‘Mind your bones’—a targeted educational intervention in a retirement village community

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Introduction

The concept of “*ageing in place*” is important for older Australians.[1] It is important that people “*age well*” by “*maintaining their independence in daily living along with good self-rated health and psychological well-being.*”[2] Osteoporosis or low bone density can affect quality of lifestyle with problems ranging from inability to write or perform personal care tasks due to a broken wrist, to fractures of the hip affecting mobility and increasing the chance of early mortality (AIHW, 2015). “*There is 1 fracture every 3.6 minutes in Australia* (2013)”[3] and this rate is projected to increase to one fracture every 2.9 minutes by 2022.

Currently, 2.2 million Australians have osteoporosis and 2 in 3 women and 1 in 3 men over the age of 60 will suffer an osteoporotic fracture in their lifetime (Garvan Institute). The NSW Health Agency for Clinical Innovation (ACI) Model of Care for Osteoporotic Refracture Prevention (2011)[4] reveals that the potential life years lost due to the disease is greater in people aged 60-75 (the young old) than in more elderly women and men. There is no known cure for this “*silent*” disease, therefore it is important that evidence-based, safe and acceptable prevention strategies targeted at the population level be developed.[5]

In addition to personal cost, there is a considerable financial burden through the provision of ambulance, hospital inpatient, emergency department and outpatient services, as well as rehabilitation, aged care and community services. The total cost of osteoporosis to the community is estimated to be $7 billion per year, i.e. $20 million every day (Access Economics, Garvan Institute). Reducing the burden of fractures caused by osteoporosis would significantly reduce both the direct costs of health care and the indirect costs to families and the economy. Simply addressing calcium intake and vitamin D levels could lower the direct costs of osteoporosis in Australia by up to $432 million per year.[6]

A study carried out in the UK to determine the public’s view of osteoporosis research priorities[7] found that health consumers wanted easy access to health professionals for advice and information, increased understanding about osteoporosis drugs and earlier identification through screening. Most importantly, participants wanted to **understand more about osteoporosis** and **how to prevent it**. Current osteoporosis care following a minimal trauma fracture has been shown to not always be effective in changing older patients’ knowledge and understanding of the disease.[8]

Aims/objectives

This pilot project aimed to develop awareness of the prevalence of osteoporosis and the potential threat to healthy ageing by implementing an initiative in a retirement village setting.

Method

The intervention was a two stage pilot program consisting of a group education session followed by individual bone plan consultations conducted in a retirement village in a large regional city in NSW.

Village management and the residents' committee fully supported the program by distributing advertising materials in letterboxes, arranging sign up for appointments and providing the venue for the education day and follow-up sessions. One hundred and seventy invitations were distributed to all residents living in the retirement community inviting them to a two hour education session in the community centre to discuss osteoporosis. Sixty residents attended the education program delivered by a local orthopaedic surgeon (KF author), a general practitioner (CH author) and an exercise physiologist.

Table 1 Methodology for pilot intervention

	Time frame	Actions	Type of session	Personnel involved
Pre intervention	Week 1	Osteoporosis education session Recruitment for pilot intervention	Group (2 hours)	Orthopaedic surgeon General practitioner Exercise physiologist
Intervention	Week 4	Osteoporosis knowledge pre-test survey Fracture risk calculation Feedback on fracture risks	Individual (20 mins each)	Researcher Trainee doctors General practitioner
	Week 4	Goal setting/strategies Develop Bone Plan	Individual (10-15 mins each)	General practitioner
	Week 14	Progress discussion Education session	Group (1.5 hours)	General practitioner Researcher
Post intervention	Week 30	Osteoporosis knowledge post –test survey Evaluation of Bone Plan Feedback on program	Individual (10-20 minutes each)	General practitioner Researcher

Thirty residents volunteered to take part in the second stage where they completed a 10 item pre-test osteoporosis survey[9] and individual bone plans were developed based upon risk of fracture and personal lifestyle factors. Table 1 outlines the methodology used in the pilot intervention. Each participant had their fracture risk calculated using the online Garvan Institute of Medical Research Bone Fracture (FRAX) calculator.[10]

The potential fracture risk was explained to each participant by the GP researcher and this was used as the starting point for individuals to decide their goal(s) which were recorded on their "Bone Plan." Each participant could choose from three main areas—[1] discuss osteoporosis with their GP, [2] focus on the type and amount of exercise, or [3] consider changes to their diet, particularly regarding calcium intake.

