International Journal of Science and Healthcare Research
Vol.5; Issue: 1; Jan.-March 2020
Website: www.ijshr.com
Original Research Article *ISSN: 2455-7587*

Efficacy and Safety of Nutraceutical Composition Mobileye® Capsules in Improving Synovial Joint Health in Indian Population

Dharmeshkumar B Kheni, Varun P Sureja, Divyanshu G Prajapati, Mayank P Rajawat, Ajit D Magar

Department of Medical Affairs, SundyotaNumandis Group of Companies, Ahmedabad

Corresponding Author: Dharmeshkumar B Kheni

ABSTRACT

Background: Osteoarthritis (OA); a whole joint disorder is a most common and progressive disease that worsens with age. Synovitis and synovial effusion can play important role in early OA diagnosis and progression. Limited pharmacological interventions affecting synovial effusion are studied clinically in Indian population.

Aim: This was a pilot, observational, single arm, open label study in real world set-up designed to evaluate the efficacy and safety of Mobileye® capsules containing sodium hyaluronate along with collagen and polysaccharides derived from rooster comb extract in subjects suffering from synovial effusion and knee pain of osteoarthritis.

Materials and Method: The study was conducted on total 30 subjects at Outpatient Department (OPD) at three different sites under the supervision of medical doctor. All subjects consumed Mobileye® capsule orally twice daily for 3 months. Synovial effusion, VAS score, WOMAC score and safety parameters were assessed as scheduled.

Results: Treatment with Mobileye® capsule showed significant and progressive improvement in all study related parameters. Baseline score vs. day 90 score (mean ± SD) for synovial effusion, WOMAC pain score, WOMAC stiffness score, WOMAC physical function score, WOMAC total score and VAS score were 8.52±2.960 mm vs. 2.58±0.903 mm ($p<0.0001$), 15.13±3.10 vs. 4.13±2.4 ($p<0.0001$), 6.63±1.098 vs. 1.60±1.192 ($p<0.0001$), 54.33±8.39 vs. 14.23±8.67 ($p<0.0001$), 76.13± 11 vs. 20.33± 10.86 and 8.13 ± 1.28 vs. 1.93±1.17 ($p<0.0001$) respectively. No significant adverse events were reported.

Conclusion: Oral intake of Mobileye® capsule is safe and effective intervention in reducing synovial effusion, pain, stiffness and in improving joint mobility.

Key Words: Mobilee®, Mobileye®, Rooster Comb Extract, Hyaluronic acid, Synovial effusion

INTRODUCTION

Osteoarthritis (OA) is a multifactorial degenerative joint disorder. It occurs at large weight bearing joints such as knee, hips, feet, hand, spine etc. [1] Joint pain, joint stiffness, muscle weakness and inflammation are the major symptoms of osteoarthritis. [2] Up to 39% prevalence of osteoarthritis is reported in India. [3] Earlier OA was considered as a disease related to cartilage degradation and pathophysiological changes that happened before cartilage degradation were ignored. The diagnosis of OA was majorly confirmed by X-ray. X-ray determines the degree of cartilage destruction and indicates the severity of OA. Presently, OA is considered as whole joint disorders including abnormality to any of the structure present in the joint such as synovial membrane, synovial fluid, synovial muscles, cartilage, bone etc. [4] Recent advances in OA research have demonstrated a critical role of synovium in the pathophysiology of OA. Synovitis is now considered as an active

component of OA pathogenesis. [5] Up to 50% of OA patients were reported with localized proliferative and inflammatory changes in synovium by arthroscopic studies. Synovitis results from the synthesis and release of various proinflammatory cytokines and mediators. These proinflammatory cytokines and mediators produce pain and inflammation. They also stimulate the release of cartilage degrading enzymes matrix metalloproteases (MMPs) resulting into cartilage breakdown. [6]

Apart from synovitis and synovial effusion, many studies have reported that OA patients are also complaining of greater difficulty in performing functional activities, particularly those that involve mobility and transfers. Functional decline, increased risk of falls and presence of pain related to the muscle weakness caused by especially weakness of the quadriceps and hamstring muscles. Adequate functioning of the articular cartilage needs biomechanical and muscular stability for its structural maintenance and integrity of extracellular matrix. Alteration in these could give rise to the exacerbation of articular destruction. [7] Hence, a therapeutic intervention acting beyond cartilage health which include reduction in synovitis/ synovial effusion, pain, inflammation along with improvement in joint mobility can provide comprehensive control on OA progression.

Mobilee® is a synergistic and proprietary composition of hyaluronic acid, collagen and polysaccharides derived from Rooster comb extract developed by Bioiberica S.A.U, Spain. Published literatures have suggested improvement in joint mobility, reduction in synovitis/synovial effusion and strengthening of synovial muscles with Mobilee® treatment. [8,9] However, data showing the benefits of Mobilee® treatment in Indian population are lacking.

