The present work examines the role of uremia and the effect of dialysis treatment on red blood cells (RBCs) membrane properties of hemodialysis patients. The results showed that, the uremic patients had a lower value of erythrocyte deformability than that of healthy control subjects. the median osmotic fragility (MOF) showed a significant increase in hemodialyzed patients than that for the control group. The osmotic resistance to hemolysis was improved after dialysis. The solubilization process of the RBCs membrane showed that the detergent concentration needed to solubilize the RBCs membrane for uremic patients was much higher than that for the control group. The abnormalities of the present results for RBCs membrane properties are mostly related to membrane fluidity, which are slightly improved after dialysis. Biochemical analysis showed a decreasing trend in RBCs count, urea nitrogen, creatinine, potassium, phosphate, hemoglobin, and serum osmolarity after dialysis. Moreover, serum sodium, ionized calcium, and blood sugar, showed a significant increase after dialysis.