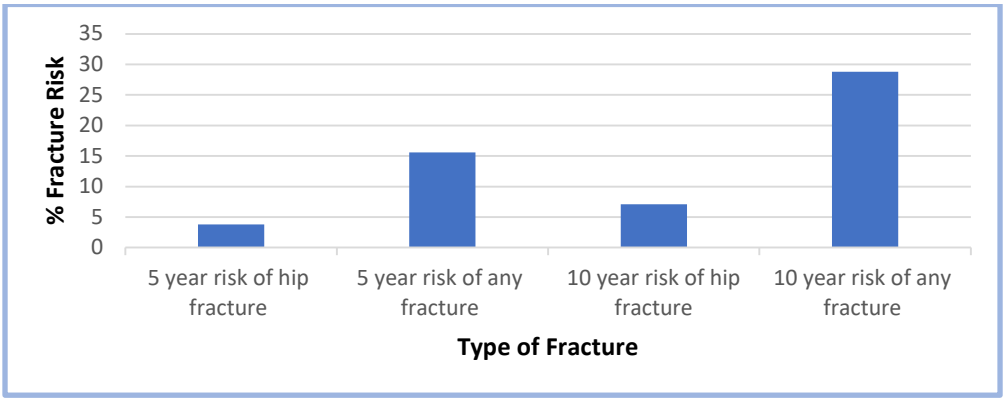
At the midpoint of the intervention, participants were invited to attend a follow-up session in the residents' community centre to check on progress, provide opportunity to discuss any issues and supplement take home information. Participants were contacted at six months to complete a post-test osteoporosis survey, ascertain how they felt they had progressed with meeting the goals of their Bone Plan and to provide general feedback on the intervention.

Data from the osteoporosis knowledge surveys were analysed using SPSS Inc. (Version 22; Chicago, IL,USA) software and mean changes in total scores were detected using paired t-tests with significance set at $p \leq 0.05$.

Results

Twenty three females and seven males aged between 66 and 91 years volunteered to participate in the program and twenty seven completed the six months review. The average fracture risk scores for the group can be seen in Figure 1.

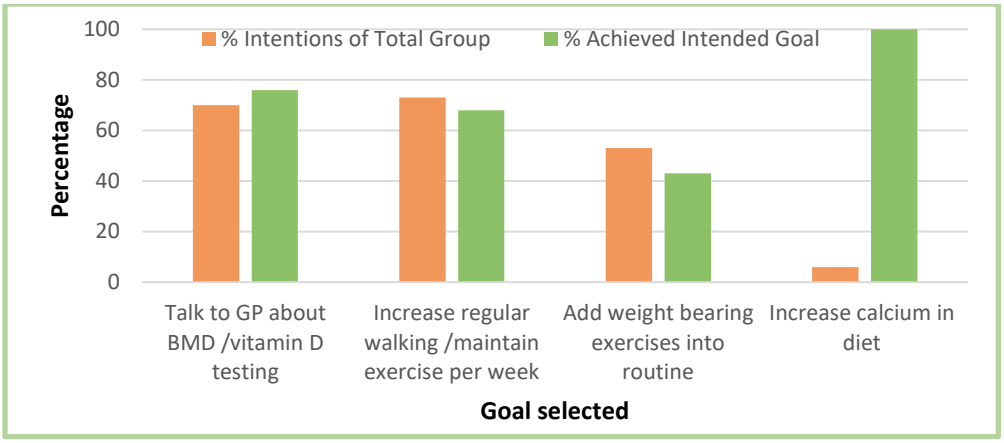
Figure 1 Average fracture risk of the pilot group using Garvan FRAX Calculator



Setting Goals on the Bone Plan

Figure 2 shows the percentage of the total group who intended to make changes in a particular area and the percentage of those who actually achieved their goals. Within the total group, 21/30 (70%) indicated they would speak with their GP about Bone Mineral Density (BMD) testing or having their Vitamin D levels checked and 16/21 (76%) did so. A commitment to either increasing regular walking per week or maintaining an existing exercise program was reported by 22/30 (73%) and 15/22 (68%) reported achieving their goal after the intervention. Slightly more than half of the group (16/30) indicated they wished to incorporate weight bearing exercise into their regular routine but only 7/16 (43%) achieved this. Only two residents indicated they would increase the amount of calcium enriched foods in their diet and both participants succeeded in doing this.

