

Effect of Nursing Interventions on Self Care Behaviors and Knowledge for Rheumatoid Arthritic Elderly Patients

Tarek Mohammed Selim^{1*}, Neamit Ibrahim El-Emam Ahmed Elashri²,
Amira Ahmed Hasanein³

¹Assistant Lecturer of Gerontological Nursing, Faculty of Nursing, Mansoura University, Egypt;

²Lecturer of Gerontological Nursing, Faculty of Nursing, Mansoura University, Egypt.

³Professor of Medical Surgical Nursing, Faculty of Nursing, Mansoura University, Egypt.

*Corresponding Author: Tarek Mohammed Selim, E-mail: tarekselim@mans.edu.eg

Abstract: Rheumatoid arthritis is a chronic disabling autoimmune joint disease that may affect other body parts and have serious effects on elderly patients general health status, it requires a multipronged approach for its management, and elderly patients have an important role to play in terms of their rheumatoid arthritis disease self-care behaviors. **Aim:** Evaluate the effect of nursing interventions on self-care behaviors and knowledge for rheumatoid arthritic elderly patients. **Methods:** A quasi-experimental design was used. **Setting:** This study was conducted in rheumatology and rehabilitation outpatient clinic of Mansoura university hospital. 30 rheumatoid arthritis elderly patients were included in the study (pre and post) group. Data were collected by using four tools: Structured Interview Assessment, Elderly Patient Knowledge Questionnaire about Rheumatoid Arthritis, Self-Care Behavior Scale of Rheumatoid Arthritis patients and Rheumatoid Arthritis Outcome Score. **Results:** there is a statistical significant difference in the total mean score of knowledge and self care behaviors and it's categories of rheumatoid arthritis study participants before and after implementation of the proposed interventions (P1=0.001) (P2=0.001) respectively. **Conclusion:** Significant improvements in the total mean score of knowledge and self-care behaviors after implementation of the proposed interventions. The higher level of knowledge and self-care behaviors, the better quality of life and rheumatoid arthritis disease prognosis of study participants. **Recommendations:** Comprehensive training for rheumatology nurses and family caregivers about rheumatoid arthritis treatment, complications and nursing management, instruct rheumatoid arthritis elderly patients to share their experiences about the disease with other patients and health care providers during follow up and distribute the developed booklets and flyers to all rheumatoid arthritis elderly patients to have a source of knowledge available at any time they need.

Keywords: Elderly, knowledge, Rheumatoid Arthritis, Self-Care Behaviors.

I. INTRODUCTION

Aging process is associated with many changes occur in all body systems such as increase the frequency of infections occurrence, malignancies and autoimmune diseases due to the decline of normal immune surveillance and dysregulation of immune responses which mistakenly attacks and destroys healthy body tissues (Mancuso et al., 2018). Rheumatoid arthritis (RA) is a systemic autoimmune inflammatory disease causing synovitis in multiple joints especially hands and legs, pain, joint destruction and disability and gradually, it is a common type of inflammatory arthritis characterized by a clinical course of exacerbations and remissions (Lewis et al., 2016).

Around 1% of the world population affected by rheumatoid arthritis, it is the most common inflammatory arthritis (**Rudan et al., 2015**). It primarily affects the small joints of the hands and feet and, if not treated aggressively it can be a major cause of disability, decreased quality of life, need for joint replacement surgery (**Nikiphorou et al., 2014**). Rheumatoid arthritis is the most common type of inflammatory arthritis in the older populations, it's incidence increases with aging until about the eighth decade of life (**Ford et al., 2018**).

The specific causes of RA are unknown, but there are some factors that can increase the risk of developing the disease. As for most autoimmune diseases, RA results from a complex interaction of genetic and environmental factors. Moreover, female gender and family history are considered risk factors of RA (**Ceccarelli et al., 2016**).

