

ORIGINAL RESEARCH

HORMONE REPLACEMENT THERAPY IN REDUCTION OF KNEE OSTEOARTHRITIS AMONG MENOPAUSAL WOMEN

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ABSTRACT

Objective: The association between knee OA prevalence and MHT was investigated.

Methods: 4,766 postmenopausal women from the NSMCH in Patna provided the data. MHT was defined as taking regular hormone therapy for a year, and differences in demographic and lifestyle factors between MHT and non-MHT groups were examined. Both radiographic data and symptoms were used to characterise knee OA.

Results: In comparison to the non-MHT group, the odds ratio for OA in the multivariate logistic regression models was 0.70 for the MHT group (95 percent confidence interval 0.50-0.99).

Conclusions: Persons with MHT had a lower prevalence of knee OA than participants without MHT.

INTRODUCTION

One of the main causes of pain and disability globally is osteoarthritis (OA), a degenerative musculoskeletal disease characterised by the destruction of bone and cartilage (1). An estimated 654 million people worldwide have OA, with women being more likely to have it (~22%) than males (~12%), and sex differences only becoming noticeable after age 50. (2). According to recent studies, up to 60% of those with OA also have other chronic diseases (3). Menopause, which is characterised by the termination of the monthly cycle and the ensuing dramatically decreased levels of the sex hormones oestrogen and progesterone, is an important stage in a woman's life. The consequences of androgens on women's health after the menopause transition are not thoroughly understood, despite the fact that postmenopausal women's testosterone levels likewise decline, albeit more gradually (4, 5).

Drs. Cecil and Harper initially discussed the link between OA and menopause in 1925 (6); by 1952, the condition was known as "menopausal arthritis" (7). Since then, a number of studies have looked into how the menopausal transition's altered sex hormone profile affects the development and progression of OA. Partly due to a lack of oestrogen, elderly women have a higher prevalence of OA (8). Women adjust to a new biological condition during the menopause, which is a particularly significant time. Women in the postmenopausal stage

typically have high levels of follicle-stimulating hormone and low levels of oestradiol and serotonin. (9-12) Because it lessens symptoms associated with oestrogen insufficiency, hormone replacement treatment (HRT) has demonstrated a number of advantages for aged females. (9, 11-16)

One of the main contributors to chronic pain and disability, osteoarthritis (OA) is characterised by aberrant subchondral bone development and sclerosis, excessive cartilage degradation, and synovial inflammation (17). The considerable impact of OA on speeding the onset of functional limits and impairment is highlighted by a wealth of studies (18). Physical restrictions (19) and deteriorated mental health are consequently caused by the decrease in physical activity in people with OA (20, 21). The hand, knee, and hip are the areas of the body where OA is most common, particularly as people age (22, 23). It is crucial to recognise that these various sites of OA may, depending on their genesis, have varying risk connections with menopause.

METHODS

STUDY DESIGN AND SETTING

It was an observational cross-sectional study. Information was gathered from the NSMCH in Patna. Through proportional systematic sampling, the participants were chosen.

PARTICIPANTS

5,798 postmenopausal women over the age of 50 who had had knee joint radiography in three years. The ultimate sample size for this study was 4,766 people after women who didn't complete the health survey section were excluded.

MAIN VARIABLES

According to the responses to the following query: "Have you ever frequently utilised female hormone medications?" menopausal hormone therapy was recorded. Participants were placed in the MHT group if they had taken MHT for a minimum of 12 months, which was measured in months. (25) On the basis of symptoms and radiological findings, knee OA was identified. Self-reported knee joint pain was defined as discomfort for 30 consecutive days in the previous three months. The knee joint KL grade of 2 was the radiologic criterion. The radiographs were read by two professionals from the hospital's Department of Radiology, and one examiner made the final radiological grade determination. Those who were not designated as having knee OA were designated as non-OA participants from the participants who had had knee radiography and finished the health survey portion.

STATISTICAL ANALYSIS

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 23.0 (SPSS Inc., Chicago, IL), and a P value of <0.05 was regarded as significant. Chi-square tests were used to compare the overall traits of postmenopausal women in the MHT and non-MHT groups and the prevalence of knee OA. Odds ratios (ORs) and 95 percent confidence intervals were used to calculate the correlation between MHT and the prevalence of knee OA (CIs).

RESULTS

With the exception of HTN, smoking status, and household income level, there were significant differences between the MHT and non-MHT groups for all of the general characteristics (Table 1). The non-MHT group had significantly higher age, BMI, and DM prevalence than the MHT group. The MHT group had a higher degree of education than the non-MHT group. In comparison to the non-MHT group, the MHT group had a younger age at menarche and a more advanced age at menopause.

