

Non-pharmacological Community Intervention, Especially Pain Management, in Rheumatoid Arthritis: A Review of the Literature

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ABSTRACT

Objective: Rheumatoid arthritis (RA) is a crippling disease with significant affection in a patient's life. The objective of this study is to describe the role of uni-modular and multi-modular non-pharmacological community intervention effectiveness, especially pain management interventions in rheumatoid arthritis.

Methods: This review built on a preliminary literature search, covering 2009 up to December 2013. Selective review of current literature was produced by searching the term non-pharmacological intervention, "self-management programme", "self-care", "rheumatoid arthritis" to capture all spectrums of rheumatoid arthritis non-pharmacological intervention. Twenty-six reviews were included in this overview.

Results: A substantial and remarkable number of studies of non-drug care interventions in RA are available. Twenty-six reviews were included in the present overview indicated a beneficial effect of cognitive-behavioural therapy and psychotherapeutic intervention, self-management, physical therapy (Exercise) but a few studies indicated a beneficial effect of the multidisciplinary education programme and specific dietary interventions. The evidence of effectiveness varies among the different non-pharmacological modalities and indicates a need for further investigation into the most clinically and cost-effective strategies to deliver individual, non-pharmacological treatment modalities as well as comprehensive arthritis service delivery models for RA patients.

Conclusion: This review gives a summary of the available evidence regarding the effectiveness of non-pharmacological treatment modalities are often prescribed as an adjunct to standard care in RA, but the data need scientific appraisal into the most clinically and cost-effective strategies

Keywords: Intervention studies, non-drug therapy, pain management, rheumatoid arthritis

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INTRODUCTION

The spectrum and severity of rheumatoid arthritis (RA) is not very different in developing and developed countries, the dismal rheumatology services in developing countries further compounds the burden (1). The incidence and prevalence of these conditions, it has been proved, is dynamic, not static, and appears to be influenced by both genetic and environmental factors (2). Ample information has been collected in the community oriented programme for control of rheumatic disease (COPCORD) studies (3) to show wide prevalence of RA. The prevalence of clinical RA recently reported by the WHO ILAR COPCORD urban and rural surveys in India varied from 0.45 to 0.68% (4) in Iran was noted as urban 0.33% and rural 0.19% (5, 6) in Asia Pacific countries was calculated 0.33% (7) and in developed populations 0.5% to 1% of the adult population (8).

Despite substantial advances in medical treatment, RA is a disease that continues to affect the lives of individuals considerably (9, 10). The challenge is to find a cost-effective treatment for better disease control (11, 12). Pharmacological treatment has recently seen great advances, but is associated with increased toxicity and cost also the long term outcome is still unknown. Non-pharmacological treatment is cheap, less toxicity better long term outcome (4, 9, 10, 13).

The objective of this literature review is to present the most recent evidence related to the non-pharmacological intervention programme for management of the rheumatoid arthritis to inform the development of evidence based recommendations for general practitioners working in the healthcare setting.

MATERIAL AND METHODS

This review is built on a preliminary literature search. The literature review was conducted in July 2010 up to 2014. Articles published from 1990 to 2013 were considered. The literature review was raised by a thorough search conducted in MEDLINE, Pub MED (Pub MED Central and pub MED Health), EMBASE, Web of Science and the Cochrane Library were searched to identify studies for inclusion.

The following search strategies were adapted to apply to the other databases. Using a MESH term of "rheumatoid arthritis", "arthritis", "rheumatic diseases", "Joint", "complementary therapies", "non-prescription drugs", "intervention studies", "self-care", "pain management" to capture all spectrums of rheumatoid arthritis non-pharmacological intervention and self-management practices, inclusion was limited to English language publications. The final search strategy sought to identify non-pharmacological intervention studies of all levels of evidence. Concurrently a manual search was carried out to find an article review of reference lists of retrieved papers. In the beginning, the papers were selected for inclusion based on the title and abstract. Studies providing evidence on the efficacy of an intervention or compared to another intervention were included. Initial searches failed to identify many articles related to non-pharmacological intervention programme for management of the rheumatoid arthritis.

Participants of interest to this literature review were people aged 16 years or over with a diagnosis of RA. The review focussed on data in adult populations (above 16 years of age). Intervention in the form of any non-pharmacological intervention used to manage RA was eligible for inclusion. Articles focussing on non-pharmacological interventions in RA, with a

community approach, big sample size, with control, randomize control trial (RCT) and having a core measure of pain VAS were selected. Other alternative treatments controversy has arisen over the employment of therapies same occupational therapy, podiatry, hydrotherapy, joint protection, ultrasound, acupuncture, laser therapy, use of compression gloves, thermotherapy, use of splints or orthoses, homeopathy and transcutaneous electrical nerve stimulation (TENS) which were not being eligible for inclusion.

The search strategy was formulated by Ovid in cooperation with a medical librarian to make it applicable to all the databases. A computerized broad search strategy was developed. Retrieved hits were assessed by three of the authors (HY, FA, NK), who screened the titles and abstracts to identify relevant studies. If there was doubt about a study's relevance, one of the expert authors (AC) was consulted. The relevant full-text article was read by three authors (AC, HY, RF). The methodological quality of included review was independently assessed by two reviewers (AC, HY). Data was extracted by two of the authors (HY, NK). If doubt occurred, one of the other authors (AC) was consulted. In the search finding following statement was used to indicate direction of reduced pain effect.

RESULTS

The literature search identified 14 362 references, which were first examined on the basis of titles and abstracts. Of these, 13 963 references were not related to the non-pharmacological intervention programme for management of the rheumatoid arthritis diseases. Two hundred and

sixty-one references were not RCT study. One hundred and thirty-eight references were retrieved in full text. One hundred and twelve reviews were excluded: 49 because of conducted to mix rheumatic and musculoskeletal disease and 41 were conducted by other than rheumatoid arthritis. 19 because of no relevant intervention on pain. Three because of duplicate publication. Twenty-six reviews were included in this overview (Fig. 1).