RA is associated with severe symptoms as aching pain, stiffness, tenderness and swelling in more than one joint, then the same symptoms radiated to both sides of the body such as in both hands or both knees. Other symptoms' can occur weight loss, fever, fatigue, or tiredness and weakness (**Smolen, 2019**). The overall treatment approach of RA elderly patients depends upon the time and careful use of several types of therapeutic interventions. A number of non-pharmacologic measures and other medical interventions are important in the comprehensive management of rheumatoid arthritis (**Feldthusen & Mannerkorpi, 2019**). The purpose of RA elderly patient education is to provide them with adequate knowledge so that they can monitor and manage the symptoms caused by RA, improves their understanding and awareness of it's treatment regimen (**Zangi et al., 2015**). Self-care behaviors are specific actions which ease the disease symptoms, maintain and promote RA elderly patient health (**Nadrian, Niaz, Basiri, & Roudsari, 2019**). Gerontological nurses have a key and essential role in helping and supporting RA elderly patients and families by providing them knowledge about drug counseling and monitoring, exercise training, pain relief measures, which promote their self-care behavior and health status which enhance elderly patient quality of life (**Bech et al., 2019**).

Aim of the study: To evaluate the effect of nursing interventions on self-care behaviors and knowledge for rheumatoid arthritic elderly patients.

Hypothesis of the study: Elderly patient who exhibit to rheumatoid arthritis nursing interventions will report higher level of knowledge and improve their self-care behaviors.

II. SUBJECTS AND METHOD

Design: A quasi-experimental design was utilized. This study was conducted in rheumatology and rehabilitation unit of Mansoura university hospital. The present study included elderly patients diagnosed with rheumatoid arthritis, willing to participate in the study according the following criteria: Aged 60 years and above, both sexes, ability to comprehend and communicate.

While elderly patients diagnosed with fourth grade rheumatoid arthritis were excluded.

Sample size:

The study included 30 rheumatoid arthritis elderly patients in (pre and post) group. The sample size was calculated by medcalc software Based on the previous study by (**Davis et al., 1994**) at following: Type 1 error (α) 0.05, Type 2 error (β) 0.2, Difference of means 4.83, SD pretest 5.29, SD posttest 4.19.

Tools:

Four tools were used for data collection:

Tool I: Structured Interview Assessment: the demographic and clinical data structured interview assessment was developed by the researcher.

Tool II: Elderly Patient Knowledge Questionnaire about Rheumatoid Arthritis (PKQ): It was developed by (**Hill et al., 1991**) to assess patient's knowledge regarding rheumatoid arthritis and its treatment. It was translated into Arabic, validated and tested for its reliability using the Cronbach's alpha coefficient ($r = 0.87$). It consists of 16 questions, which divided in four major areas as following: 1-General knowledge, including etiology, symptoms and tests. 2-Drugs and how to take them. 3-Exercise regimens. 4-Joint protection. PKQ questionnaire total score is 30 points classified as follows: 1) Poor knowledge (score 0-10) 2) Moderate knowledge (score 11-20) 3) Good knowledge (score 21-30).

Tool III: Self-Care Behavior Scale of Rheumatoid Arthritis Patients: It was adapted from the scale proposed in *Peng's study (1997)*. It was translated into Arabic, validated and tested for reliability using the Cronbach's alpha coefficient ($r = 0.89$). It includes 6 items in 3 dimensions that include: 1-Daily energy preservation and joint protection. 2-Medication taking. 3-Exercise. In the "daily energy conservation and joint protection" subscale, possible scores ranged from 1 (never correct), 2 (rarely correct), 3 (sometimes correct), 4 (often correct) and 5 (always correct). In the medication taking subscale, possible scores ranged from 1 (never), 2 (rarely), 3 (sometimes), 4 (often) and 5 (always), with a reversed scoring scale employed for item 3. In the subscale of exercise, scores for frequency ranged from 1 (never), 2 (sometimes), 3 (once a week), 4 twice a week and 5 (three times a week); and for duration ranged from 1 (never), 2 (5 minutes), 3 (10 minutes), 4 (15 minutes) and 5 (20 minutes and above). Total scores ranged from 6 to 30, a higher score representing a higher level of self-care behavior.

