

POWER in Osteoporosis: Descriptive Review of a Multidisciplinary, Community-Based Prevention and Management Program

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Osteoporosis is a systemic disease resulting in bone fragility and increased risk of fractures. For optimal prevention, the literature increasingly supports the combined use of education on nutrition, lifestyle, and exercise. Currently, multidisciplinary, multimodal initiatives are rarely implemented in the community. The POWER (Promoting Osteoporosis Wellness through Education, Exercise and Resources) program in Toronto, Ontario, strives to empower individuals with osteoporosis with diverse cultural backgrounds to sustain healthy behaviours for self-management of their condition. This article provides a description of the POWER program philosophy, as well as a preliminary evaluation to assess its benefits and potential for further expansion and adaptation.

Key words: osteoporosis, management program, cultural differences, education, health beliefs

Introduction

A silent public health epidemic, osteoporosis is a disease resulting in bone demineralization, low bone mass, and an increased risk of fractures.¹⁻³ Primarily affecting older adults, it has been estimated that 1.4 million Canadians have osteoporosis and that it affects one in four women and one in eight men over the age of 50.⁴ It is predicted that 54% of 50-year-old women will have osteoporosis-related fractures in their remaining years,

with 40% of these cases amassed before 70 years of age.² Osteoporosis and related fractures often cause devastating effects on the well-being and functional independence of those who have experienced fractures⁵; significant economic consequences are also amassed, with expenditures in Canada of \$1.3 billion for treatment, long-term care, and hospitalization.⁴

Osteoporosis is potentially a preventable disease if monitored and managed

in its early stages. The literature is extensive in reflecting medical advances in the field, yet this knowledge has not necessarily been consistently or effectively translated to practice in community or clinical settings.^{1,6,7} Despite established preventive strategies and treatments for the disease, including hormone replacement therapy, biphosphonate treatment, dietary intake of calcium and Vitamin D, and exercise,^{8,9} the knowledge often has not been translated into awareness or practice, particularly in the targeted population.^{1,10} In numerous studies, women were found to have a low perceived threat of the disease, have a low level of knowledge, or be insufficiently treated by physicians.¹¹ The condition in men is even more poorly addressed: few studies have been conducted to determine osteoporosis knowledge for this susceptible group with similar risks.¹

In recent years, concepts of patient and health psychology complementing conventional therapies have been explored to facilitate more effective management among those with osteoporosis.^{3,6,10,12} These initiatives have emphasized increasing patient knowledge of the disease so that a more comprehensive and effective perception of risk and consequences can be solidified. Ultimately, these educational interventions strive to modify the mindset of individuals with osteoporosis so that their understanding will be translated into sustained practice.^{2,3} Despite increasing recognition of its value in managing osteoporosis, psychological models have largely remained theoretical, without permanent or consistent clinical implementation to fully ascertain the effects of extensive application.^{1,11} In elucidating the link between education, patient psychology, and osteoporosis, further research will likely demonstrate promising results.

We describe and evaluate a joint pilot program that targets osteoporosis prevention and management in Toronto, Ontario, in key programmatic sites of the city. The program is ongoing, with each session lasting 7 weeks. This article explores the participant responses of 28

individuals from an approximate 175 clients that have completed the program as of 2005. Data are derived from both the spring and autumn sessions implemented at the three sites between 2004 and 2005.

Program Description

Founded on current medical beliefs and practices, the POWER (Promoting Osteoporosis Wellness through Education, Exercise and Resources) program addresses various limitations as discussed in published research. A pilot project launched in 1998 by the Baycrest Centre for Geriatric Care, North York General Hospital, the Yee Hong Centre for Geriatric Care, and Toronto Public Health, the joint program is a multidisciplinary initiative targeted toward affected individuals in their later years. This population was chosen as the focus of the program because osteoporosis and related fractures are most frequent and debilitating in this group.¹¹ Since then, independent satellite POWER programs have been implemented at St. Michael's Hospital and the Scarborough Hospital in Toronto through the provision of a comprehensive, start-up manual for interested institutions. The innovative program strives to empower the susceptible population by combining exercise, education, and nutritional information established from evidence-based literature. POWER is unique in that it not only integrates current knowledge on osteoporosis, it contains culturally sensitive programming in an increasingly multicultural society. The aim of POWER is to encourage and sustain self-management of the disease by guiding people in making more informed and healthy lifestyle decisions so that overall quality of life is improved. Ultimately, behavioural changes resulting from the program goals will hopefully reduce the incidence of injuries and falls related to osteoporosis among participants.

