Research Article

Myopia in Chinese Adolescents: Its Influencing Factors and Correlation with Physical Activities

Yao Yin,1 Cheng Qiu,2 and Yufei Qi3

1Beijing College of Finance and Commerce, No. 15, Shuizi East Rd., Chaoyang District, Beijing, China
2People’s Public Security University of China, Huangyi Rd., Daxing District, Beijing, China
3Central South University, 932 Lushan South Rd., Changsha, China

Correspondence should be addressed to Cheng Qiu; 20052483@ppsuc.edu.cn and Yufei Qi; yufeiqi@csu.edu.cn

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Purpose. The study is conducted to analyze the risk factors and the protective factors of myopia in Chinese adolescents and its correlation with physical activities and then to provide 2 formulas to predict the probability of becoming myopic and the probability of preventing myopia.

Methods. This is a cross-sectional study in which a questionnaire survey was conducted among 650 students aged 14-17 from 5 schools in Beijing in 2021. The students were divided into two groups: nonmyopia group and myopia group. Statistically significant variables were selected after the univariate analysis for a binary logistic regression analysis. Results. In the univariate analysis, 18 risk factors of myopia were found and 14 physical-activity-related protective factors were found. In the multivariate analysis, 5 independent factors were found to be positively related to myopia and could be used for calculating the probability of becoming myopic. The 5 factors are gender, staying up late playing smartphones, parental myopia, daily time spent on digital devices, and regular eye examinations. Five physical-activity-related factors were found to be positively related to the prevention of myopia and can be used for the calculation of the probability of preventing myopia. The 5 factors are regular physical activities, attitude towards physical education, daily time spent on in-school physical activities, daily time spent on after-school physical activities, and eye exercises. Conclusions. The influencing factors of myopia in adolescents mainly include heredity, habits of using eyes, and environment. Physical activities can effectively reduce the probability of becoming myopic in adolescents and promote eye health. Therefore, taking part in physical activities is an effective way to reduce the prevalence of myopia in adolescents.

1. Introduction

Eye health was defined by the Lancet Global Health Commission as maximized vision, ocular health, and functional ability, thereby contributing to overall health and well-being, social inclusion, and quality of life [1]. The International Agency for the Prevention of Blindness (IAPB) stressed in 2030 IN SIGHT that the eye health of children and adolescents was the focus of future work and should be integrated into school health policy resulting in schools the world over routinely offering sight tests and eye health promotion and prevention information should be taught within education settings [2].

The incidence of myopia in China has increased significantly in recent years. Some pointed out that 20% to 50% of the students in primary school, 35% to 60% of the students in middle school, and 50% to 75% of the students in college are myopic in China in 2018 [3]. As of October 2021, 52.7% of the children and adolescents in China were myopic, and the rate was 2.5% higher than that in 2019 [4]. Schools, where children and adolescents carry out daily activities, are the main places for the improvement of their physical and mental health. The Ministry of Education attaches great importance to the prevention and control of myopia in young students and has formulated a specific work plan for it in 2018. Multiple measures and much effort have been taken to curb the prevalence of myopia.

Previous studies show that gender, age, region of habitation, family history of myopia, daily reading time, breaks while studying, daily time spent on digital devices, and
learning piano are independent risk factors of myopia in primary school students in China [5]. The pathogenesis of myopia remains unclear so far, which may be related to genetic, environmental, and other factors. Some argued that the influence of environmental factors, such as bad habits of using eyes and visual fatigue, was greater than that of genetic factors [6, 7]. In summary, the eye health of children and adolescents is closely related to the environment, heredity, and intense use of the eyes.