Tool IV: Rheumatoid Arthritis Outcome Score (RAOS): It was adopted from the knee injury and osteoarthritis outcome score (KOOS) by *(Roos, 2003)*, developed to assess pain, functional limitation, and quality of life of patients with chronic joint inflammatory diseases of lower extremity. It was translated into Arabic, validated and tested for its reliability using the Cronbach's alpha coefficient ($r = 0.82$). It consists of five subscales: 1. Pain, 2. Symptoms of the disease, 3. Function in daily living (ADL), 4. Function in sport and recreation (Sport/Rec). 5. Quality of life (QOL). Standardized answer options are given on 5 point Likert scale ranged from no, mild, moderate, severe to extreme for each answer question. All items have a possible score from zero to four, and each of the five subscale scores was calculated as the sum of the items included. Raw scores are then transformed to a zero to 100, worst to best scale, 100 indicates no problem and 0 indicates extreme problems. The normalized score transformed to meet this standard by using the formulas provided for each subscale.

1- Pain:	$100 - \frac{\text{Total score (p1 -p9)} \times 100}{36} = 100 - \frac{\text{---}}{36}$
2- Symptoms:	$100 - \frac{\text{Total score (S1 -S7)} \times 100}{28} = 100 - \frac{\text{---}}{28}$
3- ADL:	$100 - \frac{\text{Total score (A1 -A17)} \times 100}{68} = 100 - \frac{\text{---}}{68}$
4- Sport and REC:	$100 - \frac{\text{Total score (SP1 -SP5)} \times 100}{20} = 100 - \frac{\text{---}}{20}$
5- QOL:	$100 - \frac{\text{Total score (Q1 -Q4)} \times 100}{16} = 100 - \frac{\text{---}}{16}$

The total score of each subscale categorized into:

0	extreme
1 - 25	severe
26 - 50	moderate
51 - 75	mild
76 -100	none

Tool V: Rheumatoid arthritis proposed interventions:

The proposed interventions were developed by the researcher based on reviewing the related literature (**Scott, Machin, Mallen & Hider, 2018; Bilberg, Bremell, Bjersing & Mannerkorpi, 2018**). The proposed interventions included knowledge, self-care behaviors and practices required for management of elderly patients with rheumatoid arthritis. It covered items related to the meaning of rheumatoid arthritis, causes or risk factors, signs and symptoms, types of management, life style practices, medication compliance, different types of exercise and dietary management. The interventions were prepared and divided into four sessions.

RA **proposed interventions** were composed of 4 sessions ;2 educational and 2 training sessions.

It were represented into educational and training components and implemented in four sessions.

Educational sessions: include rheumatoid arthritis knowledge and were conducted in two sessions, as follows

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- **1st session:** Definition of rheumatoid arthritis, Risk factors of rheumatoid arthritis, Signs and symptoms of rheumatoid arthritis, Diagnosis of rheumatoid arthritis, Treatment of rheumatoid arthritis (types, how to use and side effects).
- **2nd session:** Re-emphasizing the previous session content, Meaning of self-care behavior, Benefits and types of exercise for rheumatoid arthritis, Diet for rheumatoid arthritis, Life style and environmental modifications for rheumatoid arthritis, Heat and cold applications and assistive devices for rheumatoid arthritis.