Figure 2 Summary of goals set and goals achieved in the group



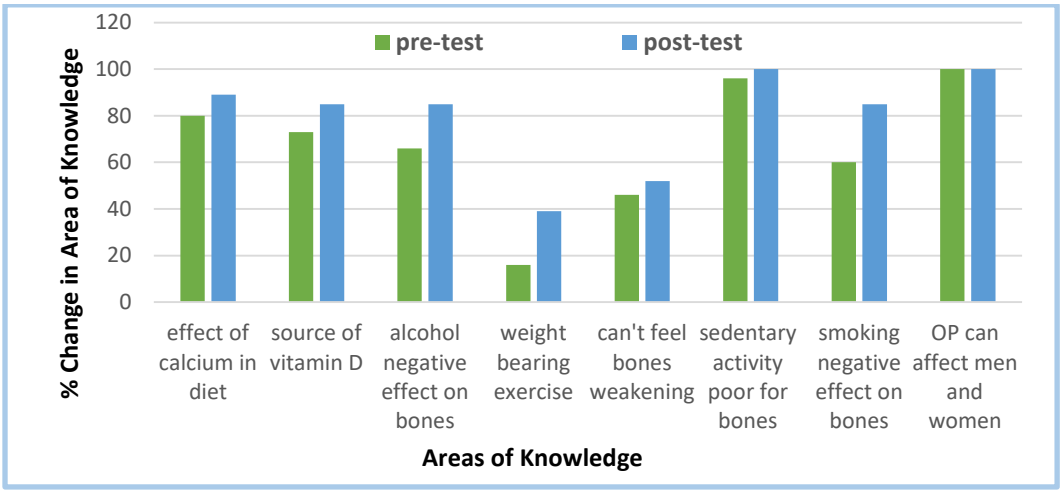
Knowledge about osteoporosis

A paired sample t-test was conducted to determine the mean change in total scores on the osteoporosis knowledge survey from pre-test (Mean = 7.37, SD = 1.24) to six months post-test which showed a significant change (Mean = 7.96, SD = 1.34); t (26) =-2.21, p=0.036. There were no

significant differences between genders and paired t-tests showed no significant differences in the mean scores on individual items pre and post intervention.

The highest pre-test scores were recorded for awareness about calcium enriched foods aiding in bone protection (80%), osteoporosis can affect both men and women (100%) and being sedentary for long periods of time does not help strengthen bones (96%). Post-intervention scores showed the greatest change in knowledge pertained to understanding that exposure to sunlight helps vitamin D in the body and that smoking and alcohol can also affect the bones. Some change was detected in knowledge about the benefits of weight bearing exercise in aiding bone strength (16% pre-test to 39% post-test) and that it is untrue that people with osteoporosis can feel their bones weakening (46 % to 52%) but overall these remained the areas of weakest understanding. See Figure 3 for a summary of the changes in areas of osteoporosis knowledge prior to and post intervention.

Figure 3 Comparison of % changes in areas of osteoporosis knowledge pre and post-test.



Discussion

There are multiple factors that impact upon the prevention and treatment of osteoporosis as a disease including age, lifestyle, weight bearing exercise, diet and family history which necessitates multifactorial interventions. WHO guidelines report that any intervention should provide basic information such as knowledge of the disease and its consequences, how it is diagnosed, possible treatment options along with an action plan and follow-up.[11] The increase in numbers of older people who are living longer also means that the incidence of osteoporosis in the population will increase along with the associated costs to the community. It is therefore important that inexpensive educational programs be developed and trialled such as group programs in communities which have the potential to be easily translated to other similar populations.

Our osteoporosis intervention, piloted in a retirement village community, showed a significant, sustained change in participants' knowledge regarding osteoporosis prevention. Lesser gains were made in participants' understanding of the 'silent' asymptomatic nature of osteoporosis and their success in incorporating weight bearing exercise into daily routines. Other researchers have shown "patients' knowledge of osteoporosis can be increased as well as their health-related quality of life, physical activity and psychosocial functioning."[11] The "Mind Your Bones" program was unique in that it was conducted within a targeted community of retirees living in independent village style accommodation and it offered opportunity for personalised goal setting to meet their individual needs.

