Original Article

Effect on Mobility and Pain with Collagen Peptides in Knee Osteoarthritis in Pakistani Population

Mehwish Mansoor[1], Muhammad Ali Zubair[1], Shabih Zehra[3], Muhammad Sajid Abbas Jaffri[2], Hina Amjad[1] and Syed Ijaz Hussain Zaidi[1]

ABSTRACT

Objective: To evaluate the effects on mobility and pain with the use of collagen active peptides in knee osteoarthritis patients in Pakistani Population.

Study Design: It is an open label randomized clinical trial study.

Place and Duration of Study: This study was conducted at the Tertiary Care Hospital, Karachi from Sep, 2020 to March, 2021 for a period of six months.

Materials and Methods: One hundred and ten patients were scheduled in the study suffering from knee osteoarthritis. They were divided into three groups; Group I Diacerein (n=37), Group II Collagen active peptides (n=37) and Group III NSAID's (Diclofenac Potassium) (n=36).

Results: One hundred and two patients successfully completed the study with collagen active peptides improving the intensity of pain (VAS) visual analogue score at 6th and 12th weeks ($p > 0.001$) with highly significant results.

Conclusion: Collagen active peptides not only reduces pain and associated joint stiffness with OA but also enhances the functional mobility hence the quality of life improved with the use of collagen active peptides.

Key Words: Collagen active peptides, mobility, visual analogue score

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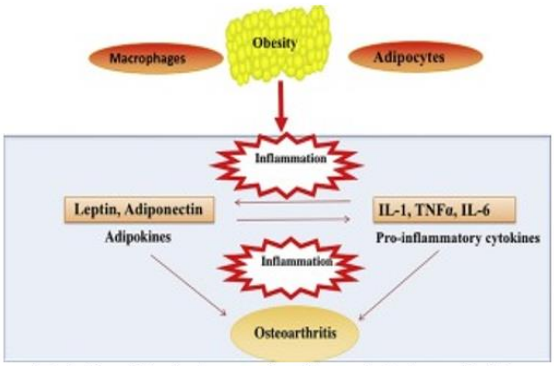
INTRODUCTION

Osteoarthritis is described as the slow progressing and degenerative inflammatory disorder of the synovial joints where there is gradual loss of the articular cartilage. It is most commonly found in patients who are above the age of 40 years. Among the various factors involved in disability osteoarthritis stands at the 11th highest number[1]. It can also be considered as a syndrome because it involves various targeted tissues in different areas therefore it becomes quite a challenge to manage patients of OA with a single drug therapy. The incidence of osteoarthritis is approximately 1 in 10 people. It is more common in young males who are less than 45 years of age and more common in older females who are above the age of 45 years. The prevalence of osteoarthritis has been generally observed tobe common in ages between thirty and sixty –five which is approximately 33.6%. In addition to the advancement in age, obesity is another major risk factor associated with osteoarthritis.[2]

Obesity is one of the most contributing and important factor for this disease. In addition to leading a high prevalence of OA in non-weight bearing areas, obesity also increases the mechanical stress on the cartilage of tibia and femur bone.



Relationship between obesity and Osteoarthritis

The relationship between inflammation and increase in weight is evident. Adipose tissues are a source of adipokines which are the metabolically-active mediators including leptin and adiponectin, chemokines and cytokines including interleukin 1- beta and IL-6. Adipokines are known to regulate the immune responses in the cartilage while the regulatory mechanism of cytokines promote lipolysis, modulate

1. Department of Pharmacology / Medicine[2], Bahria University Medical & Dental College, Karachi.
3. Department of Radiology, Al Tibri Medical College & Hospital, Karachi.

Correspondence: Dr. Mehwish Mansoor, Senior Lecturer Pharmacology, Bahria University Medical & Dental College, Karachi
Contact No: 03342988957
Email: mehwish_mansoor@hotmail.com

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proliferation and apoptosis of fat cells and inhibit the synthesis of lipids. There-fore an increase in the inflammation in OA is related to the environment of low grade systemic inflammation created by the obesity/adiposity.[3]

Despite there being no cure for the disease the main focus during the management is the reduction of pain and improvement in the physical and functional mobility of the joints.

MATERIALS AND METHODS

This prospective study is a part of an ongoing randomized open prospective clinical trial for MPhil research work. After approval (FRC/BUMDC/ Phar/120) from Faculty Research Committee & Ethical Review Committee (ERC 64/2021) dated: 14.01.2021, of Bahria Univerisity of Medical & Dental College (BUMDC), the study was conducted at National Medical Centre, Karachi from September 2020 to March 2021. It included 110 patients suffering from Knee Osteoarthritis. After a well- written informed consent data collection was started. Basic biophysical parameters were recorded of all the patients. Lab investigations were done before and at the end of the treatment. The parameters were recorded before, at 6th week and at 12th weeks. The patients were divided into 3 groups each consuming capsule Diacerein, Collagen (sachet powder) and NSAID's.

