

model assessment of insulin resistance (HOMA-IR) was calculated. BMC increased from NW to OW to OB (mean  $1.35 \pm 0.4$ ,  $1.41 \pm 0.4$ , and  $1.49 \pm 0.4$  kg, respectively,  $p=.005$ ). Peak VO<sub>2</sub> decreased from NW to OW to OB ( $41.3 \pm 9.7$ ,  $35.5 \pm 7.7$ ,  $28.9 \pm 5.5$  mL/kg per min, respectively,  $p < .001$ ). After adjusting for sex, age and lean body mass, BMC was inversely related to fat mass ( $r = -0.34$ ,  $p < .001$ ) and HOMA-IR ( $r = -0.29$ ,  $p < .001$ ). Similar relationships were found for BMD. In a regression model with BMC as the dependent variable, lean body mass (standardized coefficient ( $\beta$ )=0.95,  $p < .001$ ) was positively and fat mass ( $\beta = -0.18$ ,  $p < .001$ ) negatively associated with BMC (model  $R^2 = 0.88$ ,  $p < .001$ ). HOMA-IR ( $\beta = -0.07$ ,  $p = 0.001$ ) and VO<sub>2</sub>peak ( $\beta = 0.09$ ,  $p = 0.003$ ) had significant and opposite associations with BMC (model  $p < .001$ ) but fat mass was no longer a significant contributor. With BMD as the dependent variable, lean body mass ( $\beta = 0.82$ ,  $p < .001$ ), HOMA-IR ( $\beta = -0.06$ ,  $p = 0.04$ ) and peak VO<sub>2</sub> ( $\beta = 0.17$ ,  $p < .001$ ), but not fat mass, contributed to the variance in BMD ( $R^2 = 0.79$ ,  $p < .001$ ). In conclusion, lean body mass is the major determinant of BMC and BMD in Hispanic youth. Adiposity associated insulin resistance has a negative effect on BMC and BMD. CRF contributes positively to the variance in BMC and BMD. This suggests that CRF and higher lean mass attenuate the adverse effects of insulin resistance on bone health in children.

## Pediatric Endocrinology

### DIABETES, INSULIN, AND LIPIDS IN PEDIATRIC ENDOCRINOLOGY

#### *Trends in HbA1c Change Among Youth Referred to a Pediatric Type 2 Diabetes Prevention Clinic*

Emily Paprocki, DO, Yun Yan, MD, Brian R. Lee, PhD, Mitchell Barnes, Francesco De Luca, MD, Kelsea Halpin, MD, MPH.

Children's Mercy Kansas City, Kansas City, MO, USA.

**Background:** Pediatric type 2 diabetes (T2D) has increased in prevalence as childhood obesity rates climb. More youth are being referred to pediatric endocrinology due to the concern for developing T2D, yet prediction of which children will progress to overt T2D is challenging. We describe a single center experience with pediatric prediabetes referrals and trends in HbA1c change.

**Methods:** Retrospective review of new patients seen at a Type 2 Diabetes Prevention (T2DP) Clinic July 2015 - December 2019. All children referred to T2DP Clinic have an elevated BMI and findings of insulin resistance/prediabetes/early T2D. They are evaluated by pediatric endocrinology providers and dietitians at each visit.

The outcome of interest was categorical HbA1c change between patients' initial and most recent T2DP Clinic visit. Only HbA1c measurements conducted at the study site were included to address inconsistencies in lab assays. HbA1c at the initial visit was categorized into 3 groups: 1)  $< 5.7\%$ ; 2)  $5.7$  to  $< 6.5\%$ ; 3)  $6.5$  to  $< 8.5\%$ . Final HbA1c was categorized similarly with the option to progress to a 4<sup>th</sup> HbA1c group of  $\geq 8.5\%$ . Patients were categorized as progressors, regressors, or stable depending on change in group (e.g., group 1  $\rightarrow$  group 2) between initial and most

recent HbA1c. Comparisons between groups were made using ANOVA and Fisher's exact tests.

**Results:** Among 297 patients seen for an initial visit, mean BMI z-score was 2.3 and body fat percentage was 44%. High blood pressure occurred in 47%, high ALT in 24%, low HDL in 14%. Prevalence of initial HbA1c  $< 5.7\%$ ,  $5.7$  to  $< 6.5\%$ , and  $6.5\%$  to  $< 8.5\%$  was 46%, 42%, and 12%, respectively. One-third (31%) were prescribed metformin at their initial visit.

Only 63 patients (21%) had 2 or more visits in the T2DP Clinic with study site HbA1c data available. Of those 63 patients, mean age at initial visit was 12.5 years, BMI z-score 2.0, and body fat 46%. Most patients were female (68%) with public insurance (70%). Race/ethnicity was 35% black, 29% white, 30% Hispanic. Mean time between initial and most recent HbA1c was 11.9 months. Assessment of categorical HbA1c change showed 14% of patients with progression ( $n=9$ ), 65% stable ( $n=41$ ), and 21% with regression ( $n=13$ ). Female sex, ALT elevation, HbA1c, fasting glucose were found to be statistically different between the groups at baseline ( $p < 0.05$ ). Age, race/ethnicity, BMI, body fat percentage, elevated blood pressure, lipid profile, 120-minute glucose on OGTT, and metformin use were not different between the groups.

**Conclusions.** Only 14% of children who presented for follow up in our T2DP clinic demonstrated progression in HbA1c. Risk factors for those who progress include female sex and ALT elevation. Further development of predictive models to identify this high-risk population who will progress is necessary. Retaining consistent follow up in pediatric prediabetes clinics presents a challenge.

## Pediatric Endocrinology

### DIABETES, INSULIN, AND LIPIDS IN PEDIATRIC ENDOCRINOLOGY

#### *Trends of Diabetes and Prediabetes Prevalence Among Korean Adolescents From 2007 to 2018*

Jihyun Kim, MD, PhD<sup>1</sup>, Jungsub Lim, MD, PhD<sup>2</sup>.

<sup>1</sup>Dongguk university Ilsan hospital, Goyang-si, Korea, Republic of, <sup>2</sup>Korea Cancer Center Hospital, Seoul, Korea, Republic of.

**Background:** To provide updated prevalence data and to estimate changes in the prevalence of diabetes among Korean adolescents by sex and age between 2007 and 2018.

**Methods:** We used the data of children and adolescents (8,718 subjects aged 10 to 18 years) from the Korea National Health and Nutrition Examination Survey IV-VII (KNHANES 2007-2018). The recent prevalence of diabetes and pre-diabetes estimated by using the latest KNHANES VII. The linear trends were estimated by comparing 3-year KNHANES cycles according to sex and by using logistic regression. **Results:** The prevalence of diabetes and pre-diabetes was 0.298% (95% CI, 0.289-0.308) and 7.914% (95%CI, 0.43-0.49). The prevalence of diabetes was a significant increase from 0.189 to 0.430 during KNHANE IV and VII. A positive linear trend is significant for diabetes ( $p$  trends=0.006) in only male subjects. The prevalence of pre-diabetes was a significant increase from 5.86 to 12.08 in both sexes. During KNHANES IV and VII, the prevalence of obesity increased significantly. **Conclusion:** Between