Rheumatology education for undergraduate nursing, physiotherapy and occupational therapy students in the UK: standards, challenges and solutions

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Introduction

In an average year, ~9 million people attend GP surgeries for arthritis-related conditions, which are also found in about one-fifth of hospital inpatients [1, 2]. Most nurses (Ns), physiotherapists (PTs) and occupational therapists (OTs) therefore need the skills and knowledge to manage rheumatological conditions or understand their impact (e.g. the consequences for a patient with RA who is temporarily immobilized through a myocardial infarction). Rheumatology should therefore be a core component of undergraduate health professional (HP) education.

Nurses, OTs and PTs in the UK are trained over 3 yrs. There are guidelines from the governing bodies but no agreed national core curricula [3–5] and validation is provided by individual Universities. Two major problems in providing a rheumatological component to HP undergraduate education are limited curriculum time available for theoretical input and decreasing opportunities for clinical placements as hospitals concentrate on acute illness [6], with fewer rheumatology inpatient beds. Paradoxically, these challenges come at a time when the role of the rheumatology HP is expanding, with almost every rheumatology department employing specialist rheumatology nurses, OTs and PTs [7].

In a recent survey of undergraduate nursing, OT and physiotherapy courses in the UK, educationalists reported only limited coverage of rheumatology theory for disease mechanisms, disability, psycho-social issues and multi-disciplinary team working [8]. They found it difficult to identify rheumatology-specific content, as many curricula concentrate on generic skills [8]. Concerns about disease-related vs generic education for undergraduate HPs have been raised and Government recommendations are that although nurse education should be principle-based, it should be built around patient pathways [9–13]. It is thus possible that rheumatology-specific teaching is being delivered on clinical placements, but again the data showed little rheumatology exposure during clinical placements for nurses and OTs, and many educationalists felt that the rheumatology content of their course was inadequate (50% of nursing courses, OT 30%, PT 42%) [8].

Similar problems occur in medicine where undergraduate rheumatology exposure is only offered to some students, and the time spent teaching rheumatology continues to decrease [14, 15].

Limited rheumatology exposure for undergraduate HPs may mean that rheumatology patients on general wards, in the community or being treated for other problems but with underlying rheumatological conditions, may receive less than optimal care. In addition, fewer HPs may consider rheumatology as a career option if they have not been exposed to it during training. The removal of theatre placements from the undergraduate nursing curriculum reduced recruitment rates for theatre nurses, while increased clinical exposure in psychiatry improved recruitment [9, 10].

Many specialties face challenges in agreeing core theoretical teaching for undergraduate HPs but several have been able to identify these, along with delivery methods [11, 12]. The aims of this study were for rheumatology clinicians to propose a draft core set of rheumatology topics for undergraduates; for educationalists to explore potential ways of delivering it; and for clinicians and educationalists together to finalize the rheumatology core topics and proposals for their delivery.
Subjects and Methods

Phase I (clinicians’ preliminary core set)

The Delphi technique uses ‘expert’ opinions to establish consensus through a series of questionnaire rounds, with the results of each round informing the contents of the next [16]. Data from the literature are commonly used to construct the initial questionnaire [16]; therefore, Round 1 was based on a previous consensus on the standards for qualified HPs in rheumatology [17]. Several topics clearly applied only to qualified HPs (e.g. joint injections) and were therefore removed, leaving 17 broad topics such as pathology, assessment, treatment, education and psychology.

Round 1. Expert clinicians from the previous consensus [17] or professional society handbooks were approached (Fig. 1). Consenting clinicians were also asked to pass a study invitation to a local HP with ≤1 year’s rheumatology experience, as they might bring a more recent perspective on preparation for entering rheumatology. A postal Delphi was used, with no reminders. Participants rated each topic as not required, optional, preferable or essential (0–3) for undergraduate HPs. The Delphi technique was modified [18] by also asking participants to generate specific issues for each topic (e.g. psychology might generate issues such as depression). Topics rated as essential/preferable and any new issues generated by ≥3 participants were taken forward to Round 2 (Fig. 1).

