



Effectiveness of Glucosamine Therapy Upon Selected Symptoms of Osteoarthritis

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Abstract – Osteoarthritis (OA) is one of the most common chronic degenerative joint disease. It is one of the recognized causes of disability among elderly. Glucosamine is a nutritional supplement which has recently emerged as an alternative treatment option for clients with osteoarthritis to reverse or stop the progress of the disease. The aim of the study was to assess the effectiveness of glucosamine therapy upon selected symptoms of osteoarthritis among geriatric clients in selected old age homes. A true experimental research design was adopted, and 60 participants were selected using simple random sampling technique, out of which 30 were randomly assigned to control group and 30 clients to experimental group. The data was collected using four point categorical verbal rating pain scale and Lequesne osteoarthritis index scale. The data was statistically analyzed, and the results revealed that the joint pain levels in the experimental group ($M=2.83$, $SD=1.23$) and level of selected symptoms ($M=12.33$, $SD=2.19$) after the therapy was low, compared to those before the therapy ($M=6.53$, $SD=1.41$) & ($M=14.23$, $SD=2.61$) respectively. The difference was found to be statistically significant at $p<0.001$, which attributes to the effectiveness of glucosamine therapy.

Keywords: Osteoarthritis, Glucosamine therapy, Geriatric clients, Selected symptoms.

1. INTRODUCTION

The life process starts from newborn to old age; old age is often termed as the second childhood. In the last three decades, the older adult population has grown twice as fast as the rest of the population. Worldwide, the number of people aged 65 or above is increasing faster than ever before. According to the 2011 census in India, it was estimated that the elderly population was about 104 million. India has thus acquired the label of "an ageing nation" with 8.6% of its population being more than 60 years old.

As the elderly population is constantly increasing, the burdens of health issues are also invariably increasing. Osteoarthritis is a classic age-related disorder and one of the prevalent type of arthritis among older people. This is the most common source of pain and activity restriction among elderly population, and it hit hard on both men and women.

Osteoarthritis (OA) is one of the frequently occurring type of arthritis in the world. It is classified into two categories: primary and secondary osteoarthritis. Typically, OA manifest with various intensities of pain in the joints and loss of certain function; still, this condition clinically varies and can present only as an asymptomatic finding incidental to a distressing and everlastingly disabling disorder. (Bortoluzzi, 2018).

In OA, severe damage and loss of the articular cartilage is a significant feature which attribute to "wear and tear". It affects the knee, hip, cervical and lumbar spine, distal and proximal interphalangeal, carpometacarpal, and metatarsophalangeal joints. Almost everyone has structural evidence of OA on

radiographs in any one of the joint atleast by 70 years of age. (Felson, 2004).

Current treatment for this condition largely focuses on pain management, of course these drugs finally ending up with lot of adverse effects. Glucosamine is a nutritional supplement has recently emerged as an alternative treatment option, the beneficial effect of this chondroprotective agent has been reported to reverse or at least stop the progression of the disease. In the past 20 years, numerous studies are done to identify the potential of glucosamine sulfate to enhance the symptoms (joint pain and function) and to postpone the structural changes of osteoarthritis. (Reginster et al. 2012).

One of the greatest benefits of glucosamine is its safety; it is well-tolerated and easy to take, it is a disease modifying intervention and basically acts on the etiology to solve the problem. Glucosamine is considered as a viable option to ease pain, but the studies related to glucosamine is less in the Indian context. In addition to this, there is a constant expansion of elderly population, and they are the vulnerable group, largely forgotten and tossed aside by the caregivers. It is not known whether old age causes more burdens comparing to pain and physical inabilities or vice versa. All these significant viewpoints moved the researcher to measure the efficacy of glucosamine upon osteoarthritis, to improve their quality of life and independent living.

2. STATEMENT OF THE PROBLEM

An experimental study to assess the effectiveness of glucosamine therapy upon selected symptoms of osteoarthritis among geriatric clients, in selected old age homes, Chennai.

