Full title: Is there evidence to support multidisciplinary healthcare working in rheumatology? A systematic review of the literature

Short title: Multidisciplinary working in rheumatology

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ABSTRACT

Aim: This review aimed to identify whether or not there is evidence to support multidisciplinary team working in rheumatology.

Methods: A systematic review was completed using a pre-defined search applied across the databases CINAHL, MEDLINE, EMBASE, Web of Science, DH Data, The Kings Fund and The Cochrane library. The terms Rheumat* OR rheumatology/AND multidisciplinary.mp. OR interdisciplinary* OR interprofessional* were used. Grey literature was hand searched. Report titles, abstracts and full texts were sifted for inclusion by two reviewers. Reports were included if full text was available, they were published in English or had English translation, and the main subject material referenced rheumatology healthcare, multidisciplinary team working and the implications thereof. Single profession contributions were excluded. A narrative synthesis of the data was conducted following a thematic analysis of the literature, which included descriptive characteristics and key findings.

Results: 63 key reports were identified of which 20 were clinical practice guidelines, 11 randomised controlled trials (RCTs), 10 reviews, 9 observational studies, 6 pilot studies, 5 qualitative studies, 1 case study and 1 survey. Frequently investigated conditions were rheumatoid arthritis (n=12), general inflammatory arthritis (n=10) or fibromyalgia (n=10). Of the 11 RCTs identified, 9 reported clinical benefit whilst 2 reported no effect with MDT working. Explicit reference to MDT composition was within clinical guidelines only and considered in terms of 'core', 'key', and 'beneficial' members.

Conclusion: A range of evidence to support MDT working within rheumatology exists. MDT arrangement can be considered in terms of 'core', 'key' and 'beneficial' membership.

Key words: Rheumat*, multidisciplinary, interdisciplinary

INTRODUCTION

A multidisciplinary team, as defined by the department of health in 2014, is composed of members from different health care professions with specialised skills and expertise. Multidisciplinary work is often anecdotally considered to represent best clinical practice. However, within the clinical speciality of rheumatology, the evidence available to support multidisciplinary working is conflicting. As such, there is a need to identify and synthesise the evidence base regarding multidisciplinary healthcare working, both in secondary care and community based settings, within a rheumatological setting in order to determine current best practice recommendations. The main aim of this study was therefore to identify whether or not there is evidence to support multidisciplinary team working in rheumatology.

METHODS

Search strategy

A systematic literature review was completed, between the start of each database record system and June 2013, using a pre-defined search strategy applied across the electronic reference databases CINAHL, MEDLINE, EMBASE, Web of Science, DH Data, The Kings Fund and The Cochrane library. Table one summarises the *PICOC* boundaries used to refine the research question and related search parameters of interest. The search was conducted with librarian support from the University of Southampton.

Based upon the PICOC boundaries, the search terms Rheumat* OR rheumatology/ AND multidisciplinary.mp. OR interdisciplinary* OR interprofessional* were used in preference to limited MESH headings to allow expansive searching of the databases. Hand searches of non-empirical studies, book reviews, commentaries and policy reports were also included if identified in the reference list of identified electronic sources. Reports were included in the study if the primary

source full text was available, they were written in English or had English translation available, and the main subject material referenced rheumatology healthcare, multidisciplinary team working and the clinical implications thereof. Reports looking at the benefit of a sole profession were not included. Report titles, abstracts and full texts were sequentially sifted for inclusion by two reviewers.

Study selection criteria

Identified texts were subsequently selectively included or excluded within the review on the basis of adherence with the criteria defined a priori. Reports were included in this review if: the report addressed the primary research question: 'Is there evidence to support multidisciplinary healthcare working in rheumatology?', i.e. had primary reference to multidisciplinary team working and rheumatological healthcare (either in general practice or in relation to a single rheumatological condition), had primary source full text was available and were written in English or had English translation available. Reports were excluded from this study if: all inclusion criteria were not met, the report addressed a primary research questionnaire about the role of a single profession only and if the main subject material did not reference rheumatology healthcare, multidisciplinary team working and the clinical implications thereof. No inclusion restrictions were made based on the year of publication, clinical setting (e.g. secondary care or community care) or country of origin.

The titles, abstracts and full texts of all identified reports were sequentially sifted for inclusion against the selection criteria by two reviewers (VC and LC). Disagreements regarding inclusion were settled following discussion between reviewers.

Data analysis and synthesis

A narrative synthesis of the data was completed following a thematic analysis of the identified reports, which included descriptive characteristics and key findings. Key questions asked of the

literature included ‘does this evidence support multidisciplinary working in rheumatology’, ‘what are the recommendations of publications?’ and ‘how much and what evidence is available in this topic area?’ Gaps in the evidence base were also identified.

The distinct and unique benefit that individual disciplines may contribute to rheumatological healthcare was not covered within this review. Rather the terms of this review were purposefully broad and focussed upon those reports which cite multidisciplinary working as a primary focus. It is however noteworthy that a large proportion of literature, relating to the specific roles of key professions working within rheumatology, is available.

