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EFFECT OF CUTTING DAIRY PRODUCTS ON PHYSICAL FUNCTION AMONG PATIENTS WITH CHRONIC KNEE OSTEOARTHRITIS WHO REFERRED TO THE TEHRAN RHEUMATOLOGY CLINIC OF IMAM KHOMEINI HOSPITAL

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ABSTRACT

Objective: Osteoarthritis (OA) is the most prevalent form of arthritis. Analgesic drugs and joint replacement are the main treatments in modern medicine but these treatments have a lot of complications.We are looking for safe modifications to prevent disease progression and morbidity rate.

Material and method: In this quasi-experimental study, 90 patients with knee osteoarthritis referred to the Tehran Rheumatology clinic of the Imam Khomeini hospital were enrolled. The other including criteria were: 1-age between 30-52 year. 2- Daily consumption of One to five units of dairy products. 3- Body mass index between20-30. 4-disease onset 5years and less. 5-No any other major disease. The cases were assigned randomly into 2 groups: continue taking dairy products and cutting dairy consumption. Cases were assigned equal by gender in both groups. The limitation of physical activity was determined by physical function subscale of *WOMAC* osteoarthritis index (The *Western Ontario and McMaster*

Universities Arthritis Index). This questionnaire was completed at the baseline and the end of the study (week 6).

The effects of this intervention on limitation of physical activity, according to the *WOMAC* score (physical function subscale) were determined.

Results: In the cutting dairy products consumption group, a significant decrease in the score of the physical function subscale of *WOMAC* osteoarthritis index was seen at the end of the study (week6) in comparison of baseline (*P* 0.018), but in the other group, changing of this score was not statistically significant(*P* 0.065).

Conclusion: cutting dairy consumption, led to significant improvement in physical function of patients with knee OA.

Keywords: Osteoarthritis, Dairy products, Physical function, *WOMAC* osteoarthritis index

INTRODUCTION

Osteoarthritis(OA) is a physiologic process of degeneration in joint cartilage that most commonly presents after the ages of 45 years, although any age group can be affected [1].

The core symptoms of OA are joint pain, stiffness and limitation of movement. Disease progresses slowly but can lead to joint destruction with pain and disability finally.

Aproximately 13% of women and 10% of men older than 60 years, are affected with symptomatic knee OA.

Aging, female gender, overweight and obesity, trauma, frequent use of joints, bone density, muscle weakness, and joint laxity are the main risk factors of disease development [2,3].

Osteoarthritis is a multifactorial disease and there is still much unknon about it`s mechanisms of incidence and progression. Anyway, there are some modifiable risk factors, including obesity and joint trauma; efforts to modify these risk factors can decrease the risk of deasess onset [4].

In a study about prevalence of osteoarthritis in rural areas of Iran, About 20% of the study population had OA in at least one of their joints. Prevalence of OA in the knee joint was 19.34%, in hand joins was 2.66% and in the neck was 2.21% [5].

Citing statistics from the Rheumatology Research Center of Tehran University of Medical Sciences, 16 percent of Iranians over 15 years, are affected different types of arthritis involving the knees, fingers, hips and neck arthritis. If we consider the population over 15 years in the country, about 56 million people, At least about 9

million people suffer from osteoarthritis [6].

The average annual cost of osteoarthritis in the US is $ 4,400. In 2009, about 185 billion dollars were spent on arthritis. If the cost of osteoarthritis in Iran is calculated at least 20 percent of expenditure in US, Any Iranians with osteoarthritis, spends average about $ 600 per year (one million and eight hundred thousand Rials), to treat arthritis. The cost includes a minimum of four visits per year, Intermediate drug consumption (daily average of thirty thousands Rials) and physiotherapy. The above numbers are calculated excluding costs such as surgery, joint replacement, the number of days of hospitalization and home, the costs of complementary and alternative therapies (such as acupuncture and massage therapy, etc.) in the country [6]. Arthritis is the sixth most common health problem treated with Complementary alternative medicine in the United States [7].

Physiotherapy and patient education and weight control are some strategies for pain relief [8]. Drug managements contain non-opioid analgesics such as paracetamol, non-steroidal anti-inflammatory drugs (NSAIDs), opioids and intra articular corticostroid injection. Some patients maybe resistant to these treatments and on the other hand some drug treatments such as NSAIDs have many complicationssuch as Gastrointestinal side effects. [9, 10].

