Effectiveness of computer- assisted patient education on knowledge and perceived self efficacy of patients with Rheumatoid Arthritis in Salalah, Oman

Jayasree Radhamaniamma[1], Suja Karkada[2], Mariyamma V George

[1]Salalah Nursing Institute, Sultanate of Oman, Oman. [2]Department of Community Health Nursing, and [3]Department of Fundamentals of Nursing, Manipal College of Nursing, Manipal University, India.

ABSTRACT

Introduction: The prevalence of Rheumatoid arthritis (RA) in Oman was 8.4 per 1000 adults as per earlier records. Onset of RA implies lifelong process of adaptation in all domains of life and it can be improved through education. Patient education helps to increase knowledge and self management strategies by influencing their self efficacy. **Objective**: To describe how much patients know about their disease and what kind of self efficacy they have, also to evaluate the effectiveness of computer- assisted patient education in terms of knowledge and self efficacy. **Method**: An evaluative, one group pre-test- post-test design was used. Data was collected from 76 RA patients who attend the Rheumatology polyclinic, Sultan Qaboos Hospital, Salalah, at baseline and after 30 days of teaching. **Result**: The mean pre-test score of PKQ was 10.16 ± 4.16; the subscale general knowledge of RA had a better mean 3.58 ± 1.70, than knowledge of drugs (1.74 ± 1.14). Fifty percentage of the sample had average knowledge and 48.6% poor knowledge. The mean pre-test self efficacy scores for pain, function and other symptoms were 4.60 ± 1.71, 4.99 ± 1.76, 4.81 ± 2 respectively. Post test score of knowledge was 21.69 ± 4.04 and self efficacy (total) 7.25 ± 1.46. Wilcoxon- matched pairs signed- rank test showed that knowledge and self efficacy improved with patient education ($Z= -7.44$, $p < 0.0001$, $Z= -7.19$, $p < 0.0001$, respectively). **Conclusion**: Education helps patients to get accustomed to living with chronic diseases like RA. Patient focused education on self-management of RA is a neglected area. There is an urgent requirement to address this unmet need and optimize the general health of every person with RA.
.

CORRESPONDING AUTHOR: Mrs. Jayasree Radhamaniamma, Senior Teacher, Salalah Nursing Institute, Sultanate of Oman, Oman. Email: jayasreebibi@gmail.com
.

Introduction

Rheumatoid Arthritis (RA) is an inflammatory, systemic and chronic illness, which mainly affects the synovial membranes of multiple joints. Because of the unknown aetiology of RA, it has been described as "one of the modern medicine's major enigmas (1)". The onset of RA is a "life-changing event", implying the start of a lifelong process of "adaptation to significant physical, psychological, social and environmental changes'. Key life domains affected by RA include psychological well-being, social well-being, family relationships, employment restrictions in daily functioning and loss of independence (2).

Patient education has been recommended as a part of the routine management of RA. One purpose of RA patient education is to increase patients' self-efficacy. Self-efficacy beliefs have an important role as they affect RA patient functioning (3).

The self-efficacy theory developed by Bandura states that the strength of belief in one's own capacity is a good predictor of motivation and behavior. Perceived self-efficacy is described as 'a judgment of one's capability to accomplish a certain level of performance, whereas an outcome expectation is a judgment of the likely consequence such a behavior will produce'. Increased self-efficacy leads to improved behavior, motivation, thinking patterns and emotional well-being. Once patients have developed strong self-efficacy, they tend to generalize from one experience to another, and single failures do not influence their self-efficacy beliefs. In addition, patients' cognitive mechanisms can sub-serve their pain tolerance. The patients with more self-efficacious chronic pain judge themselves, the less pain they experience. Furthermore, more self-efficacious patients' pain tolerance is higher than that of those patients whose self-efficacy is weak, because their self-management skills include cognitive pain control techniques (4).

The prevalence of RA varies from country to country, from 0.7% to 3%, with an average of 1% in the adult population worldwide. In the Gulf region, two studies estimated the prevalence of RA to be 1% in the Iraqi population (5) and 0.85 in the Omani population (6). The prevalence of RA in Al Qassim region of Saudi Arabia is 2.2 per thousand people which are similar to that in the rural black South Africans. Approximately 0.5-1.0% of the Caucasians in Europe and America suffer from RA, and two- thirds of all RA patients are women (7). The prevalence and incidence of RA increase from the age of 70 onwards.

