

Factors Affecting Self-Management of Patients with Rheumatoid Arthritis

Samar Samy Mohamed¹, Ola Abdel Aty Ahmed², Naglaa El Sayed Mahdy³, and Samar Faltas Marzouk⁴

Clinical Instructor, Faculty of Nursing, Damanhur University¹, Professor of Medical Surgical Nursing², Professor of Medical Surgical Nursing³, and Assistant Professor of Medical Surgical Nursing⁴, Faculty of Nursing, Ain Shams University.

Abstract

Background: Rheumatoid Arthritis (RA) is a systemic, autoimmune and inflammatory disease that is associated with progressive joint degeneration, limitation of physical activity and disability. **Aim:** the study aimed to assess factors affecting self-management of patients with rheumatoid arthritis. **Design:** A descriptive exploratory research design was utilized. **Setting:** This study was carried out at the National Medical Institute of Damanhur –affiliated to the General Organization for teaching hospitals and Institutes at the Medical clinics in the out- patient department. **Study subjects:** A purposive sample of 100 adult patients of both genders with rheumatoid arthritis. **Tools:** Patient interviewing questionnaire, Rheumatoid Arthritis Disease Activity Scale, Rheumatoid Arthritis Self-Efficacy and Rheumatoid Arthritis Self-Management practices Questionnaire. **Results:** About 58% of the studied patients had unsatisfactory level of knowledge about the self-management of RA. Also, 32% of them had low disease activity. Moreover, 52% of them had moderate level of self-efficacy and 50% of them had moderate level of total self-management. **Conclusion:** More than half of the studied patients had unsatisfactory level of knowledge about rheumatoid arthritis. Also, one third of them had low level of disease activity. Moreover, more than half of the studied patients had moderate level of self-efficacy and half of them had moderate level of total self-management. There was highly significant positive correlation between total knowledge of the studied patients and self-efficacy with self- management. While, there was highly significant negative correlation between total disease activity of the studied patients and self- management. **Recommendation:** Self-management educational program should become an integrated part of the total management of patients with rheumatoid arthritis.

Keywords: Rheumatoid arthritis, self-management, self-efficacy, disease activity.

Introduction

Arthritis is considered one of the most prevalent chronic conditions in the middle aged to late adulthood and is ranked among the top 10 causes of disability as nearly 54.4 millions people in the united states of 18 years or older have been diagnosed with arthritis (Barbour, Helmick, Boring & Brady, 2017). It affects women more frequently than men

and its incidence increases with age (Centers for Disease Control and Prevention, 2018).

Rheumatoid arthritis (RA) is a chronic autoimmune disease of unknown etiology that affects the connective tissue in synovial joints, muscle, tendons, and fibrous tissue. It is the most common form of chronic inflammatory arthritis characterized by a symmetric, peripheral polyarthritis and often results in articular cartilage and bone destruction and

functional disability. As a systemic disease, RA may result in a variety of extraarticular manifestations, including fatigue, subcutaneous nodules, lung involvement, pericarditis, peripheral neuropathy, vasculitis, and hematologic abnormalities (Jameson et al., 2018).

Rheumatoid arthritis is characterized by periods of remission and exacerbations (disease flare). Arthritic flare-ups may be attributed to precipitating stressful events such as infection, work stress, physical exertion, childbirth, surgery or emotional upset. During remission the inflammation, pain, stiffness and edema subside and progression of tissue damage is halted or reduced (Cooper & Gosnell, 2019).

The exact cause of RA is unknown; however, initiation of disease seems to result from an interaction among genetic susceptibility, environmental triggers, and chance. RA is characterized by dysregulated inflammatory processes in the synovium of the joint that eventually leads to the destruction of both cartilaginous and bony elements of the joint, with resulting pain and disability. Systemic inflammation associated with RA is associated with a variety of extra-articular comorbidities, including cardiovascular disease, resulting in increased mortality in patients with RA. RA is also associated with several psychosocial disorders (Gibofsky, 2014)

Chronic disease self-management (SM) is an intervention, a program or service designed to support healthy behaviors and routines, and an outcome. Although SM processes differ based on illness, common care routines include symptom recognition, medication adherence, nutrition and exercise maintenance, managing relations with family, friends and providers, and psychological response management. SM empowers individuals to take responsibility

in their care by handling out-patient day-to-day care (Portz, 2017).