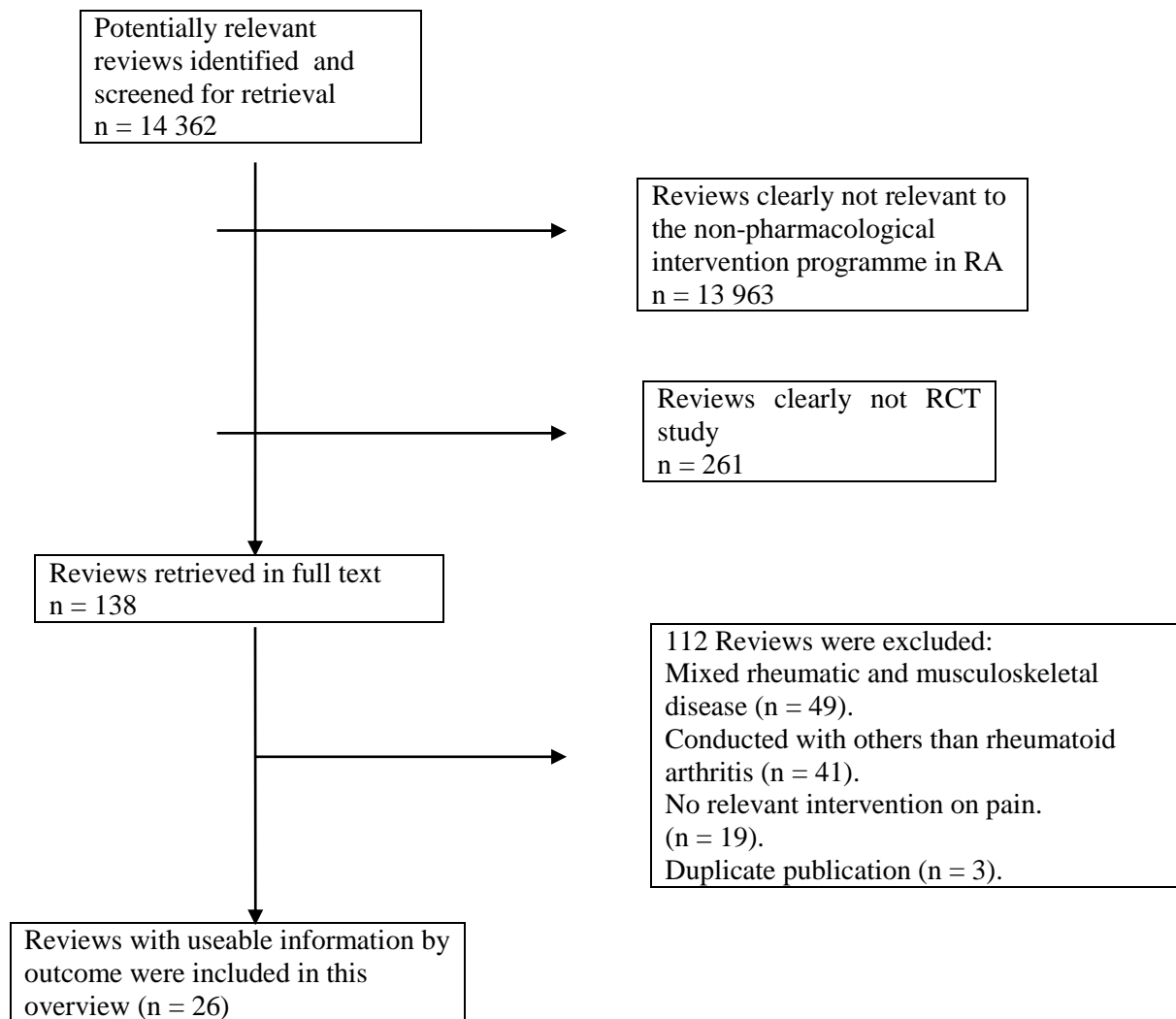


Fig: 1. Selection process of eligibility reviews from all identified citations.

Cognitive-behavioural therapy and psychotherapeutic intervention

A hospital based on six month studies by Sharp *et al*, designed and conducted to examine the efficacy of CBT (Fig. 2) on preventing psychological and physical morbidity in patients with RA.

Fig: 2. Uni-modular and multi-modular self-management programme

CBT: Included 8 individual sessions each of 1hour per week, developed from standard pain management approaches and self-help educational material developed for patients with arthritis. The programme included an educational component plus the self-management skills of relaxation training, attention diversion, goal setting, pacing, problem-solving, cognitive restructuring, assertiveness and communication, and management of flare-ups or high-risk situations [14].

LMAP: Included two modules, each with four meetings of 2.5 hours duration and one 2-hours review meeting (one rheumatology OT, one community OT and one rheumatology PT delivered modules). Participants could attend two LMAP modules and review meeting over a 3- to 9-month period as convenient to them. Module 1 was developed from a behavioural joint protection programme. The concepts discussed in meeting 1 were RA, health beliefs, personal impact of arthritis, understanding the multiple factors affecting symptoms, attitudes, personal experiences, self-management methods and motivating for change. Meetings 2–4 focussed on ergonomic approaches to reduce pain, exercises, fatigue management and the benefits of splints. Module 2, focussed on participants' exercise beliefs, barriers and problem-solving. Cognitive symptom management included stress management and coping, pain management, distraction and relaxation practice. The review meeting included progress with goals, drug therapy, investigations, communicating with health professionals, teamcare and topics of participants' choice (*eg* diet, complementary therapies, work support services, Social Security Benefits). Participant workbooks were provided for each module with key points, illustrations and diaries to record practicing joint protection, pacing and exercise [15].