Training sessions: were conducted in two sessions, as follows

- **1st session:** Re-emphasizing the previous session content, exercises technique, using assistive devices as cane, crutch or walker, demonstration by the researcher.
- **2nd session:** Re-emphasizing the previous session content, using booklet and watching a video about steps of exercise, Demonstration by elderly patient, The researcher revise the knowledge and exercise about rheumatoid arthritis at their home.
- An official permission to conduct the study was obtained from the dean of the Faculty of Nursing – Mansoura University and a permission will be directed to directors of rheumatology and rehabilitation department and outpatient clinics to carry out the study.
- The head of outpatient clinic was informed about the purpose of the study & time of data collection.
- Tool I was developed by the researcher after the reviewing of relevant literature.
- Tool II (Patient Knowledge Questionnaire about Rheumatoid Arthritis), Tool III (Self-Care Behavior Scale about Rheumatoid Arthritis) and Tool IV (Rheumatoid Arthritis Outcome Score) were translated into Arabic by the researcher .
- Tool II (Patient Knowledge Questionnaire about Rheumatoid Arthritis), Tool III (Self-Care Behavior Scale about Rheumatoid Arthritis) and Tool IV (Rheumatoid Arthritis Outcome Score) were tested for its reliability using the Cronbach's alpha coefficient ($r = 0.87$), ($r = 0.89$) and ($r = 0.82$) respectively
- Tools I, II, III and IV were tested for its content validity by a jury committee in the field of specialty.
- The proposed study interventions were developed and translated into Arabic language by the researcher and given to each study subject participated in the study.
- A pilot study was carried out on five elderly patients from rheumatology and rehabilitation outpatient clinic to test clarity and feasibility of the tools and the approximate time needed for the interview. Accordingly the necessary modifications were done. The elderly patients who included in the pilot study were excluded from the study sample.
- The proposed interventions were conducted individually in the examination room of the outpatient clinic of rheumatology; covered into four sessions (two sessions for provision of knowledge and two sessions for training), implemented over two weeks.
- The researcher used to start each session by reemphasizing the important points in the previous session to all studied participants.
- During each session, an illustrated booklet was distributed in order to clarify the knowledge and practices for each study participant. Other teaching methods were used such as audiovisual material (using laptop), open discussion, demonstration, re-participant demonstration and real life demonstration. As well, the researcher used to do phone call in order to answer any questions and clarify any vague points in order to maintain motivation and give positive feedback and reinforcement.
- Immediately after implementation of the proposed interventions, the study participants were evaluated using study tools to determine the effect of the training sessions.
- Evaluation was done two times, after the 8 week and after 16 weeks from the implementation of the proposed interventions.
- The evaluation of the effectiveness of the proposed interventions was determined by using the proper statistical analysis.

- The implementation of the proposed interventions covered a period of six months from the middle of December 2017 till the middle of June 2018 as researcher meet the male elderly patients at Sunday and Tuesday and females elderly patients on Saturday, Monday, and Thursday in the waiting room of the outpatient clinic according to hospital schedule and the researcher met the elderly patients individually or in small groups (2 to 3) participants according to follow-up time for each patient using booklet and PowerPoint presentations and videos using laptop and each session lasts from 20 to 35 minutes start with emphasizing the content of the previous session and giving the content of the new session.

Ethical consideration:

Ethical approval was taken from Mansoura University Faculty of Nursing Ethics Committee. An official permission was obtained from the head of rheumatology and rehabilitation of outpatient clinic affiliated to Mansoura university hospital. Verbal consent was obtained from elderly patients after complete explanation of the study purpose. The elderly patients were informed that their participation is voluntary and that they can withdraw from the study at any time. Anonymity, privacy of the study participant and confidentiality of the data collected were assured.

III. RESULTS

Table (1): show the distribution of rheumatoid arthritis elderly patients according to their socio-demographic characteristics:

It was found that the age of the studied participants ranged from 60 up to 66 years. All the elderly patients (100%) were young old, the majority of them (80%) were married. As for the educational level, less than half (46.7%) of the studied participants had completed their basic education, and about quarter (23.3%) of them could just read and write.

Table (1) Distribution of demographic characteristics of the studied participants

Item	(N=30)	
	No	%
Age in years:		
-60 < 75	30	100
-75 < 85	0	0.0
-85+	0	0.0
Mean ± SD	61.73±1.59	
Sex:		
-Female	24	80.0
-Male	6	20.0
Marital status:		
-Married	24	80.0
-Widow	6	20.0
Level of education:		
-Illiterate	3	10.0
-Read and write	7	23.3
-Basic education	14	46.7
-Higher education	6	20.0

Table (2): Distribution of the studied participant according to their clinical data:

It was found that most of the studied participants (90%) has no family health history of rheumatoid arthritis, while less than half of them (46.7%) has a history of other chronic diseases such as hypertension, chest and eye diseases.

Regarding the duration of rheumatoid arthritis, it was ranged from 3 years to 15 years and more than half of them (53.7%) suffer from disease from 5 to 10 years and about one quarter of them (26.6%) suffer from disease for more than 10 years. Concerning the first joint affected, the majority of the studied participants (70%) reported that they complain at first from their legs while more than quarter of them (30%) rheumatoid arthritis start in their hands, after that more than half of them (60%) reported that rheumatoid arthritis extend to their hands and legs too. All of the studied participants suffer from morning stiffness while less than half of them suffer from it for 60 min.