This work aims to evaluate the efficacy and safety of Mobilee® (as Mobileye® capsule) on Indian population suffering from synovial effusion and knee pain associated with osteoarthritis.

MATERIALS & METHODS

STUDY DESIGN: This was a pilot, open label, single arm, observational study in real-world set-up.

STUDY DURATION: This study was conducted between Jan'19 to Aug'19 at 3 sites in India. (Jabalpur Hospital & Research Centre; Jabalpur, Raksha Hospitals; Madurai and Hussain Ortho and Trauma Care; Visakhapatnam).

INCLUSION CRITERIA:

The inclusion criteria of subjects were; (1) males or females aged ≥18 years; (2) suffering from synovial effusion and knee pain associated with osteoarthritis.

EXCLUSION CRITERIA:

The exclusion criteria of subjects were; (1) those who are regularly using paracetamol or other drugs to control joint discomfort; (2) subjects with active rheumatoid arthritis and any inflammatory arthritic conditions; (3) those who have been treated with oral corticosteroids within the 4 weeks prior to selection; (4) patients who have been treated with intra-articular corticosteroids within the 12 weeks prior to selection; (5) those with significant joint injury during the 3 weeks prior to screening (identified from medical history);(6) patients who were consuming drugs or dietary supplements for osteoarthritis at the time of screening; (7) individuals who depend on prescription drugs to control pain; (8) subjects participating in a concurrent clinical trial or having received a product being evaluated during the previous 30 days;(9) individuals following an energy restricted diet for weight loss; (10) pregnant or lactating individuals; (11) subjects currently taking nutraceuticals with hyaluronic acid and/or other types of joint regenerators; (12) subjects who are contraindicated to any of the ingredient present in the formulation.

STUDY TREATMENT:

The nutraceutical composition was provided as Mobileye® capsules (SundyotaNumandis Pharmaceuticals Pvt. Ltd., Ahmedabad, India). Each capsule contained 40mg Mobilee®. Mobilee®

contains sodium hyaluronate (60-75%) along with collagen (>5%) and polysaccharide (>10%) derived from rooster comb extract (active composition was licensed as "Mobilee®" from Bioiberica SAU, Spain). Subjects were informed to ingest one capsule twice daily for 3 months and visit the study centre on day 0, day 30, day 60 and day 90 to assess the efficacy and safety of Mobileye®. All the subjects were advised to consume NSAIDs/ analgesics as a rescue medicine as and when required.

METHODOLOGY:

Patients attending OPD and meeting inclusion/exclusion criteria were considered as eligible subjects. Eligible subjects were informed by Medical Doctor to ingest Mobileye® capsules as per the protocol. A predesigned case record form (CRF) maintained for each subject. Subjects visited study center as per the protocolon Day 0, Day 30, Day 60 and Day 90 for study parameter evaluation. Demographic profile and evaluation parameters were recorded in CRF. Efficacy evaluation parameters were synovial effusion (assessed by CT scan on Day 0 and Day 90) and pain/stiffness/physical function (assessed by WOMAC and VAS scale on Day 0, Day 30, Day 60 and Day 90).Subjects were asked to report any adverse effects or complications during the treatment.

Statistical Methods:

Statistical analysis performed using Wilcoxon matched pair sign ranked test for synovial effusion and ANOVA followed by Dunnett's multiple comparison test for VAS & WOMAC scores.

RESULTS

All the data of evaluation parameter results are represented as mean ± SD. Total 30 eligible subjects with mean age 53.66 ± 10.9 years were included in the study as per the inclusion and exclusion criteria. 17 male subjects with mean age 53.13 ± 12.39 years and 13 female subjects with mean age 54.31± 9.2 years were included.

SYNOVIAL EFFUSION: Synovial effusion was reported as 8.52±2.960 mm at baseline. After Mobileye® consumption, statistically significant reduction ($p<0.0001$ vs. baseline) in synovial effusion was reported and was reduced to 2.58± 0.903 mm at 3 months (figure-1).

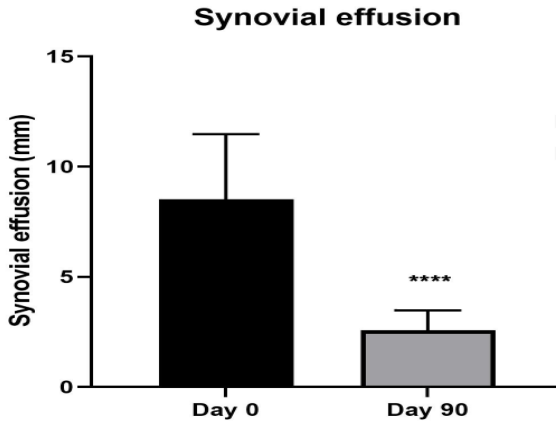

Figure-1: Effect of Mobileye® capsules on Synovial effusion (** indicates p<0.0001 vs. baseline)**

VAS SCORE: VAS score was reported as 8.13±1.28 at baseline. Progressive and statistically significant reduction was reported in subsequent visits. The reported VAS score on day 30, 60 and 90 was 5.67±1.12 ($p< 0.0001$ vs. baseline), 3.63±1.19 ($p< 0.0001$ vs. baseline) and 1.93±1.17 ($p< 0.0001$ vs. baseline) respectively (figure 2).