GESO: The programme consisted of 5 weekly 2-hour group sessions for 8 patients, with or without a significant other. The programme included 3 booster sessions of 2 hours each after 3, 6, and 9 months. Each group had 2 trained leaders (during the 2 days of training): a specialized arthritis nurse and a nurse with experience in working with RA patients. Patients received a programme book with information on the sessions, a self-help guide, various brochures on RA, and an audiotape with relaxation exercises. The programme included the contracting, goal setting, self-management and problem solving, Information on RA and treatment, Pain management and relaxation, physical exercises, coping with depression. In the booster sessions, the accomplishments of goals and problems during the past 3 months were discussed and feedback was given. The assessments were done before, immediately after and 6 and 12 months after intervention [18].

MSCG: In the programme patients, who participated in 10 sessions, supported by a manual for patients and led by 2 supervisors. All sessions lasted 2 hours. The first 8 sessions were weekly sessions, the 9th session was 2 weeks after the 8th session, and the 10th session was 3 weeks after the 9th session. At the end of every session (except for the very first session), homework assignments were given. In the CIG, the programme was teaching patients action-directed coping and coping by seeking social support; 4 steps of problem-solving steps: 1) describe the problem; 2) think about all kinds of possible solutions; 3) choose 1 or more solutions; 4) implement the solution or solutions and evaluate the results. In the MSCG programme topics

of conversation for all sessions were determined by the patients during the first session to exchange information, experiences, feelings, and emotions of the participants. The sessions were led by 2 patients who were trained in supervising mutual support groups [19].

In-patient treatment consisted of a fixed period of 11 days, each session weekly, performed by the physical therapist, occupational therapist and social worker, which prescribed regimens of bed rest and a daily individual range of motion, muscle-strengthening exercise programme, joint protection, self-care, household and work activities, joint splints, adaptive equipment and coping with the disease. During out-patient care, the prescription of drugs, paramedical treatment and splints was left to the attending physician to the out-patient clinic [21, 22]. The training programme was scheduled for nine sessions within 2 weeks, each group consisted of eight patients, and encompassed a multidisciplinary cooperation between rheumatologists, orthopedists, physiotherapists, psychologists, and social workers. The following fields were covered: mechanisms of RA, drug therapy, physiotherapy, practical exercise, relieving pain and muscle tension, joint protection devices, joint replacement, coping strategies, stress management and relaxation exercise, dietetics, social assistance and utilization of public social resources [23].

ASMP: It is a 6-week series of classes for 2 to 2.5 hours per session (total 12 hours) included information about arthritis, self-management principles, exercise, cognitive symptom management, relaxation, energy-saving techniques, cognitive pain management, dealing with depression, nutrition, communication with family and health professionals, and contracting [24].

SMART: Mailed intervention is a “tailored print intervention” includes a 1-page questionnaire asking questions about pain, disability, exercise levels, and other arthritis-related behaviours. Participants also receive a copy of the Arthritis help book and quarterly follow-up materials. These included a second book, arthritis: a comprehensive guide, a relaxation tape, and a pamphlet on physician/patient communications. The sequence of the questionnaire, letter, and report deliverable is repeated every 4 months for 1 year. The result showed that there was an improvement in all baseline variables for SMART and ASMP groups with higher benefit in self-efficacy and doctor visit rate [22].

CDSMP: It is community based, a 2.5 hours lecture per week over a 6 week period included healthy eating, starting and maintaining exercise, pain and fatigue management, managing sleep, stress management, relaxation techniques, communicating with health providers, managing medications planning and problem solving [29].

The results indicate efficacy in producing reductions in both psychological and physical morbidity (14) [Table 1]. Another study conducted by the same groups over 18 months revealed that the capacity of coping with pain and depression improved, but no change was observed in other variables (15) [Table 1].

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Table 1: Uni-modular self-management programme in rheumatoid arthritis

Year	Name of study	Sample size	Design	Duration of study	Duration of RA	Intervention	Key efficacy variable	Key finding	Reference
1993-1994	Vegetarian diet on clinical effect of psychological characteristics	124	RCT; 3 arms: Vegetarian diet Omnivorous diet and control groups site: Hospital based rheumatology	13 months	Mean 13 years intervention and 10 years controls	Vegetarian diet Omnivorous diet	GHQ-20, MHLCS, Pain VAS, ESR, TJC, TJS Believe in Ordinary and alternative treatment VAS	GHQ(anxiety), Internal MHLCS, Believe in Ordinary and alternative significant improvement and psychological distress decreased	Kjeldsen- Kragh <i>et al</i> (1994) ³⁴
1997-1998	effects of uncooked vegan diet, rich in lactobacilli, in RA	43	RCT; 2 arms: Vegetarian diet and control groups site: Hospital based rheumatology	6 months	Mean 12.6±12.3 years in intervention and 16.1±13.6 years in control groups	uncooked vegan diet, rich in lactobacilli	DAS28, TJC, TJS morning stiffness protein (S-CRP), pain VAS, HAQ and global patient	lost weight, pain VAS, DAS-28, HAQ Disease activity Improved	Nenonen <i>et al</i> (1998) ³⁵
1993 to 1995	Efficacy of physical therapy	127	Single- blind RCT; 2 arms: control wait list; intervention care; site: Community based rheumatology	2 years	mean 7.6 ± 11 and 7.4 ± 10 in experimental and control group respectively	nutrition, exercise, background Std care (RA)	Self-efficacy, pain VAS, disease activity, duration of morning stiffness, tender joint count	Improvement in all variables except pain and disease activity.	Bell <i>et al</i> (1998) ³³

