



RHEUMATOID ARTHRITIS: A BRIEF OVERVIEW OF THE ASSESSMENT AND PHYSIOTHERAPY MANAGEMENT

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Abstract:

Rheumatoid arthritis is a chronic systematic inflammatory disease which is characterised by pain and functional loss in an individual with bilateral involvement of hands, resulting in loss of joint integrity and bony deformities. Quality of life is an amorphous concept, which has a usage across many disciplines- geography, health economics, health promotion and medical and social sciences. The main perspective of this review of study health related QOL is to assess the extent of factors affecting quality of life especially in terms of physical, social, emotional, cognitive as well as work related situations, therapy induced side effects and even the financial impact of medical condition also. In view of mixed results and observations from various studies, it is worthwhile to plan a study to evaluate the hand function and Quality of life and changes in Quality of life with hand function on disease activity in Chronic Rheumatoid Arthritis patients. Such population may need a different approach to symptom control and may require greater emphasis on exercises and life style improvement manoeuvres.

Introduction

Rheumatoid arthritis is chronic systematic inflammatory disease which is with systematically native of pain and functional loss in body. The persistent synovitis of diarthroidial joint in bilateral involvement result in loss of joint integrity and bony deformities¹. The prevalence of RA is 0.5 to 1% is diverse population worldwide and more come in women¹. The clinical variation including swelling, tenderness, limited range of motion of involved joints with persistent inflammations are attributed to a number of pathologic events like soft tissue laxity, ligament weakness, destruction of joint capsule, tenderness of cartilages etc. in 1987, the American College of Rheumatoid Arthritis develop latest criteria for classification of rheumatoid arthritis with 91-94% sensitivity and 85-98% specificity². Quality of life an amorphous concept, which has a usage across many disciplines- geography, health economics, health promotion and medical and social sciences. It is multi-dimensional and theoretically incorporates all aspect of an individual's life. The WHO defined it as broad ranging concept affective person physical as well as psychological state of independence in reference to their environment (WHOQOL Group 1993b)³. The main perspective of health related QOL is to assess the extent of factors affecting quality of life specially in terms of physical, social, emotional, cognitive as well as work related situation. Therapy induced side effects and even financial impact of medical condition also⁴. In view of mixed results and observation from various studies, it is worthwhile to plan a study to evaluate the hand function and Quality of life and changes in Quality of life with hand function on disease activity in Chronic Rheumatoid Arthritis patients. These

patients may need a different approach to symptoms control and may require greater emphasis on exercises and life style improvement manoeuvres.

REVIEW OF LITERATURE

Rheumatoid arthritis (RA) is a chronic inflammatory disease of unknown aetiology marked by a symmetric, peripheral polyarthritis. Rheumatoid arthritis is most common disabling disease specific which is systematic in nature and generally affect different systems in form of clinical manifestations like fatigue, cardiovascular obliterations, haematological abnormalities as well as neuro vasculitis also.¹

Prevalence

RA affects approximately 0.5–1% of the adult population worldwide¹. It has been manifested on the basis of life span of rheumatoid arthritis patients that incidence of rheumatoid arthritis has been decreasing with time while prevalence has remained the same level and all these are based on geographic locations having certain ethnic graphs with in a country. For example, the Native American Yakima, Pima, and Chippewa tribes of north America have reported prevalence rates in some studies of nearly 7%. D. Symmons, G. Turner, et al conducted a study in 2002 on prevalence of RA in united kingdom as the criteria of classification for RA has been revised and they estimate that as criteria revised the prevalence of Ra has also been decreased in women². Lawrence published an artical on prevalence of RA in UK in 1962 and he reported the prevalence ratio is .67% for women and 0.19% for men³. Malaviya et al conducted a study on 39,826 persons living near 5 village of Delhi over a period of 3 years. Primary aim

of research was find out the prevalence of lupus however it give useful data lupus and RA in the Indian population. They found total of 3393 (8.5%) identified⁴. In 1981 WHO and international League association for Rheumatology (ILAR) launched a special programme for Rheumatic disease called a COPCORD. Basically it is a community oriented programme for control of Rheumatic disease in rural communities of developing countries. In this survey a total of 4092 adults involved and out of them 746 (18.5%) were identified to have rheumatologically complaints. In the same study the research reports the various musculoskeletal syndrome OA 5.8%. Soft tissue rheumatism 5.5%, RA 0.5%. Inflammatory arthritis (unclassified) 0.85% and as 0.09%⁵.