Self-management in RA patients includes drug management as prescribed by the physician, complementary therapies (e.g. thermotherapy, exercises, massages therapy), hydrotherapy, resting, and receiving support and advice or social support from family and others (Chang et al 2014, and Rezaei, Neshat Doost, Molavi, Abedi, & Karimifar, 2014;).

Nurses perform myriad roles, including counselor, caregivers, educator, coach, liaison, advocate, monitor, and information resource, as well as assessor of patient health status, quality of life, disease activity, and function. Nurse is in the unique position to provide patient care (Duffy & McCoy, 2015).

Significance of the study:

Prevalence of rheumatoid arthritis is estimated to vary between 0.5% to 1.5% worldwide in 2017 with geographic variation (Silman & Pearson, 2017). In 2016, according to the Egyptian society for rheumatology and rehabilitation reported that 180,000 Egyptian patients had RA (Gamal, Mahran, Abo El Fetouh & Janbi, 2016).

RA is also associated with multiple serious and potentially life-threatening extra-articular manifestations that can also contribute to the physical disability and psychological morbidity of RA that lead to reduced quality of life, higher direct and indirect costs, and societal burden of the disease (Giles, 2019).

Aim of the study

The present study aimed to assess factors affecting self-management of patients with rheumatoid arthritis

Research question:

What are the factors affecting self-management of patients with rheumatoid arthritis?

Subjects and Methods:**I- Technical design:****Research Design:**

A descriptive exploratory design was utilized to conduct this study.

Research Setting:

This study was conducted at the National Medical Institute of Damamhur – affiliated to the General Organization for teaching hospitals and Institutes- at the medical clinics in the out-patient department.

Subject:

A purposive sample of 100 adult patients of both genders with rheumatoid arthritis in the previously mentioned setting was selected to conduct this study through the following inclusion criteria; patients who diagnosed for rheumatoid arthritis more than three months , both gender (males & females), free from other psychological and neurological illness and able to comprehend and communicate verbally.

Data for this study was collected by using the following tools:

Tool (I): interviewing questionnaire:

It was designed in a simple Arabic language by the researcher after reviewing relevant and recent literature. It was used to assess the patient's level of knowledge regarding RA. It included three parts:

Part I: Socio demographic data of the studied patients, including: age, gender, marital status, educational level, occupation, area of residence, income, and housing condition.

Part II: Clinical data of the studied patients, including: past, present medical and surgical history and family history

Part III: Assessment of the patient's level of knowledge regarding RA and its associated self- management, which included knowledge about the nature of the disease, medications, treatment and.

❖ Scoring system:

The total score of knowledge was thirty-seven grades, each correct answer was given one grade and incorrect answer was given zero. The satisfactory score started from 60% and above and unsatisfactory was below 60%.

Tool (II): Rheumatoid Arthritis Disease Activity Scale (DAS-28): It was used to assess disease activity in 28 joints of the body and it was consisting of four parts; (the number of joints affected with joint tenderness, the number of swollen joints, erythrocyte sedimentation rate (ESR), and the visual analogue scale (VAS) of patient's global health; it was adopted from (Prevo, van't Hof, Kuper, van Leeuwen, & van Riel,1995).

❖ Scoring system:

These results are entered into specific formula and produce a score between 0 and 10 and ranged as follows:

<2.6 was considered disease remission, 2.6 – 3.2 was considered low disease activity, 3.2 – 5.1 was considered moderate disease activity, and > 5.1 was considered high disease activity

Tool (III): Rheumatoid arthritis self-efficacy questionnaire: It was used to measure tasks specific self-efficacy and its effect on of self-management. It was consisting of twenty eight statements and addressed beliefs about ability to perform tasks across 8 dimensions of self-management identified as important in rheumatoid arthritis including relaxation, relationships, function, leisure activities, exercise, sleep, medication, and fatigue. It

was adopted from (Hewlett, Cockshott, Kirwan, Barrett, & Stamp, 2001)

❖ Scoring system:

The responses were ranged from 1 for strongly disagree to 5 for strongly agree. The total score for the tool which was 140 and categorized into three categories as following $\geq 60\%$ (>84 grades) was considered high /good self-efficacy, 40%- 60% (56-84 grades) was considered moderate /fair self-efficacy, and $<40\%$ (<56 grades) was considered low/bad self-efficacy

Tool (IV):Rheumatoid Arthritis Self-Management practice Questionnaire : it was written into Arabic language. It was used to assess self-management of patients with rheumatoid arthritis. It was consisting of thirty seven items across nine dimensions of self-management practices for rheumatoid arthritis include (exercise, rest & sleep, relaxation, stress management, pain management, joint protection & energy conservation, diet & food supplements, drug management and social support). It was adapted from (Nadrian, Morowatisharifabad, & Bahmanpour, 2011).