3. OBJECTIVES OF THE STUDY

- To compare the effectiveness of glucosamine therapy upon selected symptoms of osteoarthritis in the control and experimental group of geriatric clients.

- To determine the association between the selected demographic variables and clinical variables with selected symptoms of osteoarthritis before and after Glucosamine therapy in the control and experimental group of geriatric clients.

Hypotheses

Ho1: There will be no significant relationship between the selected symptoms of osteoarthritis among geriatric clients before and after glucosamine therapy in control and experimental group at $p < 0.05$.

Ho2: There will be no significant association between the selected demographic variables and clinical variables with selected symptoms of osteoarthritis among geriatric clients before and after glucosamine therapy in control and experimental group at $p < 0.05$.

4. RESEARCH METHODOLOGY

A true experimental research design was adopted which was conducted at Kshetropasna old age home, Sriperumbudur (control group) and New life trust, Erayur (experimental group). Simple random sampling was used to select the participants. About 60 geriatric clients with osteoarthritis were selected out of which 30 clients were randomly assigned to control group and 30 clients to experimental group. Data was collected using baseline variable proforma, clinical variable proforma, and using four points categorical verbal rating pain scale, the subjective level of pain was measured. The pain level was categorized in to Mild (1 – 3), Moderate (4 – 6), Severe (7 – 9).

The effectiveness of therapeutic interventions was assessed using Lequesne osteoarthritis index score under the following three components. **Pain or discomfort** – assess all the various characteristics of pain, **maximum distance walked** – assess the use of walking aids and the maximum distance walked in a day, **activities of daily living** – includes the activities where the joints are actively used.



Maximum score of 8 is assigned to all three components, with a maximum Lequesne index score is 24. The interpretation of the score is none (0), mild (1 – 4), moderate (5 – 7), severe (8 – 10), very severe (11 – 13), extremely severe (≥ 14). The reliability of the tool was 0.8 and validity was obtained from experts in the field of nursing. Level of satisfaction on glucosamine therapy was assessed with a rating scale.

After ethical clearance and certification from orthopedician, pre-test was conducted for geriatric clients in both the control and experimental groups with their consent. Glucosamine 750mg was administered as capsule, orally twice a day i.e., after the breakfast (8:30am) and after the dinner (8:00pm) for 4 weeks duration (4weeks x7days) to the clients in the experimental group. After 4 weeks, post test assessment was done in both the groups; in addition, the level of satisfaction on glucosamine therapy was assessed in the experimental group.

5. RESULTS AND DISCUSSION

Among the demographic variables about 50% and 36.7% of the participants in the control group and the experimental group were in the age group of 71 – 80 years and most of them were women. Most of them (76.7%, 63.3%) had no previous history of hospitalization.

Most of the participants (66.7%, 60%) were females, which reveals that OA is common among women due to the hormonal changes during menopause or obesity, This is consistent with Boyer et.al (2008) findings which revealed that the hip joint stress is more in the female population when compared to male population, which contribute to greater joint degeneration at the hip in females.

The clinical variables reveal a significant percentage (36.7%, 46.7%) were between 151 – 160 cms, with BMI around 18.5 – 24.9 Kg/m² (70%, 60%), nearly half of them (50%, 53.3%) were free from co morbid illness and about 83.3% and 63.3% had previous history of trauma.

Weight is one of the modifiable risk factor for osteoarthritis. There is a significant percentage of elderly who are obese and this could be a strong underlying factor for the risk of developing OA. Toivanen et.al (2009) also have found that the possibility of osteoarthritis of the knee was strongly associated with BMI (25 – 29). Weight loss has shown to slow the progression of knee osteoarthritis, so the importance of weight reduction has to be insisted, taught and encouraged to do exercise regularly to prevent or reduce the progression of osteoarthritis.

Joint stiffness was present (70%) in both the groups. In the experimental group, most of them (53.3%) had morning stiffness for <15 min & 23.3% (more than 15 min) after the therapy, stiffness was reduced comparatively (70% had for <15 min, 6.6% had for >15 min).