Diagnosis

Rheumatoid Arthritis is diagnosed on the basis of clinical symptoms, laboratory and radiographic information. The American College of rheumatology develops a revised criteria for classification of RA in 1987 (Table-1)⁶. Out of seventh four of them required to classify a patient's having RA. The sensitivity of this criteria is 91-94% and specificity is 89% when we used this criteria to classify RA patients compared with control subjects. This criteria is specially meant for classification of RA for investigation purpose⁶.

American College of Rheumatology (ACR) and the European League against Rheumatism collectively revised the 1987 ACR classification criteria in 2010 to improve the early diagnosis of RA patients so that early anti rheumatic drugs introduced or administered (Table-2).⁷ The new criteria score is 0-10, out of them six fulfil the requirement to define RA. The new criteria is differ from older one in means of several ways. Anti-Cyclic Citrullinated peptide antibody positive test is also include in new criteria. Presence of rheumatoid nodule or X-ray which shows joint damage are not included in new criteria because they occur rarely in early RA. It is very important to use new 2010 ACR-EULAR criteria for diagnosis of RA.^{7,8}

Table I: 1987 Criteria for the Classification of Rheumatoid Arthritis.⁶

1987 ARA criteria (traditional format)	
Morning Stiffness	Morning stiffness in an around joints lasting at least 1 hr. before maximal improvement lasting >6 wks
Arthritis in >3 joint areas*	Soft tissue swelling or fluid (not bony overgrowth observed by a physician, present simultaneously for at least >6wks).
Arthritis of hand joints	Swelling of wrist, MCP, or PIP joints for at least 6 wks.
Symmetric arthritis	Simultaneous involvement of the same joint areas (defined in 2) on both the sides of body (bilateral involvement of PIP, MCP or MTP joints) is acceptable without absolute symmetry (for at least 6 wks.).
Rheumatoid nodules	Subcutaneous nodules on bony prominences extensor surfaces, or in juxta articular regions, observed by physician.
Rheumatoid factor	Detected by a method, positive in fewer than 5% of the normal controls.
Radiological changes.	Typical of a RA on posterior anterior hand and wrist radiographs; it must include erosions or unequivocal bony decalcification localized in our most marked adjacent to the involve joints (OA changes alone do not qualify)
The most affected areas are right and left proximal interphalangeal joint, metacarpophalangeal joint, wrist, elbow, knee, ankle and metatarsophalangeal joint.	

Table II: Classification Criteria for Rheumatoid Arthritis (2010 ACR-EULAR criteria)⁷

	Score	
Joint involvement	1 large joint (shoulder, elbow, hip, knee, ankle)	0
	2-10 large joints	1
	1-3 small joints (MCP, PIP, Thumb IP, MTP, wrists)	2
	4-10 small joints	3
	>10 joints (at least 1 small joint)	5
Serology	Negative RF and negative ACPA	0
	Low-positive RF or low-positive anti-CCP antibodies (≤3 times ULN)	2
	High-positive RF or high-positive anti-CCP antibodies (>3 times ULN)	3
Acute-phase reactants	Normal CRP and normal ESR	0
	Abnormal CRP or abnormal ESR	1
Duration of symptoms	<6 weeks	0
	≥6 weeks	1

Note: These criteria are aimed at classification of newly presenting patients who have at least 1 joint with definite clinical synovitis that is not better explained by another disease.

Various measures of adult pain

Pain is common symptoms and its prevalence increases with age. In RA pain is a reason for medical care⁹. Pain is not measured because it is subjective in nature. Self-report questionnaire is made to measures quantitative and qualitative properties of pain. There are many self-report questionnaire used to measures pain in RA however they are difficult and time consuming to administered¹⁰. GILLIAN et al in 2011 reviewed various measures of adult pain in contest of rheumatoid arthritis. They reviewed the easy uses and measuring properties of the various questionnaire available in order to assist both clinical and research select the questionnaire which are most appropriate.