1994 -1996	Cognitive behaviour intervention on preventing psychological and physical morbidity	53	Single blind (assessor) RCT; 2 arms: control; intervention care; Site: Hospital based clinical Psychologist	6 months	less than 2 years	cognitive behaviour therapy, background Std care	HADS, HAQ, pain VAS	HADS, depression ad anxiety, HAQ showed significant improvement but no benefit in pain	Sharp <i>et al</i> (2001) ¹⁴
2001	Effect of patient education programme on adherence to drug treatment	100	Single blind (assessor) RCT, 2 arms: control; intervention care; site: Hospital based clinical pharmacology	6 months	median 12 year	patient education programme, background Std care (RA)	articular index, morning stiffness, pain VAS	improvement in drug adherence but no clinical benefit	Hill <i>et al</i> (2001) ¹⁹
2001	A vegan diet free of gluten improves the signs and symptoms of rheumatoid arthritis	66	RCT 2 Arms: vegan diet and non-vegan diet site: Hospital based rheumatology	1 year	Mean 5.2± 2.5 years in intervention and 5.8± 2.8 years in control groups	a vegan diet free of gluten and a well-balanced non-vegan diet	IgG, β -lactoglobulin X-Ray TJC, TJS, CRP, PhGA	significant improvement in clinical parameters, IgG, β -lactoglobulin level decreased no significant differences in X-Ray	Hafström <i>et al</i> (2001) ³⁶
1994 -1996	Long-term efficacy of cognitive behaviour therapy	53	Single blind (assessor) RCT 2 arms: control; intervention care; site: Hospital based clinical Psychology	18 months	less than 2 years	cognitive behaviour programme (CBP), background Std care (RA)	HADS, HAQ, pain, VAS, coping, Ritchie articular index	coping and depression improved but no change in other variables	Sharp <i>et al</i> (2003) ¹⁵
2004 -2005	Mediterranean dietary on Fat intake and composition of fatty acids in serum phospholipids	51	RCT (assessor blind) 2 arms: control; Dietary intervention; site: Community based rheumatology	3 months	NA	Mediterranean dietary: advised to replace high fat dairy products with low fat products	Fat , Total saturated fatty acids , monounsaturated fatty acids , polyunsaturated fatty acids , n-6 fatty acids , n-3 fatty acids	a lower ratio of n-6 to n-3 fatty acids better clinical improvement, higher intake of n-3 fatty acids and a lower ratio of n-6 to n-3 fatty acids	Hagfors <i>et al</i> (2005) ³⁷

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1997-2002	Cod liver oil (<i>n</i> -3 fatty acids) supplementation in daily NSAID requirement in RA	97	RCT double-blind placebo-controlled 2 arms: Vegetarian diet and control groups site: Hospital based rheumatology	9 months	Mean 13±1.26 years in intervention and 13±1.4 years in control groups	take either 10 g of cod liver oil containing 2.2 g of <i>n</i> -3 EFAs or air-filled identical placebo capsules.	CRP, TJC, TJS DAS-28, Pain VAS HAQ, IgM, EMS Daily NSAID requirement	Significantly reduce daily NSAID requirement no significant differences in the clinical parameters of RA disease activity	Galarraga <i>et al</i> (2008) ³⁸
2007-2008	Vegan diet on blood lipids (oxLDL) and natural atheroprotective (anti- PCs).	66	RCT; 2 arms: vegan diet and control non- vegan diet site: Community based rheumatology	1 years	Mean 5 years vegan group and 5.8 years controls	Vvegan diet free of gluten	BMI, DAS28, HAQ, biochemical variables, OxLDL, anti-PCs Drugs	Decreased LDL and oxLDL levels and raised anti-PC IgM and IgA levels.	Elkan <i>et al</i> (2008) ³⁹
2007-2011	Internal family System based psychotherapeutic Intervention (IFS)	79	RCT (assessor blind) 2 arms: control ; intervention care; Site: Hospital based Rheumatology	4 year	mean ± S.D 18.9 ± 10.8 And 13.9 ± 9.2 in IFC and control groups respectively	IFS model intervention, background Std care (RA)	DAS28-CRP4, pain VAS, depression, anxiety, physical function, medication usage	disease activity and medication use unchanged, benefit seen in all other variables.	Shadick <i>et al</i> (2013) ¹⁸

oxLDL: oxidized low-density lipoprotein; anti- PCs: antibodies against phosphorylcholine; BMI: body mass index; LDL: low-density lipoprotein; IgM: immunoglobulin M; MHLCS: Multi-dimensional health locus of control scale; GHQ-20: General Health Questionnaire; EMS: early morning stiffness; IgG: immunoglobulin G; PhGA: physician global assessment; CRP: C-reactive protein.

A longitudinal study was conducted by Hammond *et al* to develop a modular behavioural group programme "The lifestyle management for arthritis programme" (LMAP) [Fig. 2] and evaluate its longer term effects on pain, physical and psychological status. The study finding indicated that behavioural group continued to have decreased pain and fatigue; better functional ability, psychological status and self-efficacy scores; and greater use of health behaviours (16) [Table 2].

Table 2: Multi-modular self-management programme in rheumatoid arthritis

Year	Name of study	Sample size	Design	Duration of study	Duration of RA	Intervention	Key Efficacy variable	Key finding	Reference
1992-1993	Intensive inpatient multidisciplinary care <i>versus</i> standard care (out-patient)	80	RCT 2 arms: control ; intervention care; site: Hospital based rheumatology	1 year	0.5-33	Inpatient training of exercise, coping and occupational therapy in interventional arm, background Std care (RA)	pain VAS, Ritchie articular index, HAQ, anxiety and depression scale.	reduced pain, improved indices of function; no benefit for anxiety depression after 12 weeks	Vlieland <i>et al</i> (1996) ²⁴
1992-1993	Intensive inpatient multidisciplinary care versus standard care	80	RCT 2 arms: control ; intervention care; site: Hospital based rheumatology	2 year	0.5-33	Inpatient training of exercise, coping and occupational therapy in interventional arm, Background Std care (RA)	pain VAS, Ritchie articular index, HAQ, patient and physician global assessment.	no significant change in HAQ; rest significant improvement	Vlieland <i>et al</i> (1997) ²³
1999	Long-term benefit of multidisciplinary arthritis training programme	68	Study 1: Prospective RCT 2 arms: control ; intervention care; site: Community based internal medicine Study 2: cross over non- controlled observation	Study 1: 1 year; Study 2: 5 years	0.4 to 30 years	Multidisciplinary arthritis training programme, background Std care (RA)	HAQ, coping , Beck depression, knowledge of drug therapy, physiotherapy, joint protection, relaxation exercises.	significant improvement in all variables in intervention arm	Scholten <i>et al</i> (1999) ²⁵
2003	Group education in patient of RA and their partner	218	RCT; 3 arms: control ; intervention care; site: Hospital based communication studies	12 months	mean 11.7 ± 9.8 Years	Education programme, background Std care (RA)	Self-efficacy pain, exercises, coping, DAS28, fatigue -VAS.	improvement in fatigue and coping with no change in rest variables	Riemsma <i>et al</i> (2003) ²⁰
2008	Life style management for arthritis programme (LMAP)	167	Parallel-group RCT; 2 arms: control; intervention care; site: Hospital based rehabilitation center	12 months	mean 7.34 ± 6.9	LMAP versus standard self-management programme (SP), Background Std care (RA)	pain VAS, self-efficacy, fatigue, HAQ, psychological status, exercise, Joint protection,	significant improvement in all variables	Hammond <i>et al</i> (2008) ¹⁶