There are extremely few studies on the perceived self efficacy of RA related fatigue management even though fatigue is a major problem with RA patient. There is lack of knowledge of the contents of patient education and how current patient education influences RA patient's knowledge and self efficacy. While attending the Rheumatology clinic of Sultan Qaboos Hospital Salalah, the researcher felt that patients lack knowledge about their condition; they are not compliant, and many of them had deformities. Also, no researches have been conducted on patient education and self efficacy of RA patients in Salalah, Oman. Hence this study was designed.

The purpose of the study was to detect the effectiveness of computer - assisted patient education on knowledge and perceived self efficacy in Rheumatoid arthritis patients.

Method

Design and sample

An evaluative, one group pre-test, post-test quasi experimental design was used for this study. The sample consisted of 76 patients attending the Rheumatology polyclinic of Sultan Qaboos Hospital (SQH), Salalah, Oman. Arabic speaking patients with RA between the ages of 20- 75 years without any hearing impairment were selected purposively. Even though the sample size was small, it was large enough to give a statistically significant result at 0.05 levels as per the Slovin's formula.

Ethical considerations

The study was approved by the institutional research committee of Manipal College of Nursing. Permission to conduct the study was obtained from the Director of SQH, Salalah. The researcher explained the study to the potential participants. Written informed consent was obtained from every patient, and anonymity and confidentiality were assured. The staff and clinicians of the Rheumatology clinic were informed about the purpose and plan of the study to obtain their cooperation. Permission to use the standardized tools was obtained from the authors through electronic mail. A pilot study was conducted in the Rheumatology polyclinic of Sultan Qaboos Hospital, Salalah, during November to December 2010.

Data collection

Data collection is the process of acquiring subjects and collecting the data needed for the study. Data collection was done during the period from 01. 01. 2011 to 10. 04.2011. Seventy six participants who fulfilled the inclusion criteria were selected using purposive sampling. Procedure was explained, and the subjects who were willing to participate in the study were asked to sign the informed consent. Privacy and confidentiality were assured. Demographic proforma, patient knowledge questionnaire (PKQ) and arthritis self efficacy scale (ASES) were used to collect the data. The PKQ and ASES are standardized tools which were translated into Arabic and checked for their language validity by experts. The tools were pretested in a pilot study with five patients and found suitable for the study.

Tool 1: Demographic proforma

Demographic proforma including gender, age, marital status, educational level, employment status, disease duration, family history and co-morbid conditions was collected. This enabled the researcher to understand the samples better.

Tool 2: Patient knowledge questionnaire (PKQ)

The level of the patient's knowledge of Rheumatoid arthritis and its treatment was determined using the patient knowledge questionnaire (PKQ) developed by Hill et al. (8) The PKQ measures the correctness of the patient's information on RA and its treatments. The PKQ contains 16 questions under four subscales. The first subscale contains four questions (question no.1-4) on general RA knowledge such as the aetiology, symptoms and blood tests that must be taken as follow-up controls (maximum score 9). The second subscale contains four questions (5-8) on non-steroidal anti-inflammatory drugs (NSAIDs) and anti-rheumatic drugs, how to use them and the side effects of NSAIDs (maximum score 7). The third subscale contains four questions (9-12) on exercise technique and RA (maximum score 7), and the fourth subscale contains four questions (13-16) on the most practical ways and methods to protect the joints and to conserve energy (maximum score 7). Each question comprises of 5-7 statements, of which only one to three are correct (each correct answer scores one point; the maximum score is 30). There is also an option which states 'Don't know'. PKQ scores were calculated and subdivided into three subscales: 1) poor knowledge (score 0-10), moderate knowledge (score 11-20) and good knowledge (score 21-30). The PKQ is a standardized tool with known reliability. Test retest was used to check its stability (r=0.81), and Kuder Richardson formula 20 (r=0.72) was used for internal consistency. It has reported face and content validity. It is a useful tool to evaluate the patient's knowledge before RA health teaching, to focus on areas of low knowledge, and also to evaluate the effect of RA education intervention. This tool was sent to experts to assess for its suitability to the study. As per the expert opinion, the statement plasma viscosity which was given under the subscale of laboratory tests (question no.4) was changed to 'haemoglobin'. Another statement given under the subscale drugs (question no.7) was also changed from D-penicillamine to Methotrexate, because that is the medicine used in Oman.
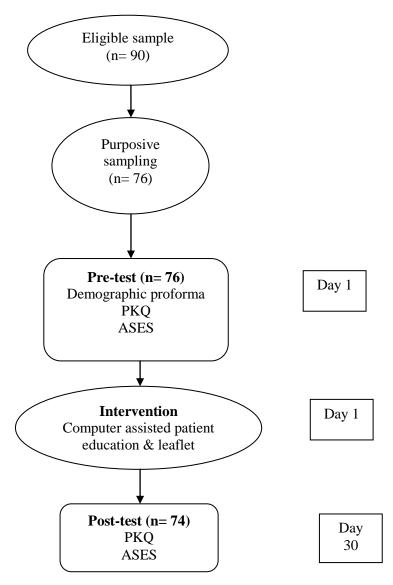
Figure 1: Data collection procedure