Visual analogue scale for pain (VAS): it is a unidimensional measures of pain which was used initially in 1900 and same was adopted by rheumatologist in 1970 with the emphasis that severity of pain is only known to the suffers¹⁵. The scale comprised of horizontal or vertical line, usually 10 centimetre in length. The score ranges from 0(no pain) to 10(maximum pain). The reliability of VAS has been shown good in literate population ($r=0.94$, $P<0.001$) than in illiterate population ($r=0.71$, $P<0.001$).¹⁶

Numerical rating scale for pain (NRS): it is also a unidirectional measures of pain intensity in adults, including those who suffer RA¹⁷. It consist of 11 point numerical scale where a respondent select a whole number (0-10 integers) that best reflect the intensity of their pain. Higher score indicate greatest pain. Reliability has been observed in both literate and illiterate population with RA ($r=0.96$, $r=0.95$) respectively.¹⁶

MCGILL pain questionnaire (MPQ): MPQ is a multidimensional pain questionnaire designed to measures the sensory, affective and evaluative aspect of pain and

pain intensity in adults with chronic pain. The scale consist of 4 subscale- sensory, affective and evaluative and miscellaneous aspect of pain.it has an ability to detect mild pain because of multidimensional nature of scale.¹⁸

Short-Form MCGILL pain questionnaire (SF-MPQ): it is a short version of MCGILL pain questionnaire which is comprised of 15 words (11 sensory and 4 affective). It is easier to use and take less time and the intensity ranking of mild, moderate and severe is better understood by patients.^{18,19}

Chronic pain grade scale (CPGS): it is a multidimensional measures of pain which include severity of pain and Pain - related disability. It is use in chronic pain conditions. It also assess the pain impact on various activity of patient like daily, working or social activity.²⁰

Short form 36 bodily pain scale (SF-36 BPS): it is a short form version of SF-36 questionnaire used to measure health status of population. It contain 2 item scale which assess bodily pain as the dimension of health status.¹⁷

Assessment of morning stiffness in RA

Morning stiffness more than 60 min is a characteristics symptoms of RA. However Yazici et. al. in 2001 observed that morning stiffness did not differ among RA patient and then with osteoarthritis²¹.

Functional assessment of rheumatoid arthritis

F.K.MATHIESEN et al²² Examined 221 patients who definite Rheumatoid arthritis are according to 1958 ARA criteria. They all were tested with simple hand test. The hand test included three grip. A closed hand grip (firm closed hand grip around the examiner hand with full contact of all distal phalange), a four finger grip around a pencil and a round pincer grip around a piece of paper. The hand test was performed on both hand and each grips was scored for mobility, subjective power and pain. The test was graded from 0 to 3, where 0 represent a normal grip function or negative hand test, grade 1 to 3 indicate one, two or three of the modalities; mobility, force, pain. They found a positive response to the hand test in 208 out of 211 patients with definite RA. 48 patients had a positive hand test, despite statement of unaffected hand. The important finding of this study was that one fourth of the patients with hand impairment were unaware of their hand affection and would therefore fail to state it in an interview. Other possible explanation is that the patients with chronic inflammatory disease often learn to live with their handicaps and in time do not regards deformities or joint swelling as a problem.

JANET L et al in 2011 reviewed the various measures of hand function for rheumatoid hand. He reviewed self-report and performance based hand function tests which

have been used for patients with Rheumatoid arthritis and have psychometric support.²³

Arthritis hand function test (AHFT): it is consist of an eleven item performance based test designed to measure hand strength and dexterity in person with RA. The eleven item include group and pinch strength, peg board dexterity, lacing a shoe and tying fastening/ unfastening 4 buttons, pins, cutting, pulling with knife etc. it is a performance based test which include both unilateral and bilateral functional tasks. The test has adequate psychometric properties for RA and OA. There is no summative total score, as most of the items are measured in different units of measures, which is a disadvantage of AHFT in research. Also the respondent burden might limit clinical use as it takes 20-30 min for the test.²⁴

Australian Canadian Osteoarthritis hand index (AUSCAN): it is a self-report measures to assess hand stiffness, pain and function in person with OA. It include three scales:-stiffness, pain and function is assessed at rest and during activity which include griping, lifting, squeezing etc. while stiffness refers to morning stiffness up on waking. There are 15 items divided in to 3 subscales: pain (5items), stiffness (1 items) and function (9 items). This measures is appropriate for evaluating interventions. Because this hand index is copy righted so it is a little more difficult to obtain than other measures of hand function.²⁵

Cochin hand function scale: it consist of self-performing 18 tasks without the help of any assistive device.18 items further divide in to 5 subscale which include Kitchen (8 items), dressing(2 items),hygiene(2 items), office(2 items) and other (4 items). Kitchen tasks include holding bowl and full plate of food. Dressing tasks include buttoning and opening/closing a zipper, and hygiene task include squeezing a tube of toothpaste and holding a brush. Office time task include 2 writing tasks while other items include turning a key in a lock and cutting with scissors. It is an appropriate measures for evaluating intervention in patients with RA, OA and Diabetes mellitus. The psychometric evaluation supports research uses in clinical trials but items probably need to be updated to reflect common hand activities such as keyboarding, texting, and cell phones. It would be better if scores were interpreted in terms of severity of hand dysfunction.²⁶

