CONCISE REPORT

Can intervention modify adverse lifestyle variables in a rheumatoid population? Results of a pilot study

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Background: Rheumatoid arthritis (RA) is associated with significant excess morbidity and mortality. Cardiovascular disease is the commonest cause of premature death in patients with RA. In recognition of this, blood pressure, weight, and smoking history are routinely ascertained in the clinic and appropriate advice and treatment started.

Aims: To ascertain if attending a specialist nurse, in addition to routine medical care, would increase the success in dealing with lifestyle variables in a cohort of patients with RA.

Methods: Twenty two consecutive patients starting treatment with the disease modifying antirheumatic drug (DMARD) sulfasalazine were invited to attend an additional clinic dealing with lifestyle factors every 12 weeks over a 48 week follow up. Smoking and alcohol history, baseline demographic and metrology assessments were determined for all patients. Body mass index (BMI) was calculated, blood pressure recorded, function assessed by the Health Assessment Questionnaire (HAQ), and social deprivation determined by the Carstairs Index. Patients were advised on exercise and diet, and serum cholesterol was measured.

Results: Twenty women and two men, with a mean age of 52 years and mean disease duration of five years, were enrolled. Eight patients smoked and, unfortunately, none were persuaded to discontinue. Fifteen of the cohort were already taking regular exercise; one additional patient began swimming regularly. At baseline, 10 patients were found to have a high cholesterol, with a mean of 6.8 mmol/l. A 14% reduction in mean cholesterol was achieved by dietary modification, and three patients merited statin treatment. Obesity is a major problem in our population and 15 of the patients had grade I obesity with a mean BMI of 30.6; five of these gained a further 4.5 kg. Six patients with previously untreated hypertension were identified, but unfortunately five remained hypertensive and only two had received anti-hypertensive drugs.

Conclusions: Educating patients in order to change lifestyle habits and influence outcome is a long term challenge facing all healthcare workers. In our cohort, most adverse lifestyle factors had already been recognised and discussed by the general practitioner or at prior clinic visits. Additional advice and input led to only modest improvement.

Rheumatoid arthritis (RA) is a chronic, progressive, debilitating condition which influences the physical, emotional, and social wellbeing of the patient and their family. Comorbidity has a significant effect on outcome. RA is associated with significant excess morbidity and mortality from infection, neoplasms, iatrogenic consequences of disease, and renal disease.[1–3] However, cardiovascular disease occurs in a similar proportion to that in the general population and is the commonest cause of premature death in patients with RA. Survival rates in RA have been shown to be comparable with those for Hodgkin's disease, triple vessel coronary artery disease, diabetes mellitus, and cerebrovascular disease.[4] Patients with RA have a life expectancy of between two and 18 years less than the general population, with death from cardiovascular disease consistently an important determinant of the excess mortality.[1 5 6] Traditional risk factors, such as smoking, hypertension, hyperlipidaemia, and diabetes, account for 50% of all cardiovascular events in the general population. Why the effect is so pronounced in the rheumatoid population is the subject of intensive research, but inflammatory processes certainly play a part. In particular, seropositive RA, male sex, and high age at disease onset are better predictors of death and cardiovascular events.[5] Smoking and obesity are risk factors for ill health for all causes. Smoking not only adversely influences the severity of RA in a potentially dose dependent fashion[7] but may also be an independent risk factor in the de novo development of RA.[8] The risk in the rheumatoid population is further exacerbated, in that lack of exercise, obesity, and poor diet may be worsened by progressive disability.