There are 12000 hospitalizations and about 2000 deaths associated to NSAID use in the UK annually [9, 11–12]. Hence there appears to be a need for treatment strategies with good efficacy and low toxicity in the treatment of OA. Specifically, there is a need for safe and effective treatments for patients who do not respond well to conventional medical therapy. Such patients are turning increasingly to complementary/alternative medicines (CAM) and traditional medicine.

From the perspective of traditional medicine, one of the most important causes of pain in osteoarthritis (OA), is slimy mucus production and pouring in joints and dairy products are one of important and common producers of the slimy mucus in the body [13].

With regards to the high rate of arthritis, especially knee osteoarthritis and its associated with high morbidity and mortality, prevention of this disease, especially in terms of improving mobility and proper physical activity, proper nutrition, joint protection and regulation of body weight would be critical and certainly the role of nutrition in the prevention and even stop the progression of the disease cannot be ignored.

Since dairy is one of the most common foods in the diet of people in our society and osteoarthritis one of the most common diseases of our present society, particularly in the elderly, We decided to investigate the effects of dairy consumption on chronic pain in patients with osteoarthritis of the knee in patients referred to the Rheumatology clinic of the Imam Khomeini hospital of Tehran University of Medical Sciences.

MATERIAL ND METHODS

In this quasi-experimental study, 120 patients with knee osteoarthritis referred to the Tehran Rheumatology clinic of the Imam Khomeini hospital during March 2014-March 2015 were assessed and ninety patients were enrolled finally according to the inclusion criteria.

The protocol of the study was approved by the Regional Ethics Committee of Tehran University of Medical Sciences (Research Project Number: 1394.1858.

Informed consent form was obtained from all participants.

Definite diagnosis of knee osteoarthritis was established by Rheumatology specialist (according to diagnostic criteria) before of study enrollment. Including criteria were:

1-age between 30-52 years. 2- non menopausal women aged. 3- Daily consumption of one to five units of dairy products (the equivalent of each unit in clinical nutrition science is one glass of milk or two bowls of yogurt, Each of which is equivalent to about 200 grams or is equivalent to the size of a matchbox cheese and curd. 4- Body mass index between20-30 (In the range of normal weight and overweight but not obese weight range, because overweight is a risk factor for developing knee osteoarthritis). 5-disease onset five years and less. 6-No any other major disease Including diabetes mellitus, cardiovascular disease, high blood pressure and types of cancer. 7- Normal blood calcium levels (serum levels of calcium in all participants were tested before entering the study and hypocalcemia cases due to any reason whom were treated with calcium were excluded from study.

8- Mild to moderate pain (score 0-5 on Visual Aalog Scare) at the baseline.

The participants were equal in both genders. The patients were assigned into 2 groups: continue taking dairy products and cutting dairy product consumption. Participants were assigned equal by gender into both case and control groups. The selection of individuals for intervention or non-intervention group was performed by using of random blocks of four (AABB).

In the intervention group participants will be asked to stop any dairy products consumption for 6 weeks, but no other changes in their lifestyle should make

during this period. In the control group, no intervention was done in dairy product consumption. Both groups were only allowed to use acetaminophen to pain relief and other medications should be discontinued in both groups during the study period. Physiotherapy or other methods of reducing pain in both intervention and control groups were cut. The onset of the disease was determined by the time of the first signs of pain or limitation of motion in the knee, that the patients were questioned. Disease onset five years or less was one of the inclusion criteria. Participants with one to five units of dairy products consumption were enrolled to study.

The limitation of physical activity was determined by physical function subscale of *WOMAC* osteoarthritis index (*The Western Ontario and McMaster Universities Arthritis Index)* that its reliability and validity has been proved[14] .This questionnaire was completed at the baseline. All participants had score0-48 at baseline (Total score of physical subscale of *WOMAC* osteoarthritis index is 96).

This questionnaire was completed at the baseline and the end of the study (week 6).

The effects of this intervention on limitation of physical activity, according to the *WOMAC* score (physical function subscale) were determined.

Data analysis was performed by using of t-test and paired t-test and unidirectional analysis of variance (ANOVA) and Pearson correlation coefficient. SPSS software was used for data analysis.

RESULTS:

At baseline, the physical function subscale score of *WOMAC* in both intervention and control groups did not differed statistically significant (*P* 0.087) (Table1).

