then fed into a complex mathematical formula to produce the overall disease activity score, the investigator used online calculator via the internet.

Score interpretation according to (Kiely, 2014):

- Greater than 5.1 implies high disease activity,
- Between 5.1 and 3.2 = moderate disease activity.
- Less than 3.2 = low disease activity.
- Less than 2.6 = remission.

4- World Health Organization Quality Of Life (WHOQOL- BREF 26): it contains a total of 26 questions. To provide a broad and comprehensive assessment of four domains for a quality of life profile In addition, two items from the overall quality of Life and General Health facet have been included **(WHO, 2016). 26 questions** which were grouped according to response format and were rated on a 3-point Likert scale (modified by the researcher from the original version which is a 5-point Likert scale) where:

1 _ for low response format (Not satisfied, No, bad, few, never).

2 _ for moderate response format (Neither poor not good, moderately, often).

3 _ for high response format (very good, very satisfied, extremely).

Scoring the WHOQOL-BREF (WHO, 2016): domain scores are scaled in a positive direction (i.e. higher scores denote higher quality of life). The mean score of items within each domain is used to calculate the domain score with the reverse of negatively phrased item also raw domain calculated score was converted to transform score using to be comparable with the scores used in the WHOQOL-100.

5- Scoring of Knowledge: knowledge about the disease (Definition, Causes, Aggravating factors, Symptoms and signs, Complication, Treatment, Pain relief measures, Dietary regimen, Benefits of physical exercise) and the overall knowledge:

- Questions which permit more than one answer were coded as follow:
  - 2 degrees for complete Right answer.
  - 1 degree for incomplete Right answer.
  - Zero degree for Wrong answer or don't know.
- Other questions, only one answer was correct so:
  - 1 degree for Right answer.
  - Zero degree for Wrong answer or don't know.

Scoring: knowledge was calculated in each question and total knowledge was scored and classified based on **Median** as cutoff point to be:

- **Satisfactory at** 50 -100 %.
- **Unsatisfactory at** less than 50%**.**

6- Scoring of practice: Percentage Distribution of patients' adequate level of RA care practice were scored either adequateor inadequate regarding regular intake of medication, avoiding non- prescribed medication, Regular medical follow up, Dietary regimen, Physical exercise, Pain relief, Care of stiffness, Care of edema, and Total practice.

7- Readiness for change according to Trans theoretical model: Trans theoretical model measure the temporal and motivational readiness to take action to modify a behavior as represented by five stages: precontemplation, contemplation, preparation, action and maintenance **(Di Noia et al., 2012).** Classification into stages of change was done according to algorism of classification **(HABITS lab, 2015).**

Statistical analysis: The collected data were analyzed by computer using Statistical Package of Social Services version 22 (SPSS) **(IBM, 2015)**, Data were represented in tables and graphs as frequencies and percentages. Suitable statistical tests of significance were used. The results were considered statistically significant when the significant probability was less than 0.05 ($P < 0.05$).

Administrative design and Ethical issues: 1- Approval for the study protocol from the institutional review board (IRB). 2- The local authority and manager of outpatient clinics, Zagazig university hospital was informed about the nature and steps of the study and written consent was taken.

2-The study group were informed about the nature and the purpose of the study and informed consent was taken before their participation. 3-The study group were not exposed to any harm or risk.4- Patient's data were confidential.

3. Results

Some Sociodemographic data and disease characteristics: The mean age of the studied group is 35.05±8.31years old, with a range from 18 to 49 years old. The majority of the studied group were females, married and not working (66.7%). The university level of education only represents 11.2%, and low social class constitutes 50%, the mean disease duration among the studied group is 6.05±3.32 years, with a range from 2 to 10 years. One third of the studied group have positive family history (33.3%), and also they don't seek medical advice on regular base, while half of the studied patients are visiting health care facilities once per month. **(Table 1),** the majority of the studied RA patients treated with Corticosteroids in combination with DMARDs (83.3%), and about two thirds of them treated with triple combined therapy (Corticosteroid + DMARDs + NSAIDs), Only 22.2% of them add nutritional supplements to the triple combined therapy **(figure 1).**

Disease activity and functional status: the mean total score of the disease activity among RA patients according to DAS28 decreased from (4.30±0.99) at the first assessment to (3.58±0.93) at the follow upassessment after 6 months with high statistical significant difference. **(Table 2),** the overall functional disability level was changed after application of the program with statistical significance difference where mild functional disability increased from 44.4% at the first assessment time to be 81.30% at the 3 rd assessment time after (6 months), while sever functional disability decreased from 16.7% at the preprogram assessment to be zero% at the follow up. **(Figure 2),** the percentage of RA patient who suffered from mild functional disability increased by about the half (46.2%) after 3 months later while those patients who suffered from moderate functional disability decreased by 32.37%, there is statistical significance difference regarding distribution of functional disability between post program application and at 3 rd assessment time (after 6 months) **(Table 3).**

