Several studies point to an important function of cyclooxygenase (COX) and prostaglandin signaling in models of synaptic plasticity which is associated with N-methyl-D-aspartate receptors (NMDARs). Cyclooxygenase gene is suggested to be an immediate early gene that is tightly regulated in neurons by NMDA dependent synaptic activity. Nonsteroid Antiinflammatory Drugs (NSAIDs) exert their antiinflammatory effect by the inhibition of COX have controversial effects on learning and memory. We administered ibuprofen as a non-selective COX-2 inhibitor and nimesulide as a selective COX-2 inhibitor for 8 weeks for determining the cognitive impact of subchronic administration of NSAIDs to aged rats. Wistar albino rats (16 mo, n = 30) were separated into control (n = 10), ibuprofen (n = 10) and nimesulide (n = 10) treated groups. First we evaluated hippocampus-dependent spatial memory in the radial arm maze (RAM) and then we evaluated the expression of the NMDAR subunits, NR2A and NR2B by western blotting to see if their expressions are affected by subchronic administration with these drugs. Ibuprofen and nimesulide treated rats completed the task in a statistically significant shorter time when compared with control group (p < 0.01), but there was no statistically significant difference between groups about choice accuracy data in RAM. Furthermore, no statistically significant difference was detected for the protein expressions of NR2A and NR2B of the subjects. Oral administration of ibuprofen and nimesulide for 8 weeks showed no impairment but partly improved spatial memory.