A recent longitudinal study by Vriezekolk et al conducted to describe the development and feasibility of the integration of a CBT within a multimodal rehabilitation programme for highly distressed patients with rheumatic diseases. The study concluded that a significant improvement was noticed in physical and psychological functioning, attendance rate and satisfaction (17) [Table 5].

Table 5: Multi modular self-management programme in arthritis

Year	Name of study	Sample size	Design	Duration of study	Duration of RA	Intervention	Key Efficacy variable	Key finding	Reference
1996 to 1997	SMART <i>versus</i> Usual care or ASMP in arthritis	2 RCT: 1 st -1090 2 nd -341 (RA 60% OA 40%)	2 RCT Staff involved in administering was blinded to participant status 2 arms: control ; intervention care; Site: Medical information system, (ARAMIS) databank center, and community based medicine	18 months and 3 years	NA	SMART <i>versus</i> ASMP, background Std care	HAQ index, pain VAS, depression, role function, doctor visits, self-efficacy	improvement in all baseline variables for SMART and ASMP groups with higher benefit in self efficacy and doctor visit rate	Lorig <i>et al</i> (2004) ³⁰
2002 to 2003	ASMP <i>versus</i> CDSMP in arthritis	355 RA 18% <i>vs</i> 13%, OA 75.7% <i>vs</i> 5.1%, Other arthritis 10.5% <i>vs</i> 19.8% in ASMP and CDSMP groups respectively	RCTs 2 arms: control ; intervention care; Site: Community-based medicine	1 year	NA	ASMP <i>versus</i> CDSMP, background Std care	disability, global health, pain, fatigue, exercise, self-efficacy, healthcare utilization	lesser disability indices, pain, fatigue and healthcare utilization with improved self-efficacy seen in ASMP group	Lorig <i>et al</i> (2005) ³¹
2009	ASMP in arthritis	124 (RA 59, OA 59, Other arthritis 6)	Cross-sectional Follow-up 2 arms: control; intervention care; Site: Community based health and life Sciences	8 years	mean 19±11 years	ASMP, background Std care	self-efficacy, exercise, communication with physician, HAQ, HADS, GP visit	Significant improvement, in all variables	Barlow <i>et al</i> (2009) ³²

2005	Effect of education on perceived self-efficacy in arthritis	80 OA (24 vs 16) RA (9 vs 7) Other (7 vs 17) in intervention and control group respectively	Pre-test and post-test equivalent control group 2 arms: control; intervention care; Site: Hospital based health sciences	6 months	6 months to more than 11 years	Education programme- arthritis, treatment, care, preventing method, exercise. background Std care	Self-efficacy in pain, ASES	significant improvement, in all variables	Unsal.and Kasikei. (2009) ²²
2008 to 2009	CBT with multimodal rehabilitation in Rheumatic disease	25 (Inflammatory rheumatic disease and OA)	proof-of-concept study 2 arms: control; intervention care; Site: Clinic rheumatology based rheumatology	15 months	NA	Cognitive behaviour therapy with multimodal rehabilitation programme. background Std care	significant improvement in physical and psychological functioning, attendance rate, satisfaction	significant improvement in all variables.	Vriezolk <i>et al</i> (2012) ¹⁷

A study by Shadick *et al* which conducted to proof-of-concept of psychotherapeutic intervention on disease activity and psychological status in RA. The study results indicated that the intervention model was feasible and acceptable, provide some sustainable benefits to patients and may complement medical management of the disease (18) [Table 1]. These results suggest that CBT can be an effective adjunctive treatment for patients with RA and can help them for both psychological and physical morbidity.

Education

A study by Hill *et al* demonstrated improvement in drug adherence with an education programme (19) [Table 1]. Another study by Riemsma *et al* designed to determine the effects of group education. The study finds indicated that participation of a significant other in psycho-educational programmes does not have only positive effects. Instead of stimulating patients to adopt beneficial health behaviours and increase their self-efficacy expectations, participation of a significant other led to decreases in self-efficacy and increased fatigue, whereas patients participating in group education without partners showed increases in self-efficacy and decreased fatigue (20) [Table 2]. A study by Savelkoul *et al* conducted to assess the effects of a coping intervention group (CIG), (Fig. 2) and the manual support control group (MSCG), [Fig. 2] with rheumatic diseases. The results show that, at post-intervention, the coping intervention resulted in more action-directed coping than in the mutual support groups (21) [Table 3].

Table 3: Uni-modular self-management programme in arthritis

Year	Name of study	Sample size	Design	Duration of study	Duration of RA	Intervention	Key efficacy variable	Key finding	Reference
2001	Effect of coping intervention in rheumatic diseases	168 RA 67%, OA3.6% and RA54.5%, OA9.1% And RA55.4% OA10.7% in CIG and MSCG and WLCG respectively	Single Blind (assessor) RCT 3 arms: control; intervention care; Site: Hospital based health education	6 months	Mean were 12.6 ± 10.75	CIG programme: <i>versus</i> MSCG programme, background Std care	coping, functional, health status, life satisfaction	CIG showed better improvement in coping and functional state than other arms	Savelkoul <i>et al</i> (2001) ²¹

A study by Unsal and Kasikei conducted to determine the effects of education on self-efficacy perception of arthritis individuals. Study finds indicated that self-efficacy levels after education were significantly improved in the experimental group (22) [Table 5].