Table (2) Distribution of the studied participants according to their clinical data

Item	(N=30)	
	No	%
Family history:		
-Yes	3	10.0
-No	27	90.0
RA disease duration:		
< 5 years	6	20.0
5<10 years	16	53.7
≥10 years	8	26.6
Mean ± SD	7.63±3.05	
First joint affected:		
-Legs	21	70.0
-Hands	9	30.0
Joints affected now:		
-Hands and legs	18	60.0
-Other joints	12	40.0
RA disease effect on other body parts:		
-No	15	50.0
-Yes	15	50.0
If yes, body parts affected:		
-Eyes (redness, dryness and inflammation of conjunctiva)	7	23.3
-Kidney (nephritis)	3	10.0
-Blood vessels (hypertension, atherosclerosis and vasculitis)	5	16.7
Duration of morning stiffness:		
-30 min	8	26.7
-45 min	6	20.0
-60 min	14	46.7
-75 min	2	6.7

Table (3): Distribution of the studied participants according to their follow up, exercise and medications compliance:

It was found that two fifth of the studied participants do not make regular medical checkup and more than half of them do not practice any type of exercise while the majority of them reported that they compliant with their medication.

Table (3) Distribution of the studied participants according to their follow up, exercise and medication compliance

Item	(N=30)	
	No	%
Follow up:		
-Yes	18	60.0
-No	12	40.0
Causes of noncompliance with follow up:		
-High costs	6	20.0
-Difficult transportation	6	20.0
Practice exercise:		
-Yes	13	43.3
-No	17	56.7
If yes, type of exercise:		
-Range of motion	8	26.7
-Walking	5	16.7
If no, causes:		
-Not able to practice exercise	9	30.0
-No one clarify the importance of exercise	6	20.0

-No place to practice exercise	2	6.7
Medication compliance:		
-Yes	24	80.0
-No	6	20.0
If no, causes of noncompliance:		
-Expensive	2	6.7
-Not beneficial	2	6.7
-Side effects	1	3.3
-Forget to take	1	3.3

Table (4): Distribution of the studied participant according to their knowledge about disease, drugs, exercise and joint protection before and after implementation of the intervention:

It was found that the total mean score of knowledge of studied participants had been improved from 11.26±2.80 before the interventions to 25.66±1.62 immediately after interventions and slightly decreased to 21.73±2.65 two months after the interventions with statistically significant difference before and immediately after the interventions, before and two months follow up after the interventions (P1<0.001) (P2<0.001) respectively.

Table (4) Distribution of the studied participants according to their knowledge categories

knowledge categories	Pre interventions (n=30)	Immediate post interventions (n=30)	2 months post interventions (n=30)	P1	P2
	Mean ± SD	Mean ± SD	Mean ± SD		
- Disease knowledge	4.00±1.41	7.83±0.64	6.86±1.22	0.001	0.001
- Medications knowledge	1.83±1.34	5.90±0.66	6.86±1.22	0.001	0.001
- Exercise knowledge	1.13±0.43	4.73±0.44	3.70±0.95	0.001	0.001
- Joint protection knowledge	5.30±1.02	10.10±0.84	8.73±1.25	0.001	0.001
Total	11.26±2.80	25.66±1.62	21.73±2.65	0.001	0.001

P1: comparison between pre-intervention and immediate post-intervention

P2: comparison between pre-intervention and 2 months post-intervention

(P <0.05) Significant

Table (5): Distribution of the studied participant according to their self-care behavior categories before and after implementation of the intervention:

It was found that the total mean score of self-care behaviors of studied participants had been improved from 16.46±1.71 before the interventions to 21.03±1.67 immediately after interventions and increased to 22.40±1.99 two months follow up after the interventions with statistically significant difference before and immediately after the interventions and before and two months follow up after the interventions (P1<0.001) (P2<0.001) respectively.

