

Analyzing health status using questionnaires: Assessment of glucose metabolism status and water intake

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Abstract:

A simple method of assessing health status is required to monitor health status and prevent disease. This study addressed the following two challenges.

First, maintaining adequate water intake is essential for physical and mental health. Therefore, we aimed to validate a selective recall method for assessing water intake. In a clinical trial, participants recorded the food and beverages consumed via a multiple-choice questionnaire. We multiplied the obtained data by the water conversion factor for cooking to calculate water intake. While we assessed the same water intake of the participants by a validated method, the descriptive dietary record method. As a result, there was a strong correlation between the water intakes by the two methods ($r = 0.94$, $p < 0.0001$). Thus, the new method was shown to assess water intake accurately. The method makes it easier for a user to enter dietary data and for an investigator to calculate water intake.

Second, it is necessary to understand one's glucose metabolism status to take appropriate measures to prevent diabetes. Therefore, we aimed to identify the glucose metabolism statuses using a questionnaire. In a clinical trial, participants underwent an oral glucose tolerance test (OGTT) and completed a lifestyle and physical characteristics questionnaire. We classified them into four glycometabolic categories based on the OGTT results. We developed machine learning models using questionnaire responses to identify the glycometabolic category. As a result, the AUCs to classify category 1 and others, category 2 and others, category 3 and others, and category 4 and others were 0.68, 0.66, 0.61, and 0.70. Furthermore, several selected variables were new lifestyle factors related to glucose metabolic status that have not been reported.