Round 2. Participants rated Round 2 items using the same 0–3 scale. Data were converted to a percentage of the maximum possible importance score for each topic, e.g. if all nurses scored a topic as essential (3), this would score 100%. There is no universally agreed cut-off point for consensus and Delphi studies have adopted levels of 51–100% [16, 18]. There was no clear level at which consensus markedly dropped; therefore, an inclusive approach was taken and items scoring ≥60% for each profession were taken into Round 3.

Round 3. Using the same scoring system and a more stringent consensus of ≥80%, a preliminary core set of rheumatology topics was created for undergraduates in each profession.

In Round 3, recent entrants to rheumatology were also asked what motivated them to take up rheumatology (Did anything or anyone inspire you? Which aspects of training did you find inspiring, helpful or interesting? What would have enthused you or professional society handbooks were approached (Fig. 1). Consenting clinicians were also asked to pass a study invitation to a local HP with ≤1 year’s rheumatology experience, as they might bring a more recent perspective on preparation for entering rheumatology. A postal Delphi was used, with no reminders. Participants rated each topic as not required, optional, preferable or essential (0–3) for undergraduate HPs. The Delphi technique was modified [18] by also asking participants to generate specific issues for each topic (e.g. psychology might generate issues such as depression). Topics rated as essential/preferable and any new issues generated by ≥3 participants were taken forward to Round 2 (Fig. 1).

Phase II (educationalists’ challenges)

For each profession, 6–7 curriculum organizers/clinical placement officers from the UK survey [8] were invited to participate in a 30–40-min telephone discussion. Participants were selected to reflect a range of Universities and Trusts across the UK. The interviews followed a structured format, asking how rheumatology was currently taught, views on the preliminary core sets from Phase I and how they might be delivered. Responses were documented on a record sheet and the typed summary returned to participants for validation. The data were examined by two researchers (C.A., S.H.) using a thematic approach [19] to produce a summary of common issues.

Phase III (core set consensus, delivery solutions)

Three inter-professional workshops were held to finalize the core set and generate potential solutions for delivering it. Workshops comprised 8–14 participants, including Phase I clinical experts and Phase II educationalists, and were facilitated by members of the research team, including a patient (P.R.). Discussions were interactive, drawing on suggestions from Phases I and II, workshop participants and facilitators. Working in their professional groups, participants divided their Phase I core set into topics that could be delivered to all professions and topics that were only applicable to their own profession. The results were debated by the whole workshop, allowing the core set to be finalized, after which participants organized it into cohesive teaching units. Finally, participants worked in inter-professional groups to generate potential ways of delivering the core set, which were then discussed by the whole workshop. Data from all three workshops were collated, reviewed and summarized by the research team.

Ethics approval was given by the South West Multi-Centre Research Ethics Committee and individual participant consent obtained.

Results

Phase I: clinicians’ preliminary core set of topics

A total of 103 expert clinicians were invited to participate, of whom 47 consented and then enrolled 19 juniors (total n = 66, of whom 39 completed all three Delphi rounds) (Fig. 1). In Round 1, participants considered all 17 topics essential/preferable and 94 new issues were generated by ≥3 participants, giving 111 items to be taken forward into Round 2. After Round 2, using a conservative consensus of ≥60%, nurses retained 106 items,
Common (N, OT, PT) 
OA pathology 
RA pathology 
A and P (in disease) 
Assess: Holistic 
Assess: Problem-based 
Assess: Function 
Assess: Observation 
MDT: Overview of roles 
MDT: Team working 
Joint protection 
Pacing 
Address function and ADL 
Clinical problem-solving 
Pt Ed.: tailored to individual

Shared by two professions 
History taking (OT, PT) 
Assess: ADL (N, OT) 
Joint exam: observation (N, PT) 
Joint exam: pain (N, PT) 
Red flags in MSK disorders (N, PT) 
QoL: impact on employment (N, OT) 
QoL: impact on lifestyle (N, OT) 
QoL: impact on social life (N, OT) 
QoL: impact on family/roles (N, OT) 
QoL: impact on relationships (N, OT) 
Psych. well-being: holistic assess (N, OT) 
Psych. support: intervention (N, OT) 
Psych. support: self-management (N, OT) 
Coping theories and strategies (N, OT) 
Basic psychosocial model (N, OT) 
Pt Ed.: evidence based (N, PT) 
Pt Ed.: joint protection (N, OT) 
Pt Ed.: fatigue management (N, OT) 
Pain management: Heat/Cold (N, PT)