Table (5) Distribution of the studied participants according to their self-care behavior categories before and after implementation of the interventions

Self-care behavior categories	Pre interventions (n=30)	Immediate post interventions (n=30)	2 months post interventions (n=30)	P1	P2
	Mean ± SD	Mean ± SD	Mean ± SD		
-Energy conservation	3.83±0.46	4.53±0.50	4.80±0.40	0.001	0.001
-Medication	10.00±1.28	12.16±0.98	12.60±0.96	0.001	0.001
-Exercise	2.66±0.99	4.36±1.03	4.96±1.18	0.001	0.001
Total	16.46±1.71	21.03±1.67	22.40±1.99	0.001	0.001

P1: comparison between pre-intervention and immediate post-intervention

P2: comparison between pre-intervention and 2 months post-intervention

(P <0.05) Significant

Table (6): Distribution of the studied participants according to rheumatoid arthritis disease outcomes before and after implementation of the interventions:

Regarding the mean score of symptoms severity; it was improved from 2.66±0.99 before the interventions to 42.66±6.95 immediately after the interventions and increased to 47.70±7.50 two months follow up after the interventions with statistically significant difference before and immediately after the interventions, and before and two months follow up after the interventions (P1<0.001) (P2<0.001) respectively.

As regard to pain level, the mean score of pain was improved from 35.76±6.18 before the interventions to 56.13±4.77 immediately after the interventions and increased to 60.76±4.36 two months after the interventions with statistically significant difference before and immediately after the interventions, and before and two months follow up after the interventions (P1<0.001) (P2<0.001) respectively.

As for the ability to do activities of daily-living; it's mean score was improved from 42.16±5.03 before the interventions to 63.13±4.96 after the interventions and become 67.10±5.28 two months after the interventions with statistically significant difference before and immediately after the interventions, and before and two months follow up after the interventions (P1<0.001) (P2<0.001) respectively.

Concerning the exercise ability and recreational activities; it's mean score was improved from 12.00±11.34 before the interventions to 33.50±6.71 after the interventions and increased to 40.16±5.94 two months after the interventions with statistically significant difference before and immediately after the interventions and before and two months follow up after the interventions (P1<0.001) (P2<0.001) respectively.

Moreover, The main score of studied participants quality of life has been improved from 17.03±6.50 before the interventions to 42.00±4.54 immediately after the interventions and increased to 51.83±5.59 two months follow up after the interventions with statistically significant difference before and immediately after the interventions; before and two months follow up after the interventions (P1<0.001) (P2<0.001) respectively.

Table (6) Distribution of the studied participants according to rheumatoid arthritis disease outcomes before and after implementation of the interventions:

Item	Pre interventions (n=30)	Immediate post interventions (n=30)	2 months post interventions (n=30)	P1	P2
	Mean ± SD	Mean ± SD	Mean ± SD		
-Symptoms	21.33±6.29	42.66±6.95	47.70±7.50	0.000	0.000
-Pain	35.76±6.18	56.13±4.77	60.76±4.36	0.000	0.000
-Activities of daily living	42.16±5.03	63.13±4.96	67.10±5.28	0.000	0.000
-Exercise and recreational activities	12.00±11.34	33.50±6.71	40.16±5.94	0.000	0.000
-Quality of life	17.03±6.50	42.00±4.54	51.83±5.59	0.000	0.000

P1: comparison between pre-intervention and immediate post-intervention

P2: comparison between pre-intervention and 2 months post-intervention

(P <0.05) Significant

IV. DISCUSSION

Rheumatoid arthritis (RA) is a chronic disabling joints disease, may affect other body parts which starting at any age but mainly 55th to 75th and, and is a deadly disease in 80th and older (Lewis et al. , 2016). It is more common in females three times more than in males (Kordasiabi et al., 2016). Elderly patients with RA suffer from multiple complications that lead to poor quality of life and disabilities due to the devastating effect of the disease on all body parts. RA patients knowledge level can affect their self-care behaviors toward disease coping and compliance with treatment regimen (Van Onna & Boonen, 2016). Promoting knowledge and self-care behaviors of RA elderly patients affect the prognosis of the disease, severity of symptoms, level of pain, activities of daily living, recreation activities and exercise and on quality of life in general, so that this study was conducted to determine the effect of nursing interventions on self-care behaviors and knowledge for rheumatoid arthritic elderly patients.