Stages of change: regarding practicing exercise the RA patients before the application of the program were at the precontemplation (PC) and contemplation (C) stages with an equal percentage, but after the program application (72.2%) of them reach the action stage after 3 months, while after 6 months at the 3 rd assessment 68.75% of them were still in the Maintainace stages of change with highly statistical significant difference**.** **(Table 4),** regarding diet regimen the percentage of change in following special RA diet regimen after program application among the studied RA patients, where percentage of patients in the precontemplation phase decreased by (87.5%) at the 2nd assessment (3months) and number of patients in the contemplation phase decreased by 80%, after program half of patient (50%) were in action stage with high statistical significance **(Figure 3).**

Quality of life: the mean of total quality of life score in RA patients according to WHO-BREF 26 increased from (41.8 ± 9.37) at the first assessment to (52.44 ±7.32) at the follow up assessment after 6 months of the program with high statistical significance difference ($P < 0.0001$), and there is no statistical significance difference in categorization into Bad QOL or Good QOL throughout the program. **(Table 5),** physical health domain mean score in RA patients increased from (10.72 ± 3.21) before program to be (16.37 ± 2.76) after 6 months of the program with high statistical significance difference ($P < 0.05$). However, is no statistical significance difference in environmental health domain throughout the program **(Table 6).** RA patients are statistically significantly more likely to have good general quality of life after program (12.5%) than before the program (0%), also percentage of patients with moderate general health are (66.7%, 72.2% & 50%) throughout the program with highly statistical significance difference ($P < 0.05$). **(Table 7)**

Knowledge and practice: RA patients' satisfactory knowledge concerning name disease, definition, RA causes, complication, treatment and knowledge about aggravating factors, increased throughout the program, total satisfactory knowledge score is 16.7% before program increased to be 100% by the end of the program, with highly statistical significance difference ($P < 0.001$) **(table 8),** all of RA patients (100%) don't practice physical exercise and don't practice care of edema. While for the adequate level of RA patient practice, more than two third of them take medication regularly, avoid non- prescribed medication and follow up regularly. RA patients' practice concerning regular intake of medication, avoiding non-prescribed drugs, regular medical follow up, care of stiffness and care of edema increased adequately throughout the program, as well as the total adequate practice which increased by 100%, with highly statistical significance difference (P < 0.001). **(Table 9),** total RA patient's knowledge throughout the program are (19.8%,72.2% & 97.5%) respectively, as well as total percentage of practice among RA patients is 34.04% before program and increased to be 97.66% by the end of the program. Regarding percentage of change total knowledge increased by 2.5 times (264%) at the 2nd assessment time (3 months) while total practice increased by about 1.5 time. **(Figure 4).** knowledge had statistical significant positive correlation with practice throughout the program, and with quality of life at post program (r= 0.429), Also practice had statistical significant positive correlation with quality of life at post program and during follow up(r= 0.31 & r=0.34) respectively, while it had negative significant correlation with functional disability and disease activity score during post intervention and during follow up (r=-0.299 & r=- 0.357) respectively. This table reveals that there is statistical significant negative correlation between quality of life and disease activity (r= -0.708) and functional disability throughout the program. **(Table 10),** multiple liner regression model for total follow up quality of life score, the table demonstrates that age, disease activity score (DAS 28), functional disability score (MHAQ) and total knowledge score are statistically significant independent predictors of total follow up QOL score. **(Table 11).**

Table (1): Frequency distribution of sociodemographic characteristics of the Studied Rheumatoid Arthritis patients (No=54).

Characteristics of studied patients		**No (54)**	**Percentage %**
Age (years):	• >20	3	5.6
	• 20-	18	33.3
	• 30 and more	33	61.1
	Mean ± SD	35.05±8.31	
	Median (Range)	35.5(18-49)	
Sex	• Male	3	5.6
	• Female	51	94.4
Marital status	• Single	6	11.1
	• Married	48	88.9
Occupation	• Non-working /house wife	36	66.7
	• Unskilled manual worker	9	16.7
	• Skilled manual worker	3	5.6
	• Semiprofessional / clerk	3	5.6
	• Professional	3	5.6
Socioeconomic level	• Very low (1st quartile ≤21)	6	11.1
	• Low (2nd quartile ≤42)	27	50.0
	• Middle (3rd quartile ≤ 63)	21	38.9
	• High level (4th quartile ≤84)	0	0.0
Duration of disease(years)	Mean ± SD	6.05±3.32	
	Median(Range)	5(2-10)	
Family history	• Positive	18	33.3
	• Negative	36	66.7
Frequency of health care utilization	➢ **Not regular**	18	33.3
	➢ **Regular:**		
	• Once per month	27	50.0
	• Once every 3 months	9	16.7