It is regarded as an important part of student management, education, and teaching in China’s School Management Standards for Compulsory Education that schools should help students to develop strong constitutions and reduce the prevalence of myopia among students. Mingmu Gong, a kind of Chinese eyesight improvement exercise, is said to have a significant effect on the recovery of students’ eyesight, which helps to relax the eye muscles and accelerate the eye blood flow and further promote the recovery of eye vision [8]. Smartphone users are more likely to be myopic, showing a moderate positive correlation between playing smartphones and myopia. Outdoor activities reduce the probability of myopia, showing a strongly negative correlation between outdoor activities and myopia [9]. Compared with nonmyopic children, myopic children spend more time watching screens and shorter time on outdoor activities [10]. Outdoor activities help to prevent adolescents from being sedentary and improve their eyesight. Physical education should be integrated with the health service system to promote eye health education.

Based on an in-depth literature review, this study analyzed the influencing factors of myopia in adolescents and predicted the probability of becoming myopic through the analysis of the risk factors of myopia. Physical activities were important factors affecting eye health, and in this study, they were analyzed and used to predict the probability of preventing myopia.

2. Research Objects and Methods

2.1. Participants. A total of 650 questionnaires were distributed to 650 middle school students in Beijing using stratified sampling, and 610 of them were collected. After excluding 31 invalid questionnaires, there were 579 (89%) valid questionnaires left.

2.2. Research Variables. Based on previous studies, this study summarized the influencing factors of myopia in adolescents and the physical-activity-related factors, according to which the questionnaire was designed. 17 binary variables were investigated, such as gender, only child, playing video games, parental myopia, reading posture, writing posture, staying up late playing smartphones, and regular physical exercises. 21 continuous variables were investigated, such as diopter, daily time spent on digital devices, daily sleep duration, distance to the TV screen, illumination while studying, drinking milk, bedtime, get-up time, afternoon nap duration, breaks while studying, reading extracurricular books, daily time spent in reading in extremely weak or strong light, picky about food, eating whole grains and vegetables, frequency of visual acuity tests, regular eye examinations, attitude towards physical education, daily time spent on in-school physical activities, after-school physical activities, and eye exercises.

2.3. Statistical Methods. The data were statistically analyzed by SPSS 26.0. The continuous variables were first tested for normality, and those that do not conform to the normal distribution were analyzed by nonparametric tests. Binary logistic regression was performed for the multivariate analysis, and GraphPad 9.0 was used to draw figures. All participants agreed to participate in the study.

2.4. Ethical Approval. This research was approved by the independent ethics committee of the Institute of Clinical Pharmacology, Central South University (registered number: ctzx-140003). All methods were carried out in accordance with relevant guidelines and regulations. This study was carried out in compliance with the ARRIVE guidelines. Informed consent was obtained from caregivers, and all information was kept strictly confidential.

3. Results and Analysis

3.1. Univariate Analysis. The chi-square test and the nonparametric two-sample test were performed for the univariate analysis of 24 independent variables. The results are as follows (see Table 1).

The results in Table 1 show factors such as gender, playing video games, parental myopia, reading posture, writing posture, staying up late playing smartphones, diopter, daily time spent on digital devices, daily sleep duration, distance to the TV screen, illumination while studying, daily time spent on homework, breaks while studying, reading extracurricular books, daily time spent in reading in extremely weak or strong light, eating whole grains and vegetables, visual acuity tests, and regular eye examinations were found significant ($P < 0.05$). These factors were kept for the multivariate analysis. Factors such as only child, daily sleep duration, drinking milk, get-up time, afternoon nap duration, and picky about food were found not significant, which means they are not the influencing factors of myopia in adolescents. The details are shown in Figure 1.

3.2. Univariate Analysis of Physical-Activity-Related Factors. The chi-square test and the nonparametric two-sample test were performed for the univariate analysis of 13 independent variables. The results are as follows (see Table 2).

