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Factors influencing adherence with therapeutic sunlight exposure in older people in intermediate care facilities

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ABSTRACT

Purpose of research: The purpose of this study was to investigate the factors influencing low adherence with therapeutic sunlight exposure in a randomized controlled trial conducted with older people living in intermediate care facilities. *Materials and methods*: The study involved participants in the FREEDOM (Falls Risk Epidemiology: Effect of vitamin D on skeletal Outcomes and other Measures) study, a randomized controlled trial of therapeutic sun exposure to reduce falls in older people in intermediate care facilities. Semi-structured interviews were conducted with thirty participants in the FREEDOM trial, and with ten sunlight officers who were employed to facilitate the sun exposure. Two focus groups involving 10 participants in the FREEDOM trial were also held at the end of the intervention period. Common themes were derived from the interview and focus group transcripts. *Principal results*: The study showed that the perceived health benefits did not influence adherence with the sun exposure. Factors such as socializing with others and being outdoors were more important in encouraging attendance. The main barriers to adherence included the perceived inflexibility and regimentation of daily attendance, clash with other activities, unsuitable timing and heat discomfort. *Major conclusions*: This study showed that providing greater flexibility and autonomy to older people in how and when they receive sun exposure is likely to improve adherence.

1. Introduction

Older people living in residential aged care facilities have a high prevalence of falls and fractures that are often associated with vitamin D deficiency (Flicker et al., 2003). The use of vitamin D supplements, usually in combination with calcium to correct this deficiency, has been shown to reduce falls and fractures in this population (Chapuy et al., 2002; Bischoff-Ferrari et al., 2009). In Australia, sunlight is the main source of vitamin D production in the body, and it has been shown that brief periods of sun exposure can raise vitamin D levels in older people living in residential aged care facilities (Corless et al., 1978; Reid et al., 1986; Chel et al., 1998). However, many in this population currently have inadequate sun exposure (Brock et al., 2004). While vitamin D deficiency can be corrected with vitamin D supplements, therapeutic sunlight exposure as a public health intervention is likely to be more cost effective and has the potential added benefits of improving mood and encouraging greater social interaction.

The FREEDOM study was a one-year cluster randomized controlled trial of sun exposure and calcium supplementation in older people in intermediate care facilities (known as aged care hostels) in the northern region of Sydney, Australia (Sambrook et al., 2011). The FREEDOM study was designed to test the hypothesis that brief, regular periods of sun exposure could reduce falls in this population, by increasing serum vitamin D levels. Participants in the sunlight intervention groups were required to expose their face, arms and hands to sunlight for 30–40 min in the mornings for five days a week. The sunlight sessions were held in a suitable outdoor space of the facility, and personnel (sunlight officers) were employed for the duration of the study to encourage and assist participants to attend. During the study, sunlight officers noted low or decreasing rates of attendance at many facilities.

At the end of the intervention, there was no significant reduction in falls risk in the sunlight groups, but adherence to

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the intervention was low. However, in the small group of participants who attended more than half of the sessions, there was a statistically significant reduction in falls incidence. These outcomes of the FREEDOM study highlighted the need to understand the factors contributing to adherence with therapeutic sunlight exposure by participants in this study.

There is a large body of literature concerning low adherence to medical treatments and preventive health interventions. Wright (1993) cites two studies that show only about 50% of patients adhere to long term medication regimens. In a randomized controlled trial of hip protector use to reduce hip fractures in community dwelling older women, adherence at the end of the two year study was also only 51% (Kurrle et al., 2004). A recent randomized controlled trial of sun exposure and vitamin D supplements in non-western immigrants in the Netherlands found little increase in serum vitamin D in the sunlight group, partly due to low adherence with the intervention (Wicherts et al., 2011). The factors contributing to poor adherence are complex and various theoretical models have been postulated. As outlined by DiMatteo (2001), the Social Cognition approach emphasizes the role of the patient's beliefs in adherence. Within this, self-efficacy refers to the individual's belief in his or her ability to successfully implement a preventive health intervention. Further, the Health Belief Model states that people are more likely to take a preventive health action if they perceive that they are at risk of a disease, and that the benefits of action outweigh its disadvantages (Harris and Guten, 1979). The concept of locus of control, originally developed by Rotter (1966) may also have an influence on the person's health and health behaviors. Those with a strong internal locus of control believe that success or lack of success depends on their own actions, while people with a strong external locus of control see their outcomes being dependent on external factors such as chance, or other people, rather than their own actions.

