Factors that are related to reduced visual acuity in male junior high school students and their effects: findings based on cross-sectional study

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Objectives　The study was performed to find factors in daily routines and living environments of male junior high school students that are linearly or non-linearly related to reduced visual acuity and to assess the strength of their relationships.

Methods　Data on daily routines and living environments were collected by questionnaire from 382 male junior high school students and these data are matched with records on visual acuity of each student measured at the annual school medical examinations. In addition to univariate statistical analysis, multivariate analysis was conducted by the spline logistic regression developed in this paper by modifying the similar technique for follow-up studies; the detail of the method is given in the appendix of this paper.

Results　A significant association was found between "viewing distance from a TV" and "reduced visual acuity" ($P=0.004$). There was also a significant interaction observed between "viewing distance from the TV" and "hair-obstructed eyes" ($P=0.012$). Furthermore, it was found that the adjusted odds ratio between the "reduced visual acuity" and "having 1〜2 days of physical activity per week" relative to "having physical activity less than one day per week" was 0.27, which was statistically significant ($P=0.022$). While the adjusted odds ratio continued to decrease as the physical activity increased per week, this was not significant as compared to "having physical activity 1〜2 days per week" ($P=0.204$).

Conclusions　Exercising 1〜2 days per week outside of school can prevent reduced visual acuity. In addition, students should be encouraged to prevent hair from obstructing their eyes and they should view TV from a distance of more than 2.5 m, as such behavior can prevent reduction in visual acuity.

Key words : visual acuity, male junior high school students, spline, logistic model, cross-sectional study

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