The results in Table 2 show that the myopia rate of adolescents who often took part in physical activities is significantly lower than those who occasionally took physical exercise ($P < 0.05$). The myopia rate of adolescents who often participated in football, basketball, table tennis, track and field, swimming, tennis, badminton, volleyball, dance, and other sports is low ($P < 0.05$). Continuous variables such as attitude towards physical education, daily time spent on in-school physical activities, after-school physical activities, and eye exercises were found significant, and they were kept for the multivariate analysis. The details are shown in Figure 2.
| Parameter                          | Groups          | Myopia rate | $X^2/Z$ | $P$   |
|-----------------------------------|-----------------|-------------|---------|-------|
| Gender                            |                 |             |         |       |
| Male                              | 115             | 190         | 62.3%   | 5.543 | 0.019 |
| Female                            | 78              | 196         | 71.5%   |       |       |
| Only child                        |                 |             |         |       |
| No                                | 94              | 191         | 67.0%   | 0.031 | 0.860 |
| Yes                               | 99              | 195         | 66.3%   |       |       |
| Playing video games               |                 |             |         |       |
| Occasionally                      | 67              | 97          | 59.1%   | 5.823 | 0.016 |
| Often                             | 126             | 289         | 69.6%   |       |       |
| Parental myopia                   |                 |             |         |       |
| No                                | 76              | 107         | 58.5%   | 8.090 | 0.004 |
| Yes                               | 117             | 279         | 70.5%   |       |       |
| Reading posture                   |                 |             |         |       |
| Poor                              | 123             | 288         | 70.1%   | 7.396 | 0.007 |
| Good                              | 70              | 98          | 58.3%   |       |       |
| Writing posture                   |                 |             |         |       |
| Poor                              | 116             | 272         | 70.1%   | 6.250 | 0.012 |
| Good                              | 77              | 114         | 59.7%   |       |       |
| Staying up late playing smartphones|                 |             |         |       |
| Occasionally                      | 116             | 194         | 62.6%   | 5.013 | 0.025 |
| Often                             | 77              | 192         | 71.4%   |       |       |
| Diopter #                         |                 |             |         |       |
| <2.0                              | 75              | 40          | 10.40%  |       |       |
| 2.0-4.0                           | 27              | 105         | 27.20%  |       |       |
| 4.0-6.0                           | 35              | 105         | 27.20%  |       |       |
| 6.0-8.0                           | 38              | 94          | 24.40%  |       |       |
| >8.0                              | 18              | 42          | 10.90%  |       |       |
| Daily time spent on digital devices # |                 |             |         |       |
| <1 h                              | 73              | 39          | 10.10%  |       |       |
| 1-2 h                             | 29              | 113         | 29.30%  |       |       |
| 3-4 h                             | 43              | 123         | 31.90%  |       |       |
| >4 h                              | 48              | 111         | 28.80%  |       |       |
| Daily sleep duration #            |                 |             |         |       |
| <6 h                              | 29              | 75          | 19.40%  |       |       |
| 6-8 h                             | 109             | 215         | 55.70%  |       |       |
| >8 h                              | 55              | 96          | 24.90%  |       |       |
| Distance to TV screen #           |                 |             |         |       |
| <1 m                              | 28              | 89          | 23.10%  |       |       |
| 2-3 m                             | 35              | 72          | 18.70%  |       |       |
| 3-4 m                             | 48              | 84          | 21.80%  |       |       |
| 4-5 m                             | 40              | 73          | 18.90%  |       |       |
| >5 m                              | 42              | 68          | 17.60%  |       |       |
| Illumination while studying #     |                 |             |         |       |
| Reading lamp (white light)        | 29              | 92          | 23.80%  |       |       |
| Reading lamp (yellow light)       | 36              | 64          | 16.60%  |       |       |
| Pendant lamp (white light)        | 29              | 83          | 21.50%  |       |       |
| Pendant lamp (white light)        | 45              | 73          | 18.90%  |       |       |
| Natural light (sunlight)          | 54              | 74          | 19.20%  |       |       |
| Drinking milk #                   |                 |             |         |       |
| Never                             | 5               | 13          | 3.40%   |       |       |
| Occasionally                      | 61              | 118         | 30.60%  |       |       |
| Often                             | 57              | 148         | 38.30%  |       |       |
| Every day                         | 70              | 107         | 27.70%  |       |       |
| Bedtime #                         |                 |             |         |       |
| After 24:00                       | 91              | 222         | 57.50%  |       |       |
| 23:00-24:00                       | 50              | 105         | 27.20%  |       |       |
| 22:00-23:00                       | 36              | 33          | 8.50%   |       |       |
3.3. Multivariate Analysis of Influencing Factors of Myopia.