Changes in behaviour and lifestyle are difficult for most people but, particularly in the management of chronic diseases, modification may be necessary. The place of self management and education is now accepted and has been validated in the management of other chronic diseases such as asthma and diabetes.[9] The same principles can be applied to the rheumatic diseases, particularly RA, to enhance self efficacy, reduce disability, and pain.[10]

The incidence and prevalence of cardiovascular disease continue to rise. Sixty per cent of risk factors are modifiable.[11] Adverse lifestyle variables, such as poor diet, lack of exercise, smoking, and obesity, all increase morbidity and mortality. In recognition of this, blood pressure, weight, and smoking history are routinely ascertained in the clinic and appropriate advice given and treatment started. We sought to investigate if attending a specialist nurse, in addition to routine medical care, would increase the success in dealing with adverse lifestyle variables in a cohort of patients with RA. We report the results of a pilot study.

METHODS
Background
The Centre for Rheumatic Diseases acts as a local referral unit for the East End of Glasgow, an area with a high prevalence of cardiovascular disease, as well as a tertiary referral centre for rheumatology in the west of Scotland.

Assessments

Twenty two consecutive patients starting treatment with sulfasalazine as a disease modifying agent for RA were invited to attend an additional clinic dealing with lifestyle factors. They were assessed at baseline, then every 12 weeks over a 48 week follow up. Smoking and alcohol history, baseline demographic and metrology assessments were determined for all patients. Weight and height were measured (and BMI calculated) and blood pressure recorded. Blood was analysed for erythrocyte sedimentation rate (ESR), C reactive protein (CRP), lipid profile, glycated haemoglobin, in addition to regular monitoring of bloods for the effect of sulfasalazine, including renal and liver function. Function was determined using the modified HAQ. Social deprivation was assessed with the Carstairs Index, which is a composite score derived from the postcode and based on overcrowding, male unemployment, car ownership, and social class,[12] ranging from the most affluent group 1, to the most deprived group 7. Risk factors for the development of osteoporosis were ascertained.

Interventions

Patients were advised on stopping smoking and provided with a generic "Quitter's pack" containing further advice and telephone numbers if necessary. Guidance on safe levels of alcohol consumption was given and restricted to <3 units a day for men and <2 units a day for women. Patients were encouraged to take regular exercise, 20 minutes 3 times a week, and were invited to attend a weekly swimming group organised by patients, for patients with arthritis, but under the auspices of a physiotherapist. Dietary advice was given verbally and reinforced by the provision of generic information booklets advising on low fat, high fibre diets containing at least five portions of fruit and vegetables a day. If a specific dietary problem was identified, review was arranged with a dietician. Any change in BMI was noted.

Cardiovascular status

In addition to details on smoking, exercise, and BMI, blood pressure was measured at each visit and, if abnormal, follow up was arranged through the patients' general practitioner with appropriate treatment instituted by the primary care doctor. Fasting lipids were measured in all patients and, if abnormal, the consensus guidelines of the Royal College of Physicians of Edinburgh were applied with appropriate dietary advice and treatment instituted.

All patients completed 48 weeks of follow up. All adverse and beneficial effects were recorded.

RESULTS

Twenty four consecutive patients starting treatment with sulfasalazine were invited to take part. Two patients refused because of the time involved, and thus 20 women and two men were enrolled. Table 1 shows the demographic data at baseline. The 22 patients had a mean age of 52 years (median 50, range 32–80) and mean disease duration of five years (median 4, range 6 months to 13 years). Most patients had received no previous DMARDs (range 0–4). All patients were starting treatment with sulfasalazine as a disease modifying agent and had active disease as judged clinically by a mean articular index of 7 (median 6, range 0–24), and mean duration of morning stiffness of 150 minutes (median 60, range 0–960). Investigations showed a mean baseline ESR of 31 mm/1st h (median 24, range 1–72) and mean CRP of 27 mg/l (median 20 mg/l, range 6–85).