Program Implications

Knowledge, as proposed in the medical literature, is a factor most easily modifiable in patients.^{3,13} However, knowledge

Table 1: Participants' Assessment of Program Materials and Medication Information

Statement	Yes (%)	No (%)
The program materials received were useful.	28 (100)	0 (0)
The program materials received were easy to read.	27 (96)	1 (4)
The medication information was useful.	26 (93)	2 (7)

acquisition and belief alteration do not necessarily translate into behavioural change.^{13,14} POWER integrates several key horizontal threads throughout the program to address possible contributing factors impacting sustained change. These include themes of an older adult learner, literacy, cultural differences, pain management, and community resources. By integrating these key components in the form of empowering strategies, uptake and application of program information will more likely occur in the program's participants. In a preliminary analysis of user feedback by Bernick *et al.*, for POWER,¹⁵ 97% of a sampled total of 131 participants reported an increase in knowledge about the disease, and 88% reported changes in lifestyle practices. In our evaluation, 60% of the 28 study participants reported learning more about osteoporosis than what was expected, while 93% reported confidence to share the knowledge with others upon program completion:

"I feel if it weren't for this time with the program, I would not have known as much."

"I have already passed information to my sister."

"There is so much talk about medication that it was helpful to find out [which] ones were OK."

The participants' assessments of the program materials and information about medication are presented in Table 1.

POWER facilitates comprehensive discussions of diverse topics as they relate directly to the multidimensional nature of osteoporosis. Such concrete relevance is believed to further motivate the participant in learning about the condition.^{2,3} In our evaluation, 100% of partic-

ipants expressed having sufficient opportunities to ask questions and actively engage in group discussions. As well, topics such as bone fragility, low bone mass, and inadequate nutrition are presented in interactive formats, including lectures, visual aids, hands-on activities, and written information. Not only does this accommodate different learning styles of older adults, it also promotes control and responsibility in participants over their own education, as recommended in adult learning.² This is critical considering the high proportion of participants over the age of 65; more than 70% represented this population in our study. Particularly, the principle goals of many osteoporosis patients—to maintain mobility and independence¹¹—are specifically targeted by delivering information on pain management and falls prevention, which constitute key purposes in POWER. Furthermore, literature supports that for an intervention to be successful, psychological barriers must first be removed for increased physical activity to occur.^{13,14} The fundamental aims of the program can promote exercise habits and a reduction in fracture risk.

Research has demonstrated that written educational materials can facilitate uptake of knowledge about osteoporosis.^{3,11} This is crucial in altering the mentality that the disease and its effects are natural and irreversible with aging.^{11,14} Specifically, permanent behavioural changes are more likely to result when changes in health beliefs first occur.^{3,13} Examining both the Transtheoretical Model of Change and Health Belief Model, studies have suggested that a personal perception of disease vulnerability, effects, prevention, and manage-

Key Points

Osteoporosis is a significant threat to the well-being and mobility of older adults.

There are evidence-based effective therapeutic interventions that can decrease the risk of the disease.

The information about osteoporosis is not well communicated to the at-risk patient population.

Programs that combine educational and exercise components in the approach to osteoporosis prevention and management have a great deal of potential for success

POWER, a combined intervention program, has been shown to be effective.

More robust long-term studies on the effectiveness of such programs are needed.

ment is a key determinant to action modification.^{2,3,11,16} In application, it entails aligning programming and materials of the osteoporosis management initiative to the theoretical stage the participant is in to prepare, initiate, or maintain change. Once self-perceived cognitive inadequacies are overcome, perceived threat and relevance are heightened to more likely trigger continuous compliance.^{3,11} Although POWER requires further evaluation tools to determine its impact on participant psychology, the structure of the program directly addresses this foremost determining factor. Information is conveyed to the individual with osteoporosis through various means, including true-or-false quizzes, surveys, exercise logs, and bone mineral density assessments, among other powerfully persuasive yet personal testaments. These cognitive measurement methods can significantly raise the perception of risk and self-competency to promote behavioural change in the patient.

Perhaps most unique to POWER is its extensive integration of the theme of cultural diversity in targeting the disease. There is much support in literature on effective osteoporosis treatment and management initiatives; however, it is primarily targeted for the Caucasian population. The participants in these studies are often well-educated with program materials catered to their proficiency of the English language.^{2,3,13} Thus, osteoporosis may be misconceived as a disease primarily targeting the older, white,

female population.¹⁷ Conversely, findings have demonstrated that minor ethnicities have a poorer knowledge of osteoporosis, poorer motivation, greater passivity, and more frequent sedentary lifestyles compared with the general population.^{14,16} Also, Chinese women in particular have a significantly lower bone mass density than do European and North American women, which may be attributed to genetic differences, lifestyle, and traditional diet choices and their availability.¹⁴ POWER has addressed this cultural difference with its launch at Yee Hong Centre for Geriatric Care in Toronto. Although the initial curriculum was devised in English, actual program implementation is conducted in both Cantonese and Mandarin with the support and knowledge of a multidisciplinary team of health care professionals. As well, future initiatives of POWER are not limited to program expansion at just the three pilot sites but across Toronto. This has been achieved so far at St. Michael's Hospital and the Scarborough Hospital, health institutions that also have multicultural patient populations.