Inclusion Criteria:

Patients who met the following criteria were included in the study:

1. Males and females $\geq$ 40 years of age.
2. Diagnosed cases of knee osteoarthritis on radiological images of the knee.
3. OA patients willing to participate in the study.
4. Patients with co-morbidities.
5. BMI < 30
6. Clinical and X-ray findings according to the criteria of ACR for OA.

Exclusion Criteria:

Patients who had the following features were excluded in the study:

1. Known history of hypersensitivity to patients to the study drugs.
2. Pregnant women.
3. Lactating mothers.
4. Concurrent inflammatory disease such as Rheumatoid arthritis.
5. Overweight BMI (body mass index) > 30.
6. Women on hormonal replacement therapy.
7. Terminal illness.
8. Patients having connective tissue disorders

The drugs included in the study are:

1. Capsule, Diacerein- 50mg (Group I) orally twice daily
2. Bioactive Peptides- Collagen active peptide 10g powder sachet (Group II) orally twice daily
3. NSAID's - (Diclofenac potassium) 50mg (Group III) orally twice daily

A subject evaluation performa was made and filled for each patient that included patient's personal bio-data including patient's identity, age, weight, height, gender, co-morbids, side of knee involvement, duration of pain etc.

RESULTS

Biophysical parameters are shown in Table I. The effects of mobility are shown in Table 2. The effects of pain (VAS at rest and movement) are shown in Table 3.

Table No.1: Bio physical Parameters in the study patients (n = 110)

Variable	Group I Mean ± SD	Group II Mean ± SD	Group III Mean ± SD	p-value
Age (years)	50.94±13.14	51.0±11.93	54.69±7.01	0.259^{ns}
Weight (kg)	84.83±18.84	78.55±15.36	74.94±11.99	0.029*
Height (m)	152.36±5.91	153.11±7.59	158.72±7.53	<0.001**
BMI	37.11±7.41	34.97±9.50	29.28±3.60	<0.001**

Variable		Group I n(%)	Group II n(%)	Group III n(%)	p-value
Gender	Male	9(25.0%)	4(11.1%)	13(36.1%)	0.045*
	Female	27(75.0%)	32(88.9%)	23(63.9%)	0.045*
Type of Knee	Right	11(30.6%)	22(61.1%)	4(11.1%)	<0.001**
	Left	7(19.4%)	5(13.9%)	0(0.0%)	<0.001**
	Both	18(50.0%)	9(25.0%)	32(88.9%)	<0.001**

Table No.2: Effects of mobility in the study patients

Variable		Group I n(%)	Group II n(%)	Group III - n(%)	p-value
Mobility Walking	Yes	31(86.1%)	34(94.4%)	31(86.1%)	0.430 ^{ns}
	No	5(13.9%)	2(5.6%)	5(13.9%)	
Mobility Bending	Yes	32(88.9%)	29(80.6%)	24(66.7%)	0.067 ^{ns}
	No	4(11.1%)	7(19.4%)	12(33.3%)	
Mobility Kneeling	Yes	15(41.7%)	6(16.7%)	19(52.8%)	0.005*
	No	21(58.3%)	30(83.3%)	17(47.2%)	
Mobility	Yes	11(30.6%)	3(8.3%)	7(19.4%)	0.059*

Housecleaning	No	25(69.4%)	33(91.7%)	29(80.6%)	
Mobility Getting In or out of bed	Yes	24(66.7%)	31(86.1%)	32(88.9%)	0.034*
	No	12(33.3%)	5(13.9%)	4(11.1%)	
Mobility Standing up from a Chair	Yes	28(77.8%)	26(72.2%)	32(88.9%)	0.202 ns
	No	8(22.2%)	10(27.8%)	4(11.1%)	
Mobility Lifting	Yes	10(27.8%)	3(8.3%)	34(94.4%)	<0.001**
	No	26(72.2%)	33(91.7%)	2(5.6%)	
Mobility Crepitus	Yes	22(61.1%)	25(69.4%)	11(30.6%)	0.002*
	No	14(38.9%)	11(30.6%)	25(69.4%)	

Table No.3: Effects of pain in the study patients

Day 0

Comparison of Visual Analogue Scale (VAS) in Groups I, II and III Pain at Rest

Variable		Group I n(%)	Group II n(%)	Group III n(%)	p-value
Pain on Visual Analogue Scale	Moderate	16(44.4 %)	14(38.9%)	18(50.0%)	0.638 ns
	Severe	20(55.6 %)	22(61.1%)	1(50.0%)	

Week 6th

Comparison of Visual Analogue Scale (VAS) in Groups I, II and III Pain at Movement

Variable		Group I n(%)	Group II n(%)	Group III n(%)	p-value
Pain at 6th Week	Slight Relief	29(80.6%)	10(27.8%)	27(75.0%)	<0.001**
	Complete Relief	7(19.4%)	23(63.9%)	1(2.8%)	
	No Relief	0(0.0%)	3(8.3%)	8(22.2%)	