18 significant factors were kept for the multivariate analysis using binary logistic regression, and the factors are gender, playing video games, staying up late playing smartphones, parental myopia, reading posture, writing posture, diopter, daily time spent on digital devices, distance to the TV screen,

![Table 1: Continued.](image)

| Parameter | Groups | Myopia group | Nonmyopia group | Myopia rate | X^2/Z | P     |
|-----------|--------|--------------|-----------------|-------------|-------|-------|
| 21:00-22:00 | 16 | 26 | 6.70% |
| Get-up time # | 2 (1-3) | 2 (1-3) | 2 (1-3) | -0.783 | 0.434 |
| Before 5:00 | 57 | 116 | 30.10% |
| 5:00-6:00 | 51 | 115 | 29.80% |
| 6:00-7:00 | 67 | 129 | 33.40% |
| After 7:00 | 18 | 26 | 6.70% |
| Afternoon nap duration # | 2 (1-2) | 2 (1-3) | 2 (1-3) | -0.693 | 0.488 |
| No | 84 | 178 | 46.10% |
| <20 minutes | 72 | 101 | 26.20% |
| 20-40 minutes | 29 | 72 | 18.70% |
| >40 minutes | 6 | 28 | 7.30% |
| Daily time spent on homework # | 2 (2-3) | 2 (2-3) | 2 (2-3) | -4.201 | <0.001 |
| <40 minutes | 43 | 39 | 10.10% |
| 40-80 minutes | 74 | 135 | 35.00% |
| >80 minutes | 76 | 212 | 54.90% |
| Breaks while studying # | 2 (1-2) | 2 (2-3) | 2 (2-3) | -3.451 | 0.001 |
| Often | 60 | 76 | 19.70% |
| Rarely | 89 | 180 | 46.60% |
| Never | 44 | 130 | 33.70% |
| Reading extracurricular books # | 2 (1-2) | 2 (1.75-3) | 2 (1.75-3) | -3.547 | <0.001 |
| Dislike | 67 | 96 | 24.90% |
| Like | 93 | 173 | 44.80% |
| Very like | 33 | 117 | 30.30% |
| Daily time spent in reading in extremely weak or strong light # | 2 (1-3) | 2 (2-3) | 2 (2-3) | -2.528 | 0.011 |
| <20 minutes | 49 | 66 | 17.10% |
| 20-40 minutes | 81 | 161 | 41.70% |
| >80 minutes | 63 | 159 | 41.20% |
| Picky about food # | 4 (3-5) | 4 (3-5) | 4 (3-5) | -0.585 | 0.559 |
| Extremely | 4 | 10 | 2.60% |
| Quite | 10 | 24 | 6.20% |
| Moderate | 45 | 84 | 21.80% |
| Slightly | 49 | 111 | 28.80% |
| Not | 85 | 157 | 40.70% |
| Eating whole grains and vegetables # | 2 (2-3) | 3 (2-3) | 2 (2-3) | -4.243 | <0.001 |
| Never | 84 | 230 | 59.60% |
| Rarely | 68 | 120 | 31.10% |
| Often | 41 | 36 | 9.30% |
| Visual acuity tests # | 1 (1-2) | 1 (1-2) | 1 (1-2) | -2.011 | 0.044 |
| Rarely | 121 | 212 | 54.90% |
| Once every 6 months | 45 | 95 | 24.60% |
| Once every 3 months | 27 | 79 | 20.50% |
| Regular eye examinations # | 2 (1-2) | 2 (1-2) | 2 (1-2) | -2.800 | 0.005 |
| Never | 91 | 132 | 34.20% |
| Rarely | 80 | 199 | 51.60% |
| Annually | 22 | 55 | 14.20% |