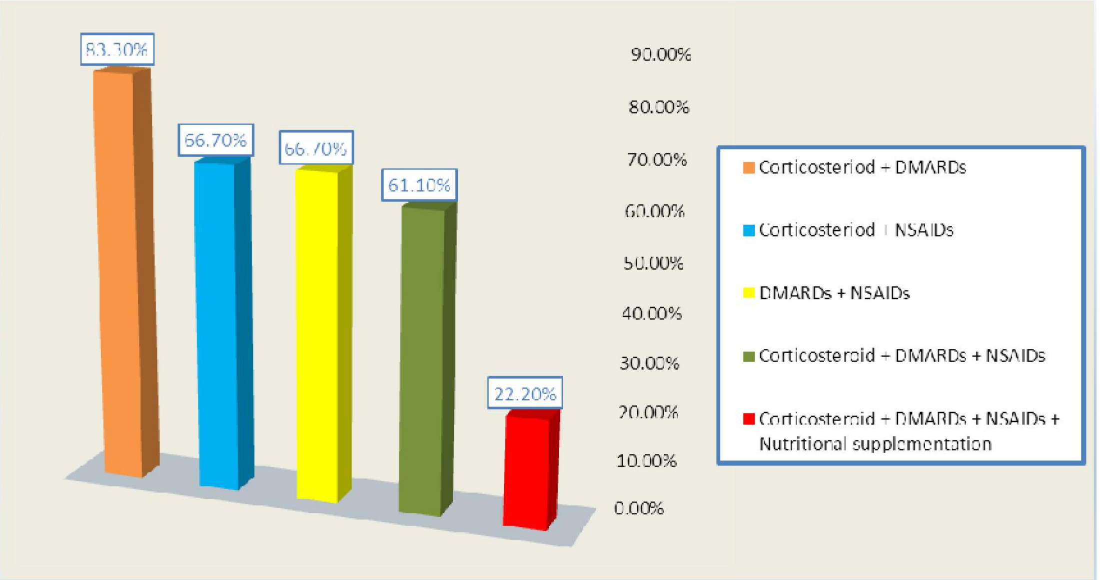
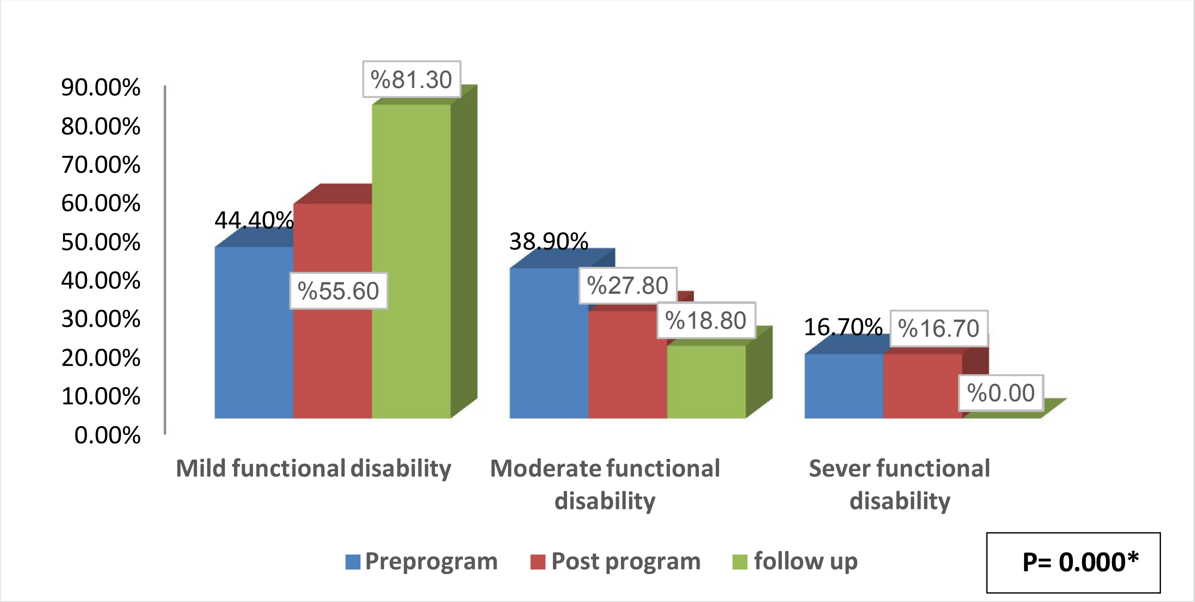


Figure (1): Distribution of studied patients regarding the current medical drugs combination

Table (2): Distribution of disease activity according to DAS 28 among the studied patients throughout the program.

Disease activity	**Pre-program (N=54)**	**Post (after 3 months) (N=54)**	**Follow-up (after 6 months) (N=48)**	Pre – post	Pre- FU
DAS 28 score					
Mean ± SD	4.30±0.99	3.85±0.95	3.58±0.93	**-6.04**	**-6.03**
Median(Range)	4.27(3-6.45)	3.50(2.5-5.6)	3(2.5-5)	**0.000***	**0.000***

Wilcoxon Signed Ranks Test



Test: Freidman test

Figure (2): Functional health assessment according to Modified Health Assessment Questionnaire “MHAQ” flow sheet of the studied patients throughout the program (No. = 54)

Table (3): Percentage of change in functional health assessment according to Modified Health Assessment Questionnaire "MHAQ" at follow up.

