



Patient acceptance of osteoporosis treatment: Application of the stages of change model



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ABSTRACT

Objectives: To examine whether a commonly used model of behaviour change, stages of change, is helpful in understanding osteoporosis treatment initiation in a cohort of fragility fracture patients.

Study design: This longitudinal cohort study used data from a provincial osteoporosis screening program targeting fragility fracture patients age 50 and over. Logistic regression was used to identify baseline factors associated with patients moving from the first, pre-contemplation stage at baseline to the more advanced stages of action/maintenance at follow-up, when treatment is initiated and maintained.

Main outcome measure: Patient's stage-of-change readiness to accept osteoporosis treatment.

Results: At baseline, 91% of patients were in the pre-contemplation stage. Of these, 74.1% remained at the same stage at follow-up, 2.7% moved to contemplation and preparation while 23.2% moved to action/maintenance. The adjusted analysis showed that those who moved from pre-contemplation to action/maintenance were more likely to have a previous fracture OR 1.5 (1.1–2.0), history of oral steroid use OR 2.1 (1.3–3.5), higher perceived benefits to osteoporosis drug treatment OR 1.2 (1.0–1.3), perception of bones as "thin" OR 2.8 (2.0–4.0) and were less likely to perceive that they were taking too many medications OR 0.6 (0.5–0.9).

Conclusions: With the majority of patients in the pre-contemplation and the action/maintenance stages, our results suggest an existence of a two-stage model. The baseline factors that we identified can be used to predict which patients are less likely to initiate treatment, which in turn, can be used to inform post-fracture interventions and facilitate behaviour change.

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1. Introduction

Inadequate osteoporosis management is common following a fragility fracture even though the fragility fracture is a major risk factor for osteoporosis and repeat fractures [1–3]. Barriers to more effective post-fracture osteoporosis management are associated with both the healthcare environment [4–6] and the patient [7–10]. While addressing and removing barriers associated with the healthcare environment is an important step in improving post-fracture bone health management, without the engagement of the patient, interventions are not likely to be successful as patients are

the ones who need to change their health behaviour by implementing and persisting with the recommended interventions.

Theories of health behaviour change provide an explanation of why and how health behaviours are altered and what factors influence individual behavioral change. These theories are often used to develop interventions to help patients adopt and sustain healthy living habits and to encourage adherence to relevant therapies [11]. Stages of change theories, such as Weinstein Precaution Adoption Process Model (PAPM) [12–14] and the Transtheoretical Model (TTM) [15–17] define sustained behaviour change as a process that unfolds over time involving a progression through five main stages: pre-contemplation ('unaware of issue' or 'aware of the issue but not personally engaged'), contemplation ('engaged and deciding what to do'), preparation ('planning to act but not acted yet'), action ('change recently made') and maintenance ('change maintained'). As compared to the TTM, PAPM also contains a

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Table 1
Stage of change, the corresponding PAMM stage and the statement describing patients' readiness to accept osteoporosis treatment at each stage.

Stage of change [13]	PAMM stage [13]	Statement describing patients' readiness to accept osteoporosis treatment (modified from Ref. [26])
Pre-contemplation (unaware of the issue)	1	I have never heard of osteoporosis and am unaware of any treatment for osteoporosis
Pre-contemplation (aware of the issue but not personally engaged)	2	I am aware that there are treatments available for osteoporosis but I have never thought seriously about using these medications
Decided against (decided not to engage)	3	I have considered using medications to treat osteoporosis but have decided against it
Contemplation (engaged and deciding what to do)	4	I am currently considering the use of medications to treat osteoporosis but I have not made up my mind
Preparation (planning to act but not yet acted)	5	I have decided to use medication to treat osteoporosis but I have not yet started taking anything
Action (change recently made)	6	I have recently started medications for osteoporosis within the last 6 months.
Maintenance (change maintained)	7	I have been taking treatment for osteoporosis for at least 6 months

mid-stage 'decided not to act'. In order to achieve behaviour change, both theories suggest that interventions need to be tailored to the stage of change that the individual occupies. For example, fragility fracture patients who are in the pre-contemplation stage and are unaware of the potential bone health issue will require a different intervention than those who are in the contemplation stage where they are already considering the use of medications to treat osteoporosis.