Nurse-specific issues 
Osteoporosis pathology 
Rationale for clinical investigations 
Blood tests (routine) 
Disease activity: blood tests 
Disease activity: DAS 
Disease activity: pain 
Disease activity: EMS 
Disease activity: flares 
Disease activity: function 
Disease activity: fatigue 
QoL: impact on sex 
QoL: financial effects 
Coping: attitude to chronic illness 
Psych well-being: assessment 
Psych well-being: yellow flags 
Drugs: general principles 
Drugs: analgesics 
Drugs: NSAIDs 
Drugs: DMARDs and anti-TNF 
Drugs: steroids 
Drugs: monitoring 
MDT: referrals to team members 
MDT: assessment 
Clinical problem-solving (practical) 
Pt Ed.: information giving 
Pt Ed.: literature in ARC booklets 
Pt Ed.: involving carers 
Pt Ed.: one to one sessions 
Pt Ed.: MDT self-management programmes 
Pt Ed.: changing health behaviours 
Pt Ed.: problems of managing arthritis 
Pt Ed.: pain management 
Pt Ed.: support groups 
Psych. suppt: enhance self-efficacy 
Psych. suppt: empowering 
Psych. suppt: improving adherence 
Psych. suppt: life with chronic illness

Physiotherapy-specific issues 
Assessment: documentation 
Physical examination principles 
Recognizing common MSK disorders 
Exercise

Table 1. Clinicians’ preliminary consensus on core topics for their undergraduate students (Phase I Delphi)

| Common (N, OT, PT) | Shared by two professions | Nurse-specific issues | Physiotherapy-specific issues |
|--------------------|--------------------------|----------------------|-----------------------------|
| OA pathology       | History taking (OT, PT)  | Osteoporosis pathology | Assessment: documentation   |
| RA pathology       | Assess: ADL (N, OT)      | Rationale for clinical investigations |
| A and P (in disease) | Joint exam: observation (N, PT) | Blood tests (routine) |
| Assess: Holistic   | Joint exam: pain (N, PT) | Disease activity: blood tests |
| Assess: Problem-based | Red flags in MSK disorders (N, PT) | Disease activity: DAS |
| Assess: Function   | QoL: impact on employment (N, OT) | Disease activity: pain |
| Assess: Observation | QoL: impact on lifestyle (N, OT) | Disease activity: EMS |
| MDT: Overview of roles | QoL: impact on social life (N, OT) | Disease activity: flares |
| MDT: Team working  | QoL: impact on family/roles (N, OT) | Disease activity: function |
| Joint protection   | QoL: impact on relationships (N, OT) | Disease activity: fatigue |
| Pacing             | Psych. well-being: holistic assess (N, OT) | QoL: impact on sex |
| Address function and ADL | Psych. support: intervention (N, OT) | QoL: financial effects |
| Patient role in management | Psych. support: self-management (N, OT) | Coping: attitude to chronic illness |
| Clinical problem-solving | Coping theories and strategies (N, OT) | Psych well-being: assessment |
| Pt Ed.: tailored to individual | Basic psychosocial model (N, OT) | Psych well-being: yellow flags |
|                     | Pt Ed.: evidence based (N, PT) | Drugs: general principles |
|                     | Pt Ed.: joint protection (N, OT) | Drugs: analgesics |
|                     | Pt Ed.: fatigue management (N, OT) | Drugs: NSAIDs |
|                     | Pain management: Heat/Cold (N, PT) | Drugs: DMARDs and anti-TNF |

Phase II: educationalists’ challenges

Nineteen curriculum or clinical placement organizers were interviewed (N6, OT3, PT2). They reported that rheumatology was considered preliminary, to be fed into the Phase III workshops for inter-professional debate.

Phase III: core set consensus, delivery solutions 

The three workshops comprised 33 clinicians (N12, OT9, PT5), educationalists (N2, OT3, PT2) and a patient (P.R.), including several members of the research team who facilitated, and also contributed to the discussions around potential delivery methods. Several participants had combined clinical and educational roles.

