

Increasing Trend of Fasting plasma Glucose levels and impaired fasting glucose in non-diabetic Korean Youth and young adults : A Nationally Representative Population-based Study

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Introduction

Diabetes in children and young adults is increasing worldwide. However, the study of change in fasting glucose among general pediatric and young adult population was lacking. The aim of this study was to investigate the secular trend of fasting plasma glucose (FPG) levels in non-diabetic Korean youth and young adults and to evaluate change in the proportion of impaired fasting glucose (IFG).

Materials and Methods

Study subjects were Korean youth aged 10-19 years and young adults aged 20-29 years who participated in the Korea National Health and Nutrition Examination Survey (KNHANES). KNHANES was a nationally representative cross-sectional survey. KNHANES wave 3 (K3) was performed in 2005, KNHANES 4 (K4) in 2007-09, KNHANES 5 (K5) in 2010-12 and KNHANES 6 (K6) in 2013-15. Study participants were classified according to FPG: normal plasma glucose (<100 mg/dL); IFG (100-125 mg/dL).

Results

A total of 14,128 eligible participants (6,872 youth aged 10-19 years, 7,256 young adults aged 20-29 years) with available FPG were enrolled. Mean FPG (mg/dL) in youth was 87.6 ± 0.3 in K3, 88.6 ± 0.3 in K4, 88.5 ± 0.2 in K5, and 91.3 ± 0.2 in K6, respectively ($P < 0.001$). In young adults, mean FPG was 85.1 ± 0.4 in K3, 87.3 ± 0.2 in K4, 87.4 ± 0.2 in K5, and 89.0 ± 0.3 in K6, respectively ($P < 0.001$). Significantly higher fasting glucose levels were observed in boys (89.7 ± 0.1 mg/dL vs. 88.6 ± 0.1 mg/dL; $P < 0.001$). The absolute change in FPG between K3 and K6 was 3.7 ± 0.4 mg/dL in youth and 3.9 ± 0.5 mg/dL in young adults. The proportion of IFG in youth was 3.2% in K3, 5.2% in K4, 4.6% in K5, and 9.9% in K6 ($P < 0.001$). In young adults, the proportion of IFG was 2.1% in K3, 5.5% in K4, 5.0% in K5, and 6.8% in K6, respectively ($P = 0.005$). In overweight and obese population, proportion of IFG was 3.9% in K3, 11.3% in K4, 11.3% in K5, and 12.0% in K6, respectively ($P = 0.02$). In normal weight population, proportion of IFG was 3.1% in K3, 4.5% in K4, 3.5% in K5, and 8.4% in K6, respectively ($P < 0.001$). In multiple regression analyses, mean FPG showed significant linear correlation with KNHANES wave after adjusting sex, age and body mass index (adjusted $R^2 = 0.073$, $P < 0.001$).

Table 1. Clinical characteristics of study participants

	10-19 years	20-29 years	P-value
N (%)	6,872 (52.9%)	7,256 (47.1%)	
Age (years)	15.11 ± 0.04	25.24 ± 0.05	<0.001
Male, n (%)	4,309 (52.9%)	2,563 (53%)	0.91
BMI (kg/m²)	20.89 ± 0.05	22.66 ± 0.06	<0.001
Obesity, n (%)	784 (10.0%)	1,244 (22.4%)	<0.001
Waist circumference (cm)	70.31 ± 0.14	76.79 ± 0.17	<0.001
Fasting plasma glucose (mg/dL)	89.07 ± 0.11	87.51 ± 0.13	<0.001
Systolic blood pressure (mmHg)	103.3 ± 0.2	108.9 ± 0.2	<0.001
Diastolic blood pressure (mmHg)	66.3 ± 0.1	71.8 ± 0.2	<0.001
Total caloric intake (Kcal/d)	2019 ± 13	2169 ± 18	0.007
CHO intake (g/d)	321.1 ± 1.9	306.8 ± 2.4	<0.001

