This study evaluated the effect (at 0.6 and 12 months) of three interventions [Only lifestyle changes (LSC) vs Metformin + LSC since beginning (LSC + M) vs Metformin added after three months of LSC (LSC»M)] on the relative body mass index (RBMI) in 131 adolescents [African-American (AA) and Caucasians (C)] X ± s.e. age (years), 13.2 ± 0.2; weight (Kg), 102.2 ± 4.8; BMI (Kg/m²), 37.2 ± 0.5; RBMI (%), 194 ± 2.3; 30% diabetics; 38.2% hypertensives and 40.5% with MetS. Those groups receiving metformin (LSC»M and LSC+M) reached a faster (at 6 months) significant weight reduction and the group LSC+M continued a non-significant (p = 0.068) weight loss between 6 and 12 months (~ 5% of basal RBMI). However, no statistical differences were found between groups. When subjects receiving metformin were pooled (n=88) no difference in the variation of RBMI was found when compared with the LSC group (n=44). A logistic regression analysis including intervention group, presence of MetS, number of components of MetS, age, gender, race, presence of T2DM, number of visits, severity of obesity, insulin secretion (Insulinogenic index, CIR 30), insulin sensitivity (HOMA-IR, Cisi, QUICKI) and inflammation (high hs-CRP and/or fibrinogen), shown that AA race (p = 0.05), presence of MetS (p = 0.02) and number of components of MetS (p = 0.04) predict (89%) more than 5 points RBMI reduction. We recommend identify the presence of MetS in all obese adolescents, especially female AA to implement LSC. The possible benefit of metformin on RBMI remains unclear.