Overall functional disability	MHAQ				Percentage of change	Pre- FU
	Post-program		Follow up			
	N	%	N	%		
Mild (MHAQ < 1.3)	30	55.6	39	81.3	46.2%	17.08 **0.000*** **(HS)**
Moderate (1.3 ≤ MHAQ < 1.8)	15	27.8	9	18.8	-32.37%	
Severe (MHAQ ≥ 1.8)	9	16.7	0	0.0	-100%	

Wilcoxon Signed Ranks Test

Table (4): Distribution of the studied patients concerning practicing exercise according to stages of change throughout the program (No. = 54)

Stages of change	Pre		Post		Follow-up		Test p- value pre-post	Test p- value pre-FU
	NO. (54)	%	NO. (54)	%	NO. (48)	%		
• Stages of change • Pc yes No	30 24	55.6 44.4	0 54	0.0 100	0 48	0.0 100	**0.000*** **(HS)**	**0.000*** **(HS)**
• C yes No	24 30	44.4 55.6	3 51	5.6 94.4	3 45	6.25 93.75	**0.000*** **(HS)**	**0.0003*** **(HS)**
• P yes No	0 54	0.0 100	12 42	22.2 77.8	6 42	12.5 87.5	**0.002*** **(HS)**	**0.041*** **(S)**
• A yes No	0 54	0.0 100	39 15	72.2 27.8	6 42	12.5 87.5	**0.000*** **(HS)**	**0.041*** **(S)**
• M yes No	0 54	0.0 100	0 54	0.0 100	33 15	68.75 31.25	**0.479** **(NS)**	**0.000*** **(HS)**

PC: precontemplation, C: contemplation, P: preparation, A: action, M: maintenance

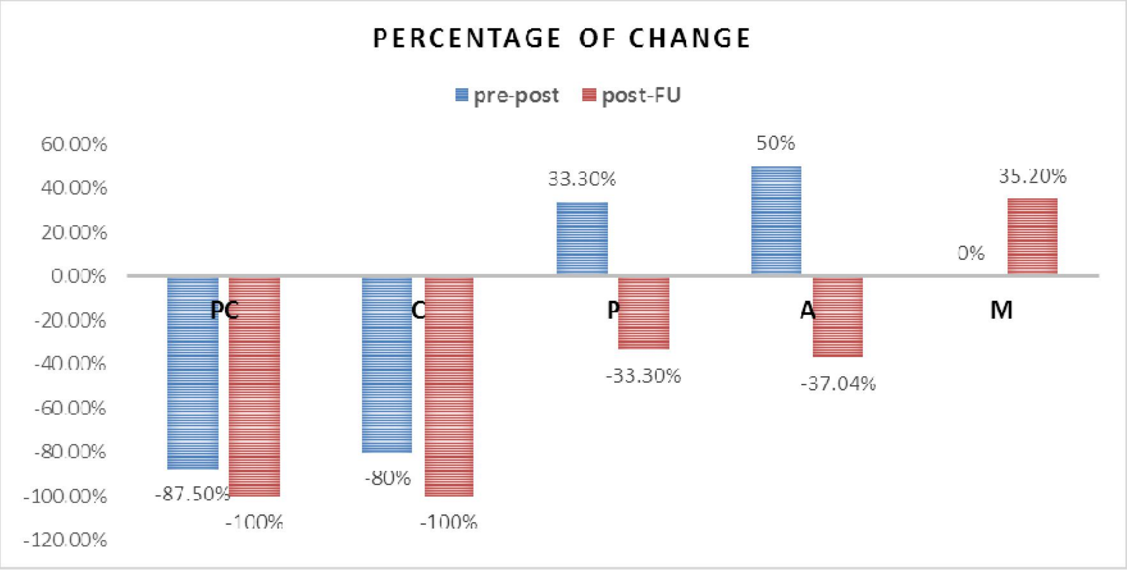


Figure (3): Percentage of change concerning diet regimen according to stages of change throughout the program (No. = 54).
PC: precontemplation, C: contemplation, P: preparation, A: action, M: maintenance

Table (5): Total quality of life according to WHOQOL – 26 BREF questionnaire among the studied patients throughout the program (No= 54).

Total quality of life	Pre		Post		Follow-up		Pre – post	Pre- FU
	NO. (54)	%	NO. (54)	%	NO. (48)	%		
• **Total QOL**								
▪ Bad QOL	27	50.0	30	55.6	24	50.0	0.250○	0.607○
▪ Good QOL	27	50.0	24	44.4	24	50.0	(NS)	(NS)
QOL score								
▪ Mean ± SD	41.8 ± 9.37		48.88 ± 6.65		52.44 ±7.32		-6.227◊	-6.039◊
▪ Median (Range)	41(28-68)		48(36-68)		51(43-73)		0.000*	0.000*

○ Mc Nemar's test *◊ Wilcoxon Signed Ranks Test*

Table (6): Quality of life according to WHO – 26 BREF questionnaire among the studied patients throughout the program (No=54).