All patients were treated with sulfasalazine. By 48 weeks, eight of the 22 had discontinued treatment. The reasons for discontinuation were nausea in three, abnormal liver function tests in two, leucopenia (total white cell count $<4\times10^9$/l), and a drug induced lupus illness characterised by rash, mouth ulcers, fever each in one patient. All adverse events resolved on

Table 1 Baseline demographic data in 22 patients studied

Variable	Median (range)
Age (years)	50 (32–80)
Disease duration (years)	4 (0.5–13)
Ritchie articular index	6 (0–24)
Duration of morning stiffness (min)	60 (0–960)
ESR (mm/1st h)	24 (1–72)
CRP (mg/l)	20 (6–85)
HAQ	1.75 (0.5–2.875)

drug discontinuation. One patient temporarily discontinued sulfasalazine owing to pregnancy and restarted after a postpartum flare. Of the 14 patients continuing to receive treatment, the median daily dose at 48 weeks was 2.5 g.

In patients with established RA, the use of oral steroids is limited in our practice—only one patient was taking oral prednisolone in a dose of 5 mg/day. Nineteen patients received a mean of two intra-articular injections of steroid (range 1–5) and six also received intramuscular steroid during the study period, bridging the time for new DMARD treatment to be effective. All patients were treated with non-steroidal anti-inflammatory drugs.

Comorbidity

Osteoporosis risk factors

Ten of the 14 post-menopausal women were receiving hormone replacement therapy for osteoporosis. One other woman was receiving an oral bisphosphonate and three were also taking oral calcium and vitamin D3 supplements. Neither of the male patients had osteoporosis.

Depression

Two patients had pre-existing depression treated with anti-depressant drugs.

Cardiovascular disease

Three patients at baseline had ischaemic heart disease and all were treated with aspirin and a statin. One further patient sustained a non-fatal myocardial infarction during the study period.

Respiratory disease

Four patients had chronic obstructive pulmonary disease, treated with appropriate inhaled bronchodilators and steroids.

Diabetes

One patient had type II diabetes; no additional cases were identified during the 48 week period as determined by glycated haemoglobin and urine analysis for glycosuria.

Hypertension

Sixteen patients were normotensive at baseline. One patient became hypertensive after hormone replacement therapy. Six previously untreated patients were hypertensive at baseline (defined by systolic blood pressure >140 mm Hg, and/or diastolic blood pressure >90 mm Hg). By week 48, five of these six patients were still hypertensive and only two had been treated with anti-hypertensive drugs despite advice to the patients to attend their GP or practice nurse.

Hyperlipidaemia

Ten patients with dyslipidaemia were identified, defined by a fasting cholesterol of >5.2 mmol/l (range 5.3–9.55). For the cohort as a whole, the mean serum cholesterol was 5.1 mmol/l. Two patients also had hypertriglyceridaemia. At baseline,

Table 2 Change in disease-specific measures and functional outcome during the study period

Variable	Baseline median (range)	Week 48 median (range)	p Value
ESR (mm/1st h)	24 (1–72)	22 (2–75)	0.117
CRP (mg/l)	20 (<6–85)	8 (<6–41)	0.004*
Articular index	6 (0–24)	4 (0–16)	0.92
Haemoglobin (g/l)	127 (102–147)	127 (100–151)	0.779
HAQ	1.75 (0.5–2.875)	1.75 (0–2.75)	0.558

*Significant reduction from baseline to study end.

three of the patients were being treated orally to lower lipid levels; all had sustained a previous cardiovascular event. All 10 were advised by a dietician on a lipid lowering diet.

Three of the original 10 patients with hypercholesterolaemia did not have a repeat sample at six months or 48 weeks. In the seven with paired samples, mean cholesterol fell from 6.8 mmol/l to 5.8 mmol/l, with a mean reduction in each patient of 14%, as expected by diet alone. Treatment with an oral statin was also subsequently started in two patients at the end of the study.

Obesity
BMI (weight in kg divided by the square of the height in metres) is a reliable measure of abnormal body mass. Fifteen patients had a BMI >25 (range 26.2–41.7), with a mean BMI in this group of 30.6, falling to 30.3 at week 48 (not significant). In this group, nine patients managed to lose a mean of 3.4 kg in weight, with a mean reduction in BMI of 1.4. However, five patients gained a mean of 4.5 kg in weight, with a mean BMI increase of 1.8. None of the 15 obese patients returned to a normal BMI.