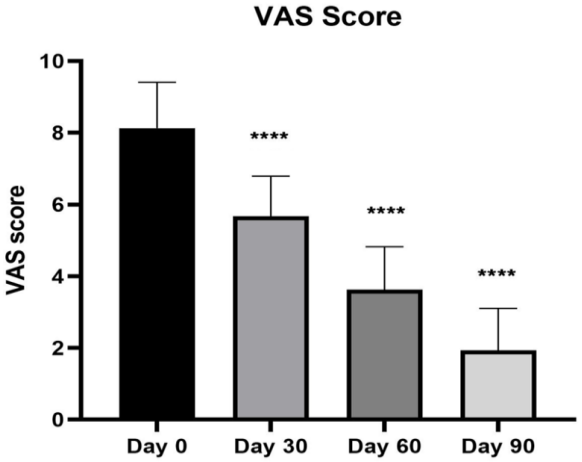

Figure-2: Effect of Mobileye® capsules on VAS score (** indicates p<0.0001 vs. baseline)**

WOMAC SCORE: Mobileye® treatment also showed significant improvement on WOMAC scores as mentioned in the table-1.

Table-1: Effect of Mobileye® capsules on WOMAC scores (* indicates p<0.0001 vs. baseline)

Sr. no	Parameters	Day 0	Day 30	Day 60	Day 90
1	WOMAC pain score	15.13±3.10	11.43±3.78*	7.67±3.09*	4.13±2.4*
2	WOMAC stiffness score	6.63±1.098	5.03±1.299*	3.37±1.450*	1.60±1.192*
3	WOMAC physical function score	54.33±8.39	40.87±9.08*	27.07±8.91*	14.23±8.67*
4	WOMAC total score	76.13±11	56.87±12.24*	38.07±11.33*	20.33±10.86*

Treatment with Mobileye® showed statistical improvement in all evaluated parameters from 2nd visit itself compared to baseline.

TOLERABILITY:

Two subjects reported self-limiting mild nausea at the beginning of the study. However, this side-effect did not cause discontinuation of the treatment. No significant adverse event reported during the study indicated that the Mobileye® treatment was well tolerated.

DISCUSSION

The present study demonstrated the beneficial effects of Mobilee® on joint health by reducing synovial effusion, joint pain, joint stiffness and by promoting joint mobility. Although most of the therapeutic interventions target cartilage health, synovial effusion plays critical role in pathogenesis of osteoarthritis. Synovitis is evident at the clinical stage of disease and is a predictor of disease progression. Studies showed that almost half of patients presenting with pain demonstrated localized synovial thickening. These patients were more likely to have progression of cartilage degradation when repeat arthroscopies performed 1 year later. Synovial inflammation contributes to the progression of osteoarthritis by affecting areas adjacent to damaged cartilage & bones, producing pain and inflammation and contributing to cartilage degradation by releasing IL-1β.IL-1β stimulates synovial cells to release matrix metalloproteases (MMPs) leading to cartilage breakdown. Synovitis probably contributes to the dysregulation of chondrocyte function, thus causing an imbalance between anabolic and catabolic processes that allow cartilage extracellular matrix to maintain its structural integrity in physiological conditions. [7] Published literatures have suggested multimodal mechanism of actions of Mobilee® in improving the joint health which includes (i) reduction in synovitis and synovial effusion by reducing prostaglandin E2 (PGE-2), [10] (ii) strengthens the synovial muscles by stimulating myoblasts proliferation and by reducing its catabolism through IL-6 inhibition [11] and (iii) stimulation of synovial cells to increase the endogenous production of hyaluronic acid to facilitate the joint lubrication. [12] Earlier published clinical studies have reported the ability of Mobilee® in reducing joint pain & synovial effusion. [8] Mobilee® is reported to increase peak torque, mean power and total work of synovial muscles indicating its critical role in strengthening of synovial muscles. [9] Mobilee® is reported to reduce the number of patients with severe cases of synovial effusion and synovitis. [13] Clinical efficacy of Mobilee® is also confirmed using nutrigenomic study where it has reduced the expression of four genes viz. matrix metallopeptidase 23B (MMP23B), xylosyltransferase II (XYLT2), glucuronidase-β (GUSβ) and heparan sulfate 6-O-sulfotransferase 1(HS6ST1) which are involved in the progression of osteoarthritis. [8] However, none of these studies are conducted on Indian population. A study has reported total 69% intestinal absorption profile of Mobilee® determined using Everted Gut Sac Model. This model has reported 38%, 22%, 9% absorption of Mobilee® from duodenum, jejunum and ileum respectively. [10] The outcome of our study has similar finding with other clinical studies. Outcome of this study suggest the potential role of Mobilee® in controlling the progression of osteoarthritis at early stage by acting at synovial level. Controlling the synovial effusion by Mobilee® can reduce the release of inflammatory and cartilage degrading substances to prevent the cartilage degradation. Moreover, synovial

