SUMMARY AND CONCLUSION
CHAPTER VI

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6.0. Overview of the Chapter

This chapter discusses the summary and conclusion. The research findings were highlighted the prevalence, demographic features, education level, food habits and dietary patterns and Body Mass Index affecting Knee Osteoarthritis patients. Further, the study elaborated an association between ESR level and concentration of MMP-3 and MMP-13 in Knee Osteoarthritis patients and association between WOMAC scores and MMP-3 and MMP-13. Finally, the study suggests that, prototype for positive prevalence of Knee Osteoarthritis and gives future research directions.

6.1. Summary

- Knee Osteoarthritis (OA) is a common condition which represents a major contribution to the burden of physical disability. It is incurable with currently available therapeutic options.
- The enzymes of Matrix metalloproteinases (MMPs) are highly elevated in body fluids such as serum and synovial fluids, which cause potential damage in cartilage tissues.
- The MMPs play an important role both in normal physiological and pathological conditions such as arthritis. This study provides an extensive analysis of systemic serum levels of MMP-3 and MMP-13 in Knee Osteoarthritis patients with different age group and sex.
The demographic study reveals that, the prevalence of Knee Osteoarthritis was highest in the age group of 60 and above irrespective of the sex.

The prevalence of Knee Osteoarthritis was more in female while comparing with the male. Several studies reveal that female particularly more than 55 years tended to have severe Osteoarthritis in Knee.

Literacy and education level is also one among the important social indicators in development. A low level of literacy it directly impacts on patients ability to access and navigate their health care system as well as the ability to read information about Knee Osteoarthritis disease and several studies suggest the low literacy and low health awareness.

Food habits and dietary pattern of Knee Osteoarthritis patients opined that never consuming milk and less than one time consuming dairy products and fat contents, it directly correlated with their income status. Many studies reveal that, calcium is only source for increasing bone mass density.

Regarding clinical pattern evidences that, different population, life style and day to day activities also matters for most causes of joint.

WOMAC scores results reveals that, majority of the Knee Osteoarthritis patients were having moderate in Pain, Stiffness and Physical functions, it directly associated with their pain of knee while doing different activities. Body Mass Index results shows that, major share of Knee Osteoarthritis patients was selected for the study were having normal BMI and least is the obese. Even though, various studies attempts that, the impact of knee joint loads and weight loss will not be reduced structural changes in Knee Osteoarthritis patients.
The mean average is 15 and standard deviation is 6.091, it indicates that Erythrocyte Sedimentation Rate (ESR) level is more and inflammation. There is a variation while comparing ESR level between Knee Osteoarthritis patients and control groups. ESR level were elevated in Knee Osteoarthritis patients while comparing with the control groups.

There is a variation in MMP-3 while comparing between Knee Osteoarthritis patients and controls. The various study found that, the greater elevation of MMP-3 over controls and Knee Osteoarthritis patients may indicate that more activity of joint destruction as well as cartilage destruction not only in knee joints but also in whole joints compared to control (Naito et al. 1999).

There is a major variation in MMP-13 while comparing between Knee Osteoarthritis patients and controls. Several lines of evidence suggest that MMP-13 contributes to cartilage degradation in OA. MMP-13 expression is significantly higher in chondrocytes from cartilage of late stage OA compared to early OA or normal knee cartilage (Bau et al. 2002). Recently, several studies have demonstrated that MMPs are produced by chondrocytes and synovium during the development of cartilage degradation (Okada et al. 1992).

Finally, using Karl Pearson’s coefficient of correlation to know the association among the MMP-3, MMP-13 and WOMAC scores. There is strange relationship between MMP-3 and MMP-13 has nearly positively significant correlation. While comparing with the MMP-3 and WOMAC scores of Pain, Stiffness and Physical functions, the pain is inverse correlation and nearly negative significant of correlation with MMP-3. WOMAC scores of Stiffness and Physical functions has
nearly positive correlation, it indicates that self-administered WOMAC scores in Knee Osteoarthritis patients has correlated with and MMP-3.

- The association between MMP-13 and WOMAC Scores of Pain, Stiffness and Physical functions results findings that, there is an inverse correlation and nearly negative significant of correlation between WOMAC scores and MMP-13 in Knee Osteoarthritis patients. However, some studies and radiologists were well aware that, these findings do not perfect correlate with clinical findings represented by the MMP-3 and MMP-13 with WOMAC scores (self-administered questions to Knee Osteoarthritis patients).

6.2. Conclusion

Felson (2000) highlights that the Knee osteoarthritis (OA) is seen radiographically in 33 per cent of the population older than 60 years of age and is responsible for a higher incidence of disability than any other chronic condition. This study concludes that, there is considerable evidence that MMPs is capable of mediating degradation leads to knee joint destruction. Our finding suggests that serum MMPs is a marker of systematic inflammation of Knee Osteoarthritis patients. In this research study, concludes that, the concentration of serum enzymes of MMP-3 and MMP-13 in Knee Osteoarthritis was elevated and MMP-3 and MMP-13 have long been considered as the major enzyme involved in cartilage erosion or cartilage degradation.

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MMP-3 and MMP-13 is a marker of systematic inflammation of Knee Osteoarthritis patients.

6.3. Suggestion

Knee Osteoarthritis (OA) is a common condition which represents a major contribution to the burden of physical disability. It is incurable with currently available therapeutic options. The only way for reduction of the burden of the disorder is prevention. There is need to take appropriate steps to increase awareness regarding Knee Osteoarthritis in the community regarding importance of daily exercise, proper position of the knee joint during daily activities and also to control the risk factor such as obesity. Adequate treatment and physiotherapy could make patients to manage the pain, maintain mobility and minimize disability. This study outcome may help to measure the primary Osteoarthritis patients for degree of cartilage degradation and further research. Our results provide information that will assist in the early diagnosis of osteoarthritis. Early detection of elevated serum levels of MMP-3 and MMP-13 markers may herald progressive course and may modulate the lines of treatment.

In fact, Knee Osteoarthritis affecting millions of population Worldwide, the various measures need to be developed to prevent early progression of the disease. The very interest and important is to understanding biochemical changes in Knee Osteoarthritis patients is crucial for suggesting therapeutic approach to each stage of the disease. Cartilage degradation is an intrinsic occurrence of Knee Osteoarthritis along with chronic inflammation. The various studies reveal that both enzymatic and non-enzymatic factors
significantly contribute to the degradation of cartilage. MMP-3 and MMP-13 serum enzymes play an important role in cartilage degradation. However, careful understanding of MMPs mechanisms would certainly help to prevent further cartilage degradation and inflammation of Knee Osteoarthritis patients. The research study suggests that, prototype for positive prevalence of Knee Osteoarthritis is detailing on enzymatic and non-enzymatic factors.

6.4. Future research

Future investigations or researcher are needed to determine the singular importance of MMPs and WOMAC scores. The disease patients have to be graded based on Kellgren-Lawrence and their associations and impact on Knee Osteoarthritis incidence and progression. It is well known that, obesity is a major risk factor for Knee Osteoarthritis. More obese people and individual with severe Knee Osteoarthritis are at risk for poorer further implications on gait mechanics and decreased strength. Present research was excluded obesity people to know the concentration of MMP-3 and MMP-13 in Knee Osteoarthritis patients. There is further scope for investigating concentration of MMPs with obese and non-obese patients. In particularly, any approach that tackles both Knee Osteoarthritis and obesity would be a major step forward in stemming the global epidemic of these two interlinked conditions.