QOL domains	QOL			Test#
	PRE	POST	FU	
Physical health domain Mean ± SD	10.72 ± 3.21	14.50 ± 2.16	16.37 ± 2.76	0.000*
Psychological health domain Mean ± SD	9.66 ± 2.67	12 ± 1.96	12.69 ± 2.01	0.000*
Social relationships Mean ± SD	5.78 ± 1.58	6.14 ± 1.20	6.12 ± 1.16	0.000*
Environmental domain Mean ± SD	12.43 ± 2.74	12.44 ± 2.65	12.75 ± 2.54	0.087

Test: #Friedman test

Table (7): Frequency percentage (%) for general quality of life and general health of WHOQOL – 26 BREF questionnaire among the studied patients throughout the program

Scale points/domain and facets	Time						Test P-value Pre-post	Test P-value Pre-FU
	Pre- program		Post -program		Follow-up			
	No.	%	No.	%	No.	%		
General QOL (Q1)								
▪ **Bad**	15	27.8	3	5.6	0	0.0	-3.464	-4.24
▪ **Moderate**	39	72.2	51	94.4	42	87.5	0.001	0.000*
▪ **Good**	0	0.0	0	0	6	12.5	(HS)	(HS)
General health (Q2)								
▪ **Bad**	12	22.2	3	5.6	0	0	-3.873	-4.973
▪ **Moderate**	36	66.7	39	72.2	24	50.0	0.000*	0.000*
▪ **Good**	6	11.1	12	22.2	24	50.0	(HS)	(HS)

Wilcoxon Signed Ranks Test

Table (8): Relation between patients' satisfactory knowledge about the disease and time of assessment throughout the program (No=54)

Satisfactory knowledge about RA	KNOWLEDGE time						Pre-Post P-value	Pre-FU P-value
	PRE		POST		FU			
	No	%	No	%	No	%		
Name of disease	51	94.4	54	100.0	48	100.0	0.250	0.250
Definition	15	27.8	51	94.4	48	100.0	0.000*	0.000*
Causes	0	0.0	24	44.4	45	93.8	0.000*	0.000*
Aggravating factors	3	5.6	39	72.2	48	100.0	0.000*	0.000*
Symptoms and signs	24	44.4	45	83.3	48	100.0	0.000*	0.000*
Complication	0	0.0	30	55.6	48	100.0	0.000*	0.000*
Treatment	0	0.0	21	38.9	42	87.5	0.000*	0.000*
Pain relief measures	0	0.0	45	83.3	48	100.0	0.000*	0.000*
Dietary regimen	8	15	46	85	48	100.0	0.000*	0.000*
Benefits of physical exercise	6	11.1	36	66.7	45	83.3	0.000*	0.000*
Total satisfactory knowledge score	9	16.7	48	88.9	48	100.0	0.001	0.054

Test: Mc Nemar's test #chi-square test

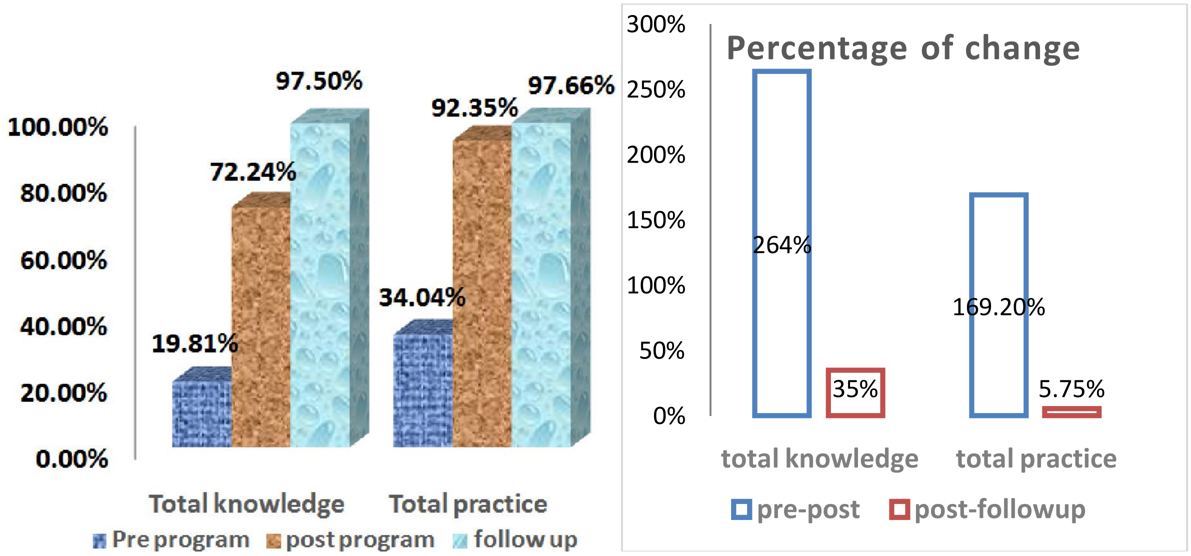


Figure (4): Percentage of change in total knowledge and total practice of RA patients throughout the program (No=54).