RESULTS

A total of 1,222 reports were identified following the initial trawl of databases. 137 reports were retained after title sifting, 108 after abstract sifting and 43 after full text sifting. A further 57 reports were identified following hand searching and reference list review. After title, abstract and full text sifting 20 reports were additionally included. Thus, 63 reports were included within the final analysis. Figure one illustrates the report identification and extraction process. Table two summarises the reports identified following completion of the literature review.

Following a comprehensive literature search 63 key reports were identified of which 20 were clinical practice guidelines, 11 randomised controlled trials (RCTs), 10 reviews, 9 observational studies, 6 pilot studies, 5 qualitative studies, 1 case study and 1 survey. The most frequently investigated conditions were rheumatoid arthritis (n=12), general inflammatory arthritis (n=10) or fibromyalgia (n=10).

Is there evidence to support multidisciplinary healthcare working in rheumatology?

Of the 11 RCTs identified, 9 reported significant clinical benefit with MD team working and 2 reported no effect on clinical outcomes following extended MD team working compared to minimal team intervention, as shown in table three. Due to the wide range of conditions investigated, and various outcome measures used, it is difficult to draw any consistent conclusions about the nature of the benefit from MDT working reported. However where positive effect was noted, generally sustained improvement in pain severity (Casanueva-Fernandez et al 2012, Castel et al 2013), sustained improvement in skills for managing health (Manes et al 2012), improved emotional and psychological well-being (Lemst and Olszynski 2005; Castel et al 2013) and reduction in inflammatory disease activity were cited as key benefits from MD team involvement (Vliet Vlieland 1996). For patients with Scleroderma, improvement in pain was not observed although specific improvements in grip strength and psychological well-being were noted (Shouffoer et al 2011).

Poor recruitment, low sample size, short follow-up period and inappropriate choice of outcome measure were cited as likely confounding factors for a reduced positive effect in 5 of the 11 RCTs reported. Direct trial comparison was prohibited in this review due to a high degree in variation in both study design, condition of interest and MD team composition. The range of methodology and conditions identified is shown in table four.

Similarly, the role, make-up and reported potential benefit of the MD team working differed dependent upon time since diagnosis. A number of authors identified the point of initial diagnosis as a critical juncture in determining future disease status (Cox 2004, Esselens et al 2009, Li et al 2008, Velez et al 2012) , specifically with regards to inflammatory arthropathies. The importance of easy access to the MD team for long-term condition management was also frequently cited (Cox 2004, Davies et al 2010, Esselens et al 2009, Li et al 2008, MacKay et al 2008, Oliver 2008) .

Additionally, the benefit of MD working was reportedly reduced in those conditions typically managed well pharmacologically, such as gout (Zhang et al 2006), and increased in those managed

with allied health professional support, such as Fibromyalgia (Carville et al 2008, Casaneuva-Fernandez et al 2012, Lemstra and Olszynski 2005, Sarzi-Puttini et al 2011, van Koulil et al 2009).

Who should be included in a rheumatology MD team?

Explicit reference to MD team composition was included within clinical guidelines only and considered in terms of 'core members', 'key members', and 'beneficial members', referenced in order of the frequency of contact required (MacKay et al 2008, Woolf et al 2007). Core members, often cited as those with primary responsibility for overall care coordination, include medics and nurses, key members include physiotherapists, occupational therapists, dieticians, podiatrists and orthotists. Beneficial members include dermatologists (SIGN 2009, Velez et al 2012), pharmacists (Moe et al 2010), psychologists (Bradt et al 1998, Casanueva-Fernandez et al 2012, Lambert et al 1994, Lemstra and Olszynski 2005) and social workers (Bradt et al 1998, Dager et al 2012, Mahnes et al 2012, Lambert et al 1994, van Eijk-Hustings et al 2013, van Koulil et al 2009). Figure 2 illustrates the specific frequency with which different professional groups were cited as relevant to rheumatological MD team working both by identified academic literature (black) and published national health guidelines (white).

Physiotherapists, Rheumatologists and Occupational Therapists were the three most frequently recommended professionals required for optimal MD team care respectively, based upon frequency analysis of all papers combined without regard to condition. Psychologists and social workers were referenced in research studies although were infrequently included within UK based clinical guidelines (Cox 2004, Dager et al 2012, Finset et al 2012, Kroese et al 2009, Moe et al 2011, Shouffoer et al 2011).

Recommendations regarding team structure and composition were typically based upon Delphi expert consensus and referenced within guidelines relating to specific conditions only, and as such

the generalisability and applicability of these groups to the general rheumatological community remain unclear based upon the findings of this review.