Week 12th

Comparison of Visual Analogue Scale (VAS) in Groups I, II and III Pain at Movement

Variable		Group I n(%)	Group II n(%)	Group III n(%)	p-value
Pain at 12th Week	Slight Relief	19(52.8%)	11(30.6%)	19(52.8%)	<0.001**
	Complete Relief	14(38.9%)	20(55.6%)	5(13.9%)	
	No Relief	3(8.3%)	5(13.9%)	12(33.3%)	

DISCUSSION

This study was conducted on 110 patients of knee osteoarthritis who were equal to or above the age of 40 years having primary (idiopathic) osteoarthritis. Idiopathic (primary) osteoarthritis is the most common type of arthritis especially in elderly people. This has been shown in a study conducted in Austria where people having age more or equal to 40 years suffered from knee OA[4,5]. In our study 74.5% of the participants were females as compared to 23.6% males. A Japanese study showed similar results where prevalence of knee OA was more in females (62.4%) than males (42%)[6-10]. Another study conducted in Korea also showed knee OA prevalence to be 28.5% in the female population above 40 years of age. The prevalence being more frequent in females is still unknown.[11] A European study by Turkiewicz et al also reported a prevalence of 25.1% frequent knee pain in females[12].

A double blinded randomized trial was carried out on 218 patients. The participants were assigned to CP-group and Placebo-group randomly. They were assessed using the visual analogue scale pre and post treatment. Specific collagen peptides supplementation of 5g daily intake led to a statistically significant reduction (P- value = 0.024) in knee pain compared to placebo group. These findings were however consistent with the evaluation of the physician (P- value = 0.003)[13-16].

Another similar double blinded randomized trial was conducted in Germany on 139 knee OA patients, with the objective to evaluate the use of specific collagen peptides in reducing pain in athletes with functional knee problems. The patients were randomized to CP and placebo groups. Individual having functional knee pain ingested 5g of collagen peptides supplementation or placebo for about 12 weeks. The physicians then evaluated the primary outcome of the study which was a change in the intensity of pain during activity using visual analogue scale (VAS) before and after the end of the study. No statistically significant group differences could be detected (p = 0.253) at baseline. A marked statistically significant improvement was observed in the individuals taking supplementation of CP compared to placebo (P –value = 0.021) [17].

Another similar study was conducted on patients with functional knee pain where the primary end points were pain during movement(walking) and pain at rest. The intake of BCP showed good results of 38% and 39% improvement respectively. The parameters including joint stiffness, joint pain, movement restriction was however more pronounced in the BCP group compared to placebo group. A statistically significant improvement ($p < 0.05$) after a 12-week BCP supplementation was observed specifically in pain after physical stress(movement-

related) and pain and movement restriction when kneeling or crouching down. These results were hence in accord with our study.[18]

A prospective, multi-centric clinical trial was conducted on 226 patients in India to

Assess the effectiveness of collagen active peptides. The signs and symptoms were assessed for VAS at day 30, day 60 and day 90. Statistically significant reductions were observed in VAS scores at day 90 with P value <0.0001 thus suggesting the effectiveness of collagen active peptides. Hence, it can be concluded that collagen active peptides not only help in reducing pain and associated joint stiffness with OA but also helps in enhancing the functional mobility in patients suffering from knee OA. The results are in accord with our study[7].

A multicenter clinical trial was conducted in 78 patients in Spain to evaluate the effectiveness of dietary supplement containing hydrolyzed collagen in pain reduction and functional capacity in OA patients. The participants consumed the supplementation for 6 months where the primary outcome was measured using the VAS for pain reduction and functional mobility was assessed using the WOMAC score. Patients showed a statistically significant reduction in pain after 3 (1st follow up visit) and 6 (2nd follow up visit) months (P value< 0.0001). In adition marked significant score reduction was observed in physical function after 6 months ((P value< 0.0001).[19].

CONCLUSION

1. Collagen active peptides is clinically effective in management of knee osteoarthritis.
2. Collagen active peptides has better outcome in knee OA in terms of safety profile.
3. The quality of life improved with the use of collagen active peptides.

Recommendations:

1. Multicentre study
2. Using probability sample technique
3. Duration of the study should be 12 months or more
4. Use MRI for diagnosis of knee OA
5. OA without co-morbidities should be included

Author's Contribution:

Concept & Design of Study:	Mehwish Mansoor
Drafting:	Muhammad Ali Zubair, Shabih Zehra
Data Analysis:	Muhammad Sajid Abbas Jaffri, Hina Amjad, Syed Ijaz Hussain Zaidi
Revisiting Critically:	Mehwish Mansoor, Muhammad Ali Zubair
Final Approval of version:	Mehwish Mansoor

Conflict of Interest: The study has no conflict of interest to declare by any author.

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