Stages of change models have mostly been applied to the field of osteoporosis in preventive contexts [18–23] and less often to the post-fracture context [24–26]. In the post-fracture context, Mauck (2002) [26] and Escott (2007) [25] used a cross-sectional approach to explore the distribution of patients in relation to osteoporosis treatment initiation and to determine which factors were associated with different stages of change. Mauck found that a majority of patients were either unaware of osteoporosis or had not considered an osteoporosis treatment and that having a previous bone mineral density (BMD) test and a diagnosis of osteoporosis were associated with a more advanced stage of change (active consideration of treatment or current treatment) while having previous fractures and osteoporosis knowledge were not. Escott found that a majority of fracture patients occupied less advanced stages (pre-contemplation), with an overall bimodal distribution including a smaller proportion of patients found in the action/maintenance stage. Escott also identified factors associated with the most advanced (maintenance) stage of change at the time the patients were surveyed: age >60, female gender, history of previous fractures and a greater awareness of bone quality.

Since previous research that applied stages of change models in the post-fracture context was cross-sectional in nature, they could not answer the question on whether fragility fracture patients move through stages over time or determine what factors were predictive of changing stages. The first objective of our study was therefore to answer the question on whether fragility fracture patients move through stages over time, as described by stages of change models. The second objective was to identify baseline factors that predict movement from a less advanced to a more advanced stage of change. Based on the previous research [7,10,25,26], we considered a number of variables and hypothesized that the following baseline factors would be associated with a more advanced stage of change at follow up: older age, female gender, history of previous fractures, history of maternal fracture, a more complex fracture type, oral steroid use, diagnosis of rheumatoid arthritis, greater osteoporosis knowledge, perception of osteoporosis pharmacotherapy as beneficial, a lack of perceived barriers to osteoporosis treatment, perception of bones as "thin" and the awareness of the link between osteoporosis and the fragility fracture.

2. Methods

2.1. Settings and sample

The sample for this study was derived from a database created as part of a post-fracture osteoporosis screening program implemented in over 30 fracture clinics across the province of Ontario, Canada. This program consisted of osteoporosis screening coordinators identifying, assessing, referring and providing education to fragility fracture patients aged 50 and over. Coordinators collected self-reported patient data at baseline (the time of screening) and, for those patients who were not diagnosed or treated at baseline, at follow up (within six months of baseline). At baseline, coordinators also obtained patient consent for research use of their data. The education provided at baseline consisted of verbal and written recommendations for further assessment of bone health and an appropriate Calcium and Vitamin D intake and the distribution of osteoporosis educational materials. Patients who were not diagnosed or treated for osteoporosis at baseline were contacted by phone within six months of baseline for follow up. During the follow up, screening coordinators collected data on patients' follow up visit with their family physician, new testing, diagnosis and treatment information and asked the same osteoporosis knowledge and beliefs questions that were asked at baseline. All information was documented in a web-based data collection system.

The study sample included consenting patients who were not diagnosed or treated for osteoporosis at baseline.¹ This was done to remove any confounding factors (confounding by indication) and to focus on the shift in stages of change, as including patients who were already diagnosed and treated (and were therefore already at the most advanced stage of change) would prevent us from testing the shift in stages of change. In addition, the focus of our study was on patients who were making a decision about their care and treatment, rather than those deciding to stay on care. For the purpose of answering the research question, the sample was further restricted to those patients who answered the question on stages of change at both baseline and follow up.

2.2. Dependent variable

The main outcome variable was the patient's stage-of-change readiness to accept osteoporosis treatment. The stage was measured by patients' choice of one of the statements describing their stage-of-change at follow up (Table 1).

¹ 66% of all consenting patients were not diagnosed or treated.

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