DISCUSSION

The definition of 'clinical benefit' and rationale for concluding that MD working is beneficial appears to be highly variable and context dependent. A large proportion of reports have focussed upon the potential benefit of MD team working in patients with either rheumatoid arthritis or fibromyalgia (Carville et al 2008, Casanueva-Fernandez et al 2012, Lemstra and Olszynski 2005, Sarzi-Puttini et al 2011, van Koulil et al 2009). However the composition of the recommended MD team in each condition differs significantly, as do the outcome measures used to evaluate clinical efficacy, as shown in table two. For example, the management of RA typically referenced significant contribution from medics, nurses, physiotherapists, occupational therapists and podiatrists (Hagel et al 2010, Hennell and Luqmani 2008, Lambert et al 1994, Li et al 2008, MacKay et al 2008, NICE 2009, Stewart and Land 2009, Taal et al 2006, Vliet Vlieland et al 1997, Vliet Vlieland and Hayes 1997). Conversely, the management of fibromyalgia typically referenced significant contribution from medics, physiotherapists, social workers, psychologists and occupational therapists(Carville et al 2008, Casanueva-Fernandez et al 2012, Castel et al 2013, Manes et al 2012, Hauser et al 2009, Kroese et al 2009, Lemstra and Olszynski 2005, Sarzi-Puttini et al 2011, van Eijk-Hustings et al 2013). Therefore, whilst MD team working within rheumatology appears to be beneficial, overall it would appear that the MD team needs to be specifically tailored to suit differing conditions in order to achieve this.

It was not possible to ascertain probable causes for the clinical benefits identified where reported. However, an emergent theme arising from the literature is that MD team working necessitates greater availability and overall frequency of patient contact with *any* healthcare professional (Cox 2004, Esselens et al 2009, Kroese et al 2009, MacKay et al 2008, Moe et al 2011, Shouffoer et al 2011,

Stewart and Land 2009, Vliet Vlieland and Hayes 1997, Vliet Vlieland et al 2006a, Vliet Vlieland et al 2006b). Thus, it may be possible that the reported benefits of the MD team noted in those newly diagnosed are in fact related to the frequency of patient contact with healthcare professionals rather than the type of contact. Future work in this area may be of particular benefit to healthcare workforce planners.

Additionally, a number of reports document potential overlap between professional groups in order to provide a key intervention, in particular when considering the provision of patient education or psychosocial support (Li et al 2008, MacKay et al 2008, Taal et al 2006, Tijhuis et al 2002, Vliet Vlieland et al 2006a, Vliet Vlieland et al 2006b). Thus, there may be scope for variation in the composition of the MD team without negative clinical effect. Woolf et al (2007) provide a comprehensive framework for the set-up of an 'ideal' rheumatology service which emphasises the need to identify the regional patient demographic, their projected clinical need, the skills set available within the core staff team and identification of what skills and/or additional access to care pathways are required when the core team do not hold all necessary skills. This approach to work force planning appears to be supported by the findings of this review.

Several different models of MD team care have been proposed including the use of triage and telemedicine (Li et al 2008, MacKay et al 2008). However, consistently noted throughout the literature is the underlying requirement for any MD team care to be well co-ordinated (Esselens 2009, BJD 2005, Li et al 2008, NICE 2008, NICE 2009, Stewart and Land 2009, Taal 2006, Vliet Vlieland 2006a, Vliet Vlieland 2006b) . Vliet-Vlieland (2006b) report that comprehensive, coordinated and problem-orientated team work with explicit and consensual division of responsibility facilitates optimal MD team working. Arguably this summarises a further key theme identified by this review; good coordination is essential to effective team working.

Conclusion

A range of evidence to support MD team working within rheumatology is available. There is inconsistency in the design, conduct and outcomes used in the studies and guidelines identified. Three MD team membership levels are frequently cited; 'core', 'key' and 'beneficial' members. Future comparative investigation of models of care, using matched outcome measures, including economic evaluation, would be of benefit.

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Table 1: Summary of PICOC analysis parameters

Population (P)	Rheumatology healthcare community, this may include but is not limited to, all healthcare professionals involved in the management of patients with a rheumatological condition
Intervention (I)	Multidisciplinary working
Comparison (C)	Single discipline/lone working
Outcomes (O)	Clinical impact; this may include but is not limited to, management of disease activity or related co-morbid health needs, social independence and quality of life
Context (C)	Primary focus upon UK healthcare provision, although international studies will be considered if the results are relevant to the UK healthcare setting.

Table 2: Summary of reports identified following completion of the scoping literature review

Where OA = Osteoarthritis, FM = Fibromyalgia, JIA = Juvenile Inflammatory Arthritis, MSK = Musculoskeletal, IA = Inflammatory Arthritis, AS = Ankylosing Spondyloarthropathy
PT = Physiotherapist, OT = Occupational Therapist, Pod = Podiatrist, OR = Orthotist, SW = Social Worker, Psych = Psychologist, GP = General Practitioner, NPs = Nurse Specialist
FMIQ = Fibromyalgia Impact Questionnaire, VAS = Visual Analogue Scale, HAQ = Health Assessment Questionnaire, DAS = Disease Activity Score, SF = Short Form, ESR = Erythrocyte Sedimentation Rate, ROM = range of movement, ADL = Activities of Daily Living, BASDAI, BASFI, HRQoL = Health Related Quality of Life, FIQ, MFPDQ = Manchester Foot Pain & Disability Questionnaire, HAMIS = , MMO = , CIS-20 = , AUSCAN = , TAPPDQ = , HOO S = , KOOS = , ICOAP =