Functional index for hand osteoarthritis (FIHOA): it is used to measure hand function in person with hand osteoarthritis. The original scale was in French in 1995. It include 10 items with no subscales and the question ask about using a key, buttoning, using tools, cutting different objects, lifting, writing and shaking hands. All question are rated on 4 point scale from 0(possible without difficult) to 3(impossible). It is a quick self-report measures of hand function. It is specially made for OA but items are relevant

to other Rheumatic conditions that affect the hand function. There is also a some evidence of diabetes mellitus.²⁷

Grip ability test (GAT): it is a simple and rapid test of hand function for persons with rheumatoid arthritis. It is based on activities of daily living, the grip function test include putting a sock over 1 hand, putting a paper clip on an envelope and pouring water from a jug.²⁸

Jebsen hand function test (JHFT): JHFT is designed for broad aspect of hand function commonly used in children more than age of 6 years and adults who have impairments in hand.it includes 7 items : writing, turning a card, picking up small objects and large cans and other feeding tasks etc.it is widely used and standardised test and easy to administer. It is less responsive to change compared to other questionnaire of hand function.²⁹

Michigan hand outcomes questionnaire (MHQ): it is a questionnaire based on person's perception of their hands in terms of function, appearance, pain and satisfaction. The questionnaire include activities of daily living (ADL), work performance, pain, and aesthetics and patients satisfaction with hand function. All items are scored on a 5 point Likert scale from 1(very good/ not at all difficult/ always/ very mild/very satisfied) to 5 (very poor/very difficult/never/severe/very dissatisfied). The score range from 0-100. Higher scores indicate better performance in all domains except pain.³⁰

Quality of life

Quality of life is a nebulous concept, which is used across many discipline- philosophy, health economics, advertising, literature, health promotion, geography and medical science (sociology and psychology). Quality of life has also been defined as the output of the inputs of the physical and the spiritual as the degree to which a person accomplish life goals. After World War II the term quality of life is introduced to describe the effect of material welfare on individual lives after the effects of economic prosperity of war, a quality of life is noticed in general population. 1970, quality of life is being measured in research and clinical practice in patients with chronic disorder (psychiatry oncology).³¹⁻³²

Subjective and Objective quality of life

In general we used two types of concept regarding quality of life, namely objective and subjective. The objective quality of life include personal information like unemployment and divorce rates which is based on normative criteria of objective indicators of individual life. On the other hand subjective quality of life is a psychological indicator based on assumption and satisfaction with life in various domains.¹⁴⁰ The subjective approach of QoL has influenced the consensus that QoL

consist of both, objective and subjective component of life, although the subjective component of QoL prevails.^{33,34}

Health related quality of life

Health related quality of life means to measure the physical abilities in simple assessment performance based activities like (patient is able to get up, drink and eat). The current concept of health related quality of life means the actual relationship between situation and personal expectation of an individuals, as the disease progresses the relationship between various tasks of life.^{35,36} It is multidimensional and covers social, emotional, physical and work related quality of life and possible spiritual aspects as well as a wide variety of disease related symptoms, therapy includes side effects, and even the financial impact of medical condition.³⁷

Health Related Quality of Life in RA

Rheumatoid Arthritis is a chronic disease and it has a major impact on their quality of life as it progresses. There are so many studies which describe the course of RA with impact on disease process and other aspects of life. Other studies shows correlation between disease process and self-report questionnaire of health related quality of life. Talamo J et al³⁸ studied the correlation between disease specific health assessment questionnaire and the physical functional scale in 137 patients of Rheumatoid Arthritis and found a strong association between severities, disease activity³⁸. Aggerwal et al studied on psychological, physical and economical aspect on their quality of life using SF-36 on 101 RA patient in Indian population. The studies show that in Indian population the rheumatoid arthritis patients suffer significant physical and social disabilities but they score good in mental and social health which reflect good family support³⁹. The rheumatoid Arthritis patients show reluctant to express their feeling despite physical disabilities.