Table (9): Adequate practice distribution among the studied RA patients throughout the program (No=54)

Practiceabout RA	**Practice time**						**Pre-Post P-value**	**Pre-FU P-value**
	Pre		**Post**		**FU**			
	No	**%**	**No**	**%**	**No**	**%**		
Regular intake of medication	39	72.2	51	94.4	48	100.0	0.000*	0.000*
Avoiding non- prescribed medication	36	66.7	54	100.0	48	100.0	0.000*	0.000*
Regular medical follow up	36	66.7	54	100.0	48	100.0	0.000*	0.000*
Dietary regimen	21	38.9	54	100.0	48	100.0	0.000*	0.000*
Physical exercise	0	0.0	39	72.2	39	81.3	0.000*	0.000*
Pain relief	12	22.2	51	94.4	48	100.0	0.000*	0.000*
Care of stiffness	3	5.6	48	88.9	48	100.0	0.000*	0.000*
Care of edema	0	0.0	48	88.9	48	100.0	0.000*	0.000*
Total adequate practice	**0**	**0.0**	**54**	**100.0**	**48**	**100.0**	0.000*	0.000*

Test: Mc Nemar's test *# wilexcon signed rank test*

Table (10): Correlation matrices of patients' knowledge, practice, total quality of life scores, DAS 28 and MHAQ throughout the program.

	Pearson correlation coefficient				
	Knowledge	**Practice**	**QOL**	**DAS28**	**MHAQ**
PRE:					
• Knowledge score	1.00				
• Practice score	0.561*	1.00			
• QOL	-0.251	0.036	1.00		
• DAS 28	0.092	-0.158	-0.681*	1.00	
• MHAQ	0.092	-0.143	-0.726*	0.809*	1.00
POST:					
• Knowledge score	1.00				
• Practice score	0.493*	1.00			
• QOL	0.429*	0.310*	1.00		
• DAS 28	-0.113	-0.098	-0.708*	1.00	
• MHAQ	-0.109	-0.299*	-0.831*	0.780*	1.00
FOLLOW UP:					
• Knowledge score	1.00				
• Practice score	0.343*	1.00			
• QOL	0.154	0.338*	1.00		
• DAS 28	0.023	-0.357*	-0.727*	1.00	
• MHAQ	0.136	0.003	-0.065	-0.004	1.00

Table (11): Multiple linear regression model for total follow up quality of life score

Model	r-square	F test	Unstandardized Coefficients		Standardized Coefficients	t- test	P- value
			B	Std. Error	Beta		
(Constant)	0.740	30.62 0.000*	47.150	10.648		4.428	0.000*
DAS 28			-5.769	0.611	-0.735	-9.449	0.000*
age			-0.412	0.077	-0.496	-5.364	0.000*
Total knowledge			2.921	0.757	0.318	3.857	0.000*
MHAQ			-1.649	0.437	-0.345	-3.774	0.000*

4. Discussion:

By studying some socio-demographic characteristics it was found that the majority of the studied sample were females (94.4%), about half of them were of low socioeconomic level **(table 1)**. The distribution of male to female ratio in the sample was 1:16. The female predominance had been observed also in similar studies from various countries, in China, **Gongand Mao (2016),** In Netherlands, **Zwikker et al., (2014),** In Egypt, **Abu Al-Fadl et al., (2014)** found that female to male ratio was 18/8 in their study, and **Ghitany et al., 2015** carried out a study at the Alexandria University Hospital (Egypt), they observed that 88.6% of group I, 94.3% of group II, and 80% in group III were females. Causes for this trend in women were not determined but might involve environmental factors as females were more exposed to hormonal changes and more liable to stress **(Sweeney et al., 2013).** A striking female preponderance characterizes many autoimmune diseases and estrogen activated humoral immunity. Sex steroids contribute to the expression of autoimmune diseases. It is well known that women are affected approximately three times as often as men **(El-Labban et al., 2010).** The age of the studied RA patients ranged from 18 to 49 years old as shown in **(table 1)**, these findings were not in agreement with **Gamal et al., (2016)** where the mean age of their studied sample was 46.4 ± 11.7 years.