❖ Scoring system

The responses were ranged from 1 for never to 3 for always. The score of items was summed and the total multiplied by the number of items, give a total score for the tool which was 111 and categorized into three categories as following:

$\geq 60\%$ (≥ 67 grades) was considered high /good self-management practice, 40%-60% (44-67 grades) was considered moderate/fair self-management practice and $< 40\%$ (< 44 grades) was considered low/bad self-management.

II- Operational design:

• Preparatory phase:

It included reviews of related literature, and theoretical knowledge of

various aspects of the study using books, articles, magazines, periodicals and websites.

• Pilot study:

A pilot study was applied on 10% of patients with RA (10 patients) in order to test the applicability and clarity of tools. Modifications were done and patients included in the pilot study were excluded from the study group.

• Field work:

- The researcher visited the selected setting four days per week (Sunday, Monday, Wednesday and Thursday), at the morning shift from 9.00am to 1.00pm at medical clinics.

- Data collection of this study was carried out through three months, in the period from the beginning of July 2019 till the end of September 2019.

III- Administrative design:

An official permission letter was obtained from the Faculty of Nursing /Ain Shams University after agreement of the Scientific Research Ethical Committee through an issued letter from the faculty dean to the director of the National Medical Institute of Damanhur –affiliated to the General Organization for teaching hospitals and Institutes at which the study was conducted.

IV- Statistical design:

The collected data was scored, tabulated and analyzed by personal computer using the Statistical Package for Social Sciences (SPSS) version 22. The statistical analysis included Percentages (%), mean, standard deviation (SD), Chi-square (X^2), Coefficient of correlation and multiple linear regression.

Results

Table (1): shows the distribution of patients, according to their socio demographic data, 75% of patients under

the study were females and the mean age of the study group was 43.75 ± 8.33 , Also, 67% and 48% of them were married and secondary educated respectively. In addition, 44% of the patients under study were working and 45.5% of them their work requiring physical effort. Moreover, 60% of them were residing in rural areas.

Figure (1): shows total knowledge of the studied patients about RA and its associated self-management, it reveals that, 58% of the studied patients had unsatisfactory level of knowledge about rheumatoid arthritis and its associated self-management.

Figure (2): shows that 18% of the studied patients were in remission state and 32% of them had low level of disease activity.

Figure (3): show that 52% of the studied patients had moderate level of self-efficacy related to self-management.

Figure (4): shows that 50% of the studied patients had moderate level of total self-management.

Table (2): reveals that, there was highly significant positive correlation between total knowledge of the studied patients and both of their self-efficacy and self-management. The table shows also that, there was highly significant positive correlation between total self-efficacy of the studied patients and total self-management. While, there was highly significant negative correlation between total disease activity of the studied patients and both of their self-efficacy and self-management.

Table (1): Frequency and percentage distribution of the studied patients according to their socio-demographic characteristics (n=100).

Items	N	%
Gender		
Male	25	25
Female	75	75
Age in years		
<30	12	12
30-<40	16	16
40-<50	27	27
50-60	45	45
\bar{x} S.D	43.75 ± 8.33	
Marital status		
Married	67	67
Not married	33	33
Educational level		
Illiterate	39	43.3
Read and Write	17	18.9
Secondary education	14	15.6
High education	20	22.2
Occupation		
Work	44	44
Not working	56	56
Residence		
Urban	40	40
Rural	60	60