Frequently used Health assessment questionnaire in RA

Short-Form Health Survey⁴⁰

RAND developed the 36-item Short Form Health Survey (SF-36). SF-36 is a set easily administered measure of quality of life. It is a self-reported questionnaire of patient and we should rely on them. This questionnaire was adapted from longer instrument completed by patients participated in the Medical Outcomes Study (MOS), which was a observational study of variation in physical practice style and patient outcomes in different systems of health care delivery^{41,42}. The SF-36 consist of eight scaled scores include vitality, physical functioning, pain, general health perceptions, mental health physical, emotional and social role functioning. Each scale is directly transformed in to 0-100 scales on the assumptions that each question carry equal weight.

Health assessment questionnaire⁴³

Health assessment questionnaire Disability Index (HAQ-DI) was published in 1980 by Fries et.al from Stanford University, USA⁴³. Few year later, Pincus et al. published N bridged version (Modified HAQ OR MHAQ), containing only eight questions out of twenty and showed that it captured the same information as obtained with the somewhat lengthy original questionnaire⁴⁴. Recently a new comprehensive instrument was published called multi-dimensional HAQ (MDHAQ) which included ADLs and psychological domain items were added to the MHAQ⁴⁵.

Energy fatigue questionnaire^{46,47}

These questionnaire are about how a patient feels and how things have been with him/her during the past month. This scale is used to measure variables for chronic disorders apart from the problem of pain and mobility. In RA patients poor levels of energy and sleep are of major concern and have also been shown related to disease activity. There is limited research on fatigue and reduce energy in RA patients and related to QOL. Wolfe et al described the clinical level of fatigue is 42% in RA patients. Crosby reported that RA patients most frequently mentioned RA disease activity, disturbed sleep and increased physical efforts as factor that contributes to fatigue⁴⁸. Else wise Belza et al suggested that fatigue has predominantly disease and sex related components, including comorbid condition, pain rating, functional status, disease duration, sleep quality and female sex⁴⁹. RA patient describe fatigue as an overall sense of tiredness and heaviness that was associated with a desire of sleep.

Depression and anxiety in rheumatoid arthritis

Getting L et al in 2002 meta-analysis the systemic review of depression in rheumatoid arthritis. Loss of joint function and mobility is associated with impairment in QOL. Moreover chronic pain, disability, fatigue, social stress, isolation, low esteem, and helplessness contributes to the development of psychiatric symptoms⁵⁰. Dickens C et al in 2009 found that 13 to 20% of RA patients commonly suffered depression. Studies using self-report measures of depressive symptoms suggest higher rates (40%). Recently studies have also highlighted significant levels (21% to 70%) of anxiety in RA⁵¹. The level of anxiety is higher when depression is present in these patients. A study by Mok et al in 200 rheumatoid patients found that 47 (23.5%) patient had a psychiatric disorders: depressive disorder in 29 patients and anxiety disorders in 26 patients using the HADS questionnaire⁵².

In a meta-analysis of 72 studies, including 13189 patients for the prevalence of depression in RA by Matcham et al, the prevalence of depression was 38.8%. They conclude that depression is highly prevalent in RA and associated

with poorer RA outcomes. Another study by VanDyke et.al, studying the anxiety in RA demonstrated that patients of RA is tend to develop higher levels of anxiety if the patients had depression than a normative group of age-equitant, working adults⁵³.

Exercise behaviour in rheumatoid arthritis

Regular exercise or physical activity provides multiple health benefits for the general population and patients with chronic disease. These include cardiovascular fitness and reducing the risk of coronary artery disease, stroke and type-II diabetes⁵⁴. A study by Baillet et al meta-analyse 510 patients in the intervention group and 530 in control group. Subjects of this study had mean age of 44-68 years and their RA disease duration was 1-16 years, researcher compared HRQL, the health assessment questionnaire (HAQ), pain using VAS, joint count. The analysis showed that patients with stable RA would benefits from regular aerobic exercises, cardio respiratory conditions appears safe, while small help in joint pain and improve function. Meta-analysis of the research showed that exercise improved the post-intervention quality of life⁵⁵.

