

Lipid Profiles in Children and Adolescents: the Effect of Weight and Diabetes Status

Tomader Ali, Saradalekshmi Radha, Esphie Fojas, Radwa Helal, Mariam Wazan, Sherif El-Reftee, Hani Sabbour, Nader Lessan

Imperial College London Diabetes Centre (Abu Dhabi, United Arab Emirates)

Introduction: Dyslipidaemia, diabetes and obesity are well-established CV risk factors in adults; the Framingham and the UKPDS scores incorporate LDL-c and diabetes status in CV risk calculation. Data on prevalence of lipid disorders in children and adolescents and the relationship to obesity and diabetes remain scant. We aim to: (1) determine the distribution of lipid parameters in children and adolescents and (2) explore associations between dyslipidemia, obesity and diabetes.

Methods: Children and adolescent patients seen at ICLDC were included in this 10-year retrospective cohort study. Relevant information and data on total cholesterol (TC), non- and high-density lipoprotein cholesterol (non-HDL-c and HDL-c), and low-density lipoprotein cholesterol (LDL-c), were retrieved from the electronic database. Patients who were underweight, with nephrotic syndrome or hypothyroidism or familial hypercholesterolemia, or were on statins or steroids were excluded. Included patients were stratified based on BMI percentiles and glucose tolerance and the 50th (median) and 95th percentiles for the lipids per group were calculated. Normal distribution curves were plotted using ggplot2 package in R. Statistical analyses were performed on SPSS24.

Results: A total of 11,116 children and adolescents (age ≤ 19 years) were identified. Following exclusion, 8,306 patients were included in the analyses; 4,984 (60.0%) normal weight-BMI 5th- 85th percentile; 3,322 (40.0%) overweight and obese-BMI $\geq 85^{\text{th}}$ percentile. Both groups had: (1) a Non-diabetic group with normal glucose tolerance (NGT), (2) a pre-diabetic and (3) a diabetic group. A clear and significant upward trend in median TC was seen with increasing weight from normal to overweight/obese group which was further enhanced by presence of diabetes. Worsening due to overweight/obesity and diabetes was likewise observed with HDL indicated by a decrease in levels and a leftward shift in the distribution curves (Figure 1).

Conclusion: To our knowledge, this is the first description of prevalence and distribution of lipid abnormalities in a large Emirati cohort of children and adolescents. Our data suggest a large number of these patients may need to be considered, at the very least, for conservative interventions such as lifestyle modification. Furthermore, a significant number within this population, particularly those with diabetes and/or obesity, may also be considered for pharmacological treatment.