Core set of rheumatology topics. All three workshops concluded that the items on each profession’s preliminary core set could be delivered to all HP undergraduates, although some items should be covered in more depth for certain professions (e.g. medication for nurses, joint protection for OTs, exercise for PTs). When participants organized the items into cohesive teaching units, there was some variation in unit labels, but the contents were very similar across workshops. The three workshops’ proposals were collated and reviewed by the research team, who refined any vaguely defined items, amalgamated several overlapping items and merged a few very detailed items into larger topics. This process clarified the six core teaching units: Anatomy and Physiology; Assessment; Management and Intervention; Psychosocial Issues; Patient Education; and the Multi-disciplinary Team, and their component topics (Table 2).
Delivery of rheumatology core topics. Participants discussed the methods raised by educationalists (Phase II) for teaching rheumatology and also generated their own ideas, resulting in a broad list of options (Table 3). For example, case studies were thought potentially useful for translating generic skills training into rheumatological situations. Resources that could be developed to support teaching included developing a standard rheumatology teaching resource pack for universities and a peripatetic rheumatology tutor. Participants recommended teaching rheumatology to inter-professional groups to reinforce the concept of multi-disciplinary team working.

Exciting opportunities for providing clinical exposure were proposed (e.g. short placements nested within longer specialist placements), which could accommodate more students, but these should have learning outcomes and be structured to include shadowing different team members, interviewing patients and self-directed learning. Tips for clinicians on how to teach in the workplace were raised (e.g. team review of a patient) as well as important suggestions for involving patients (e.g. as teachers supported by a facilitator) (Table 3).

Participants identified patient and clinician involvement as key to effective classroom and clinical teaching of the core set. Recognizing the limitations on curriculum time for disease-specific issues, they proposed two brief but intensive interventions, provided by educationalists, clinicians and patients working together. In the classroom, an inter-professional seminar (Rheumatology Chat Show) could involve groups of students interviewing patients to find out about life with arthritis and the journey to self-management. The students’ findings would be drawn together by clinical and educationalist facilitators using the core teaching topics as a basis (particularly management and intervention, psychosocial issues and patient self-management). For students on clinical placements, a ‘Rheumatology Road Show’, run by clinical rheumatology teams in collaboration with educationalists and patients could be staged. This hands-on exhibition could run throughout the day and students from all professions, on any placement throughout the host Trust, could ‘drop-in’ for an hour. This would allow them to interact with the Multi-disciplinary Team and patients, and introduce them to many of the core topics through clinical and research posters, aids and appliances displays, physiotherapy demonstrations and patient discussions. It was considered that these short but intensive interventions might capture the essence of rheumatology and be a memorable learning experience for students.

Motivators for careers in rheumatology

Eighteen recently-appointed participants completed the questions on motivation (N4, OT4, PT10). Eight could not recall any rheumatology exposure during undergraduate training (‘Cannot remember there being any specific rheumatology training’—Physiotherapist I). Ten participants said that clinical exposure to patients had motivated them (‘Clinical placements were the most inspiring aspect’—Physiotherapist J), while others identified professional role models, including clinicians (‘Inspired by excellent nursing staff who were excellent role models’—Nurse A), educationalists (‘Rheumatology lecturer at university’—Physiotherapist C) and the multidisciplinary team (‘Nursed some rheumatology patients on a medical ward when their unit was closed, and enjoyed the MDT work’—Nurse B). A third theme was the influence of formal study (‘Quite in-depth module, lectures covering RA and OA’—Occupational Therapist E). Seven participants suggested that combining the three themes of patient exposure, professional role models and formal study into a classroom experience would be a powerful teaching tool (‘A practical session with patient and their therapist would be extremely interesting and likely to promote enthusiasm.