In the control group it was identified that there was no significant variation in the joint pain levels before (M=6.53, SD=1.35) & after glucosamine therapy (M=6.07, SD=1.46), In contrast, in the experimental group the joint pain levels (M=2.83, SD=1.23) and level of selected symptoms (M=12.33, SD=2.19) after the therapy was low, compared to those before the therapy (M=6.53, SD=1.41) & (M=14.23, SD=2.61) respectively. The difference was identified to be significant statistically at $p < 0.001$, which attributes to the effectiveness of glucosamine therapy.

The difference in the level of joint pain and selected symptoms is inferred from table 1 and 2, which shows that there is a significant reduction in the level of joint pain as well as selected symptoms after glucosamine therapy. This reduction shows the effectiveness of glucosamine therapy. Jorg Jerosch, (2011) clinical trial evidence supports the same that the chondro protective action has dual mechanism: (1) as basic components of cartilage and synovial fluid, they stimulate the anabolic process of the cartilage metabolism; (2) their anti-inflammatory action can delay many inflammation-induced catabolic processes in the cartilage. These mechanisms together slowdown the progression of articular cartilage damage and destruction, thus

helps to restore the basic joint structure, which in turn decreased the intensity of pain and promote increased mobility of the affected joint. As a result of this the satisfaction level among the geriatric clients in the experimental group was high.

(n=30)

Pain scale	Before glucosamine administration		After glucosamine Administration	
	f	%	f	%
Control group				
Mild	-	-	2	6.7
Moderate	18	60	15	50
Severe	12	40	13	43.3
Experimental group				
Mild	-	-	20	66.7
Moderate	13	43.3	10	33.3
Severe	17	56.7	-	-

Table -1: Distribution of joint pain levels before and after administration of glucosamine among Geriatric Clients.

Group	Mean	Standard Deviation	't' value
Control Group			
Before	15.53	3.35	
After	15.47	3.42	0.421
Experimental Group			
Before	14.23	2.61	
After	12.33	2.19	9.01***

***p<0.001

Table -2: Comparison of Mean and Standard deviation of Level of Selected symptoms of Osteoarthritis among Geriatric Clients.

Demographic Variables	Level of selected symptoms of OA after therapy			χ ²
	Severe	Very severe	Extremely severe	
Body mass index kg/m²				
< 18.5	1	-	-	6.329 (df=6)
18.5–24.9	3	9	6	
25 – 29.9	1	6	3	
>30	-	1	-	
History of Trauma/ Accident				
Yes	-	5	6	6.585 (df=2)
No	5	11	3	
Duration of osteoarthritis				
<1yr				9.165 (df=6)
1.1–5yrs	1	6	-	
5.1–10yrs	1	6	5	
>10.1yrs	3	3	2	
Exercise pattern				
Yes				5.117 (df=2)
No	3	11	2	
	2	5	7	

Table -3: Association between Selected Clinical Variables and the Level of Selected symptoms of Osteoarthritis after Glucosamine therapy in the Experimental Group of Geriatric clients. (n=30)

There was no significant association between the selected demographic variables and clinical variables with selected symptoms of osteoarthritis among geriatric clients in the control and experimental group before and after glucosamine therapy. Most of the participants (76.66%) expressed high level of satisfaction level of satisfaction on glucosamine therapy.

It was found from the study that osteoarthritis can affect all categories of people irrespective of height, weight, BMI, blood pressure, co morbid illness, past trauma, past surgeries, smoking, and alcoholism.

6. DISCUSSION

With regard to exercise, Fig.1 reveals that clients, who don't follow regular exercise pattern, had worsening of their joint pain and mobility. This is congruent with Hurley (2018) findings that people who exercised rated their pain to be 1.2 points lower on the scale of 0 to 20 after about 45 weeks (score: 5.3 with exercise compared with 6.5 with no exercise (control), an improvement of 6%).