Tool 3: Arthritis self efficacy scale (ASES)

Patient self-efficacy was estimated using the standardized tool Arthritis self efficacy scale (ASES) developed by Lorig et al in 1989. (9) The ASES has 20 items divided into three subscales: pain self efficacy (SE pain, five items), function self efficacy (SE function, nine items) and other symptom self efficacy (SE other symptoms, six items). Each item is scored on a 10 mm scale, where one is very uncertain and ten is very certain. The subscales of the ASES (pain self efficacy, function self efficacy and other symptoms self efficacy) were summarized and subdivided into four subscales for further analysis: 1) very uncertain (0-2.5), 2) quite

uncertain (2.6-5), 3) quite certain (5.1-7.5), and 4) very certain (7.6-10). The patients are required to indicate how certain they are of performing specific tasks with regard to pain, function and other symptoms. ASES is the dominant measure of self-efficacy in arthritis and has been in use worldwide since 1990. It was found to be reliable and valid. Internal consistency of SE pain, SE function and SE other symptoms were 0.75. 0.90 and 0.87 respectively and test retest reliability were 0.87, 0.85 and 0.90 respectively. It has reported face and content validity.

On the first day pre-test was done using the demographic proforma, PKQ and ASES. Patient education assisted with power point on RA, and

a leaflet on the same content was given on the same day. Post-test was done on the 30th day. The data was collected by the researcher. Questions were read out to patients who are illiterate. The following figure illustrates the data collection procedure.

Results

Data was analyzed using both descriptive and analytical statistics with the help of SPSS for windows version 11. Descriptive statistics were used to summarize the demographic variables and the study variables. Wilcoxon- matched pairs -signed rank test was used to evaluate the pre-test and post-test scores.

Table 1: Frequency and percentage distribution of sample according to socio-demographic variables (n=76).

Sample characteristics	Frequency	%
Age in years		
20-29	9	11.80
30-39	18	23.70
40-49	22	28.90
50-59	15	19.70
60-69	8	10.50
70-79	4	05.30
Gender		
Male	7	09.20
Female	69	90.80
Marital status		
Single	13	17.10
Married	63	82.90
Educational level		
Illiterate	31	40.8
Primary school	37	48.7
College	7	9.2
Professional	1	1.3
Family history of RA		
Yes	13	17.10
No	63	82.90
Duration of RA		
< 1 yr	8	10.50
1-3 yrs	6	07.90
3-6yrs	32	42.10
>6 yrs	30	39.50

Sample Characteristics

The demographic characteristics of the sample are shown in table 1. The study included 76 patients with Rheumatoid arthritis. Majority of the sample (90.8%) were females, 29% of the sample was between the age group of 40-49 years. Forty one percentage of the sample was illiterate, and 42.10% was known to have RA for the past 3-6 years.

Knowledge

The distribution of responses to the PKQ gave baseline information about the knowledge level of the RA patients. Statistics regarding the distribution of PKQ scores reveals that RA patients had an average to minimum knowledge on various aspects of their condition before the study. Mean general knowledge on RA was 3.58 ±1.70; 40.8% gave a wrong answer on the description of Rheumatoid arthritis, 14.5% were wrong on symptoms, and 47.4% wrong on blood tests related to RA.

RA patients had the lowest mean score of knowledge on drugs (1.74 ±1.14). Majority (72.3%) had information about NSAIDs, but only 59.2% were aware of the side effects of it. Majority lacked information on long term drugs (80.3%) and pain killers (86.8%).