As for demographic characteristics, all of the studied participants were young old, the majority of the study participants were females. This finding is in line with studies done by **Rais et al. (2014)** and **Senara, Abdel Wahed & Mabrouk (2019)** and **Abo Elelaa (2019)** who reported that the majority of their participants were females, this finding can be explained by hormones and genes increase the risk for RA than in males (**Egholm et al., 2015**).

Concerning the marital status, the majority of the studied participants were married. This finding is in line with **Unk & Brasington (2014)** who reported that about half of their participants were married. With regard to educational level, the majority of studied participants have basic and higher education; this result is in the same line with **Unsal and Kasikci (2010)** who reported that the majority of their elders with RA have basic and higher education level.

In relation to family health history, the majority of the studied participants have negative family health history of RA this finding is in line with **Hamed, El badawy, El tokhy, Abo serea & Seliem (2017)** who reported that more than two thirds of their studied participants reported negative family health history of RA. Conversely, a study done by **Hussein (2016)** reported that the majority of their participant had a family health history of RA, this may be justified as the majority of the studied participants have basic education and not aware the difference between rheumatoid arthritis and other joint diseases. Moreover, elderly persons do not have the ability to remember the health history of their family members.

Regarding to RA disease duration, about quarter of the studied participants suffer from RA for more than ten years, while more than half of the studied participants suffer from RA from five to ten years and only fifth of them started suffering from RA from less than five years. This finding is in line with a study done by **Pytel & Wrzosek (2012)** which reported that nearly the same results about duration of RA disease. This finding can be explained as RA is a chronic disease start in the period of late adulthood so that elderly patients suffer from RA for a long time (**Rosen et al., 2018**).

Rheumatoid arthritis symptoms are non-articular symptoms and articular symptoms that affect joints symmetrically in more than joints especially hands and legs (**Van et al., 2016**). As for the joints affected, the present study results revealed that more than half of RA studied participants suffer from RA in their hands, legs and other joints. This finding is in contrary with a study done by **Bearne, Manning, Choy, Scott & Hurley (2017)** who reported that the majority of their subjects had affected by RA in their hands.

Rheumatoid arthritis have articular effect on joints and non-articular effect on many body parts other than joints (**Simon et al., 2017**). Regarding the effect of RA on other body parts, half of the studied participants reported that RA affected other body parts such as eyes complications (redness, dryness and inflammation), kidneys complications (nephritis) and blood vessels complications (vasculitis and hypertension). This result in the same line with a study done in Sohag, Egypt which reported that their study participants suffering from non-articular effect of RA on other body parts such as eyes and blood vessels **Abdel Motaal (2018)**.

Regarding to morning stiffness, all the studied participants have morning stiffness with a duration ranged from half an hour to more than an hour. The same result was reported by **Osman (2016)** who reported that morning stiffness lasts for more than an hour in their subjects. Follow up with health care provider have an essential role in managing and control RA symptoms and prevent complications as doing periodical medical checkup and regular doctor visits and complaint with taking medications and doing exercise regularly (**Sparks et al., 2016**). Concerning follow up, more than half of the studied participants making follow up with their doctor regularly. The present study revealed that the majority of the studied participants were complaint with medications. Reversely, a study done by **Unk and Brasington (2014)** who reported that their subjects were noncompliant with medications. This finding can be justified by the majority of studied participants are young old and have intention to promote their health, being actively independent and prevent deteriorating effect of RA symptoms and disease. As for exercise, more than one third of studied participants do simple exercise. The same result was found by **Unk and Brasington (2014)**.

Improving RA elderly patients knowledge about RA disease and their condition is very important as increasing level of knowledge will affect their controlling of the disease and decrease symptoms severity, level of pain and improve their quality of life which enable them to live without disabilities, lessen complications and being independent in their activities of daily living (**Boo, Oh, Froelicher & Suh, 2017**). The present study showed that there was a statistically significant difference in the total knowledge score of the studied participants about RA disease, RA medications, practicing exercise and joint protection techniques before and immediately after implementation of the proposed interventions and two months follow-up after implementation of the interventions.