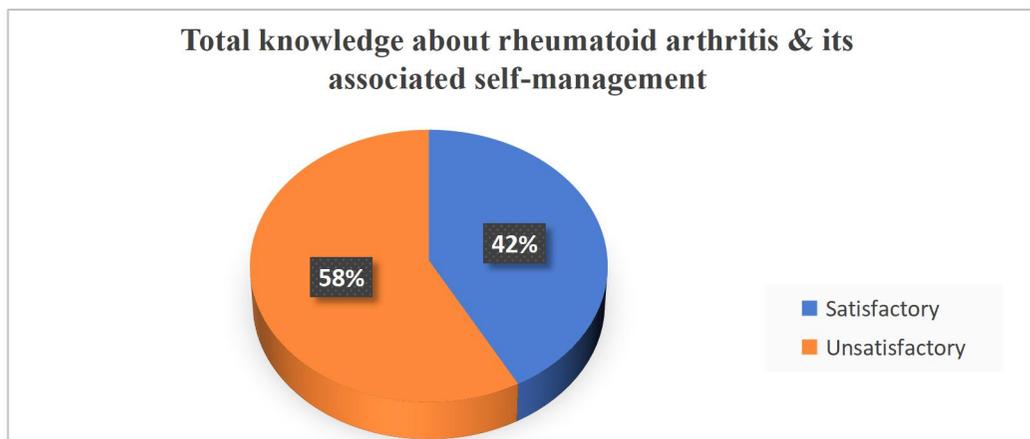


Figure (1): Percentage distribution of the studied patients according to their total knowledge about rheumatoid arthritis and its associated self- management (n=100).

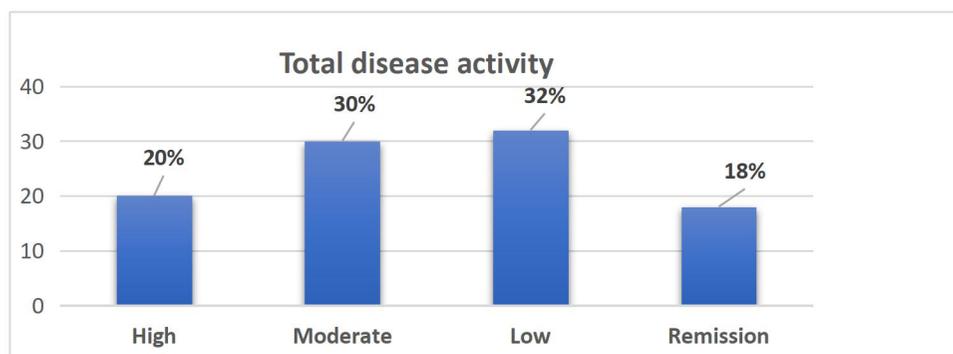


Figure (2): Percentage distribution of the studied patients according to their total disease activity (n=100).

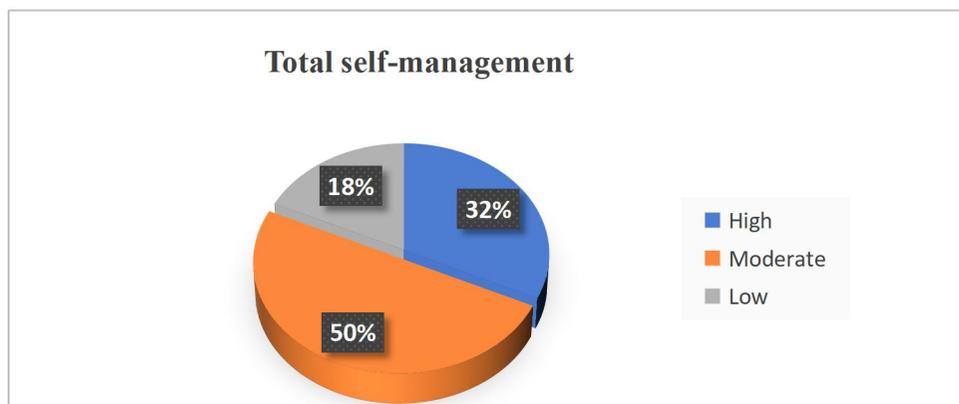


Figure (3): Percentage distribution of the studied patients according to their total self- efficacy (n=100).