Future Directions

Primary prevention and management of osteoporosis remain critical priorities in an increasing population of older adults. Health costs are high in treating the disease, and quality of life may be greatly reduced in affected individuals. Osteoporosis is frequently called a "silent epidemic" because those experiencing the

disease are often undetected and undertreated.

Osteoporosis prevention and management programs should encompass the multidimensional nature of the disease. Health beliefs must first be positively modified to ensure compliance and sustainability of health behavioural changes in both patients and potential susceptible populations.

POWER addresses the components many similar studies have recommended for a long-term program by integrating education for easier adherence to diet, exercise, and lifestyle modifications. Preliminary evaluation of this program reflects the successes of a multidisciplinary professional team of various ethnicities in practising the philosophy behind the initiative to achieve its goals. The element most unique and innovative in implementing POWER for osteoporosis patients is the accommodation of cultures other than the predominant population. Targeting ethnic groups who are of higher risk for the condition may attribute to a significant reduction in health care costs in the long run. Future analyses of educational and psychological factors, as well as the effects of follow-up program sessions, may contribute to an even greater benefit among diverse participants.



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References

1. Juby AG, Davis P. A prospective evaluation of the awareness, knowledge, risk factors and current treatment of osteoporosis in a cohort of elderly subjects. *Osteoporos Int* 2001;12:617–22.
2. Brecher LS, Pomerantz SC, Snyder BA, et al. Osteoporosis prevention project: a model multidisciplinary educational intervention. *J Am Osteopath Assoc* 2002;102:327–35.
3. Sedlak CA, Doheny MO, Jones SL. Osteoporosis education programs: changing knowledge and behaviours. *Public Health Nurs* 2000;17:398–402.
4. Osteoporosis Society of Canada. What is osteoporosis? Toronto: The Society; 2005.
5. Adachi JD, Ioannidis G, Berger C, et al. The influence of osteoporotic fractures on health-related quality of life in community-dwelling men and women across Canada. *Osteoporos Int* 2001;12:903–8.

6. Whitehead D, Keast J, Montgomery V, et al. A preventative health education programme for osteoporosis. *J Adv Nurs* 2004;47:15–24.
7. Voelker R. Osteoporosis goes unnoticed. *JAMA* 2000;284:2309.
8. Bellantoni MF. Osteoporosis prevention and treatment. *Am Fam Phys* 1996;54:986–92.
9. Eastell R. Treatment of postmenopausal osteoporosis. *N Engl J Med* 1998;338:736–46.
10. Williams B, Cullen L, Barlow JH. “I never realized how little I knew!”: a pilot study of osteoporosis knowledge, beliefs, and behaviours. *Health Care Women Int* 2002;23:344–50.
11. Jachna CM, Forbes-Thompson S. Osteoporosis: health beliefs and barriers to treatment in an assisted living facility. *J Gerontol Nurs* 2005;31:24–30.
12. Ribeiro V, Blakeley J, Laryea M. Women’s knowledge and practices regarding the prevention and treatment of osteoporosis. *Health Care Women Int* 2000;21:347–53.
13. Blalock SJ, Currey SS, DeVellis RF, et al. Effects of educational materials concerning osteoporosis on women’s knowledge, beliefs, and behaviour. *Am J Health Promot* 2000;14:161–9.
14. Yu S, Huang Y. Knowledge of, attitudes toward, and activity to prevent osteoporosis among middle-aged and elderly women. *J Nurs Res* 2003;11:65–71.
15. Bernick L, Izukawa T, Stephens A. Evaluation of POWER: a multi-site community-based educational program for older adults with osteoporosis. Paper presented at the POWER working group 2003.
16. Dergance JM, Calmbach WL, Dhanda R, et al. Barriers to and benefits of leisure time physical activity in the elderly: differences across cultures. *J Am Geriatr Soc* 2003;51:863–8.
17. Popa MA. Stages of change for osteoporosis preventive behaviors: a construct validation study. *J Aging Health* 2005;17:336–50.