Figure 1. Distribution of fasting plasma glucose

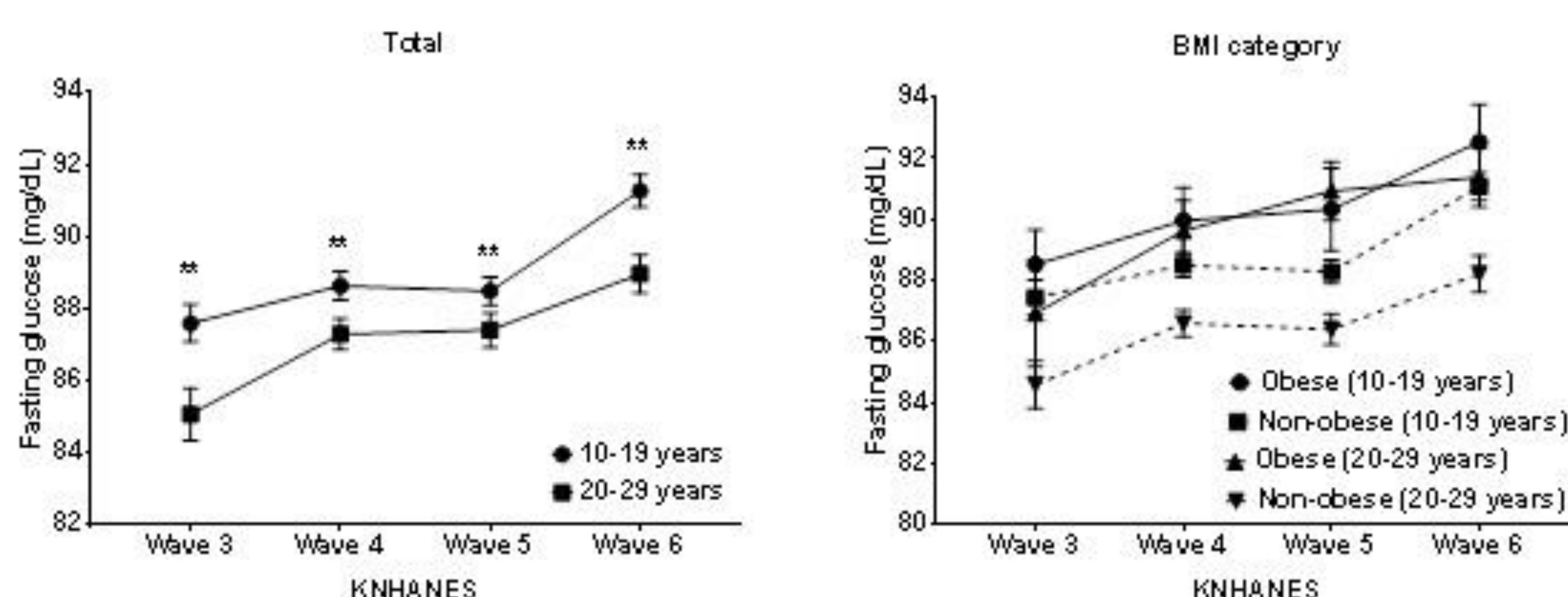
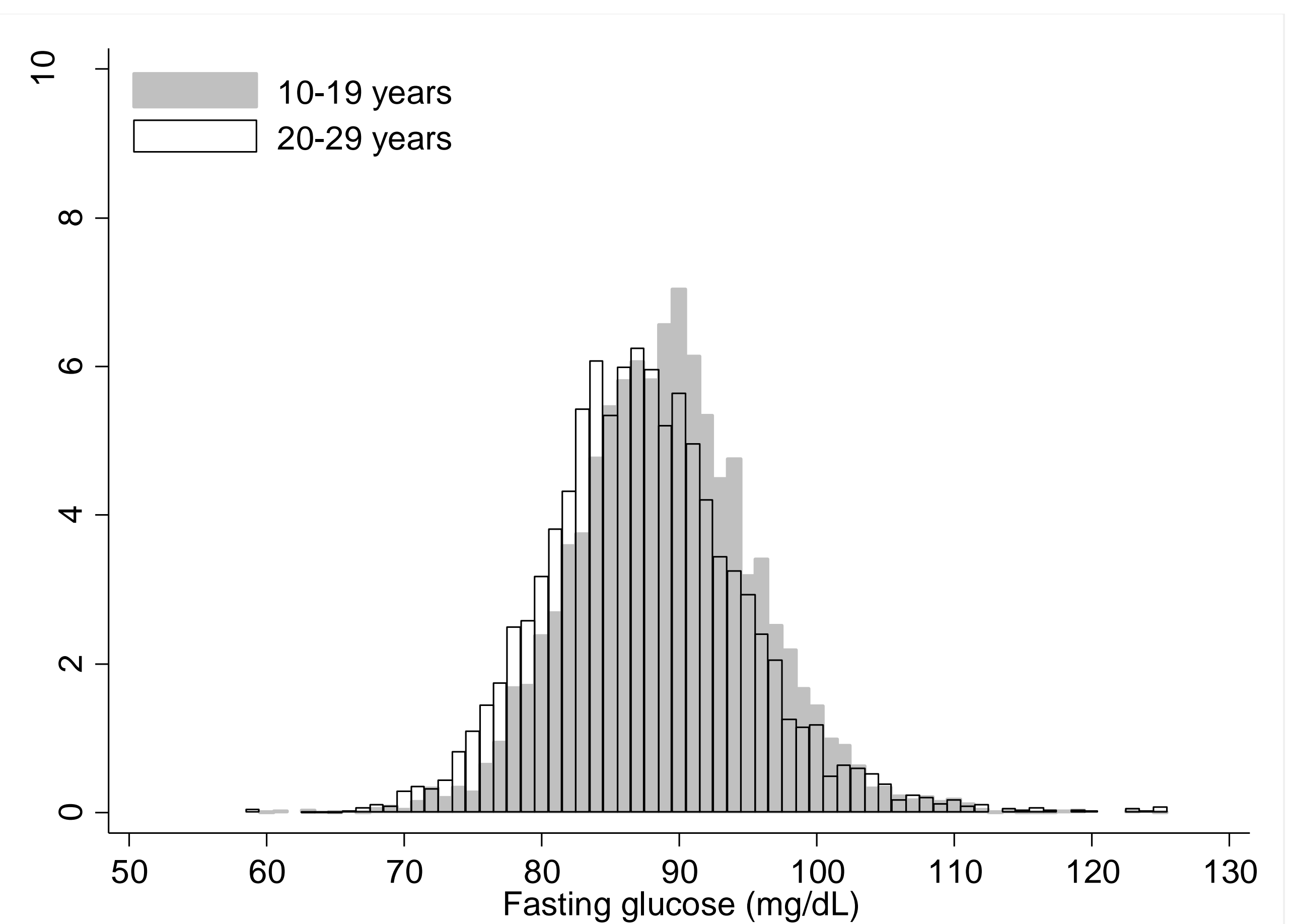


Figure 1. Secular changes of mean fasting plasma glucose by KNHANES wave and age (A), and by KNHANES wave and BMI category (B)

Conclusions

In Korean youth and young adults, mean FPG showed increasing tendency over the last 10 years. The proportion of IFG was increasing, especially in males and obese population. Further research is needed to investigate associated factors with this trend.

Conflicts of Interest

Nothing to declare.