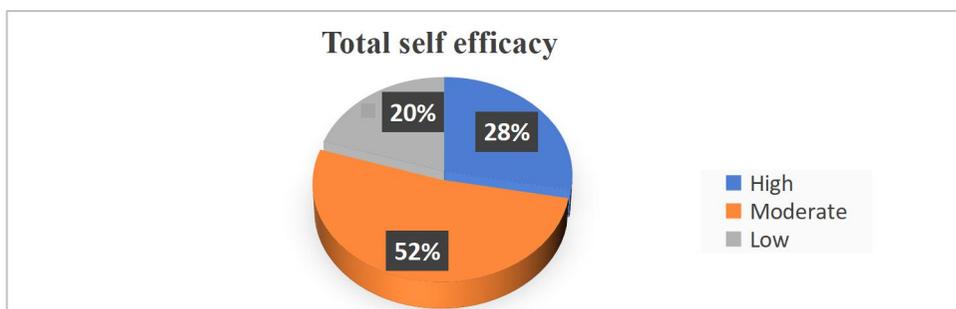


Figure (4): Percentage distribution of the studied patients according to their total self-management (n=100).

Table (2): Correlation between the patient's knowledge, self-efficacy, disease activity and self-management.

Items	Patient's knowledge	Patient's self-efficacy	Patient's disease activity	Patient's self-management
Patient's knowledge	—	r = 0.352 p = .000**	r = 0.020 P = 0.848	r = 0.334 P = 0.001**
Patient's self-efficacy	r = 0.352 p = .000**	—	r = -.390 p = .000**	r = 0.418 P = .000**
Patient's disease activity	r = 0.020 P = 0.848	r = -.390 p = .000**	—	r = -.307 P = .003**
Patient's self-management	r = 0.334 P = 0.001**	r = 0.418 P = .000**	r = -.307 P = .003**	—

(*) Statistically significant at $p < 0.05$ —(**) highly significant at $p < 0.01$

Discussion

Rheumatoid arthritis (RA) is a systemic autoimmune disease of unknown cause characterized by inflammatory polyarthritis which affects peripheral joints especially the small joints of hand and feet. It is chronic, progressive disease in which untreated inflammation may lead to cartilage and bone erosion and joint destruction resulting in functional disability (Ferri, 2020).

The current study revealed that, three quarters of patients under the study were females, this result might be due to hormonal changes that affect female more than male and make a ratio of 3 female: 1 male. These results similar with the result of study performed by **Elsaman et al. (2017)** entitled "Epidemiology and comorbidity of rheumatoid arthritis in

upper Egypt, a hospital based study", which found that around three quarters of studied patients were females.

Regarding to age, the mean age of the study group was 43.75 ± 8.33 where, about half of the studied patients were aged from 50-60 years. This may be due to age group considered high risk for exposure to rheumatoid arthritis as the risk of rheumatoid arthritis increase with age. These results similar with the result of study performed by **Rosa-Gonçalves, Bernardes, & Costa (2018)** entitled "Quality of life and functional capacity in patients with rheumatoid arthritis – Cross-sectional study", who stated that, more than two fifth of the studied sample their age were above 50 years.

Regarding to marital status and residence, the finding of the current study revealed that, two thirds of the studied patients were married. Also, three fifth of

them residing in rural areas. These results may be due to lack of availability of health care in rural areas which force patients to travel to urban areas for treatment and diagnosis.

These results are accordance with the study performed by **Bajraktari, et al. (2014)** entitled “Demographic features of patients with rheumatoid arthritis in Kosovo”, which revealed that more than two thirds of the participant in the study were married.

In relation to the **educational level** of the studied patients under study, it was found that, near to half of them had secondary education. This finding may be attributed to the association between low of educational level and self-care and their level of education doesn't enable them to seek medical assistance early. The present study is consistent with **Hussein (2017)** in their study entitled “The quality of life in patients with rheumatoid arthritis in Baghdad”, who reported that more than two fifth of the studied sample had secondary education.

Concerning to job, the finding of the current study revealed that more than half of the patients under study weren't working and house wives. These results may be due to that patient had to leave work because presence of disability or deformities in joints and due to prolonged the duration of physical work with standing posture in the household work. This result in accordance with the study performed by **El Sherbiny & Saad (2019)** entitled “Rheumatoid arthritis patients: Screening for a frequent yet underestimated comorbidity”, who found that, two thirds of the studied sample were not working and housewives.

