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# Musculo-skeletal pain, psychological distress, and hormones during the menopausal transition

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## Abstract

**Objective:** To investigate the relationship between sex hormones (estradiol, testosterone, androstendione, DHEA-S) and prolactin on one hand and musculo-skeletal pain and psychological distress on the other during the menopausal transition.

**Method:** Fifty-seven regularly menstruating women, who were studied over five consecutive years, who reached menopause before the fifth assessment, and did not use hormone replacement therapy were included in the study. Hormones were sampled and a questionnaire including questions on psychological distress and musculo-skeletal pain were administered at the five points of assessment. Data on last year before menopause (T1), first (T2) and second (T3) year after menopause are reported.

**Results:** DHEA-S, but neither testosterone nor androstendione, was inversely related to distress and pain. Pain contributed to the variance of DHEA-S over the menopausal transition, whereas DHEA-S levels did not predict pain or distress when baseline levels were controlled for. Prolactin was at T1 and T2 positively associated with distress and at T2 positively associated with musculo-skeletal pain. Musculo-skeletal pain pre-menopause was significantly related to estradiol

**Conclusion:** DHEA-S was *negatively* associated, and prolactin *positively* associated with musculo-skeletal pain and psychological distress. Whereas post-menopause DHEA-S levels were influenced by pain scores, no significant effect of pre-menopause hormones on post-menopause pain and distress was found.

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**Keywords:** Menopause; DHEA-S; Prolactin; Musculo-skeletal pain; Psychological distress

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## 1. Introduction

Both psychological distress and musculo-skeletal pain represent common complaints during the menopausal transition in addition to more specific climacteric symptoms such as hot flushes and bouts of sweating (Holte, 1992; Greendale et al., 1999). Pain and distress are obviously also common in pre-menopausal and older women as well, but many women experience an increase of symptoms during the climacteric transition, and often attribute their problems to menopause, although cultural differences clearly exist (Obermeyer, 2000).

The concept of depression covers a wide spectrum of symptoms and disorders, from major depression to milder forms of distress and depressed mood (Winokur, 1997). In particular, examples of less severe psychological distress is reported to be frequent among climacteric women (Hunter, 1990). No definite relationships have been documented between the reduction of estrogens during the menopausal transition and depression (Pearlstein et al., 1997; Haynes and Parry, 1998). However, estrogen therapy has been reported to have beneficial effects on perimenopausal depression (Montgomery et al., 1987), and several biological mechanisms for a possible relationship between estrogen and mood have been suggested (Klaiber et al., 1997).

Recently, the relationship between dehydroepiandrosterone (DHEA) and its sulfate (DHEA-S) and psychological distress has been studied. Barrett-Connor et al. (1999) found DHEA-S levels to be significantly and inversely related to depressed mood in a study of post-menopausal women from the Rancho Bernardo cohort who did not use estrogen. No others of the hormones studied (estrone, estradiol, testosterone, androstendione) were found to be significantly associated with depressed mood.

Apart from sex hormones, the role of prolactin in depression has also been investigated (see Nicholas et al., 1998 for review). For instance, Mendlewicz, 1991 measured prolactin in patients with uni-polar and bipolar depression and in healthy control subjects. Uni-polar depressed patients had higher basal concentrations of prolactin than controls and increased daytime prolactin secretion. Interestingly, bipolar patients had decreased prolactin levels. Mai et al. (1985) found that postmenopausal, but not premenopausal, depressed females had higher prolactin levels than healthy controls. Nicholas et al. (1998) suggest that since the regulation of prolactin release involves monoamine transmitter systems that are implicated in the pathophysiology of depression, prolactin provides an interesting window to aspects of the psychobiological basis of depression.

Musculo-skeletal pain is also frequent during the menopausal transition. In the research literature on perimenopausal pain syndromes much less attention has been given to potential relationships between pain and hormonal changes. For instance, Bono et al. (1995) found socio-economic factors and insomnia to be associated with pain complaints in their study of post-menopausal women. There are, however, also some indications that hormonal factors may contribute to back pain. Brynhildsen et al. (1998) studied the relationship between hormone replacement therapy (HRT) and low back pain in postmenopausal women. They actually found that women receiving

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