Table 1: Characteristics of the sample according to menopausal hormone therapy

	MHT	Non-MHT
Age(y)	61.62± 6.13	65.39±9.20
Menopauseage(y)	50.17±3.89	49.54±4.60
DM		
Normal	285	2,442
Impaired fasting glucose	97	1,104
DM	59	779
Obesity		
Normal	300	2,601
Obesity	136	1,612
Underweight	5	112
Normal	131	1,014
Prehypertension	108	1,008
HTN	202	2,303
NONDRINKERS		
Heavydrinkers	6.0	43
Alcoholintake	118	1,585
Moderatedrinkers	317	2,697
Smokingstate		
Never	410	4,003
Past	18	161
Current	13	161

The OR for OA in the MHT group was 0.59 in comparison to the non-MHT group (95 percent CI 0.45-0.78). The ORs for OA in the MHT group were considerably lower than in the non-MHT group in all models.

DISCUSSION

Menopausal hormone treatment has been proposed as a cost-effective way to preserve the health status of menopausal women since it is successful in treating the varied symptoms of menopause. (26) MHT given in the short term is useful in reducing menopausal symptoms, but the long-term consequences can only be taken into account after taking MHT for more than a year. (25) Participants in this study who had received MHT for a year or more were assigned to the MHT group. Additionally, a prior study (28) revealed that current MHT decreased the incidence of OA, but long-term MHT use may possibly have an impact on OA. We therefore demonstrated that the prevalence of knee OA decreased with current or past

MHT by included both current and past MHT users in the current investigation. In a large cohort research, oestrogen reduced the prevalence of hip joint replacements but not knee joint replacements, while oestrogen plus progestogen had no effect on the prevalence of either hip or knee joint replacements. (27) However, our study found that MHT was linked to a lower prevalence of knee joint OA, indicating that taking more female hormones after menopause may be beneficial for preventing knee OA.

Oestrogens are hypothesised to be connected to degenerative changes because they act on oestrogen receptors found in the synovial membrane, ligaments, and articular cartilage. Additionally, Gruber et al proposed that the annulus cells of human intervertebral discs express and localise oestrogen receptor-beta. They demonstrated the in vivo and in vitro expression of the oestrogen beta gene in human intervertebral disc cells. When 17-beta-oestradiol was present during the cell culture process of the annulus, cell proliferation was markedly boosted. (29) Oestrogen-replete women appear to maintain higher intervertebral discs than untreated postmenopausal women, according to research by Baron et al. on the effects of menopause and HRT on the intervertebral discs. (30) Additionally, plain radiographs of patients using long-term HRT show a decreased risk of knee and hip OA compared to women not taking HRT.

MHT may have an impact on both OA symptoms and radiographic alterations since in this study, participants with OA were defined as those who met the criteria for both symptoms and knee joint imaging findings. Controlling pain is the primary medical treatment for OA. Daily living is impacted by pain, which diminishes quality of life. More than half of postmenopausal women experience musculoskeletal pain, and MHT is proven to help manage this type of pain. Through the spinal cord's inhibitory pain pathway, oestrogen activates antinociception. Estradiol supplements may lessen pain because menopause's decreased estradiol levels make pain more severe. It has been demonstrated that a lack of oestrogen accelerates cartilage degeneration, which accounts for the rise in OA cases after menopause. Supplementing with oestrogen may prevent cartilage degeneration and, as a result, lessen the deterioration seen on radiographic analysis.

The regression models in the current study were modified to account for potential confounding factors that may affect OA in menopausal women. Since MHT duration is closely related to the long-term effects of MHT, we made an adjustment for it in model I. After adjusting for MHT duration, the risk of knee OA was significantly reduced in those who received MHT for longer than a year. Age, BMI, the age of menarche and menopause, which affect women's hormonal status, and other factors were included in model II, and the risk of knee OA was considerably reduced in the MHT group compared to the non-MHT group. Models III and IV made adjustments for lifestyle, socioeconomic position, and chronic conditions, all of which have an impact on health. These further demonstrated that there was a decreased prevalence of knee OA in the MHT group compared to the nonMHT group.

CONCLUSIONS

When compared to those who did not receive MHT, those who did had a considerably lower prevalence of symptomatic knee OA. To establish a causal correlation between knee OA and MHT, additional prospective investigations and intervention trials should be conducted as this cross-sectional study excludes inferences about causative relationships.

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