WHOQOL-Bref

WHOQOL group with other fifteen international field centre mutually develop a quality of life assessment tool that would be applicable cross culturally⁴. WHOQOL-BREF is an abbreviated genericQOL life scale develop the WHO. Validation reference is done by WHOQOL group 1998, one field trial version done is December 1996 an programme of mental health. The WHOQOL-100 gives detail assessment of subjects however it is time consuming and lengthy for practical use. The WHOBREF field version is develop to provide short form of QOL assessment. The QOLBREF contain 26 questions and it is available in 19 different language⁵⁶. Bedi et al studied the quality of life in Indian population of RA. The objective of his study was to assess the quality of life in Indian population. The study include 81 patients of RA from Rheumatological clinic in India. The quality of life measured by world Health organisation quality of life instrument (WHOQoL-Bref) and disease activity measured by Disease Activity Score-28(DAS-28). Age, gender, educational status, disease duration, Rh factor positivity, erosion, constitutional symptoms and deformity which not affect the HRQoL. He found that disease activity had a negative effect on psychological and physical domain. Patients who has extra articular manifestation had significantly higher DAS28 score when compared with patients without extra articular manifestation patients. Who has extra articular manifestation has low HRQoL score than patients without extra articular manifestation patients. Finally he conclude that the physical domains of HRQoL is most affected in Indian population who suffer with RA and it increases with

disease progress and present of extra articular manifestation which worsen the quality of life⁵⁷.

Physiotherapy intervention and RA

Amiret.alin 2001 Investigate the short term effects of a physical and exercise therapy programme including ice massage or wax packs, Thermal baths and faradic hand baths as a physical agents on Rheumatoid hand. This study was single blinded and of short duration of 3 weeks. The investigator found that the physical therapy treated group shows improvement in hand pain, joint tenderness and activity of daily living score as compared to baseline reading. In the control group all the baseline reading slightly deteriorated during the study period⁵⁸.

Hand exercises in RA

Sofia Brorsson et al in 2009 Evaluate the effects of hand exercise in Rheumatoid arthritis patients and compare the results with healthy controls. The study period is about 18 weeks and during this period all subjects were examined at the interval of 3weeks. It is strengthening exercise programme which take 10 min to complete and the subjects used therapeutics putty (85gm) for resistance, subjects are free to choose soft, medium and firm putty. They found both extension and flexion force improve significantly in both the groups after 6 weeks. Finger extension force improved by 36% in the Experimental group and 25% in Control group. The flexion force was improved by 40% in experimental group and 14% in Control group⁵⁹.

Correlation of hand grip and pinch strength with Disease activity in RA

Meryem DEDFOGL et al in 2013 Investigate the relationship of hand grip, pinch strength with disease activity, functional impairment, functional disability, articular damage, and pain and disease duration in Rheumatoid arthritis patients. They found the negative correlation between hand grip, pinch strength with disease activity, articular damage, pain, disease duration, functional impairment and disability in Rheumatoid arthritis patients. They also found strong positive correlation between the dynamometric measurement (hand grip) and Duruoz hand index (DHI) scale, it is a scale in which the patients reflect their opinions concerning their hand function⁶⁰.

Study on placebo effect of low intensity laser in RA

Geoffrey C et al in 1996 conducted a double- blinded randomised and placebo-controlled trial on rheumatoid arthritis to evaluate the effect of low intensity Laser light combined with phototherapy on the articular, systemic and functional manifestation of Rheumatoid arthritis. Low intensity Laser / phototherapy was given to 35 subjects

twice weekly for 4 weeks energy density of laser is 8.1 joule/cm² and for 240 seconds. They found that there is no significant difference between active or placebo Cohorts although range of movement at the knee improved slightly in active treatment group. They conclude that combination of laser and phototherapy used under these condition does not appear useful for rheumatoid arthritis⁶¹.

Pain reduction by low intensity laser in affected small joints of RA

J K Heussler et al in 1993 Conducted a study on 25 female patients of Rheumatoid arthritis with bilateral involvement of their metacarpophalangeal and proximal interphalangeal joints, to define the effect of low power laser treatments on small joints of rheumatoid arthritis patients. They treated each small joints of one hand with intensity of 12 joule/cm² gallium-aluminium-arsenate laser with power of 50mw, spot size of beam is 0.126 cm², pulse width 0.16ms; pulse frequency 5000 Hz and wavelength 820nm. While other hand of same patient receive the active laser from the Sham laser. They conclude that a total of 72% of patients reported pain relief but the reduction of pain is equal in both hands⁶².

Randomised control study of hand and upper limb intervention in RA patients

Sarah Trial Team in 2012⁶³ Conducted a randomised controlled trial on 480npatients of rheumatoid arthritis referrals from rheumatology clinic and 17 NHS in England over a period of 12 weeks and follow up of 12 months. All the participants randomised divide in to two group PTs and OTs after the base line readings. Control groups (OTs) intervention include the provision of joint protection information, splinting, assistive devices and other general advice are required. On other hand experimental group intervention include stretching and strengthening exercise of hand and wrist and improve dexterity. The primary outcome measures of hand function is Michigan hand outcome questionnaire and secondary outcome include hand and wrist impairment measures, quality of life and resource use. They also carried the economic and qualitative studies also.