In the control group (participants who were continuing dairy consumption), the physical function subscale score of *WOMAC*,at the end of the study (week 6) did not change significantly (*P* 0.065) in comparison of baseline but in the intervention group (participants who cut off dairy consumption) significant decrease was seen in the physical function subscale score of *WOMAC*, at the end of the study (week 6) compared to the baseline (*P* 0.018)that means improvement in physical function of patients in intervention group (Table 2).

Table 1: Mean score of physical function subscale of WOMAC index at Baseline

Time	Mean WOMAC Score(%) ± SD	F	P Value
Baseline	**0.42± 0.18**	**1. 23**	**0.087**

Table 2: Mean score of physical function subscale of WOMAC index at the end of study (week 6)

Time	Samples	Mean WOMAC Score(%) ± SD	F	P Value
Week6	Intervention group	0.26± 0.15	1.05	0.018
	Control group	0.43± 0.13	1.24	0.065

DISCUSSION

According to our finding, cutting of dairy products consumption, led to improvement in physical function in patients with knee osteoarthritis that was statistically significant compared to baseline, while continuing of dairy consumption, did not change the patient`s physical function statistically significant in the control group.

There are many controversial ideas on this issue in modern medicine that make this issue very challengeable.

Results of a RCT about the effects of milk protein concentrate (MPC) on the symptoms of osteoarthritis in adults that patients were followed by *WOMAC* questionnaire during 6weeks, indicated that the MPC, when given at a dose of 2000 mg twice daily, was effective in improvement of the symptoms of osteoarthritis [15]. These finding is in contradiction with our results.

Another study was a 6 weeks, double-blind, placebo-controlled study researched the effects of a nutritional supplement beverage containing milk-based micronutrients and fortified with vitamins and minerals on pain symptoms and activity in adults with osteoarthritis (patients were followed with *WOMAC* questionnaire), 31 subjects with osteoarthritis of both knees were divided into 2 groups randomly, giving them 12 Oz days of the micronutrient-containing beverage, or a placebo for 6 weeks. Results indicated that daily consumption of the nutritional beverage containing milk-based micronutrients, vitamins, and minerals was beneficial in alleviating symptoms and dysfunction in subjects with osteoarthritis[16]. On the other hand, other nutritiens in the beverage such as vitamin C and E with antioxidant activity, might have contributed to the improved joint health [17]. The findings are challengable because of possible relationship between milk and symptomatic osteoarthritis and Further studies are needed to clarifying this challenging.

There are some data about possible role of anti-oxidant vitamins (A, C, E) in the progression of osteoarthritis and vitamin D deficiency may be associated with increased risk of incidence and progression of established knee OA [17,18]. However, these associations are less accepted than generally accepted factors such as obesity, genetic factors, bone density or cigarette smoking [19]. .

Another study by Kaçar *et al*. performed about epidemiology of osteoarthritis in the

urban population of Antalya. Ninety seven patients with symptomatic osteoarthritis and 559 without osteoarthritis were identified. Symptomatic knee osteoarthritis was significantly lower in daily milk consumers than others. This could be in line with the observation of Colker *et al*. discussed above. However, before we can draw such a conclusion from this study, we first have to consider other risk factors for osteoarthritis. As expected, there were more women with osteoarthritis than men, but no data on the use of milk specifically for women and may influence the behavior of people in Antalya: More educated people have more physical activity, have less body mass index, and have more hygienic nutritional style, including the milk consumption. Based on this hypothesis, there could be an association between higher milk consumption and less osteoarthritis, but lifestyle and/or obesity can mediate this linkage. Do men drank more milk than women?.This in not clear in the study. More importantly, in this study the authors did not measure weight, nor did they calculate the body mass index. No data on cigarette smoking, bone density and other factors are supplied either. Therefore, it is very difficult to judge the value of the report. For instance, we should consider the hypothesis that socioeconomic factors may influence the behavior of people in this study [20].

Therefore, there is a doubtful connection between dairy consumption and osteoarthritis. This is affected by several factors such as gender, genetic factors, trauma and etc. Low fat diet and non-animal foods with less stimulation of immune system can provide health of joint [21].

Short time of study is a limitation of our study. The cause of short torm intervention is potential harm arising from the discontinuation of dairy in reducing serum calcium.

Hence further research in this issue, with longer time and greater sample size is recommended.

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