Few studies have explored the effect of patient education (PE) in RA patients, but seem it is an essential part of the successful management of RA disease.

Multidisciplinary programme

Two studies of Vlieland *et al* designed to compare the effects of in-patient multidisciplinary treatment with standard outpatient care. The results showed that percentage of patients responding to the ACR criteria was significantly greater in the in-patient group (23, 24) [Table 2]. Scholten *et al* conducted two studies to assess the sustainable benefits of a professional, multidisciplinary training programme for RA patients. Results of the one year study and five years after baseline evaluation indicated significant improvements in HAQ, depression decreased, reduction in fatigue, increased in coping capacity and knowledge of drug

therapy, sustained improvement in physiotherapy focussed on joint protection and relaxation exercises (25) [Table 2]. The review of studies demonstrated that in a Rheumatology clinic with multidisciplinary team-care has a beneficial effect with respect to disease activity and emotional status. Therefore, a multifactorial approach utilizing medications and self-management techniques is necessary. Fortunately, under proper counselling, individuals with rheumatoid arthritis can safely exercise, improving overall physical fitness, greater ease with activities of daily living and an improved sense of wellbeing.

Self-management

A longitudinal community based study by Lorig *et al* was designed to compare three- and six-week same ASMP. The results indicated that the three week ASMP intervention (Fig. 2) was not as effective in changing health behaviours, health status, or healthcare utilization as the six-weeks ASMP (26) [Table 4].

Table 4: Multi-modular self-management programme in arthritis

Year	Name of study	Sample size	Design	Duration of study	Duration of RA	Intervention	Key Efficacy variable	Key finding	Reference
1998	Patient education of ASMP 6 week <i>versus</i> 3 week version	151 (14% RA, 56% OA, Other 19%)	Comparison study 2 arms: control ; intervention care; Site: Community based patient education	4 months	NA	ASMP 6 week module <i>versus</i> 3 week module, background Std care	pain VAS, disability, depression, exercise, physician visit	6 week ASMP better than 3 week ASMP	Lorige <i>et al</i> (1998) ²⁶
1998	Long-term outcome of ASMP in arthritis	112 (RA 46% OA 44% Other 10%)	Pre - test post – test 1 arms intervention care; Site: Community-based psychological rheumatology	12 months	1-49 years	ASMP. background Std care	Self-efficacy pain, exercise, communication with physician, HAQ, pain VAS, HADS, GP visit	significant improvement in all variables	Barlow <i>et al</i> (1998) ²⁷
1999	Arthritis self-manager through an Adult education programme	89 (RA 45%, OA 48%, Other 42%)	Pre-test post- test 1 arms intervention care; Site: Health service network, arthritic care network and community-based psychological rheumatology	4 months	0-50	ASMP, background Std care	MHAQ, pain VAS, fatigue VAS, depression, self-efficacy for pain VAS, exercise, communication with physician,	significant improvement in all variables	Barlow <i>et al</i> (1999) ²⁸
2000	ASMP in arthritis in UK	544 RA37% <i>vs</i> 33% OA52% <i>vs</i> 52% Other11% <i>vs</i> 14% in intervention and control groups, respectively	Pragmatic RCT 2 arms: control ; intervention care; Site: Community-based psychological rheumatology	16 months	Mean 10.7 ±11.2 <i>versus</i> 11.3 ±10.9 intervention and control groups	ASMP, background Std care (RA)	exercises, diet communication with physician, MHAQ, pain VAS, HADS	significant improvement in all variables	Barlow <i>et al</i> (2000) ²⁹

Barlow *et al* has conducted a study to determine the longterm effect of ASMP in physical and psychological wellbeing in patient suffering from arthritis. Data was collected *via* mailed self-administered questionnaires mailed. The findings of the study had demonstrated that patient

with arthritis derives substantial and prolonged benefits in terms of perceived ability to manage arthritis, reduction in pain and improved physical and psychological wellbeing (27) [Table 4].

Another same design study by Barlow *et al* did to determine Arthritis self-management Programme (ASMP) is effective when delivered in an adult education setting. The finding of the study showed the ASMP programme was not only acceptable to people with arthritis, but can offer substantial benefits in terms of an enhanced sense of control, a reduction in pain, increased use of cognitive and behavioural techniques, and perceived ability to discuss arthritis in health settings (28) [Table 4]. In 2000, Barlow *et al* conducted a study to determine whether the ASMP improves perceptions of control, health behaviours and health status and changes use of healthcare resources. Participants were given a copy of the Arthritis help book. The ASMP had a significant effect on arthritis self-efficacy for other symptoms and pain subscales, health behaviours, less depressed and had greater positive mood (29) [Table 4]. Lorig *et al* tried to examine two studies of the self-management, arthritis relief therapy (SMART), (Fig. 2) and to compare it with the ASMP. Participants were recruited from the arthritis, rheumatism, and aging, medical information system (ARAMIS) databank centers. The finding of the study indicated that a mail-delivered arthritis self-management programme, SMART, was similarly effective in the classic ASMP, with slightly better results in the first year and a slightly more rapid attenuation over the next two years (30) [Table 5]. Lorig *et al* conducted a study to compare the relative effectiveness of the ASMP and the generic chronic disease self-management programme (CDSMP), (Fig. 2) and background standard care for individuals with arthritis. The finding results showed both programmes had positive effects, and the CDSMP should be considered a viable alternative (31) [Table 5].