*Factors ending with # are not normally distributed according to the results of the SW normality test.
illumination while studying, bedtime, daily time spent on homework, breaks while studying, reading extracurricular books, daily time spent in reading in extremely weak or strong light, visual acuity tests, regular eye examinations, and eat whole grains and vegetables. The results are as follows in Table 3.

From the above analysis, it can be clearly concluded that gender is an independent factor affecting the incidence of myopia ($P < 0.05$), and the incidence of myopia in females is 1.679 times higher than that in males. Staying up late playing smartphones is an independent factor of myopia ($P < 0.01$), and the incidence of myopia in those spending a long time playing smartphones is 1.964 times higher than in those spending a short time staying up late playing smartphones. Parental myopia is an independent factor affecting the incidence of myopia ($P < 0.01$), and the incidence of myopia in those with myopic parents is 1.880 times higher than in those who do not. Daily time spent on digital devices is an independent factor of myopia ($P < 0.01$), and the incidence of myopia in those spending a long time on digital devices is 1.721 times higher than that in those spending a short time on digital devices. Regular eye examinations is an independent factor of myopia ($P < 0.01$), and the incidence of myopia in those who never (or rarely) have their eyes examined is 1.614 times higher than that in those who have regular eye examinations annually. The rest factors are not independent influencing factors of myopia ($P > 0.05$).

From the above analysis, the forest plot of the five independent influencing factors of myopia was given.

Based on the above five factors in Figure 3 that significantly affect the incidence of myopia, a formula for predicting the probability of becoming myopic is given.

$$Z = -3.953 + 0.518 \times 1 \text{ (if gender = female)} + 0 \times 1 \text{ (if gender = male)} + 0.675 \times 1 \text{ (if staying up late playing smartphones = true)} + 0 \times 1 \text{ (if staying up late playing smartphones = false)} + 0.631 \times 1 \text{ (if parental myopia = true)} + 0 \times 1 \text{ (if parental myopia = false)} + 0.543 \times 3 \text{ (daily time spent on digital devices > 4 h)} + 0.478 \times 2 \text{ (regular eye examinations = false)}.$$

$$P_{\text{myopia}} = \frac{1}{1 + e^{-Z}}. \tag{1}$$

The following is an example that shows how to predict the probability of becoming myopic of a female student who often stays up late playing smartphones, has myopic parents, spends more than 4 hours on digital devices every
day, and rarely has her eyes examined.

\[ Z = -3.953 + 0.518 \times 1 + 0.675 \times 1 + 0.631 \times 1 + 0.543 \times 4 + 0.478 \times 2 = 0.999, \]

The probability of becoming myopic of the student is 73% (>50%), which means the student will be myopic.

\[ P_{\text{myopia}} = \frac{1}{1 + e^{-Z}} = \frac{1}{1 + e^{-0.999}} = 73%. \]
3.4. Multivariate Analysis of the Correlation between Physical Activities and Myopia. In the univariate analysis, 5 significant factors were kept for multivariate analysis using binary logistic regression, and the factors are regular physical activities, daily time spent on in-school physical activities, after-school physical activities, eye exercises, and attitude towards physical education. The results are as follows in Table 4.

From the above analysis, it can be clearly concluded that regular physical activities is an independent factor reducing the incidence of myopia ($P < 0.01$), and the incidence of myopia in those who had regular physical activities was 0.523 times lower. Daily time spent on in-school physical activities ($P < 0.001$), after-school physical activities ($P < 0.05$), eye exercises ($P < 0.01$), and attitude towards physical education ($P < 0.01$) were all independent factors reducing the occurrence of myopia. According to the above analysis, the forest plot of the five independent influencing factors against myopia was given.