1. Conflict of Interest:

None

2. Funding:

No Funding

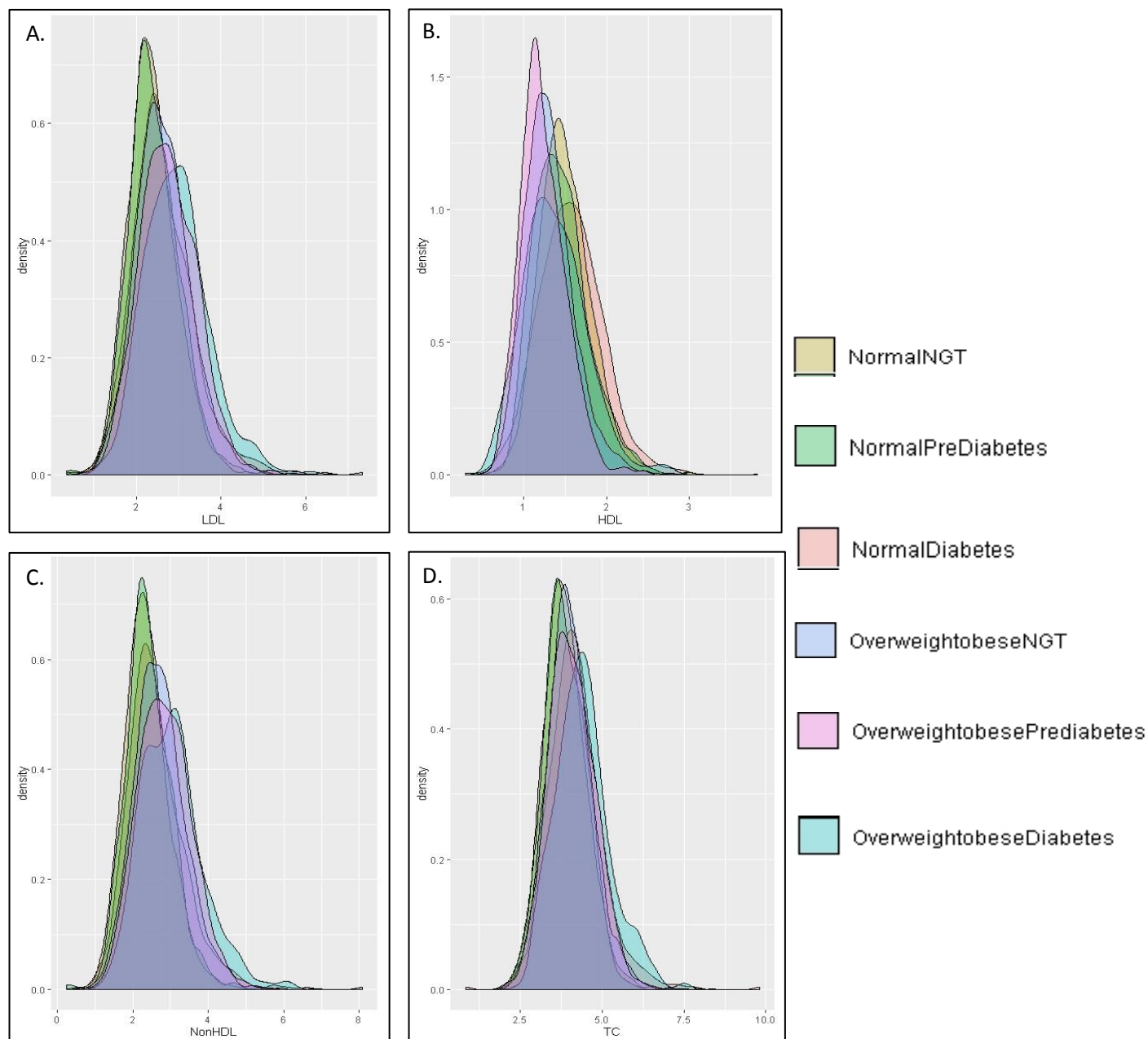


Figure1. Lipid parameters in children and adolescents. Density for various lipid parameters were plotted on ggplot on R program for; A. (LDL-c), B. (HDL-c), C. (non-HDL-c) and D. (TC).

Lipid Parameter (mmol/L)	Group1 Normal Weight + NGT	Group 2 Normal Weight + Pre-diabetes	Group 3 Normal Weight + Diabetes	Group 4 Overweight/Obese + NGT	Group 5 Overweight/Obese + Pre-diabetes	Group 6 Overweight/Obese + Diabetes	P value
LDL	2.33 ± 0.73	2.36 ± 0.77	2.52 ± 0.92	2.59 ± 0.83	2.73 ± 0.94	2.91 ± 1.06	<0.001
HDL	1.48 ± 0.41	1.41 ± 0.42	1.56 ± 0.51	1.28 ± 0.37	1.19 ± 0.35	1.12 ± 0.40	<0.001
TC	3.83 ± 0.86	3.84 ± 0.89	4.12 ± 0.96	3.98 ± 0.88	4.03 ± 0.95	4.19 ± 0.13	<0.001
Non HDL	2.33 ± 0.75	2.38 ± 0.77	2.51 ± 0.92	2.68 ± 0.68	2.80 ± 0.98	3.08 ± 1.27	<0.001

Table 1. Lipid Parameters in Children and Adolescents. Median with interquartile ranges (IQRs) were calculated for various lipid parameters; A. (LDL-c), B. (HDL-c), C. (non-HDL-c) and D. TC. Significance at 0.05 was tested using Kruskal-Wallis ANOVA on SPSS24.