Culos-Reed et al. (2000), classified the biopsychosocial factors in adherence and postulated three main categories – individual (demographic, cognitive/knowledge, attitudinal, affective and skills characteristics); interpersonal (social support/relationships, communication); and environmental (culture, home, work, physical surroundings, access and cost).

Beyond the conceptual frameworks, few studies have explored the reasons for low adherence with therapeutic regimens in older people. The aim of this multi-method, multistage study was to determine the factors influencing limited adherence to the sunlight intervention in the FREEDOM trial. An understanding of these factors may allow more effective strategies to be developed to encourage therapeutic sun exposure in this population.

2. Materials and methods

2.1. Overall study design

This study involved participants in the sunlight intervention and sunlight officers of the FREEDOM study, and was held in three stages. Participant interviews were conducted in the first stage, during the sunlight intervention. Next, interviews were conducted with sunlight officers during or immediately after the intervention phase and finally, focus group discussions were held at the intervention intermediate care facilities after the completion of the study. The interview and focus group transcripts were manually reviewed by the first author and common themes were derived. In this study, intermediate care facilities refer to those that provide accommodation, meals, cleaning and limited nursing services for older people.

This study was approved by the Human Research Ethics Committee of the University of Sydney and the Research Ethics Committee of the Northern Sydney Central Coast Area Health Service.

2.2. Stage I – FREEDOM participant interviews

In the first stage, the first author conducted semi-structured interviews of 30 FREEDOM participants during the intervention phase of the clinical trial. This was a convenience sample, but was representative in terms of the frequency of attendance. Thus, it included those who attended the sessions for most days of the week, those who did not attend at all, and those who went once or twice a week. Participants were recruited until no new themes emerged from the interviews. The individual interviews were conducted during the sunlight sessions, or shortly afterwards. Those participants who were not present at the sunlight session were interviewed in their rooms. The aims of the interviews were to determine what the participants understood about the study, how frequently they were able to attend the sunlight sessions, how they viewed the sunlight sessions and what barriers if any they perceived to attendance. The participants were also asked if attending the sessions had resulted in any perceivable changes, if the sessions had encouraged them to seek additional sun exposure, and whether they thought they had adequate sun exposure. The aims of the interviews were to determine any barriers and facilitators to attendance and any perceived benefits that may encourage participants to continue attendance. The responses to the semi-structured interviews were directly transcribed and later analyzed to identify the main themes.

2.3. Stage II – sunlight officer interviews

The sunlight officers employed in the FREEDOM study had a variety of backgrounds, but were not health or research professionals. They were trained and mentored in delivering the intervention by the research team. Ten sunlight officers from a random sample of intermediate care facilities were interviewed, using a structured questionnaire to determine the levels of attendance of sunlight sessions at their sites, how much sun exposure the participants received, and their opinion on how the sessions could be improved. Most of these interviews were conducted by telephone, but some were face to face interviews. They were conducted during the intervention phase at the relevant facility, or shortly after it had ended. The responses from the interviews were also directly transcribed and later analyzed to derive themes.

2.4. Stage III – focus groups

At the end of the FREEDOM study, after the data from all intervention intermediate care facilities were analyzed, the low attendance rate was confirmed. In this stage, in order to explore the reasons for the low adherence further, two focus groups were held, one at a facility with relatively high rates of attendance and the other at a facility with low attendance rates. The responses from the interviews with the participants and sunlight officers were used to develop the focus group discussion topics. The topics included the participants' views about the sunlight sessions, the perceived facilitators and barriers to attendance, and their views about how the sessions could have been improved. The focus group discussions were conducted by the first author and a second facilitator. The discussions were recorded on a digital recorder and later transcribed and analyzed. The second facilitator also took notes during the discussion, making observations and summarizing the views of the participants. During transcription, these observations and summaries were used to verify the recorded discussions.