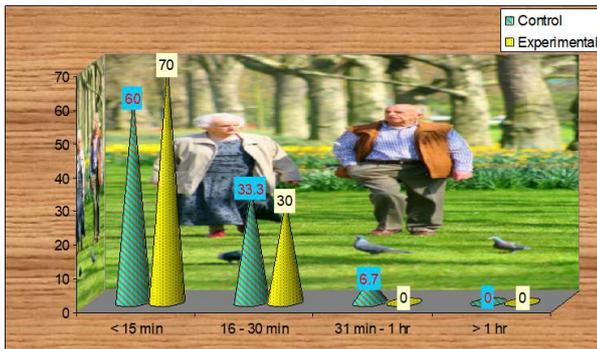


Fig -1: Distribution of duration of exercise in control and experimental group

aerobic exercise, muscle strengthening, aquatic or physiotherapy based exercise modalities has significantly reduced pain and disability and has improved physical functioning. Thus, exercise is essential to maintain healthy joints.

7. CONCLUSION

Osteoarthritis is a chronic disease which results in the functional disability. The normal mechanism of cartilage damage takes place in most of the clients as they progress older, nutrition plays an essential part in our day today life, so as the age progress the normal component glucosamine within our body also decreases so it is always essential to replace the amount which is low, hence glucosamine is given to repair the damaged cartilage and to reduce the destructive enzymes which is produced in the joint, thereby the quality of life and general wellbeing can be improved among geriatric clients.

Conflicts of Interest

The authors have declared no conflicts of interest.

REFERENCES

[1] Berenbaum F, Wallace IJ, Lieberman DE, Felson DT. Modern-day environmental factors in the pathogenesis of osteoarthritis. *Nat Rev Rheumatol*. 2018 Nov;14(11):674–681. [PubMed]

[2] Bortoluzzi A, Furini F, Scirè CA. Osteoarthritis and its management - Epidemiology, nutritional

aspects and environmental factors. *Autoimmun Rev*. 2018 Nov;17(11):1097–1104. [PubMed]

[3] Felson D.T. (2004) An update on the pathogenesis and epidemiology of osteoarthritis. *Radial Clin North Am* 42: 1–9, v. [PubMed] [Google Scholar]

[4] Jorg Jerosch. (2011). Effects of Glucosamine and Chondroitin Sulfate on Cartilage Metabolism in OA: Outlook on Other Nutrient Partners Especially Omega-3 Fatty Acids, *Int J Rheumatology*. 2011;Aug 2

[5] Hurley M, Dickson K, Hallett R, Grant R, Hauari H, Walsh N, Stansfield C, Oliver S. Exercise interventions and patient beliefs for people with hip, knee or hip and knee osteoarthritis: a mixed methods review. *Cochrane Database Syst Rev*. 2018 Apr 17;4(4):CD010842. doi: 10.1002/14651858.CD010842.pub2. PMID: 29664187; PMCID: PMC6494515.

[6] Louise Murphy, Todd., A. Schwartz. (2008). Lifetime Risk of Symptomatic Knee Osteoarthritis; *Arthritis Rheumatology*. Sep 15; 59(9): 1207–1213

[7] Miller A, Lutsky KF, Shearin J, Cantlon M, Wolfe S, Beredjikian PK. Radiographic Patterns of Radiocarpal and Midcarpal Arthritis. *J Am Acad Orthop Surg Glob Res Rev*. 2017 Jun;1(3):e017. [PMC free article] [PubMed]

[8] Reginster JY, Neuprez A, Lecart MP, Sarlet N, Bruyere O. (2012). Role of glucosamine in the treatment for osteoarthritis. *Rheumatol Int*. Oct;32(10):2959–67. doi: 10.1007/s00296-012-2416-2. Epub 2012 Mar 30. PMID: 22461188; PMCID: PMC3456914.

[9] Zheng H, Chen C. Body mass index and risk of knee osteoarthritis: systematic review and meta-analysis of prospective studies. *BMJ Open*. 2015 Dec 11;5(12):e007568. doi: 10.1136/bmjopen-2014-007568. PMID: 26656979; PMCID: PMC4679914.

[10] http://www.censusindia.gov.in/vital_statistics/rs_report/9chap%20%20-%202011.pdf

[11] <https://www.ncbi.nlm.nih.gov/pubmed/10983905>