Patients had a mean score of 2.65± 1.28 on exercise related questions. Majority was aware of the importance of exercise (61.8%), and the suitable ways to take exercise (84.2%). 78.9% of the sample were not aware of the management when all the joints are painful and stiff. The mean score of knowledge on joint protection and energy conservation was 2.64±1.75, 46.1% were wrong on the practical way to protect the joint from strain, and 39.5% lacked information on joint protection methods, 51.3% had a wrong concept of fatigue management and 42.1% on energy conservation methods.

The effect of computer– assisted patient education on knowledge of RA patients was analyzed by, descriptive (mean, standard deviation) and analytical (Wilcoxon matched– pairs signed –rank test) statistics. The data are illustrated using table 2, figure 2, and table 3.

The findings in table 2 depicts that the mean post-test score of PKQ was 21.69 ± 4.04 compared to the mean pre-test score of 10.61 ± 4.16 which shows an improvement in knowledge. Among the different subscales of the PKQ, general knowledge on RA had a better mean (3.58 ± 1.7) compared to knowledge on drugs (1.74±1.14) in the pre-test.

Table 2: Mean and standard deviation of pre-test and post-test scores of patient knowledge questionnaire (PKQ) (n=74*)**.**

PKQ	Pre-test Obtained score				Post-test Obtained score			
	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD
General knowledge on RA (#1-4) possible maximum score=9	0	8	3.58	1.70	3	9	6.70	1.39
Knowledge on drugs (#5-8) possible maximum score=7	0	5	1.74	1.14	1	7	4.57	1.12
Knowledge on exercise (#9-12) possible maximum score= 7	0	7	2.65	1.28	2	7	5.16	1.24
Knowledge on joint protection and energy conservation (#13-16) possible maximum score=7	0	6	2.64	1.75	1	7	5.24	1.33
Total (possible maximum score = 30)	**0**	**21**	**10.61**	**4.16**	**7**	**29**	**21.69**	**4.04**

*two patients were not available for the post-test.

Data presented in figure 2 show that 50% of the sample had average and 48.6% poor knowledge scores in pre-test; however 66.2% of the sample had good knowledge about RA in the post-test. This shows the improvement in knowledge with computer- assisted education and leaflet.

In order to determine whether these differences are statistically significant, Wilcoxon matched-pairs signed- rank test between pre-test and post-test knowledge score of the sample.
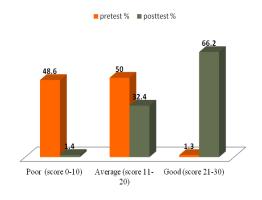

Figure 2: percentage distribution of sample based on the pre-test and post-test knowledge scores

Table 3: Wilcoxon matched- pairs signed- rank test between pre-test and post-test knowledge score of the sample (n= 74)**.**

Knowledge Scores	Median	IQR	Z	P value
Pre-test	10.50	(8, 13.25)	-7.44	0.0001*
Post-test	22	(19, 24)		

*Significant; IQR = Inter-quartile range

According to table 3, there was an increase in the post-test PKQ score (Mdn=22), than the pre-test PKQ score (Mdn= 10.5), Z= -7.44, p< .0001. Since the p value is less than 0.05, and it is inferred that there is an increase in the knowledge after patient education.

Arthritis Self efficacy

The baseline score of RA patients on ASE scale, it is evident that a majority of the sample (54.1%) was quite uncertain about their efficacy (total score) regarding various aspects of RA management (subscales: pain self efficacy 71.6%, function self efficacy 50%, and efficacy on other symptoms 56.8%). Majority was uncertain about managing pain without interfering daily activities (71.1%) and sleep (69.7%). Regarding small to moderate or large reduction of pain without taking extra medications, majority was uncertain (78.9% or 81.6% respectively).

Arthritis self efficacy function sub scale assessed the self efficacy of RA patients for their day to day activity management. Response showed that they were uncertain about their self efficacy to do activities like walking 100 feet on flat ground for 20 minutes (61.8%), walking 10 steps downstairs in 7 seconds (77.6%), getting out of armless chair quickly without support (67.1%), and turning the outdoor faucet on and off (73.7%).

On the third subscale of ASEC (self efficacy other symptoms) the majority scored uncertain about their efficacy in controlling fatigue (71.1%), regulating activity without aggravating arthritis (61.8%), managing arthritis symptoms (68.4%) and pain (75%), helping self in feeling better (73.7%) and dealing with the frustration of arthritis(64.5%).