In 2009, Barlow *et al* conducted a study to examine the pattern of scores on self-efficacy, health status and use of self-management techniques among a group of ASMP participants. Results showed that long-term maintenance of self-efficacy, psychological well-being and self-management techniques may be possible following attendance on the ASMP (32) [Table 5]. Published literature suggests that patients with RA will need long term care. The treatment comprises of not only drug therapy, but also a self-management programme of educational instruction, guidance and support to cope up with the consequences of the disease and manage this persistent, damaging, inflammatory disorder.

Physical therapy (exercise)

An empirical study by Bell *et al* conducted to evaluate the short term efficacy of a Physical therapy (PT) programme (Fig. 2) for people with RA. Improvement was noted in primary variables of self-efficacy, disease management knowledge, duration of morning stiffness and tender joint count, but not significantly change for the pain VAS and disease status measures (33) [Table 1]. Until now, the short-term and long-term health benefits and risks of physical activity at moderate and vigorous intensity levels have not yet been compared in early or established RA.

Dietary interventions

Several clinical trials, studies conducted to assess the effect of dietary interventions in RA (34–39) [Table 1]. The findings also showed that dietary interventions can assist with the management of disease symptoms that accompany rheumatoid arthritis (RA), such as pain, tender swollen joints, stiffness and associated disability and disease progression. Clinical trials

demonstrated that a subset of patients will benefit from following a vegetarian, vegan, or Mediterranean-style diet, or by eliminating certain foods from their diet (40). This type of diet has shown to be associated with anti-inflammatory effects (30, 31, 41) which are of desired benefit in RA. Mahan *et al* suggested the dietary changes to promote an anti-inflammatory diet (42). All studies of diet and RA were carried on an established and prolonged disease. Dietary therapy is an area of self-help which RA patients frequently want to explore, typically in the early stages of disease, but little is known about the extent of dietetic involvement in rheumatology. Good nutrition is an essential part of RA self-care because without it the body and sometimes medications does not work as well they be.

DISCUSSION

Lifelong disability, excruciating pain, psychological fatigue, anxiety and decline in life quality are consequences have always been associated with RA (43). Aggressive therapies with potent drugs like biologics are very effective but fraught with dangers of serious drug toxicity and life threatening adverse events (4, 9, 10, 13). It was observed that despite excellent advances in management care, patients suffering from RA continue to develop functional limitations, deformities (9, 10). It is against this background that more evidence of the efficacy of adjunct therapy with non-pharmacological methods (exercise, diet, cognitive education) be obtained through well designed studies in RA.

The concept of early and aggressive treatment of RA has occupied center stage since 1989, when reversing the pyramid (the step-down bridge concept) was published (44). From the year 1990, there was an increasing awareness about the concept "a window of opportunity for

the therapeutic consultations/treatment in rheumatoid arthritis" (45, 46). Experimental methods were used to find a solution for "how can we meet the patient's need in the best way?" (47).

Three early period experimental approaches demonstrated the path of the required change in non-pharmacological treatment measures. The first among the three was the arthritis self-management Programme (ASMP), is the prototype arthritis education programme.

Originally developed by Lorig (1981) at Stanford University, USA. The programme was adopted by the arthritis foundation in 1981 (48). The next one was based on visits carried out by groups of doctors to their patients, and was created by Dr John Scott in 1997 (49). The third experimental programme focussed on patients, staying far away from city centers in remote areas and access for medical attention was enhanced using the telephone or by other electronic means like the Internet (49–51).

Non-drug therapies are often employed as complementary adjuncts to pharmacological treatment to aid coping mechanism of RA patients as they combat the disease (52). Several non-pharmacological clinical experimental methods and or models such as ASMP or ASHC (28), CBT (14), LMAP (16), SMART (30) and CDSMP (31) were evaluated in patients suffering from arthritis. Table 2, Table 4 and Table 5 describe the key features of several studies undertaken to evaluate such modalities of treatment. These studies have demonstrated the role of a self-management programme in RA.

Using a multi-modular self-management programme for patients, Vlieland (1997) showed improvement of PHGH (physician global health) and PTGL (patient global health) by intensive inpatient multidisciplinary care *versus* standard care (24). Several studies using a modular multi programme (Tables 2, 4 and Table 5) made similar observations in different

groups of subjects, and noted a significant decrease in pain VAS and physician visit times or healthcare utilization (Tables 4 and 5).

The effectiveness of multidisciplinary teamcare in countering established RA is well recognized. The benefits of such non-pharmacological treatments can be gauged from the conclusions drawn from several RCTs and Cochrane Reviews. It is hardly therefore surprising to note that RA patients constitute the high end spectrum of complementary and alternative practice (CAP) therapies given the nature of the disease as particularly chronic and persistent (43). A diverse range of modalities comprising the “multidisciplinary Rheumatology team”, as various health professionals prefer to label it, includes exercise therapy, physical modalities, orthoses and assistive devices, self-management and dietary interventions as constituent members. Recent years have witnessed the publication of a sizeable number of reviews focussed on a broad spectrum of non-pharmacological interventions in RA (53, 54).

Contemporary interventions that supplement pharmacological and surgical interventions include conventional therapies like physical therapy and occupational therapy, besides rehabilitation and self-management programmes are put to use (43). Evidence strongly suggests that joint specific dynamic exercises may lead to a significant amplification in strength and physical function (55). The beneficial effects of self-management and functional ability through occupational therapy have shown in recent meta-analyses (56, 57). Similarly, employment of hydrotherapy in rheumatoid arthritis cases has also reported positive results (58, 59). There have been insufficient studies on the effectiveness of specific diets in managing RA. Efficacy with diet modification has been noted by several RCTs which, for example, noted that the vegetarian diet group exhibited considerably better effects on pain and indices of disease activity and across most of clinical variables (36, 60, 61). Is investigating a range of diets,

including gluten free, vegetarian, vegan and fasting diets. However, long term compliance and nutritional deficiencies, reduced the acceptability of many dietary interventions (Table 1).

