Editorial

http://dx.doi.org/10.4070/kcj.2012.42.2.80
Print ISSN 1738-5520 • On-line ISSN 1738-5555

kcj
Korean Circulation Journal

Knowledge Gap Regarding Low Density Lipoprotein-Cholesterol Levels in Koreans

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It is well known that dyslipidemia is a major risk factor for coronary heart disease and stroke, which are currently the leading causes of death in Korea. Dyslipidemia refers to the abnormal amount or imbalance of lipids in the blood, and its clinically important types include elevated total cholesterol, elevated triglycerides, elevated low density lipoprotein-cholesterol (LDL-C), and decreased high density lipoprotein-cholesterol (HDL-C) levels. Among the major types of blood cholesterol, LDL-C is the most extensively studied in association with the risk of cardiovascular disease. Numerous observational and experimental studies have confirmed that a high LDL-C level is strongly associated with the risk of cardiovascular disease, and lipid-lowering medication and lifestyle modification can effectively lower cardiovascular disease incidence and mortality.[1-5] In Korea, dyslipidemia did not cause great public interest until the 1990s because of the relatively low incidence of coronary heart disease prior to 1990. Over the last few decades, obesity has become more prevalent in Korea due to increasing consumption of high-fat diets and decreasing physical activity,[6] and has raised concerns about dyslipidemia. The Korea National Health and Nutrition Examination Survey (KNHANES) measured blood levels of total cholesterol, triglycerides, and HDL-C in national representative samples since 1998. Thereafter the KNHANES official reports and independent research papers have reported the prevalence of dyslipidemia or metabolic syndrome.[6-19] Although LDL-C is a strong predictor of cardiovascular disease and most lipid-lowering drugs are targeted to reduce LDL-C level, there is only limited information about the prevalence and management indexes of high LDL-C in the Korean population. A possible reason for the lack of information on LDL-C level is that common criteria for metabolic syndrome include triglycerides and HDL-C levels but not LDL-C level.[20][21] Another reason is that the KNHANES and many other large population studies do not directly measure LDL-C.

In this issue of the Korean Circulation Journal, Choi et al.[22] report on the prevalence, awareness, and treatment rates of high LDL-C in Korean adults based on the 2005 KNHANES data. According to their estimation, 6.6% of Korean adults aged 20-79 years had LDL-C level of 160 mg/dL or higher. They estimated that 10.0% of Korean adults had LDL-C levels that should be lowered by pharmacologic treatment and 19.9% had LDL-C levels which needed therapeutic lifestyle modifications,[22] according to the Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults.[20] They also showed that only a small proportion of people with high LDL-C were aware of their condition and were currently under treatment. These estimations inform us about the burden of high LDL-C as well as our current status in preventive therapy for individuals at high cardiovascular risk. This study provides very useful information, especially because it is the first national demonstration of representative data on the prevalence, awareness, and treatment rates of elevated LDL-C. However, we also need to be cautious when we interpret these estimations and compare them with others. Prevalence of a certain disease can be differently estimated for a variety of reasons. Although differences in the study population and study design are the biggest causes of inconsistent prevalence estimation, even studies analyzing the same dataset can produce inconsistent disease prevalence.[23] Potential causes of inconsistent prevalence estimates may include different diagnostic criteria, different exclu-

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• The author has no financial conflicts of interest.

sion criteria, and different statistical methods. The distribution of lipid levels in Choi et al.[22] report was not equal to the distribution in the 2005 KNHANES official report. The most probable causes of this include different exclusion criteria and different statistical methods, especially in dealing with sampling weights. The paper described exclusion criteria for their analysis but did not mention how sampling weights were considered. The KNHANES applied unequal selection probabilities and assigned different sampling weights to each sample unit. Sampling units and their weights in the KNHANES were related to geographic regions and residential types. Although socioeconomic factors are not major determinants of dyslipidemia, they can be related with awareness and treatment of this condition. In addition, the effects of sampling weights can be greater when analyzing subgroup data rather than an entire dataset, because of smaller sample size. Calculation of LDL-C level can be another issue, as the authors already acknowledged. Calculated LDL-C levels are underestimated when compared with directly measured levels, and the discrepancies between two methods vary by sex, age, fasting hours, and triglyceride levels.[24][25] Thus the prevalence, awareness, and treatment rates can be affected by the methods of LDL-C measurement. It is difficult to determine which study produces the best estimate of disease prevalence, because each study involves unique objectives and rationales for the methodologies employed. Instead we should consider the potential causes of different estimates when reporting and interpreting research data on disease prevalence, awareness, and treatment rates.

The KNHANES datasets are a useful source for understanding distributions of lipid levels in the Korean population. Direct measurement of LDL-C can be adopted in the KNHANES considering the importance of LDL-C in the diagnosis and treatment of dyslipidemia and the prevention of cardiovascular disease. More studies based on the KNHANES and other population datasets are required to understand where we stand and where we are going in the management of dyslipidemia. Meanwhile, we should be aware of the potential causes of different estimates when we report and compare population data on LDL-C level.

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