Table 2. Consensus on core rheumatology teaching units for all undergraduate HPs

| Anatomy and Physiology          | Assessment          | Management and Intervention                      |
|--------------------------------|---------------------|-----------------------------------------------|
| A and P (rheumatology)          | Holistic approach   | Problem-solving principles                     |
| OA, RA, AS, Osteoporosis        | History taking and examination PT | Patient’s role in self-management               |
| Routine clinical tests (bloods, | Disease activity (e.g. DAS, blood tests) N | Medication and monitoring PT                   |
| X-ray)                          | Function and ADL    | Managing function and ADL                      |
|                                | Symptoms (e.g. pain, fatigue) | Managing symptoms (e.g. pain, fatigue)         |
|                                | Patient opinion     | Managing flares                                 |
|                                | Warning signs (red/yellow flags) | Pacing PT                                      |
|                                |                     | Joint protection                                |
|                                |                     | Pacing PT                                      |
|                                |                     | Exercise                                        |
|                                |                     |                                               |
| Psychosocial issues             | Patient education/self-management |                                               |
| Psychosocial model N, OT        | Achieving behaviour change |                                               |
| Psychological impact            | Enhancing self-efficacy |                                               |
| Social impact (personal/family) | Improving adherence  |                                               |
| Assessment                      | Delivery styles to achieve these |                                               |
| Coping theories, OT empowerment | Living/coping with a chronic condition |                                               |
| Psychological support and intervention | Managing symptoms (pain, fatigue) |                                               |
|                                 | Joint protection    |                                               |
|                                 |                     |                                               |

Table 3. Suggestions for delivering rheumatology core teaching set

| Classroom teaching | Resources | Clinical placements | Clinicians | Patients |
|--------------------|-----------|---------------------|------------|----------|
| Short, intensive sessions | E-learning | 2 Weeks, structured 1 Day, structured | IP shadowing | Patients as teachers |
| Case studies       | DIPEX, Joint zone | Visits within generic placement | IP clinical problem-solving | Patient interviews |
| Case conference    | Central point of info/resources | Elective placement | Discusses patient’s team care | Patient on teaching team |
| Student conference | Peripatetic teacher/facilitator | Learning outcomes | Multi-disciplinary Team reviews a patient | Patient experiences of MDT |
| Projects           | Teaching pack for universities | Rheumatology Road Show | | Speakers from charities |
| Student IP conference | Interactive computer game | | | |
| Rheumatology Chat Show | Simulation suit/gloves | | | |
| Structured online module | Clinical teaching videos | | | |

IP: Inter-professional; DIPEX: Directory of Individual Patient Experiences.

In greater depth for nurses, OT: occupational therapists, PT: physiotherapists. ADL: Activities of Daily Living; DAS: Disease Activity Score.
This approach was applied in neuro and everyone seemed to gain from it—even the patient.”—Physiotherapist J).

Discussion
This study combined the expertise of both clinicians and educationalists to reach a consensus on a minimum core set of topics for undergraduate rheumatology education for HPs and potential ways of delivering these. Core topics comprise Anatomy and Physiology; Assessment; Management and Intervention; Psychosocial Issues; Patient Education; and Multi-disciplinary Team collaboration, with each profession covering some aspects in greater depth as appropriate. In addition, participants have suggested how current best practice in education and clinical placements might be combined to enhance delivery of core components, highlighting the need for underpinning collaboration between clinicians, educationalists and patients.

Most university courses focus on teaching transferable or generic knowledge and skills, as the basis for learning how to provide effective healthcare. It is likely that if asked, expert clinicians in most specialties would suggest that undergraduates would benefit from receiving disease-specific education in their area (e.g. diabetes, dermatology). As this would potentially overwhelm available curriculum time, teaching the generic skills that underpin healthcare practice, such as communication or coping theories, is likely to remain the only way of managing a time-limited curriculum. Clearly, five of the six rheumatology core topics agreed in this study could be generic skills (the exception being Anatomy and Physiology). However, there is little point in providing generic skills training unless students learn how to apply these to specific diseases in clinical care. Rheumatology case studies would be one way of incorporating rheumatology into the curriculum, by facilitating students in applying their generic skills training to particular patient scenarios, utilizing the rheumatology core set. For example, a case study around the journey into self-management of RA, could cover the six rheumatology core topics through diagnosis (Anatomy and Physiology; Assessment), management of common symptoms such as pain and fatigue (Management and Intervention; Multi-disciplinary Team working), through to coping and adaptation (Psychosocial Issues; Patient Education). Clear links could be made back to generic teaching on clinical reasoning, problem-solving, psychological reactions to illness, communication skills and behaviour change theories, fulfilling the government recommendation for principle-based teaching linked to patient pathways [3]. If classroom curriculum time is too limited even for this, then such a structured approach could be delivered as part of a clinical placement [20].

