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## A systematic review of interventions by healthcare professionals on community-dwelling postmenopausal women with osteoporosis

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### **CRD summary**

The authors concluded that non-drug interventions in postmenopausal women with osteoporosis improved quality of life, medication compliance and calcium intake. Further studies were needed on other outcomes. Heterogeneity between the included studies, the small number of studies for each outcome and the low quality of some studies, the authors' conclusions should be treated with caution.

### **Authors' objectives**

To assess the impact of non-drug interventions by healthcare professionals on community dwelling postmenopausal women with osteoporosis.

### **Searching**

PubMed, Web of Science, EBMR and IPA were searched from 1990 to 2009 for studies published in English. Search terms were reported.

### **Study selection**

Randomised controlled trials (RCTs) of non-drug interventions in community dwelling women with or without osteoporosis were eligible for inclusion. Studies needed to assess at least one of change in bone mineral density, quality of life, medication compliance or persistence and knowledge or lifestyle modification. The intervention needed to be delivered by a doctor, pharmacist, dietician, nurse or physiotherapist. Studies that measured prevention of falls, patient satisfaction, numbers of patients who received a dual energy X-ray absorptiometry (DXA) scan and those initiated on osteoporosis therapy were excluded. Studies published in abstract form only were not eligible for inclusion.

Included studies assessed interventions of exercise, improved detection and treatment of osteoporosis, patient education, assessment of falls and fracture risk, feedback on bone marker turnovers and DXA scan results compared to usual care or some other form of intervention. Interventions were delivered medical and associated professionals. Included studies were of healthy postmenopausal women, postmenopausal women with a fragility fracture or fall and postmenopausal women with osteoporosis or osteopenia. Some studies included men.

The authors did not state how many reviewers performed the study selection.

### **Assessment of study quality**

Study quality was assessed according to the Scottish Intercollegiate Guidelines Network hierarchy of study designs. This categorised studies according to strength of design from 1<sup>++</sup> (high quality meta-analyses, systematic reviews or RCTs with a low risk of bias) to 4 (expert opinion).

Two reviewers independently assessed study quality. Differences were resolved through discussion.

### **Data extraction**

Results for outcomes of interest for each study were extracted. Where data was available, means and standard deviations of outcomes measures for control and intervention groups were extracted and used to calculate effect sizes for individual studies using Cohen's d. Authors were contacted for missing data.

Two reviewers extracted data for each study.

### **Methods of synthesis**

The studies were combined in a narrative synthesis and grouped according to outcome.

### Results of the review

Twenty-four RCTs were included for review (at least 6,345 participants). Nine trials were level 1<sup>+</sup> (RCTs with a low risk of bias) and 15 were level 1<sup>-</sup> (RCTs with a high risk of bias). Methodological weaknesses were randomisation, lack of power calculations and short follow-up.

Quality of life (13 studies, n=2,110): Eight out of 13 non-pharmacological interventions showed significant small to large benefits on quality of life in post menopausal women with osteoporosis, osteopenia or fractures (Cohen's d from 0.24 to 1.79, p<0.05 to p<0.001).

Changes in bone mineral density (five studies, n=561): The review authors reported that one study found spinal bone mineral density was higher in the intervention group (Cohen's d = -0.02, p<0.031) for a physical activity intervention. One study showed significant benefits for nutrition education (p<0.01) on bone mineral density. The other studies had non-significant results or results that favoured control interventions.

Compliance and persistence (four studies, n=2,888): Two out of three studies that measured compliance reported significant benefits of information, monitoring or feedback on bone turnover markers compared to usual care (p=0.010 and p=0.05). One out of three studies showed significantly greater persistence to medication with nurse monitoring usual care (p=0.06).

Knowledge (six studies, n=1,824): Two out of six studies showed significant benefits on knowledge of osteoporosis with an information and follow-up intervention (Cohen's d = 0.30, p=0.015) and education group (p<0.001).

Lifestyle modifications (five studies, n=1,417): Four out of five studies showed significant increases in calcium intake in intervention groups that received education, counselling or osteoporosis status feedback (p values ranged from p<0.01 to p<0.05). One out of four studies showed an improvement in frequency of exercise with counseling interventions compared to control groups. No studies showed significant benefits on smoking or alcohol use.

### Authors' conclusions

Non-drug interventions in postmenopausal women with osteoporosis improved quality of life, medication compliance and calcium intake. Further studies were needed on other outcomes.

### CRD commentary

The review addressed a clear question. Inclusion criteria were broad for interventions, participants and outcomes, which resulted in a high level of clinical heterogeneity between studies. Several relevant databases were searched. The search was restricted by language and it appeared that no attempts were made to identify unpublished data, so language and publication biases could not be ruled out. It appeared that appropriate steps were taken to minimise review error and bias during data extraction and validity assessment; whether similar precautions were taken at the study selection stage was unclear. Study quality was assessed according to strength of study design. Some criteria used for determining risk of bias were reported, but not in detail and this made the appropriateness of the validity assessment unclear. Many of the studies that reported positive findings were categorised as high risk of bias, which may affect the reliability of the results. In light of the heterogeneity between studies, the authors decision to use a narrative synthesis was appropriate. There was a lack of clarity with results reported for bone mineral density. In one instance the authors reported significant between-group differences when the p-value was greater than p=0.05.

Heterogeneity between the included studies, the small number of studies for each outcome and the low quality of some studies, the authors' conclusions should be treated with caution.

### Implications of the review for practice and research

Practice: The authors stated that intensive comprehensive interventions such as face-to-face counselling should be employed rather than telephone or mailed information.

Research: The authors stated that further well-designed RCTs should be conducted on non-drug interventions in

postmenopausal women using validated and standardised outcome measures. Trials needed adequate randomisation, appropriate control groups and to report information on sample sizes.

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