Underweight
Two patients with a low BMI <20 were advised on a high energy diet, and although one patient gained weight, she did not achieve a normal BMI. One further patient became underweight during the duration of the study. All three had normal thyroid function.

Smoking and exercise
Only eight (36%) of the cohort were lifelong non-smokers. Six (27%) were ex-smokers and the remaining eight (36%) current smokers. Of these last eight, no-one was persuaded to discontinue, although two did manage to reduce the number of cigarettes smoked a day.

All patients in the cohort were independently mobile. All were advised on the benefits of exercise, both from a cardiovascular perspective, and also for musculoskeletal strength. Fifteen (68%) were already taking some form of regular exercise. One further patient began swimming once a week and walking regularly. The remaining six patients were reluctant to start any form of exercise.

Disease activity and functional outcome
Disease-specific measures such as ESR, CRP, articular index, and haemoglobin were recorded. Although not designed or powered to look at the effect of sulfasalazine, the placebo effect and the influence of lifestyle advice cannot be separated. Table 2 shows the changes in variables from baseline to week 48. Only CRP showed a significant reduction from baseline to study end. Functional outcome as measured by a modified HAQ showed no significant change. Overall function improved in 11 patients, deteriorated in eight, and remained unchanged in the remaining patients. However, one patient sustained an ankle fracture, with significant functional impairment.

DISCUSSION
In our cohort there was a high prevalence of comorbidity. Most adverse lifestyle factors had already been recognised and considered by the GP or at prior clinic visits. Additional advice and input led to only modest gains. The reasons for suboptimal treatment of hypertension are not clear, but in part may lie with our practice of shared care. The patients' primary care doctor starts and stops treatment and it may be that these patients did not have sustained hypertension when attending their GP. This has not been fully explained.

Making a difference to entrenched habits, such as smoking, obesity, and dietary habits, is difficult. The main difficulty is in changing behaviour, not in imparting knowledge to the patient. There is an abundance of evidence on the dangers of smoking, yet smoking rates, particularly in young women, continue to rise.

Patient education programmes are now a well established part of the treatment of a number of diseases, including RA, where they have been shown to improve knowledge, reduce pain and disability, and enhance the overall quality of life,[13] while having little measurable effect on primary outcome measures.[14] Compliance with physical exercise, energy conservation, and joint protection can also be improved.[15] Well motivated, informed patients will always do better than patients with poor self esteem, lower socioeconomic status, or learnt helplessness, which are all associated with poor long term outcome and increased mortality.[16]

Dietary factors, including obesity, coronary heart disease, hypertension, cerebrovascular events, malignancies, and osteoporosis, are influential in most important public health problems of Western society. Our patients were all advised on dietary modifications, including lowering fat, increasing fibre, an adequate calcium intake, the use of fish oil supplements, and the role of antioxidants. The benefits of dietary manipulation are likely to be long term and may take several generations for the full potential for disease prevention and modification to be apparent. None the less, our patients did manage to achieve a 14% reduction in serum cholesterol from diet alone.

Weight reduction is another problem, to the detriment of health, but the benefit of the lucrative slimming industry. Previous studies have shown that short term weight reduction in RA is possible, using a combined, supervised approach of reducing dietary energy intake, moderate physical training, and the use of food supplements or replacements.[17] Although some of our patients did lose weight, they remained clinically obese and there was no discernible difference in exercise ability. Exercise may be difficult for a patient with painful, swollen joints, but a balance of rest and exercise is important and achievable in most circumstances in order to reduce pain and improve endurance for physical activities and cardiovascular fitness.

Educating patients about changes in lifestyle habits which will influence outcome on morbidity and mortality is a long term challenge facing all healthcare workers. Although changing entrenched habits may be difficult, benefits are achievable. A modest benefit to a single person transcribes to large benefits for society, which has important implications for resources.

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