Inter-professional learning brings many benefits to health care students [21], but has a particular relevance to rheumatology where all team members are usually involved in care. Combined sessions involving not only nursing, OT and physiotherapy students but also medical, podiatry, psychology and pharmacy undergraduates should be considered. In addition, inter-professional teachers could be utilized: for example, OTs teaching nurses or nurses teaching medical students [22, 23].

Rheumatology clinical placements may be considered too narrow to provide the broad range of experience and exposure students require, particularly where nursing placements might last up to 24 weeks. Participants suggested brief, structured clinical placements, perhaps nested within longer placements. In other specialties, a week-long clinical attachment to theatres prompted 65% of the student nurse participants to consider theatres as a career option, while a 2-day rheumatology placement improved knowledge and enthusiasm (detailed data not reported) [9, 24]. Both interventions were carefully designed with pre-placement classroom preparation, structured clinical timetables and individualized learning outcomes. Thus, even a 2-h well-structured Rheumatology Chat Show or Rheumatology Road Show, linking the core topics to generic skills, might be effective and although unlikely to cover the core set sufficiently, is a practical solution likely to provide more rheumatology input than most current courses contain.

Recent entrants to rheumatology in this study, suggested that exposure to an enthusiastic role model (educationalist, clinician or patient) has a major impact on patient care and career choice. Workshop participants also identified that collaboration between educationalists, clinicians and patients is key to delivering the core topics. The rheumatology model findings reflect the relevance of social learning theory to HP education [25] and suggest the importance of combining the expertise and enthusiasm of educationalists and rheumatology clinicians. Rheumatology teams and University departments need to work collaboratively to identify lead educationalists and clinicians who would work together to drive local initiatives forward. One model for successful collaboration between 10 Rheumatology Units and one University has been established to deliver the national, ARC-funded post-qualification Graduate Certificate in Rheumatology Practice, developed jointly by rheumatology clinicians and academics. Links between universities and hospital departments might be further facilitated by joint clinician/educationalist appointments.

Many of the teaching methods proposed by the participants are current best practice in education (e.g. small clinical project placements, national teaching package for universities [26–28]) while some are relatively novel (e.g. peripatetic tutor, chat show, road show). Debating these methods together and sharing best practice, enthused educationalists about teaching rheumatology, and also enthused clinicians to try different teaching approaches. A model for delivering the rheumatology core set could be to utilize role models (social learning theory) and inter-professional settings to explore rheumatology case studies (in the classroom, placements, chat shows and road shows), as a vehicle for translating generic skills into rheumatology situations, with local opportunities facilitated by collaboration between a lead clinician and a lead educationalist (Fig. 2).

Limitations of this study include difficulty in identifying a clear cut-off point for core topic consensus, always a contentious issue [18]; therefore, an inclusive approach was taken first (60%) followed by a more stringent approach (80%). The interviews with educationalists in Phase II were documented by hand on a standard sheet, which may have resulted in some missing data. However, interview summaries were immediately returned to participants for verification, clarification and addition. The inclusion of other professions would have been beneficial and the core set could now be explored for relevance to podiatry and psychology undergraduates. The strengths of the study are the combination of clinicians and educationalists in generating, debating and agreeing the core set and delivery methods. In addition, the research team had backgrounds in clinical care, education, nursing, OT, physiotherapy and medicine, and included a patient.

This study has identified a minimum, standardized set of six core rheumatology topics for undergraduate nurses, OTs and PTs, and a variety of potential delivery methods. Further research is now needed to refine the content of the six teaching units, evaluate the feasibility and costs of delivering these core teaching sets using some of the interventions proposed, and assess the effects on student knowledge, skills and attitudes. Where curriculum time and clinical placements are limited, brief interventions that last only a few hours might be helpful (Rheumatology Chat Show, Rheumatology Road Show, case study, standard teaching package). The outputs from the workshops in particular, demonstrated the benefits of collaboration between enthusiastic educationalists, clinicians and patients. The next step is for clinical nurses, OTs and PTs to link with their local university and establish collaborations for enhancing rheumatology teaching in ways that best suit local needs and resources.
Fig. 2. Potential model for linking rheumatology core topics and generic skills through case studies.

Rheumatology key messages

- A core set of rheumatology teaching topics for undergraduate HPs is proposed.
- Potential delivery methods include brief interventions for classroom or clinic.
- Enthusiastic collaboration between clinicians, educationalists and patients is the key.

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