Lead Authors	Study design	Condition	Sample size	MD team composition	Outcome measure used
Bradt KD (1998)	Review article	OA	-	Medic, PT, OT, Pod/ OR, SW, Psych	-
Carville *et al.* (2013)	Systematic review & Delphi consensus	FM	146 papers	Medic, PT, Psych, Pharmacist	FMIQ, Pain VAS
Casanueva-Fernandez B *et al.* (2012)	RCT – double blinded	FM	34: 17 controls	Medic, PT, massage, trigger point therapy, aerobic exercise, thermal therapy, education	Fatigue VAS, FMIQ, Beck Anxiety Inventory
Castel *et al.* (2013)	RCT – un-blinded	FM	155	*Unspecified*	HAQ, Sleep deprivation, Pain VAS, Psych. distress
Cox, M. (2004)	Action Research	Early RA	23: 14 Health Care Professionals	Medic, OT, nurse, PT	Identified Themes
Dager *et al.* (2012)	Qualitative thematic analysis	Rheumatic disease	23	Medic, Psych	Identified Themes
Davies K *et al.* (2010)	Guidelines	JIA	-	Medic, NSp, GP, Opthalmologist, PT, OT, Psych, Pod, SW	-
Department of Health (2006)	Musculoskeletal Services Framework: Guidelines	MSK (all)	-	-	-
Department of Health (2010)	Elective Care Commissioning Pathway for IA: Guidelines	IA	-	-	-
Esselens G *et al.* (2009)	Cross-sectional, cohort study	Early RA	199: 102 controls	Core: Medic, NSp, Supplemental: PT, OT, SW	DAS-28, SF36, HAQ, Utrecht's coping list, Dutch revised illness perception Questionnaire, care satisfaction
European Bone and Joint Health Strategies Project group (2005)	Guidelines	MSK (all)	-	-	-
Feinberg JR and Bradt K (1984)	Comparative cohort study	RA	70	Medic, Nurse, PT, OT, SW	ESR, ROM, ADL, Psych assessment
Finset A (2012)	Editorial	Rheumatic Disease	-	Medic, Psych	-
Grotle, M *et al*. (2011)	Multicentre, longitudinal observational study	IA, OA	306	Hospital: Medic, Nurse, PT, SW, Psych Community: Medic, Nurse, PT	Costs of healthcare
Hagel *et al.* (2010)	Single intervention study	IA, AS	174: 59 controls	Medic, SW, Nurse, PT, OT	VAS, BASDAI, BASFI, HAQ, DAS, Nottingham Health Profile, VO2 sub-max

Lead Authors	Study design	Condition	Sample size	MD team composition	Outcome measure used
Hamnes B *et al*. (2012)	RCT – single-blinded	FM	150	Medic, Nurse, PT, OT, SW, Dietician	General Health Questionnaire-20 (psych distress), Effective MSK Consumer Scale (EC17), Skills & behaviour PROM, Arthritis Self Efficacy Scale (ASES), FMIQ
Hauser W *et al.* (2009)	Systematic Review	FM	9 RCT's: 1119 patients	PT, Psych	-
Helliwell *et al.* (2003)	Clinical Commentary	Rheumatic Disease	-	Medic, Pod, OR, PT, Orthopaedic surgeon	MFPDQ
Hendry, GJ, GF Watt *et al.* (2013)	Comparative study	JIA	44	Medic, Pod, PT, ultrasonographer	JA Foot Disability Index, functional impairment HAQ, EQ-5D-Y/3L, DAS, foot deformity
Hennell *et al.* (2008)	Delphi consensus	Early RA	-	Medic, Nurse, Pharmacist, OR, Psych, Dietician, OT, PT, Pod	-
Hochberg MC *et al.* (2012)	Guidelines	OA	-	Medic, OT, PT, Psych, OR/Pod, Acupuncturist	-
Hoogeboom *et al.* (2013)	RCT – feasibility study	OA	5	OT, PT	Feasibility, potential effectiveness using pain and self-efficacy
Karjalainen K *et al* (2001)	Cochrane Review	FM	7 studies	-	-
Kjeken *et al.* (2013)	Single intervention study	AS	46	PT, OT	BASDAI, BASFI, HRQoL, VAS, SF36
Kroese *et al.* (2009)	Single intervention study	FM	-	PT, Psych, Art Therapist, SW	EQ5D, FIQ
Lambert CM *et al.* (1994)	Pilot RCT – un-blinded	RA	20	Medic, N, SW, PT, OT, Psych	Physical – HAQ (modified), Functional Independent Measurement; Economic – Unit Treatment Day
Lemstra, M and Olszynski WP (2005)	RCT – un-blinded	FM	79	Medic, PT, Dietician, Massage Therapist	Self-perceived health status, average pain intensity, pain related disability, depressed mood, days in pain, hours in pain
Li LC *et al.* (2008)	Guidelines	RA	-	NSp, PT, OT, Orthopaedic surgeon	-
Luqmani *et al.* (2006)	Delphi consensus	Early RA	-	Medic, Nurse, Pharmacist, OR, Psych, Dietician, OT, PT, Pod	-
MacKay C *et al*. (2008)	Qualitative thematic analysis	Rheumatic Disease	74 Health Care Professionals	-	Identified themes
Moe RH *et al.* (2011)	Qualitative thematic analysis	OA	12	Medic, PT, OT, Dietician, Pharmacist	Identified Themes
Moe RH *et al.* (2010)	RCT protocol	OA	400	Medic, Nurse, PT, Orthopedic Surgeon, Pharmacist, Dietician, Health Secretary	-