Prevalence of fibromyalgia in RA

VARUN DHIR et al in 2009 Conducted a study on 200 patients with RA and an equal number of controls with same age groups in the gender ratio. They found the prevalence of fibromyalgia in North Indian patients with RA to be 15% compared to 2.5 % in control groups. Patients of RA has Fibromyalgia had a higher disease activity and their function disability is worsen. The number of swollen and tender joints was increased in patients of RA with fibromyalgia. Study shows that the presence of Fibromyalgia in RA was associated with high pain and

fatigue. Bidirectional relationship is also exist between Fibromyalgia and disease activity, developing of fibromyalgia due to higher disease activity⁶⁴.

Survey study on functional disabilities in RA in European

L.M. SMEDSTA et al in 1996 conducted a cross-sectional study of 706 European patients with Rheumatoid arthritis of more than 4 years duration. The aim of this study was to identify variables associated with functional disability early in the course of RA in a cross cultural European setting. The study support the Ritchie index, ESR, Sex and disease duration as significantly correlated with disability. The correlation between disability and X-ray changes could not be cross validated. The main finding of this study is that the female sex correlates significantly with disability in early course of RA, whereas the Rh factor does not⁶⁵.

Role of female hormone in development of RA

DeshireAlpizar-Rodriguez et.al review the role of female hormone in the development of RA in 2016. They conclude that female hormone contributes in the development of RA. The use of anti-oestrogen agent, post-partum periods, early age of menopause and post-menopausal stage are associated with onset of RA. All of these condition have a common decline stage of ovarian function or oestrogen bio availability. Overall the effect of sex hormone on the immune system and their interaction with genetic and environmental factors explain the more prevalence of RA in females⁶⁶.

M Gerosa et.al in 2008 published an article A female challenge in RA. Autoimmunity is under genetic control and gene of sexual hormone play a very important role in supporting the prevalence of RA in females. Oestrogen a sex hormone may regulate the immune response by favouring the survival of forbidden auto reactive clones and result in autoimmunity in females⁶⁷.

Sexual function and RA

Essam ABDA et.al study in 2016 on sexual function in females with RA:- relationship with physical and psychological states. They found that majority of patients had higher score of physical disability Pain, depression and anxiety. Sexual hormone is related to their quality of life. They reported 4% to 77.8% of patients experienced sexual problems including sexual disabilities, loss of desire and satisfaction which is vary to their age, duration of disease and their physical disabilities like pain⁶⁸.

Diagnostic use of ultrasound to detect early bone erosion is important in clinical practice

E.G.mcNallyin 2007 review the current status of ultrasound imaging of patient with rheumatologically disorders of the hands and feet which help in early detection of synovitis that is silent to clinical examination. Ultrasound machine

with high resolution surface is used for detection and classification of synovitis and the early detection of bone erosion is important in clinical practice⁶⁹.

Prevalence of rheumatoid arthritis in adult population of india

A.N.Malaviya et.al in 1993 conducted a study in adult population for prevalence of rheumatoid arthritis. It is a house to house survey of a rural population near Delhi and targeted population is 44551 adults (over 16 years). They identified possible cases of rheumatoid arthritis using a questionnaire and further used revised ACA criteria for diagnosis of RA. Total of 3393 persons were listed as possible case of RA and 299 were diagnosed RA as per ACA criteria and giving a prevalence Of 0.75 %⁷⁰.

Prevalence of peripheral neuropathy in newly diagnosed rheumatoid arthritis

R.Aneja et.al in 2007 conduct a study for the frequency and pattern of neuropathy in Indian patients with rheumatoid arthritis. 100 newly diagnosed patients include in study as per ACR criteria for diagnosis screened for 3 years. Diabetics, alcoholism, outstation patients were exclude from study. Routine laboratory investigation with detailed history were obtained including nerve conduction studies. Study shows high prevalence of subclinical neuropathy in Indian patient with RA⁷¹.

