3. Hypothesis, aim and objectives

**Hypothesis**

The link between bone biomarkers and bone mineral density, genetic markers, bone marrow fat tissue analysis would provide a better understanding of the pathogenesis of osteoporosis.

**Aim of the Study**

To find out the association between bone biomarkers and their gene polymorphism with bone mineral density in patients with osteoporosis.

**Objectives**

1) To assess the efficacy of bone biomarkers (Serum Sclerostin, PINP, CTX-I, NTX-I, Adiponectin, and FGF21) levels as diagnostic indicators of osteoporosis.

2) To evaluate single nucleotide gene polymorphism (LRP5, COLIA1 and AdipoQ) as risk factors for osteoporosis.

3) To evaluate the bone marrow fat and above mentioned biomarkers and BMD as risk factors in patients with osteoporotic bone fracture.