The theoretical framework for the study utilised a combination of the Health Belief Model which identifies factors which influence behaviour change and the concept of self-efficacy from Social Cognitive theory.[12] It involved several key components:

- presentation of a group education sessions by specialists in their field,
- a patient centred approach with flexibility in individual goal setting,
- take home action plans and a group follow-up session for goal maintenance, and
- delivery of the program within the familiar environment of the retirement community setting.

We believe a number of factors contributed to the success of this program. The education session involved presentations from an orthopaedic surgeon, a general practitioner and an exercise physiologist, providing a high level of expertise and validity to the information. To facilitate behavioural change patients must believe in the seriousness of the problem, be convinced that change can ameliorate risk and believe they have the self-efficacy to bring about change.[13] The orthopaedic surgeon, recognised in the general population as a bone specialist, informed about susceptibility and seriousness of the disease, methods of diagnosis, options for treatment and prevention, along with examples of patient stories. This was followed by information about vitamin D and calcium requirements, dietary examples and sources of vitamin D, delivered by a general practitioner experienced in dealing with clinical issues and able to address participants concerns.

The exercise physiologist discussed and demonstrated with volunteers from the group specifically tailored weight bearing exercises and indicated how they could be incorporated into everyday routine and activities. Studies have found that osteoporosis knowledge can help influence confidence and increase engagement in exercise but people need to be taught the specific types of weight bearing exercises that will benefit bone health.[14]

Effective osteoporosis management requires a shared patient-centred approach which acknowledges patient personal experiences.[15] The development of an individualised Bone Plan with each participant empowered them to negotiate bone health goals which best suited their lifestyle needs and which they deemed achievable. Goal setting, goal negotiation, and developing action plans are all recognised as key components for success in rehabilitation programmes and optimise achievement of goal related behaviours.[16]

The “Mind Your Bones” study provided participants with relevant take home written materials to support information presented in face-to-face sessions. They were given a copy of their “Bone Plan” and a letter was sent to their GP informing them of the study. Results showed that an increased number of patients who elected to discuss BMD or Vitamin D testing with their GP achieved this goal which led to treatment changes for some including initiation of prescription of bisphosphonates and Vitamin D supplements. Empowering patents to initiate discussion of osteoporosis with their GP can also raise awareness of the disease among GPs and influence attitudes.[9]

Reinforcement of goals was provided by a group meeting at the midpoint of the intervention. Participants were given the opportunity to discuss any issues that may have arisen, amend their goals, and weight bearing exercises were further reinforced by involvement in a short group exercise session. Incorporating an appraisal and feedback stage into the intervention is also an important phase in the Goal setting and Action Plan (G-AP) framework utilised in successful rehabilitation models.[16] Participants commented positively on the usefulness of the midpoint session in keeping them on track with their goals.

A unique characteristic of this study was its setting within a retirement village community enabling easy access to group education and goal setting sessions. Participants did not have to travel outside the community to attend the program and it was delivered in a familiar environment. This had an impact upon participation numbers and ensured greater sustainability. Participants commented on how useful they felt it was to have targeted a retirement village community whilst another stated they would not have bothered to attend if they had needed to travel outside of the centre.

Conclusion

Health messages concerning osteoporosis prevention and management are having minimal impact upon the majority of people who are at risk of the disease and new, multi-modal initiatives need to be trialled to target at risk populations. The number of older people who are living longer is increasing and the 2015 Commonwealth of Australia Intergenerational Report predicts that the number of Australians over 65 years will double in the next 50 years.[17] In addition, the number of older Australians moving into retirement village accommodation is also increasing.[18] Therefore, the provision of preventative health messages via the retirement community network can increase osteoporosis knowledge and develop self-efficacy to empower individuals to make shared informed decisions about their bone health.

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Presenter

Dr Jane Anderson-Wurf is a part-time research fellow at the School of Medicine, University of Notre Dame, Wagga Wagga campus. She is currently working on osteoporosis research and was initially funded under a post-doctoral APHCRI scholarship. She has worked extensively in communication, particularly with overseas-trained health professionals and their supervisors. She has developed communication skills training packages and delivered many workshops on culture and health communication for training organisations throughout Australia. Her other research interests are healthy ageing, culture and communication in health care, refugee health and primary healthcare program evaluation.