This result is in accordance with a study done in Egypt by **Metwaly (2016)** who reported that the level of knowledge of their subjects were improved after implementation of the interventions. On the same line, a study done in Iran stated that their participants total score knowledge were improved after implementation of their educational program **Nadrian, Morowatisharifabad & Bahmanpour (2011)**.

Self-care behaviors are actions and practices which taken by the elderly patients for better coping with RA disease without complications (**Marengo, & Suarez-Almazor, 2015**). In relation to self-care behaviors, the present study showed that there were a statistically significant difference in the total score of the studied participants' self-care behaviors of energy conservation, RA medications and practicing exercise before and immediately after implementation of the interventions and two months follow-up after implementation of the interventions. This result is in accordance with other studies done in Egypt and Iran which found that self-care behaviors categories were enhanced after implementation of the their program (**Zaky, 2016**), (**Nadrian, Morowatisharifabad & Bahmanpour, 2011**).

By using rheumatoid arthritis outcome score subscales to assess the effect of this study interventions on symptoms, pain, activities of daily living, exercise and quality of life of the studied participants. In relation to severity of the RA symptoms, there was a statistically significant difference in the total score of the studied participants' symptoms severity before and immediately after implementation of the interventions and two months follow-up after implementation of the interventions. This finding is on the same line with an Egyptian study done by **Senara, Abdel Wahed & Mabrouk (2019)** who reported that disability related to RA decreased after implementation of their interventions. Also, a study done in Finland by **Mäkeläinen, Vehviläinen-Julkunen & Pietilä (2009)** who reported that improvement RA symptoms severity after implementation of their interventions.

As for the intensity of the RA pain, the present study revealed that there was a statistically significant difference in the studied participant's total score of pain experience before and immediately after implementation of the interventions and two months follow-up after implementation of the interventions. The same finding was found by Egyptian studies done by **Metwaly (2016)** and **Senara, Abdel Wahed & Mabrouk (2019)** who reported an improvement in RA pain experience after implementation of their interventions.

Concerning activities of daily living, this study showed that there was a statistically significant difference in the total score of the studied participants practicing activities of daily living before and immediately after implementation of the interventions and two months follow-up after implementation of the interventions. This result in the same line with an Egyptian study done by **Osman (2016)** who reported that the daily functioning of their studied participants improved after implementation of their interventions. Also, an American study reported that physical function of their RA studied participants enhanced after implementation of their interventions and RA patients become more independent in their activities of daily living (**Hilary et al., 2009**).

Regarding practicing RA exercise, the present study showed that there was a statistically significant difference in the total score of the studied participants practicing exercise before and immediately after implementation of the interventions and two months follow-up after implementation of the interventions. This finding is in accordance with **Osman (2016) & Pytel & Wrzosek (2012)** who reported that RA patients start to practice some exercise regularly after feeling better and with more strength after applying what they learned from interventions respectively.

Regarding to the total mean score of the quality of life, there was a statistically significant difference in the total mean score of the studied participants' quality of life before and immediately after implementation of the interventions and two months follow-up after implementation of the interventions. This result is in accordance with an Egyptian study by **Abdel Motaal (2018)** and a study done in Iran by **Nadrian, Morowatisharifabad & Bahmanpour (2011)** who reported that quality of life of their RA patients enhanced after implementation of their interventions.

V. CONCLUSION

It can be concluded from the present study that, a significant improvement in rheumatoid arthritis study participants knowledge and self-care behaviors and it's categories after implementation of the proposed interventions with reached a good level of independence for daily living activities. Higher level of knowledge and self-care behaviors, better general quality of life and prognosis of rheumatoid arthritis elderly patients.

VI. RECOMMENDATIONS

Based on the finding of the present study the following recommendations are suggested:-

1. Developing training program for nurses and caregivers about rheumatoid arthritis treatment, complications and nursing management.
2. Instruct rheumatoid arthritic elderly patients to share their experiences about the disease with other patients and health care providers during follow up.
3. Distribute the developed booklets and flyers to rheumatoid arthritis elderly patients to have a source of knowledge available at any time they need.

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