Low socioeconomic status in the studied group could be explained as **El-Gilany et al., 2012** socioeconomic status (SES) scale which was used included multiple domains for education, occupation, family, economics, home sanitation, family possessions besides health care domain, besides that most of RA patient (66.7%) were not working (Housewives) and the studied patients were attending to Rheumatology outpatient clinics to get their treatment for minimum cost that they can afford, The mean disease duration among the studied group was 6.05±3.32 years **(table 1)**, this finding wasn't similar to the study of **Knittle et al., (2011)** and that of **Gamal et al., (2016),** In the current study two thirds of the studied group (66.6%) had negative family history as shown in **(table 1),** Several guidelines for management of rheumatoid arthritis exist, Disease-modifying antirheumatic drugs (DMARDs) are the mainstay of treatment for rheumatoid arthritis **(O'dell, 2013).** In the present study, the majority of the studied RA patients were treated with Corticosteroids (94.40%), while about ¾ of them (72.2%) were having NSAIDS, concerning disease modifying anti rheumatic drugs (DMARDs) as 88.9% of the studied RA were receiving it, as shown in **figure (1)**. The majority of the studied RA patients in the present study treated with Corticosteroids in combination with DMARDs (83.3%), and about two thirds of them treated with triple combined therapy (Corticosteroid + DMARDs + NSAIDs). This was in agreement with **Gamal et al., (2016)** but it was discordant with **Vermaak et al., (2015)**, this could be explained that most of rheumatology physicians are depending on corticosteroids in their treatment protocols as it's one of the best DMARDs and also characterized by its low cost.

In the current study about half of RA patients (55.6%) were suffering from moderate disease activity according to DAS 28 at baseline, this was in agree with **Gamal et al., (2016)**, In the present study the overall functional disability level was changed after application of the program with statistical significance difference where mild functional disability increased from 44.4% at the first assessment time to be 81.30% at the 3 rd assessment time after (6 months) **(figure 2)**, while those patients who suffered from moderate functional disability decreased by 32.37% at follow up as shown in **table (3).** These findings were in agreement with **Graell et al., (2009)** who found that The MHAQ decreased significantly at 6 months after initiation of DMARD therapy.

Living with a chronic condition, such as rheumatoid arthritis (RA), impacts all functional domains, health professionals help patients to develop coping skills to minimize the condition's effects on physical and psychological wellbeing. To do this effectively health professionals must understand why and how people adopt or reject certain health behaviors **(Ryan and carr, 2010).** Changing or modifying a behavior is difficult for most people. The Transtheoretical Model (TM) is providing a framework for the stages of progression when deciding to change a problematic behavior **(Peterson, 2009).** In the current study, RA patients were more likely to be in preparation, action and maintainace stages of change after the program application but they were in precontemplation and contemplation stages before the program with statistical significant difference. The number of patients in precontemplation phase dropped from 30 patients to be no one after the program, and 33 patients out of 48 in follow up phase completed the fifth stage of change model **(table 4).(figure 3),** Similar findings were recorded by **Hewlett et al., (2011).**

Concerning the RA special dietary recommendations, the present study demonstrated that the percentage of RA patients in precontemplation phase who weren't aware of following special RA diet regimen is 0% before program, by the end of the program percentage of patients in the Maintainace phase had reached 35.2% with highly statistical significance difference ($P < 0.05$) and the percentage of patients in the precontemplation phase decreased by 87.5% after 3 months and by 80% after 6 months **(figure 3),** These findings were different from **He et al., (2016)** who stated that 33–75 % of RA patients believed that food plays an important role in their symptom severity and approximately 50 % have tried dietary manipulation in an attempt to improve their symptoms.

Overall, the WHOQOL 26-Bref was one of the most commonly used instruments and demonstrated fairly good measurement properties in different applications. This, in addition to the fact that the WHOQOL-Bref was translated to literary Arabic and did not involve cultural adaptations, makes it applicable and useful in almost all Arabic countries **(Al Sayah et al., 2013).** The WHOQOL-BREF is a 26-item version of the WHOQOL-100 assessment used as it is easily administered and which do not impose a great burden on the respondent are needed for use in large epidemiological surveys, so the raw score of WHOQOL-BREF is transformed to 100 score, **Taylor et al., (2004),** recommended the use of WHOQOL-BREF questionnaire as a valid outcome measure for interventions that aim to improve quality of life for people with rheumatoid arthritis**.** In the present study, according to WHOQOL – 26 BREF questionnaire total quality of life mean score in RA patients was 41.8 ± 9.37 before the program and it was 52.44 ±7.32 after 6 months of the program with high statistical significance difference ($P < 0.05$) **(table 6).** However, there was no statistical significance difference in environmental health domain throughout the program, this could be explained as the educational program could affect the physical quality of life facets with no effect on means of transportations, financial resources, home environment or physical environment which are the environmental domain facets. These findings were similar to **Uhlig et al., (2007),** who stated that RA inflicted a substantial disease burden, affecting all HRQOL dimensions, physical functioning was predominantly affected, but RA had social and mental consequences, Also, these findings were in agreement with **Matcham et al., (2014)** who had examined the impact of RA on HRQoL and had found that RA had a greater impact on physical HRQoL than mental well-being.

In general, after the intervention program, the results of the present study reported that there was a significant improvement in the total quality of life scores of RA patients that was in agreement with **Williams et al., (2015)** who found that the estimated difference in mean quality-adjusted life-years (QALYs) accrued over 12 months was 0.01 greater (95% CI -0.03 to 0.05) in an exercise program.