Concerning total knowledge about RA and its associated self-management of the studied patients, the finding of the current study revealed that less than three fifth of the studied patients had unsatisfactory level of knowledge about

rheumatoid arthritis and its associated self- management. This lack of knowledge would be exaggerated by their low educational level and social class as in the current study level where two fifth of the patients were illiterate or read and write and more than half of them reported income insufficiency. This finding shed the light about the importance of proper educational programs especially of those newly patients at primary health care settings.

These results supported with the study done **Shokri et al. (2014)** who conducted a study entitled “Quality and Rheumatoid Arthritis in the Iranian Patient's”, who establish that more than half of the studied patients had unsatisfactory level of total knowledge about the Rheumatoid Arthritis. Also, **Naqvi et al. (2020)** in their study entitled “Rheumatoid Arthritis Knowledge Assessment Scale (RAKAS) in patients with rheumatoid arthritis”, who found that less than two thirds of the studied subjects had poor level of knowledge about Rheumatoid Arthritis.

According to **total disease activity**, the finding of the current study revealed that, one fifth of the studied patients were in remission state and slightly less than one third of them had low level of disease activity. Also, less than one third of them had moderate level of disease activity. While, less than fifth of them had high level of disease activity. These results might due to majority of patients adhere to medical treatment and they come to periodic follow-up.

These results supported with the study done by **Van Riel & Renskers (2016)** conducted a study which entitled “The Disease Activity Score (DAS) and the Disease Activity Score using 28 joint counts (DAS28) in the management of rheumatoid arthritis”, who found that one third of studied patients had low level of disease activity. Similar study performed by **Sunar et al. (2015)** entitled “Disease

activity (rheumatoid arthritis disease activity index-5) in patients with rheumatoid arthritis and its association with quality of life, pain, fatigue, and functional and psychological status”, who found that half of patients had moderate and high disease activity.

Regarding **total self-efficacy** of the studied patients, the current study revealed that, more than half of the studied patients had moderate level of self-efficacy. Also, more than one quarter of them had high level of self-efficacy. While, one fifth of them had low level of self-efficacy. This finding coincides with **Seyam (2018)** entitled “Health Needs and Self-Efficacy for Rheumatoid Arthritis Patients”, who mentioned that greater levels of self-efficacy are typically associated with less psychological distress “less anxiety and depression”, greater tolerance of pain and other symptoms, increased ability to cope, greater use of self-care activities, better physical functioning and hence lower health needs.

Regarding to **total self-management** of the studied patients, the current study revealed that, half of the studied patients had moderate level of total self-management. Also, slightly less than one third of them had high level of total self-management. While, slightly less than one fifth of them had low level of total self-management. This result may be referred to RA is associated with negative changes in physical health. This is generally attributed to symptoms of inflammation and the adverse impact of RA on quality of life and functioning. This findings is similar with the result of study performed by **McHugh (2020)** in their study entitled “self-Management for Older People with Arthritis and other Rheumatologic Conditions”, and reported that more than half of the studied participants had moderate level of total self-management.

Regarding the correlation between the patient’s knowledge, self-efficacy, disease activity and self- management, the present study revealed that, there was highly significant positive correlation between total knowledge of the studied patients and both of their self-efficacy and self- management. This could be explained as satisfactory level of knowledge was more encountered among those patients with high level of self-efficacy and self-management as they know more about their disease and this will be reflected on self-efficacy and self-management and higher self-efficacy will result in higher self-management. This result supported with the study performed by **Quinlan et al. (2013)** which entitled “the relationship among health literacy, health knowledge, and adherence to treatment in patients with rheumatoid arthritis”, who stated that, total knowledge of the studied patients had a significant effect on their self-efficacy and self- management.

Also, there was highly significant positive correlation between total self-efficacy of the studied patients and total self- management. While, there was highly significant negative correlation between total disease activity of the studied patients and both of their self-efficacy and self- management. These results may due to the more progression of disease and its symptoms, the less ability to perform any self-management practices and this will affect self-efficacy also. This finding was supported with the study performed by **Chaleshgar-Kordasiabi et al. (2015)** which entitled “Self-management behaviors in rheumatoid arthritis patients and associated factors”, who found that there was highly significant positive correlation between total self-efficacy of the studied patients and total self- management.