Lead Authors	Study design	Condition	Sample size	MD team composition	Outcome measure used
National Ankylosing Spondylitis Society (2010)	Guidelines	AS	-	-	-
National Institute for Clinical Excellence (NICE) (2008)	Guidelines (CG59)	OA	-	-	-
National Institute for Clinical Excellence (NICE) (2009)	Guidelines (CG79)	RA	-	NSp, PT, OT, Pod, OR	-
National Rheumatoid Arthritis Society (2010)	Survey	RA	-	-	-
Nordmark *et al.* (2006)	Observational, cohort study	Early RA	110	Medic, Nurse, PT, OT, SW	Work adherence
Oliver S (2008)	Qualitative semi-structured interviews	RA	22	-	Identified themes on patients experiences of rheumatological care
Samuelson UK and Ahlmen EM (2000)	Pilot single intervention study	Scleroderma	-	Medic, NSp, OT, PT, SW, Dietician	HAQ, Pain VAS, Psychological General Well-being index, Arthritis Self Efficacy Scale
Sarzi-Puttini P *et al.* (2011)	Literature Review	FM	-	-	-
Schouffer AA, Ninaber MK *et al.* (2011)	RCT – single-blinded	Scleroderma	28: 25 controls	Medic, OT, PT, Nurse, SW	HAMIS, MMO, grip strength, VO2max, CIS-20, HAQ, SF36
Schouffoer AA, EJ Zirkzee *et al.* (2011)	Survey	Scleroderma	77	-	Healthcare needs, Healthcare delivery preference, Disease activity, HRQoL
Scottish Intercollegiate Guidelines Network (2009)	Guidelines	Psoriatic Arthritis	-	Medic, NSp, OT, PT, Pod, Psych,	-
Scottish Intercollegiate Guidelines Network (2011)	Guidelines	RA	-	Medic, NSp, OT, PT, Pod, GP, Dietician, SW, Pharmacist	-
Stewart K and Land M(2009)	Kings Fund Survey	RA	-	-	-
Stukstette *et al.* (2013)	RCT – single-blinded	OA	151	OT, Nurse	AUSCAN, OARSI response criteria
Taal E *et al*. (2006)	Single intervention study	RA	-	Medic, GP/Nurse, NSp, PT, OT, Pod, OR, SW, Psych	-
Tijhuis *et al.* (2002)	Comparative Trial – un-blinded	RA	210	Medic, NSP, OT, PT, SW	HAQ, TAPPDQ, HRQoL, DAS
van der Giesen F *et al.* (2007)	Observational, cohort study	RA	56	Medic, orthopaedic surgeon, PT, OT	General health status, DAS, Hand function, Use of aids
Van Eijk-Hustings *et al.* (2012)	RCT – single-blinded	FM	108:47: 48	SW, PT, Psych, Art Therapist	HRQoL, FIQ
Van den Hout WB *et al.* (2003)	RCT – un-blinded	RA & SLE	-	Medic, NSp, OT, PT, SW	RA QoL questionnaire, RAND-36,Rating Scale using Time Trade-Off Method;

Lead Authors	Study design	Condition	Sample size	MD team composition	Outcome measure used
van Koulil S *et al.* (2009)	RCT – un-blinded	FM	84	PT, Psych, SW	Treatment Perception, Pain VAS, Fatigue, Functional disability, Psych assessment
Velez *et al.* (2012)	Service evaluation	Psoriatic Arthritis	510	-	CASPAR
Vliet Vlieland TP (1996)	RCT – un-blinded	RA	80	Medic, Nurse, PT, OT, SW	Disease activity, Pain & fatigue VAS, Ritchie Articular Index HAQ, Arthritis Impact Measurement Scales, Radiographs, CRP & ESR
Vliet Vlieland, TPM, FC Breedveld *et al.* (1997)	RCT – un-blinded	RA	80	Medic, Nurse, PT, OT, SW	Disease activity, Ritchie Articular Index Pain, Pain VAS, HAQ , ESR
Vliet Vlieland *TPM* and Hayes JMW (1997)	Systematic Review	RA	42	Medic, Nurse, OT, PT	-
Vliet Vlieland TP *al.* (2006a)	Clinical Review	Rheumatic Disease	-	-	-
Vliet Vlieland TPM *et al.* (2006b)	Clinical Commentary	Inflammatory Arthritis	-	-	-
Voorn *et al.* (2013)	Single intervention study	OA	-	NSp, PT, Orthopaedic surgeon	HRQoL, SF36, EQ5D, HOOS, KOOS, ICOAP
Woolf AD (2007)	Delphi consensus	Rheumatic disease	-	Core: Medic, Nurse, PT, OT, Psych, SW, OR, Pod, Pharmacist, Dietician, Patient Educator. Supplemental: Radiologist/Radiographer, Pathologist, Neurophysiologist, Orthopaedic surgeon, Dermatologist, Immunologist, Pain specialist, Therapeutic Radiologist	-
Zhang W *et al.* (2006)	Delphi recommendations	Gout	-	-	-
Zhang W *et al.* (2007)	Delphi recommendations	OA	-	-	-
Zhang W *et al.* (2008)	Delphi recommendations	OA	-	Nurse, PT, Orthotist, Dietitican Acupuncturist	-