Analysis presented in table 4 shows that 54.1% of the sample were quite uncertain about their efficacy based on the pre-test ASES score and 54.1% of the sample were quite certain about their efficacy based on the post-test ASES score, which shows the improvement in self efficacy. Patients were quite uncertain about their efficacy in making a large reduction of the pain (mean 4.16).

Table 4: Frequency, percentage, mean and standard deviation of pre-test and post-test scores of arthritis self efficacy scale (ASES) (n= 74)

Subscales	Pre-test				Post-test			
	f	%	Mean	SD	f	%	Mean	SD
Pain self efficacy			**4.60**	**1.71**			**7.23**	**1.64**
Very uncertain	5	6.8			0	0		
Quite uncertain	53	71.6			4	5.4		
Quite certain	10	13.5			42	56.8		
Very certain	6	8.1			28	37.8		
Function self efficacy			**4.99**	**1.76**			**7.32**	**1.50**
Very uncertain	7	9.5			0	0		
Quite uncertain	37	50			4	5.4		
Quite certain	22	29.7			37	50		
Very certain	8	10.8			33	44.6		
Other symptoms			**4.81**	**2.00**			**7.33**	**1.66**
Very uncertain	6	8.1			0	0		
Quite uncertain	42	56.8			4	5.4		
Quite certain	17	23			36	48.6		
Very certain	9	12.2			34	45.9		
Total			**4.79**	**1.59**			**7.25**	**1.46**
Very uncertain	5	6.8			1	1.4		
Quite uncertain	40	54.1			1	1.4		
Quite certain	23	31.1			40	54.1		
Very certain	6	8.1			32	43.2		

Post-test score of ASES shows that there was an improvement in the self efficacy of RA patients on all subscales. Wilcoxon matched- pairs signed- rank test between pre-test and post-test

ASES score of the sample was done to establish the statistical significance of the improvement and the results are shown in table 5.

Table 5: Wilcoxon matched- pairs signed- rank test between pre-test and post-test ASES score of the sample

				n= 74
ASES Scores	**Median**	**(Q1, Q3)**	**Z**	**P value**
Pre-test	4.40	(3.90, 5.65)	-7.19	0.0001*
Post-test	7	(6.07, 8.69)		

* Significant

Table 5 describes that the post-test arthritis self efficacy score (Mdn=7) was more than the pre-test arthritis self efficacy score (Mdn= 4.40), $Z= -7.19$, $p< 0.001$. The p value is less than 0.05 and it is inferred that patient education increases arthritis self efficacy.

Discussion

In this study, it is concluded that the baseline knowledge and self efficacy of RA patients are poor and both can be improved by computer-assisted patient education. Findings of this study also support the role of health education in increasing self efficacy of RA patients. It is evident that patients with high self efficacy manage their fatigue well. Similar results were obtained in the following previous studies.

Hill et al (1991) (8) administered PKQ in 70 randomly selected RA patients in rheumatology out -patient clinic of a large teaching hospital in New York. There was a wide variation in total scores ranging from 3 to 28 out of 30. Sixty two percent of patients knew that the cause of RA is unknown but 27% thought it could be by injury. All the patients had some confusion of the drugs. This study like the current one highlighted the need for patient training.

A study conducted by Makelainen (2009) (10) described the patient's knowledge level about their disease and its treatments, and what kind of self-efficacy they have when no intervention has been used. Data was collected from Finnish Rheumatoid arthritis patients at baseline (n = 252), and after three and six months (n = 223) by PKQ, ASES, HAQ, VAS for pain and fatigue and AIMS. The patients' knowledge of their disease and its treatments varied from poor to good (total score- 20, median 17, range 2-29). Patients had better knowledge on general knowledge of RA (Median 7, range 0-9) and lesser knowledge on the subscale drugs (median 4, range 0-6).

Another study was done by Werner et al 2006 (11) to evaluate the level of knowledge and concern of their illness and treatment and their relationship with functional disability, perception of the pain and global assessment of disease activity, in patients with RA using a cross sectional study of 104 patients (mean age 56 years, 100 women). The knowledge about their illness and requirement of further information and concern about aspects of the illness and treatment, were assessed. Sixty percent of patients had only primary school studies. The median evolution of the illness was 14 years. Ninety eight percent knew their diagnosis and 91% required further information. There was a high degree of concern about the disease and treatment.