Conclusion

More than half of the studied patients had unsatisfactory level of knowledge about rheumatoid arthritis and its associated self-management. Also, one third of them had low level of disease activity. Moreover, more than half of the studied patients had moderate level of self-efficacy and half of them had moderate level of total self-management. This study found that there was statistically significant relation of socio-demographic characteristics (age, gender, educational level, occupation, and financial status), anxiety and stress, Patients' knowledge, disease activity, duration of disease, self-efficacy and social support with self-management of rheumatoid arthritis.

Recommendations

In services: The health education program should be available for every patient's with rheumatoid arthritis based on the patient's physical, psychological, social and spiritual needs.

In research: Further research studies are needed to focus on studying psychological factors affecting self-management of rheumatoid arthritis.

References

- Bajraktari, I. H., Teuta, B. Ç., Vjollca, S. M., Bajraktari, H., Saiti, V., Krasniqi, B., & Muslimi, F. (2014).** Demographic features of patients with rheumatoid arthritis in kosovo. *Medical archives (Sarajevo, Bosnia and Herzegovina)*, 68(6), 407–410. [Doi:10.5455/medarh](https://doi.org/10.5455/medarh)
- Barbour, K.E., Helmick, C.G., Boring, M.A. & Brady, T.J. (2017).** Vital signs: prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation — United States, 2013–2015, *Morbidity and Mortality Weekly Report*, 66:pp246–253.
- Centers for Disease Control and Prevention (CDC). (2018).** Arthritis-Related Statistics. available at: https://www.cdc.gov/arthritis/data_statistics/arthritis-related-stats.htm . Accessed on 30-1-2019.
- Chalesghar- Kordasiabi, M., Akhlaghi, M., Baghianimoghadam, M. H., Morowatisharifabad, M. A., Askarishahi, M., Enjezab, B., & Pajouhi, Z. (2015).** Self-Management Behaviors in Rheumatoid Arthritis Patients and Associated Factors in Tehran 2013. *Global Journal of Health Science*, 8(3): pp156–167. [doi:10.5539/gjhs.v8n3p156](https://doi.org/10.5539/gjhs.v8n3p156)
- Chang, R.W., Semanik, P.A., Lee, J., Feinglass, J., Ehrlich-Jones, L., & Dunlop, D.D. (2014).** Improving physical activity in arthritis clinical trial (IMPAACT): Study design, rationale, recruitment, and baseline data. *Contemporary Clinical Trials*,39(2), 224–235.
- Cooper, K. & Gosnell, K. (2019).** *Adult Health Nursing E-Book, care of patient with musculoskeletal disorders, rheumatoid arthritis*, Elsevier; Canada, 8th ed.,ch4, pp 115-121.
- Duffy, M. & McCoy, S. (2015).** *Rheumatology nursing: Scope and Standards of Practice*. Silver Spring.American Nurses Association;1ST ed,PP.1-24.
- El Saman, A.M, Radwan, A.R, Dahab, M.A, Sherif, A.M., & Al-Fadl, A.E. (2017).** Epidemiology and comorbidity of rheumatoid arthritis in upper Egypt, a hospital based study, *Annals of the Rheumatic Diseases*, 76(2):1150.
- El Sherbiny, D. & Saad, W. (2019).** Rheumatoid arthritis patients: Screening for a frequent yet underestimated comorbidity. *The Egyptian Rheumatologist*. 31(2), 293.
- Ferri, F.F. (2020).** *Ferri's Clinical Advisor: Diseases and Disorders: Rheumatoid Arthritis*, 22 ed., Elsevier , USA, pp1212-1215.
- Gamal, R., Mahran, S., Abo El Fetouh, N., & Janbi, F. (2016).** Quality of life assessment in Egyptian rheumatoid arthritis patients: Relation to clinical features and disease activity. *Egyptian rheumatologist journal*, 38(2), pp 65-70.
- Gibofsky, A. (2014).** Epidemiology, pathophysiology, and diagnosis of rheumatoid arthritis: A Synopsis. *Am J Manag Care*, 20(7 Suppl):S128-35.
- Giles, J.T. (2019).** Extra-articular Manifestations and Comorbidity in Rheumatoid Arthritis: Potential Impact of Pre-Rheumatoid Arthritis Prevention. *Clin*

