## Abstract

**Background:** Polycystic ovarian syndrome (PCOS) is a chronic complex disorder that affects about 1 in 10 women worldwide. There is a complex relationship with genetic, metabolic, endocrine, environmental, and lifestyle factors in PCOS and the etiology that remains poorly understood. Insulin resistance has been associated highly with PCOS. It is believed insulin resistance is the main pathogenic factor related to the increased rate of metabolic disturbances among women with PCOS. Butyrylcholinesterase (BuChE) is a non-specific type of cholinesterase enzyme that hydrolyzes different types of choline esters. Butyrylcholinesterase may be indirectly involved in the pathogenesis of insulin resistance. Studies have shown that BuChE may be indirectly contributing to the pathogenesis of type 2 diabetes mellitus by causing insulin resistance. This study was conducted to address the question of whether women with polycystic ovarian syndrome have higher butyrylcholinesterase activity than controls and also to determine the association between the activity of this enzyme and insulin resistance.

**Methods:** With a case-control study, 56 women diagnosed with PCOS according to the Rotterdam 2003 criteria as case group and 62 non-PCOS women as control group were enrolled in the study. Menstrual status along with metabolic parameters such as fasting serum insulin, fasting plasma glucose (FPG), homeostatic model assessment of insulin resistance (HOMA-IR), body mass index (BMI) were measured. BuChE activity was measured by using Ellman assay.

**Results:** women with PCOS had significantly higher menstrual irregularity (P=0/001), FIns (P=0/008), insulin resistance (P=0/014) and butyrylcholinesterase activities (P=0/004) than non-PCOS women. In women with PCOS, BuChE activity was significantly correlated with BMI. In Insulin resistant women, BuChE activity was significantly higher in case group (P=0/012).

**Conclusion:** These results indicate that higher activity of BuChE is associated with pathogenesis of PCOS and insulin resistance could be a link for this connection.

**Keywords:** Polycystic ovarian syndrome, Insulin resistance, Butyrylcholinesterase, Metabolic syndrome