Table 3: Summary of RCT outcomes

Lead Authors	Study Title	Condition	Number of patients	Randomisation?	Outcome measures	Authors' conclusion
Casanueva-	Efficacy of a multidisciplinary	Fibromyalgia	34	Yes	Tender Joint Index (1990 ACR	Patients with severe manifestations of

Lead Authors	Study Title	Condition	Number of patients	Randomisation?	Outcome measures	Authors' conclusion
Fernandez B *et al.* (2012)	treatment program in patients with severe Fibromyalgia				criteria) Myalgic Score (Dolorimeter) Pressure Point Threshold (Tensiometer) Grip Strength 6 min walk test VAS for work difficulty VAS for fatigue VAS for pain VAS for anxiety VAS for Depression Fatigue severity score Pittsburgh Sleep Quality Index Hamilton Anxiety Score Beck Anxiety Inventory Beck Depression Inventory Zung self rating depression score SF36 Patient Impression of Improvement Fibromyalgia Impact Questionnaire Standford Health Assessment Questionnaire	Fibromyalgia can obtain improvement with a short-term, low-cost and simple-delivery multidisciplinary program.
Castel *et al.* (2013)	Efficacy of a Multidisciplinary Fibromyalgia Treatment Adapted for Women With Low Educational Levels: A Randomized Controlled Trial	Fibromyalgia	155	Yes	VAS for pain Hospital Anxiety Depression Score Medical Outcomes Study Sleep Scale Coping Strategies Questionnaire Fibromyalgia Impact Questionnaire	Multidisciplinary treatment adapted for individuals with low educational levels is effective in reducing key symptoms. Some improvements were maintained 1 year after completing the multidisciplinary treatment.
Hamnes B *et al*. (2012)	Effects of a one week multidisciplinary inpatient self-management programme for patients with fibromyalgia: a randomised controlled trial	Fibromyalgia	118	Yes	General Health Questionnaire (GHQ-20) Effective Musculoskeletal Consumer Scale (EC17) Arthritis Self Efficacy Scale Fibromyalgia Impact Questionnaire	In patients with FM the self-management programme had no effect on psychological distress, functional and symptomatic consequences and self-efficacy, except for a small short-term effect on skills and behaviour that are important for managing and participating in health care
Lemstra, M	The Effectiveness of	Fibromyalgia	79	Yes	Self-perceived health status	Positive health-related outcomes in this

Lead Authors	Study Title	Condition	Number of patients	Randomisation?	Outcome measures	Authors' conclusion
and Olszynski WP (2005)	Multidisciplinary Rehabilitation in the Treatment of Fibromyalgia : A randomized control trial.				VAS for average pain intensity Pain and disability Index Becks depression inventory	mostly unresponsive condition can be obtained with a low-cost, group multidisciplinary intervention in a community based non-clinical setting.
Schouffoer AA, Ninaber MK *et al.* (2011)	Randomized Comparison of a Multidisciplinary Team Care Program With Usual Care in Patients With Systemic Sclerosis	Systemic Sclerosis	50	Yes	Hand mobility in Scleroderma test Maximal Mouth Opening Grip strength test VO2max Checklist Individual Strength (CIS-20) Health Assessment Questionnaire SF36 6 minute walk test SSc Health Assessment Questionnaire	In patients with SSc, a 12-week multidisciplinary day patient treatment program was more effective than regular outpatient care with respect to 6MWD, grip strength, MMO, and HAQ score, but not for VO2max, HAMIS test, CIS-20, SF-36, and visual analogue scale for pain.
Stukstette *et al.* (2013)	No evidence for the effectiveness of a multidisciplinary group based treatment program in patients with osteoarthritis of hands on the short term; results of a randomized controlled trial	Osteoarthritis	151	Yes	Australian Canadian Osteoarthritis Hand Index AUSCAN OARSI responder criteria Canadian Occupational Performance Measurement Range of Motion Scale Self Perceived change Grip strength SF36 General Self Efficacy Scale Chronic Pain Self Efficacy Scale Kapandji Thumb Index Pain Coping Inventory	There is insufficient evidence to confirm a clinically relevant treatment effect on the short term, between patients who followed a multidisciplinary treatment program and those who received only written information
Tijhuis *et al.* (2002)	A Randomized Comparison of Care Provided by a Clinical Nurse Specialist, an Inpatient Team, and a Day Patient Team in Rheumatoid Arthritis	Rheumatoid Arthritis	210	Yes	Health Assessment Questionnaire McMaster Toronto Arthritis Patient Professional Disability Questionnaire RAND 36 Heath Survey Disease Activity Score Rheumatoid Arthritis Quality of Life Questionnaire VAS for patient satisfaction	Care provided by a clinical nurse specialist appears to have a similar clinical outcome in comparison with inpatient and day patient team care. Although all patients were highly satisfied with multidisciplinary care, patients who received care provided by a clinical nurse specialist were slightly less satisfied than those who received inpatient or day patient team care
Van den	Cost-Utility Analysis of a	Rheumatoid	121	Yes	Rheumatoid Arthritis Quality of Life	Program costs were outweighed by