- Ther Journal, 41(7): 1246–1255. DOI: 10.1016/j.clinthera.2019.04.018.
- Hewlett, S., Cockshott, Z., Kirwan, J., Barrett, J., & Stamp, J. (2001).** Development and validation of a self-efficacy scale for use in British patients with rheumatoid arthritis (RASE). *British society for Rheumatology*, vol.40, pp.1221-1230.
- Hussein, W. (2017).** The quality of life in patients with rheumatoid arthritis in Baghdad, 2017: a cross-sectional study. *International Journal of Medical Research & Health Sciences*, 6(11), 20-34.
- Jameson, J.L., Fauci, A.S., Kasper, D.L., Hauser, S.L., Dan, L., Longo, D.L. & Loscalzo, J. (2018).** *Harrison's Principles of Internal Medicine: Immune-Mediated, Inflammatory, and Rheumatologic Disorders*, rheumatoid arthritis 20th ed., McGraw-Hill Education, USA, ch351, p.2527-2540.
- McHugh, G. in Ryan, S. (2020).** Nursing Older People with Arthritis and other Rheumatological Conditions: Self-Management. Springer, CH 12, (pp. 177-195).
- Nadrian, H., Morowatisharifabad, M.A. & Bahmanpour, K. (2011).** Development of a Rheumatoid Arthritis Education Program using the Precede_Proceed Model. *Health Promot Perspect*, 1(2):118–129.
- Naqvi, A., Hassali, M., Iffat, W., Shakeel, S., Zia, M., Fatima, M., Iqbal, M. S., & et al. (2020).** Cross culture adaptation and validation of English version of Rheumatoid Arthritis Knowledge Assessment Scale (RAKAS) in patients with rheumatoid arthritis. *International Journal of Rheumatic Diseases* 23(7):918-927.
- Portz, J. D. (2017).** A review of web-based chronic disease self-management for older adults. *Gerontechnology* : international journal on the fundamental aspects of technology to serve the ageing society, 16(1), 12–20. DOI: 10.4017/gt.2017.16.1.002.00
- Prevo, M.L.L., van't Hof, M.A., Kuper, H.H., van Leeuwen, M.A., & van Riel, P.L.C.M., (1995).** Modified disease activity scores that include twenty-eight-joint counts: development and validation in a prospective longitudinal study of patients with rheumatoid arthritis. *Arthritis Rheum*, vol.38 (1), pp.44-48.
- Quinlan, P., Price, K., Magid, S., Lyman, S., Mandl, L., & Stone, P. (2013).** The relationship among health literacy, health knowledge, and adherence to treatment in patients with rheumatoid arthritis. *HSS Journal*®, 9(1), 42-49.
- Rezaei, F., Neshat Doost, H.T., Molavi, H., Abedi, M.R. & Karimifar, M. (2014).** Depression and pain in patients with rheumatoid arthritis: Mediating role of illness perception. *The Egyptian Rheumatologist*, 36(2):pp57–64.
- Rosa-Gonçalves, D., Bernardes, M., & Costa, L. (2018).** Quality of life and functional capacity in patients with rheumatoid arthritis - Cross-sectional study. *Reumatologia clinica*, 14(6), 360–366. doi:10.1016/j.reuma.2017.03.002
- Seyam, M. (2018).** Health Needs and Self-Efficacy for Rheumatoid Arthritis Patients. *Port Said Scientific Journal of Nursing*, 5(2), 44-62.
- Shokri, A., Yarmohammadian, M., Mottaghi, P., Karimi, S., Gholipour, K., & Sadegh Tabrizi, J. (2014).** Customer Quality and Rheumatoid Arthritis in the Iranian Patient's Perspective: A Cross-Sectional Study. *Journal of Patient Safety & Quality Improvement*, 2(3), 110-115.
- Silman, A. & Pearson, J. (2017).** Epidemiology and genetics of rheumatoid arthritis. *Research and therapy journal*, volume 5(4):265.
- Sunar, I., Garip, Y., Yilmaz, Ö., Bodur, H., & Ataman, S. (2015).** Disease Activity (Rheumatoid Arthritis Disease Activity Index-5) in patients with rheumatoid arthritis and its association with quality of life, pain, fatigue, and functional and psychological status. *Archives of rheumatology*, 30(2).
- Van Riel, P. & Renskers, L. (2016).** The Disease Activity Score (DAS) and the Disease Activity Score using 28 joint counts (DAS28) in the management of rheumatoid arthritis. *Clin Exp Rheumatol*, 34(5 Suppl 101), S40-S44.