A study was conducted (Jennings 2006) (12) to create a Brazilian version of the Patient Knowledge Questionnaire-PKQ, an instrument for measuring the knowledge of patients with Rheumatoid arthritis (RA) as regards their disease, and through the use of this instrument, also measure the knowledge of RA patients from reference hospitals in the city of São Paulo. The

questionnaire was applied to 100 RA patients, selected in four outpatient clinics at reference hospitals in the city of São Paulo. The mean PKQ score was 12.96 and the mean test application time was 10.3 minutes, for the 100 patients assessed. The lowest scores were observed in the domains of medications and joint protection/energy conservation. Patients' knowledge of RA is poor, particularly in the domains regarding medications and joint protection/energy conservation.

Self efficacy of RA patients

Data of the present study showed that the sample had an average self efficacy on a scale of 1-10 (higher score denotes good self efficacy), (Mean efficacy score of 4.79 ±1.59, median 4.40) in the pre-test. Majority of the sample (54.1%) were quite uncertain about their efficacy. Seventy one percentage and 56.8% were quite uncertain about how to manage pain (PSE) (Mean 4.6 ±1.71) and other symptoms (OSE) (Mean 4.81 ± 2) respectively and 50% in the function self efficacy scale (Mean 4.99 ±1.76).

Study by Makelainen et al (2008) (13) demonstrated a similar pattern of self efficacy scores; the median of RA patient's self efficacy was 36 mm (range 0-98, IQR 32), 21% of the sample were quite uncertain about their self efficacy, the median FSE was 18mm (range 0-89, IQR 27), OSE 25 mm (range 0-100, IQR 30) where lower scores indicated good self efficacy. Baseline self efficacy was 5.30 (range 3.40-6.20) in a study by Hammond et al (1999). (14)

Self efficacy of RA patients in a study by Makelainen (2009) (15) showed that RA patient's self-efficacy varies from weak to strong. The patients' uncertainty level increased when they had to reduce their arthritis pain using non-medical techniques. The median score of pain self efficacy (PSE) was 35.5 (IQR- 16.7, 48.2), function self efficacy 18.4 (IQR 7.7, 34.3) and other symptoms SE 24.7 (10.3, 40.3).

In the current study there was a significant improvement in knowledge (p < 0.0001) and self efficacy (p < 0.0001), also, knowledge was correlated to self efficacy (r= 0.31, p = 0.007). Findings of the study by Davis et al. (1994) (16) demonstrated that knowledge increased significantly (p < 0.05) and self-efficacy increased from baseline to follow-up (p < 0.05). Study conducted by Helliwell et al (1999) (17) in UK reported an increase in the disease specific knowledge of the experimental group than the control group at 12 months (p< 0.002). Knowledge increased significantly (F(r) = 1.5, df =2, p=0.47) and also self efficacy (p< 0.01) (14). Similar results were found in the studies of Taal et al (1993), (18) Sohng (2003), (19) Lorig et al (2001), (20) Chui et al (2004), (21) Hennel et al, (2004), (22) and Barlow and Wright (1998). (23) Findings of the present study support the importance of patient education to improve the knowledge and self efficacy of RA patients. The study has also few limitations. a) The findings could not be generalized. The setting and the sample were not selected randomly; b) threat of statistical regression and maturation due to the weak design; c) common method bias due to the self reported questionnaires; and; d) study was of shorter duration.

Conclusion

Patient-focused education on self management of rheumatoid disease is a very important yet neglected area of current RA patient education programs. There is an urgent requirement to address this unmet need and develop properly designed and evaluated educational interventions, which will specifically address the complex lifestyle and pharmacological measures, required optimizing the general health of every person with RA. Prepared educational programs, aims of which are disease management, help patients get accustomed to living with the disease. The implications made in this study are vital to all health team members especially nursing education, practice, administration and research.