Lead Authors	Study Title	Condition	Number of patients	Randomisation?	Outcome measures	Authors' conclusion
Hout WB *et al.* (2003)	Multidisciplinary Job Retention Vocational Rehabilitation Program in Patients With Chronic Arthritis at Risk of Job Loss	Arthritis or Systemic Lupus Erythematosis			Questionnaire RAND-36 Rating Scale using Time Trade-Off Method	total savings on other health care and non-health care costs, but not significantly.
van Koulil S *et al.* (2009)	A Patient's Perspective on Multidisciplinary Treatment Gain for Fibromyalgia: An Indicator for Pre-Post Treatment Effects?	Fibromyalgia	84	Yes	VAS for treatment Perception VAS for patient perception of improvement Impact of Rheumatic Disease on General Health and Lifestyle (IRGL) IRGL subscale for mobility IRGL Subscale for anxiety and mood Checklist of Individual Strength Fibromyalgia Impact Questionnaire	Results suggest that the patient's perception of treatment gain and pre-post changes in outcomes during treatment assess different aspects of the patient's treatment progress, particularly with regard to psychological functioning.
Vliet Vlieland TP (1996)	A Randomized Clinical Trial of In-Patient Multidisciplinary Treatment versus Routine Outpatient care in Active Rheumatoid Arthritis	Rheumatoid Arthritis	80	Yes	VAS – Disease activity VAS – pain VAS – fatigue Ritchie Articular index Arthritis Impact Measurement Scales Radiographs CRP and ESR Health Assessment Questionnaire (Dutch Version)	A short period of in-patient multidisciplinary treatment for active RA has a direct beneficial effect on disease activity and emotional status with the favourable effect on disease activity remaining after 52 weeks.
Vliet Vlieland, TPM, FC Breedveld *et al.* (1997)	The Two-Year Follow-Up of a Randomized Comparison of In-Patient Multidisciplinary Team Care and Routine Outpatient care for active Rheumatoid Arthritis	Rheumatoid Arthritis	80	Yes	VAS – Disease activity VAS – pain VAS – fatigue Ritchie Articular index Arthritis Impact Measurement Scales Radiographs CRP and ESR Health Assessment Questionnaire (Dutch Version)	A short period of in-patient multidisciplinary team care has a beneficial effect on disease activity over a period of 2 years and should be considered as a useful treatment modality in patients with active RA.

Table 4: Frequency summary of identified literature by methodology or disease type (N=63)

Study Design	Frequency
RCT	11
Cross-sectional, observational studies	9
Pilot studies	6
Qualitative studies	5
Clinical Review	5
Systematic Review & meta-analyses	3
Author perspectives	2
Surveys	1
Case study	1
Condition	**Frequency**
Rheumatoid arthritis	12
General Inflammatory Arthritis	10
Fibromyalgia	10
Osteoarthritis	7
Systemic Sclerosis	3
Ankylosing Spondylitis	1
Psoriatic Arthritis	1