In the present study, the total satisfactory knowledge score between RA patients before program was 16.7% as shown in **(table 8)**, in the contrary to **Mäkeläinen et al., (2009). Nadrian et al., (2011)** stated that higher levels of knowledge, attitude, self-efficacy, enabling factors and social support were associated with better self-care behavior for improvement of quality of life (QOL) through modification of behavioral factors impacting pain and functional limitations. After implementation of health education intervention, there was a significant increase in patient knowledge regarding disease, definition, RA causes, complication, treatment and knowledge about the aggravating factors **(table 8)**. Total percentage of knowledge increased by 2.5 times (264%) at the 2nd assessment time at (3 months) as shown in **(figure 4),** These findings were in agreement with, the study done in france by **Giraudet - Le Quintrec et al., (2007)** and with that which done in oxford by **walker et al., (2007).**

Adherence to disease-modifying anti-rheumatic drugs (DMARDs) in patients with rheumatoid arthritis (RA) wasn't optimal and ranged from 22% to 100% as stated by **Koncz et al., (2010).** Non-adherence could reduce treatment efficacy and could intensify disease activity, pain, joint damage and lower quality of life (**Contreras-Yanez et al., 2010). Zwikker et al., (2014)** found thatexisting interventions to improve medication adherence in chronic diseases as RA were mostly complex and of limited effect. In the present study, 72.2% of the studied patients were taking their medication regularly, and 66.7% were avoiding non-prescribed medication, also, regular medical follow up was adequate in 66.7% of them **(table 9)**, these were in agreement with **Kordasiabi et al., (2016),** Twenty seven percent of the current studied RA patients' series were non-adherent to their medication, that was in agreement with **van den Bemt et al., (2009).**

In a cross-sectional study performed on 185 patients in Iran on Self-Management Behaviors (SMB), it was found that 27.1% of RA patients were following RA diet **(Kordasiabi et al., 2016),** while in the current study, more than one third of the studied patients (38.9%) had followed a dietary regimen adequately **(table 9)**. This could be explained by the fact that the side effects of RA medications had interfered with the preparation of different foods. The percentage of RA patient following dietetic recommendations for RA was statistically increased after the health education program.

In the current study, all of RA patients didn't practice physical exercise adequately **(table 9)**, that might be due to pain and limitation of physical movement besides lake of awareness regarding the benefits of physical exercises as the patients required enough instructions about the practice of the exercise and it should be included in their daily routine, while **Sierakowska et al., (2005)** had found that less than half of their studied patients practiced physical exercises. It was observed that after participation in the education program, the majority of the studied patients performed the physical exercise, total percentage of practice increased by about 1.5 time at the 2nd assessment time (3 months) as shown in **figure (4),** these findings were similar to the results of the study done in Egypt by **Ali et al., (2005).** In the current study about half of the studied patient used hot water bags or hot showers. These behaviors were used as therapeutic methods to improve RA problems such as pain and fatigue. As regard pain relief measures the minority of patients (22.2%) carried out pain relief measures **(table 9)**. It was found that most of the patients used joint heating for alleviating pain, **Kordasiabi et al., (2016)** found that 36.2% of the studied RA patients were using hot water pools and hot water bags as a pain relief measure. Most of patients used wrist bands and bandage but all of them had unsatisfactory knowledge about the benefit of bandage and splints in the present study, that was different from **Kordasiabi et al., (2016)** whofound that half of their patients used wrist bands, casts, and bandage for pain relief, reducing joint deformity and movement limitation.

In the present study, knowledge had statistical significant positive correlation with practice throughout the program, and with quality of life at post program (r= 0.429). Also, practice had statistical significant positive correlation with quality of life at post program and during follow up(r= 0.31 & r=0.34) respectively, while it had negative significant correlation with functional disability and disease activity score during post intervention and after follow up (r=-0.299 & r=- 0.357) respectively, Also, there is statistical significant negative correlation between quality of life and disease activity (r= -0.708) and functional disability throughout the program **(table 10),** These findings were in agreement with **Kordasiabi et al., (2016)** also **Benitha and Tikly, (2007)**. It was also consistent with the study of **Taylor et al., (2004)** who studied quality of life of people with rheumatoid arthritis measured by the World Health Organization Quality of Life Instrument, short form (WHOQOL-BREF). The present study had found that age, disease activity score, functional disability score and total knowledge score were statistically significant independent predictors of total follow up QOL score **(table 11).** This was consistent with the results of a study conducted by **Mostafa and Radwan** was noticed a significant relationship between depression, age and disease related factors **(Mostafa and Radwan, 2013).**

Conclusion and recommendations:

It was concluded that continuous use of self-management behaviors played an important role in controlling RA patients; therefore, should be considered in designing, planning, implementing programs, the current study recommends that health education self-care program should be presented for RA patients to improve their quality of life, Involvement of family members in the education program with patient and training them for specific skills is recommended. Finally, Quality of life and behavior change models should be always in mind of physicians and nurses for the sake of patients, also physical, mental, social and psychological aspects should be fulfilled in patient's care.

Acknowledgements:

Special thanks to the study sample population who were greatly helpful and cooperative to accomplish this work.

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5/2/2017