muscle strengthening property of Mobilee® can provide the joint structure stability in addition to the its joint lubricating effect. Moreover, Mobilee® has approved safety as it is Generally Recognized As Safe (GRAS) and Qualified Presumption of Safety (QPS) status.

CONCLUSION

Oral intake of Mobileye® capsule is safe and effective intervention in reducing synovial effusion, pain, stiffness and in improving joint mobility. However, since this is an open-label study, larger long-term randomized, placebo-controlled studies are required for wider therapeutic role of Mobilee® in this population.

Conflict of Interest: All the authors are employees of SundyotaNumandis group of companies.

ACKNOWLEDGEMENTS

The authors thank Dr. Jatin Dhirawani (Jabalpur Hospital & Research Centre, Jabalpur), Dr. Shyam L. (Raksha Hospitals, Madurai) and Dr. P.S.B. Hussain (Hussain Ortho and Trauma Care, Visakhapatnam) for facilitating the study.

REFERENCES

1. Mahajan A, Verma S, Tandon V. Osteoarthritis. J Assoc Physicians India. 2005; 53:634-41.
2. Ashkavand Z, Malekinejad H, Vishwanath BS. The pathophysiology of osteoarthritis. Journal of Pharmacy Research. 2013;7:132-138
3. Pal CP, Singh P, Chaturvedi S et al. Epidemiology of knee osteoarthritis in India and related factors. Indian J Orthop. 2016 Sep;50(5):518-522
4. Favero M, Ramonda R, Goldring MB et al. Early knee osteoarthritis. RMD Open. 2015 Aug 15;1(Suppl 1):e000062
5. Mathiessen A and Conaghan PG. Synovitis in osteoarthritis: current understanding with therapeutic implications. Arthritis Res Ther. 2017 Feb 2;19(1):18.
6. Monemdjou R, Fahmi H, Kapoor M. Synovium in the pathophysiology of osteoarthritis.Therapy.2010;7(6):661-668
7. Santos MLA, Gomes WF, Queiroz BZ et al. Muscle performance, pain, stiffness, and functionality in elderly women with knee osteoarthritis. Acta Ortop Bras. [online]. 2011; 19(4):193-7.
8. Sánchez J, Bonet ML, Keijer J et al. Blood cells transcriptomics as source of potential biomarkers of articular health improvement: effects of oral intake of a rooster combs extract rich in hyaluronic acid.Genes Nutr. 2014 Sep;9(5):417.
9. Martinez-Puig D, Moller I, Fernandez C, Chetrit C. Efficacy of oral administration of yoghurt supplemented with a preparation containing hyaluronic acid (Mobilee™) in adults with mild joint discomfort: a randomized, double-blind, placebo-controlled intervention study. Mediterr J NutrMetab. 2013;6:63-68
10. Torrent A, Ruhi R, Martinez C et al. Anti-inflammatory activity and absorption of a natural rooster comb extract (hyal-joint®).Osteoarthritis and cartilage. 2010;18(2):S245-S246
11. Torrent A et al. Mobilee®: New Option for Prevention and Treatment of Muscle Atrophy. Journal of Cachexia, Sarcopenia and Muscle. 2016;7:628
12. Torrent A, Ruhi R, Theodosakis J et al. Comparison of the efficacy of two products sold as orally administered hyaluronic acid supplements, IB0004 and ID386 on the endogenous in vitro synthesis of hyaluronic acid by human synoviocytes. Osteoarth Cartil. 2009;17:S278-9
13. Moller I, Martinez-Puig D, Chetrit C. LB012 Oral administration of a natural extract rich in hyaluronic acid for the treatment of knee OA with synovitis: A retrospective cohort study. Clinical Nutrition Supplement.2009;4(2):171-172

How to cite this article: Kheni DB, Sureja VP, Prajapati DG et.al. Efficacy and safety of nutraceutical composition Mobileye® capsules in improving synovial joint health in Indian population. International Journal of Science & Healthcare Research. 2020; 5(1): 1-5.

******