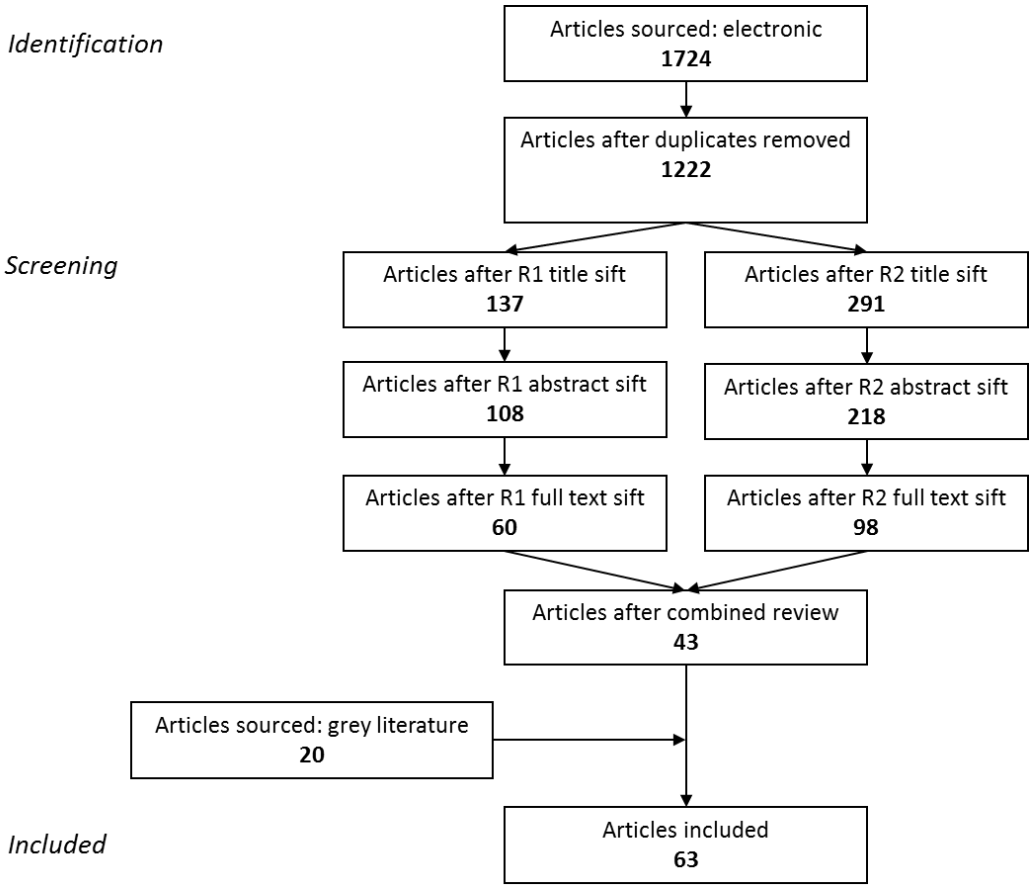

Figure 1: Report identification and extraction process

Where R1 = reviewer one, R2 = reviewer two. The combined results from both reviewers are reported in the results section.

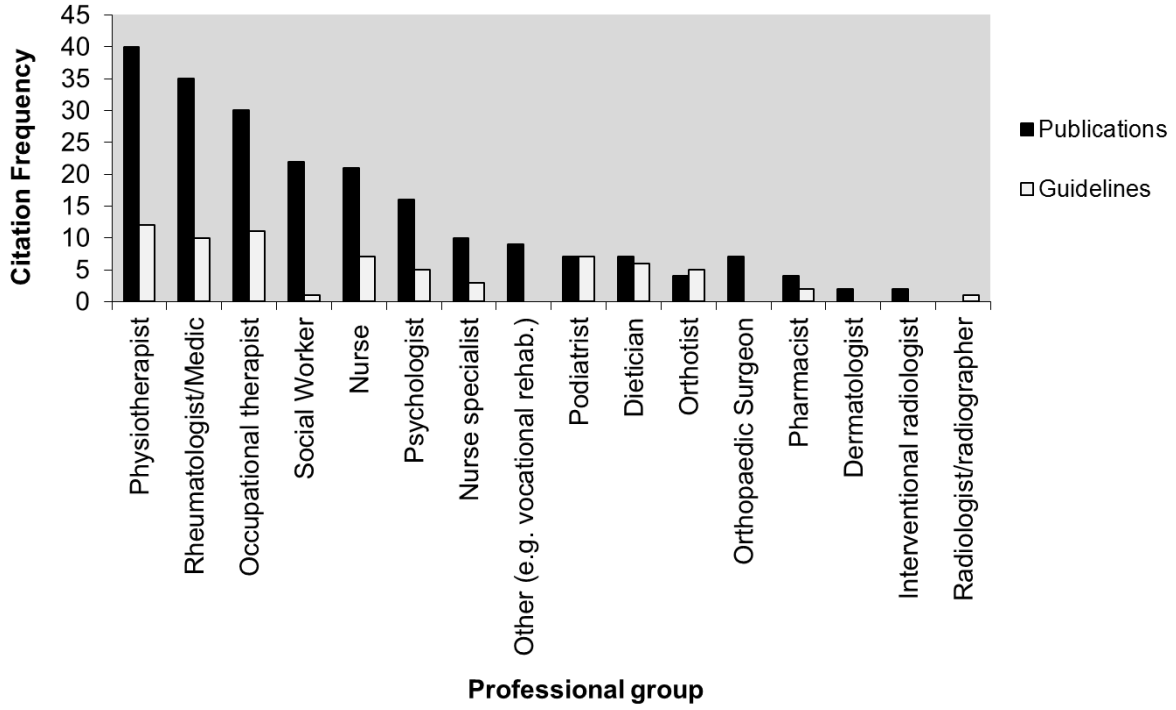

Figure 2: Frequency summary of specialisms cited as relevant to rheumatological multidisciplinary team membership

APPENDIX 1: Search strategy

1. Rheumatology/
2. Exp Rheumatic Diseases/
3. rheumat*.mp. [mp=title, abstract, original title, name of substance work, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]
4. 1 OR 2 OR 3
5. Interprofessional Relations/
6. Interprofessional.mp [mp=title, abstract, original title, name of substance work, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]
7. Interdisciplinary.mp [mp=title, abstract, original title, name of substance work, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]
8. Multidisciplinary.mp [mp=title, abstract, original title, name of substance work, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]
9. 5 OR 6 OR 7 OR 8
10. 4 AND 9