An analysis of the blood pressure and hypertension using the dataset of medical checkups

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Abstract

The medical expenditure of Japan has been rapidly increasing and it became 40.8 trillion yen in fiscal year 2014. It has becomes a serious financial issue. The World Health Organization (WHO) points out that the high blood pressure (BP) or hypertension is one of the most important health risk factors. The medical expenditure for hypertension and related disease was 1.85 trillion yen, 4.5% of total medical expenditure, and hypertension is now one of the most costly diseases. Therefore, it is a very important disease not only medical but also financial viewpoints.

In this paper, we first evaluated the distributions of BP using the dataset containing 113,979 medical checkups from 48,022 individuals obtained a health insurance association of one Japanese large corporation. The checkups were done in fiscal years 2013-2015. The ages of individuals were from 39 to 74. The means of systolic BP (SBP) and diastolic BP (DBP) were 127.2 and 80.0 mmHg for male and 119.0 and 72.4 mmHg, respectively. Gender was obviously a very important factor affecting BP.   Age, obesity, eating habits, daily activities, smoking, alcohol drinking, sleeping and wage were other important factors affecting BP.

Next, we evaluated the difference between two BP measurements using the date of 17,775 checkups where BP were measured twice. Both SBP and DBP measurements fluctuated largely despite of the fact that they were measured within short intervals. The first measurements were significantly higher than the second ones for both SBP and DBP, suggesting white coat effects should be considered in the BP measurements. The difference tended to increase as the value of first measurement increased for both SBP and DBP. Other important factors affecting the difference were gender, age, obesity and alcohol consumption. It is necessary to develop accurate and cost-effective BP measurement methods.

Keywords: blood pressure measurement, hypertension, medical checkup