Assessment and quantification score of chronic rheumatic affected hand

B.F.Leeb et.al established a questionnaire to quantify the extent of function and activities of the hand in patients with degenerative or inflammatory disease of hand and finger. SACRAH that include 23 visual analogue scale cover the extent of level of pain, stiffness and function of hand. There are four question of pain which include pain during regular daily work, during intensive work, at the time of inactivity or at rest, using a range of no pain (score 0) to unbearable pain (score 100). Severity of morning stiffness and daily starting stiffness identify by two question range from no stiffness (0) to unbearable stiffness (100). Hand function mean daily activities which measured from possible without any difficulty (0) to impossible (100) by various activities of hand function like locking unlocking a door, tying a tie, tying shoelaces. Writing, turning of pages of newspaper etc⁷².

Functional assessment of various hand strength

P HELLIWELL et.al in 2015 describe a microprocessor which is linked to dynamometer for measurement of various strength of hand. The device is consists of two aluminium bars approximately 6 inches long and the separation between the two handles is adjustable to meet any hand size or deformity and measure finger pinch strength and

hand grip strength. Grip strength analyser was interfaced with BBC model B microcomputer⁷³.

Aerobic fitness activities

A high class review of literature prepared by Marie Deanna Westby in 2001 on the topic aerobic fitness activities included the 18 accepted article among 29 reviewed and 763 identified articles. Aerobic exercises include walking indoor or outdoor, bicycling indoor or outdoor, aquatic exercises, water aerobics and low impact aerobic dance. The investigator found a significant improved in aerobic capacity in all group but more in cycling intervention. An improvement in Arthritis pain subscale was seen in walking and physical activity group⁷⁴.

Juvenile chronic arthritis and socio psychological behaviour

ACJ huygen et.al in 2000 study forty seven patients of juvenile chronic arthritis children, fifty two healthy peers and their respective parents to assess psychological behaviour and social adjustment of these children's. Study based on self-reported questionnaire which include family functioning and social supports. They reported that there is no difference between ill and healthy participation in respect to incidence of psychopathology whereas subjects of juvenile chronic arthritis perceived themselves as socially competent but they seemed to have less opportunity or energy to participate in various social activities. The aspiration of juvenile chronic arthritis children's are seen strong in case to participate in social activities inspite of high risk of injury or strains⁷⁵.

Dance based exercise programme in Rheumatoid arthritis

Noreav et.al in 1997 published an article of dance based exercise programme in Rheumatoid arthritis in American Journal of physical Medicine and Rehabilitation. The aim of this study was to improve physical fitness and psychological state of class III Rheumatoid arthritis patients by moderate dances based exercise programme. Total of ten female patients were participate in study with mean age is 54 years and it is eight week exercise programme (twice per week). There is no significant gain in aerobic capacity of these patients but four subject's shows improvement between 10 to 20 % in cardiovascular fitness. A positive sign is seen in their anxiety, fatigue and depression level after eight week dance based exercise programme⁷⁶.

EMG Biofeedback training in Juvenile Rheumatoid arthritis

Eid, Mohamed Ahmed et.al investigate the effect of electromyography biofeedback training on pain, quadriceps strength and functional ability in Juvenile Rheumatoid arthritis. It is randomized controlled study of

thirty six children (11 boys and 25 girls) with polyarticular Juvenile Rheumatoid arthritis ranging from eight to thirteen years. Control group receive conventional physical therapy programme whereas study group received same intervention to control group in addition to EMG feedback guided isometric exercise programme for 3 days per week. A significant difference is observed in between groups, study group show significant improvement in pain, peak torque of quadriceps strength and functional ability⁷⁷.

Aquatic exercise in women of Rheumatoid arthritis

Siqueiraet. Al conduct a randomised blinded study on 133 women with Rheumatoid arthritis, a 16 week control trial to compare the effectiveness of land based and water based aerobic exercise. Muscle strength of subjects were measured by Isokinetic Dynameter, disease activity (DAS-28) and functional ability were measured. There is no significant change in strength of knee joint in both groups but aquatic exercise group shows significant improvement in disease activity, pain and functional capacity⁷⁸.

Occupational therapy for Rheumatoid arthritis

A systematic review of literature prepared by EsthesM.J.steultjens et.al on occupational therapy intervention either with intervention, advice and instruction of using assistive devices included the 47 accepted published article among 149 full articles and 2137 identified articles. Occupational therapy intervention are training of skill, education about joint protection, counselling, using of assistive device and self-care activities which help in maintaining and improving their ADLs(activity of daily living) such as grooming, dressing,cleaning,cooking food, shopping etc.⁷⁹

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