The role of *Ficus carica* in regulating bone-related gene expressions in postmenopausal osteoporotic rat models

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ABSTRACT

Introduction: Osteoporosis results in millions of fracture cases globally every year with the vast majority involving postmenopausal women. Postmenopausal women are exposed to 20% lifetime risk of hip fracture and 50% risk of any osteoporotic fracture, which may decrease quality of life. The pharmacological treatments of postmenopausal osteoporosis are estrogen replacement therapy (ERT), bisphosphonates, denosumab and teriparatide. While effective, long-term use of these agents is associated with various adverse effects, prompting the search for alternative therapies with fewer adverse effects. Ficus carica (FC), commonly known locally as fig or 'buah tin', is rich in bioactive compounds and essential minerals such as calcium, magnesium, and strontium, all of which are important for bone health. This study aimed to evaluate the bone-protective effects of FC by analyzing the expression of bone-related genes in a postmenopausal osteoporotic rat model. **Materials and Methods:** Forty female Sprague Dawley rats were divided into five groups. Group I consisted of sham-operated rats, while Groups II–V were ovariectomized. Groups I and II received distilled water (0.2 ml/100 g), Group III received ERT (64.5 µg/kg), and Groups IV and V received dried and raw fig extracts, respectively (1000 mg/kg). All treatments were administered daily via oral gavage for 10 weeks. **Results:** Treatment with fig significantly increased the expression of bone resorption genes (RANKL, OPG, and CSF1) and showed an upward trend in the expression of bone formation genes (Alp1, Col1a1, and Runx2). This bone-protective potential is due to the anti-inflammatory, antioxidative and phytoestrogenic properties of FC. **Conclusion:** In conclusion, both raw and dried fig at a dose of 1000 mg/kg demonstrated potential bone-protective effects in the treatment of postmenopausal osteoporosis. Further studies are warranted to confirm these findings.

Keywords: Post-menopausal osteoporosis, Ficus carica, fig, bone formation, bone resorption, gene