Self-management programme is reported to impart psychological courage, able to face the lifelong challenge of RA and increases the acceptability of medical treatment (62). Management should address both the physical and mental aspects of life (63). Further, self-management programme provides a major support to the patient (49). It also provides better awareness of the ailment and thereby enhances the confidence to self-manage health problems with great courage (15, 64). It also encourages better compliance of the drug management programme, regular assessment and monitoring of disease and drug related effects, to know the progress and goal setting for the treatment and achieving targets in the set time (65). The first aim of a combined strategy with supervised sustained standard of care medical management and self-management programme is to obtain an early remission of the disease. The next target is to bring the body to a fully functional status and resume work with great physical and mental involvement and all this may also require vocational rehabilitation (65). Rheumatoid arthritis self-management intervention programmes help people to maximize their abilities and reduce pain, functional limitations, disability, depression and in increasing self-care behaviours (48). A self-management intervention programme to provide the knowledge, skills and confidence to manage rheumatoid arthritis was devised (66).

The very few rheumatologists available in developing countries do not have the time and the inclination for community and patient education. Education should be left to the allied rheumatology health professionals if available (67). A professional, multidisciplinary approach to educate patients with rheumatoid arthritis leads to a significant and sustained improvement of the clinical outcome and is an approach that should be established as part of conventional

therapy (25). The members of a multidisciplinary team should take particular care to ensure that a common approach to patient education is arrived at such that the patients receive a consistent health message (68).

In the literature review studies have shown that a short period of initial intensive non-pharmacological therapy (mostly cognitive behaviour change and supervised exercises) is followed by long term gains in the form of better improvement in RA symptoms and control and better health measures (Tables 1, 2, 4 and Table 5). A number of multi modular programmes in patient of RA or other arthritis, have made similar observations in different groups of subjects (Tables 2, 4 and Table 5). Physical therapy and exercise showed significant reduction in fatigue and significant improvement in joint protection, communication with physicians, and dietary habits. A number multi modular intervention programme (Tables 2, 4 and Table 5) made similar observations in different groups of subjects in patient of RA or other arthritis.

The literature on the effectiveness of non-pharmacological treatment modalities in RA, *ie* the available studies support the use of dynamic exercise and cognitive behavioural interventions, and to a lesser extent of joint protection programmes and foot orthoses and dietary manipulation. Decreased physical activity levels in RA patients combined with the symptoms of the disease *eg* pain and fatigue corroborate to formulate a vicious circle that contributes directly to a detrimental effect on other aspects of skeletal muscle health (69).

Rheumatoid arthritis patients consistently report a 70% reduction in strength in comparison to healthy counterparts (70). Two years be strengthening programmes entailed significant improvements in subjective patient assessments of disability by the HAQ (71). Decreased habitual physical activity in patients with RA is generally attributed to joint pain,

restricted mobility, fatigue, reduced muscle mass, strength and endurance (72). A corroboration of aerobic and strength exercises training constitutes an ideal exercise programme for treatment of RA patients (73). Exercise is an important component of several self-management programmes and several studies are reviewed and described in the above section on self-management progress. Research has validated the beneficial role of exercise in yielding specific health benefits in people with RA.

As demonstrated by previous research, exercise is fundamentally beneficial for RA patients when a comparison of the effectiveness of high and low intensity exercise training in stable RA is undertaken. The intervention programme on the improvement of life quality in RA patients is multifaceted and there are other modes of non-pharmacological treatment of RA same occupational therapy. My best knowledge it is not available RCT study base on decreasing pain with big sample size, especially in only RA till date in these fields is included.

Rheumatoid arthritis patients are often treated aggressively with disease modifying anti rheumatic drugs (DMARD) [*eg* Methotrexate, hydroxychloroquin *etc*] along with steroids in addition to analgesics and other anti-inflammatory drugs and supportive therapy (4). Such a therapy is fraught with drug related side effects and toxicity and more so as RA patients need long term treatment (9, 10, 13). There is a need to quickly control the disease and judiciously reduce the medicines to the minimum to sustain control. This is not an easy task and in real life continues to be a major therapeutic challenge. In the last decade or so, biologic DMARDs have emerged as very potent medications but again are extremely expensive and with a potential risk of several side effects including proneness for tuberculosis and life threatening infections (4, 13).

Gentler treatment modalities are required to augment the therapeutic efficacy of anti RA medications. A non-pharmacological treatment could fill-up this void and also improve the side-effect profile during this period.

In conclusion epidemiology has taken on new roles in the management of healthcare services. The literature on the effectiveness of non-pharmacological treatment modalities in RA, *ie* the available studies support the use of dynamic exercise and cognitive behavioural interventions, and to a lesser extent of joint protection programmes and foot orthoses and dietary manipulation. The effectiveness of multidisciplinary team-care in countering established RA is well recognized. It was indentured that despite excellent advances in management care, patients suffering from RA continue to develop functional limitations, deformities. Contemporary computation of the provision and reimbursement of healthcare is based on existing evidence.

Policy direction, formulates and purchase are regulated by the requirement and supply of data on the effective parameters of interventions. On similar note researchers, healthcare professionals and patients also subscribe to the informational paradigm to identify and define research parameters, and improve upon existing clinical practices and self-management stratification. Self-management, arthritis programmes, though found useful by several studies described above are uncommon in routine clinical practice. Therefore, it is prudent to consider non-pharmacological methods adjunct to standard care with drugs. At this stage, it may be advisable for patients to also opt for an adjunct non-drug treatment like the patients with counselling alongside the standard of care (53). These findings have implications for health policy, and allocation of funding for both healthcare and research. Ethnicity, presumably, may play a major role in the extent of coping with pain and arthritis. Non-pharmacological means to

improve the management of RA, as an adjunct therapy to standard of care, holds a socio-economic appeal for the community. Our results can be exploited further by constructing preventive instructional non-pharmaceutical strategies to treat RA that is suited to the community.

Limitation of the literature review

Some databases might not have covered due to lack of access to them. Therefore, it is not claimed that this review covers all relevant articles. Occasionally original research articles are cited without a clear account of how articles were found. At some places personal experience and conventional wisdom are included which may be difficult to distinguish.

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