Reference

1. Bresnihan B. Pathogenesis of joint damage in rheumatoid arthritis. J Rheumatol 1999; 26(3): 717-9.
2. Heiberg T, Uhlig T, Kvin TK. Seven year changes in health status and priorities for improvement of health in patients with rheumatoid arthritis. Ann Rheu Dis 2005; 64(2): 191-5.
3. Strahl C, Kleinknecht RA, Dinnel DL. The role of anxiety, coping, and pain self efficacy in rheumatoid arthritis patient functioning. Behav Res Ther 2000; 38: 863-73.
4. Bandura A. Health promotion by social cognitive means. Health Edu Behav 2004; 31(2): 143-64.
5. Al Kawi ZS, Alzzawi AJ, Al Ajili FM, Al Wakili R. Rheumatoid arthritis in population samples in Iraq. Ann Rheum Dis 1978; 37: 73-5.
6. Pountain G. The prevalence of Rheumatoid arthritis in the Sultanate of Oman. Br J Rheumatol 1991; 30: 24-8.
7. Al- Dalan A, Al Ballaa S, Bahabri S, Biyari T, Al Sukait M, Mousa A. The prevalence of rheumatoid arthritis in the Qassim region of Saudi Arabia. Ann Saudi Med 1998; 18(5): 396-7.
8. Hill J, Bird HA, Hopkins C, Lawton C, Wright V, The development and use of a patient knowledge questionnaire in rheumatoid arthritis. Br J Rheumatol 1991; 30: 45-49.
9. Lorig K, Chastain RL, Ung E, Shoor S, Holman HR. Development and evaluation of a scale to measure perceived self efficacy in people with arthritis. Arthritis Rheum 1989; 32(1 Suppl): 37-44.
10. Makelainen P. Rheumatoid arthritis patient education and self-efficacy. Kuopio University Publications E. Soc Sci 2009; 167: 89.
11. Werner AM, Kaliski S, Salazar K, Bustos L, Rojas MT, Baumert C, Leal H. Knowledge about their disease and treatment among patients with Rheumatoid arthritis. Rev Méd Chile 2006; 134: 1500-06.
12. Jennings F, Toffolo S, de Assis MR, Natour J. Brazil patient knowledge questionnaire (PKQ) and evaluation of disease-specific knowledge in patients with Rheumatoid arthritis. Clin Exp Rheumatol 2006 Sep-Oct; 24(5): 521-8.
13. Makelainen P, Vehvilainen-Julkunen K, Pietila A. A Survey of rheumatoid arthritis patient's self-efficacy. J Adv Nurs Pract [serial online] 2008 [cited2010 Nov 08]; 9(2). Available from: URL:http://www.ispub.com/journal/
14. Hammond A, Lincoln N, Sutcliffe. A cross over trial evaluating an educational behavioral joint protection program for people with rheumatoid arthritis. Patient Educ Couns 1999; 37: 19-32.
15. Makelainen P. Rheumatoid arthritis patient education and self-efficacy. Kuopio University Publications E. Soc Sci 2009; 167: 89.
16. Davis P, Busch AJ, Lowe J-C, Taniguchi J, Djkowich B. Evaluation of a rheumatoid arthritis patient education program: impact on knowledge and self efficacy. Patient Educ Couns 1994; 24: 55-61.
17. Helliwell PSM, O'Hara M, Holdsworth J, Hesselden A, King T, Evans P. A 12-month randomized controlled trial of patient education on radiographic changes and quality of life in early rheumatoid arthritis. Rheumatology 1999; 38(4): 303-8.
18. Taal E, Rasker JJ, Seydel ER. Health status adherence with health recommendations, self efficacy and social support in patients with RA. Patient Education Couns 1993; 20: 63-76.
19. Sohng K Y. Effects of self management course for patients with systemic lupus erythematosus. J Adv Nurs 2003; 42(5): 479-86.
20. Lorig KR, Ritter P, Stewart AL, Sobel DS, Brown BW, Jr. Bandura A et al. Chronic disease self management program: two year health status and health care utilization outcomes. Med Care 2001; 39: 1217-23.
21. Chui DYY, Lau JSK, Yau ITY. An outcome evaluation study of the rheumatoid arthritis self-management program in Hong Kong. Psychol Health Med 2004; 9(3): 286 – 92.
22. Hennel SL, Brownsell C, Dawson JK. Development, validation and use of a patient knowledge questionnaire (PKQ) for patients

with early rheumatoid arthritis. Rheumatology 2004; 43: 467-71.

23. Barlow JH, Wright CC. Knowledge in patients with rheumatoid arthritis: a longer term follow- up of a randomized controlled study of patient education leaflets. Br J Rheumatol 1998; 37: 373-6.