Based on the 5 factors in Figure 4 that significantly prevent myopia, a formula for predicting preventing myopia prevalence is given.

$$Z = 1.986 - 0.648 \times 1 \text{ (if regular physical activities = true)} - 0.560 \times 3 \text{ (if daily time spent on in-school physical}$$

### Table 3: Binary logistic analysis of influencing factors of myopia.

| Parameter                          | B    | S.E.  | Wald | DF  | $P$  | OR   | OR 95% CI          |
|-----------------------------------|------|-------|------|-----|------|------|-------------------|
| Gender                            | 0.518| 0.206 | 6.302| 1   | 0.012| 1.679| 1.120 - 2.516     |
| Playing video games               | 0.006| 0.761 | 0.000| 1   | 0.993| 1.006| 0.226 - 4.747     |
| Staying up late playing smartphones| 0.675| 0.232 | 8.488| 1   | 0.004| 1.964| 1.247 - 3.093     |
| Parental myopia                   | 0.631| 0.216 | 8.507| 1   | 0.002| 1.880| 1.230 - 2.872     |
| Reading posture                   | -0.590| 0.763| 0.598| 1   | 0.439| 0.555| 0.124 - 2.472     |
| Writing posture                   | -0.365| 0.21  | 3.034| 1   | 0.082| 0.694| 0.460 - 1.047     |
| Diopter                           | 0.136| 0.166 | 0.676| 1   | 0.411| 1.146| 0.828 - 1.587     |
| Daily time spent on digital devices| 0.543| 0.203 | 7.164| 1   | 0.007| 1.721| 1.156 - 2.561     |
| Distance to TV screen             | -0.072| 0.075| 0.905| 1   | 0.341| 0.931| 0.803 - 1.079     |
| Illumination while studying       | -0.116| 0.080| 2.100| 1   | 0.147| 0.890| 0.760 - 1.042     |
| Bedtime                           | -0.167| 0.115| 2.095| 1   | 0.148| 0.847| 0.676 - 1.061     |
| Daily time spent on homework      | 0.130| 0.307 | 0.179| 1   | 0.673| 1.139| 0.623 - 2.080     |
| Breaks while studying             | 0.066| 0.212 | 0.098| 1   | 0.754| 1.069| 0.706 - 1.618     |
| Reading extracurricular books     | 0.081| 0.208 | 0.153| 1   | 0.696| 1.085| 0.721 - 1.631     |
| Daily time spent in reading        | 0.221| 0.147 | 2.273| 1   | 0.132| 1.247| 0.936 - 1.663     |
| Visual acuity tests               | 0.168| 0.134 | 1.581| 1   | 0.209| 1.183| 0.910 - 1.537     |
| Regular eye examinations          | 0.478| 0.153 | 9.723| 1   | 0.002| 1.614| 1.194 - 2.180     |
| Eating whole grains and vegetables| -0.390| 0.310| 1.581| 1   | 0.209| 0.677| 0.369 - 1.243     |
| Constants                         | -2.393| 1.534| 2.433| 1   | 0.119| 0.091|                  |
activities = 40–60 minutes) + 0.192 × 2 (if after-school physical activities = occasionally) − 0.366 × 3 (if eye exercises = often) + 0.276 × 4 (if attitude to physical education = very like).

\[
P_{\text{nonmyopia}} = \frac{1}{1 + e^{-Z}}.
\] (3)

The following is an example that shows how to predict the probability of preventing myopia of a student who takes part in physical activities for 40–60 minutes every day, occasionally takes part in after-school physical activities, often do eye exercises, and like PE lessons very much.

\[
Z = 1.986 - 0.648 × 1 - 0.560 × 3 \\
+ 0.192 × 2 - 0.366 × 3 + 0.276 × 4 = 0.51,
\]

\[
P_{\text{nonmyopia}} = \frac{1}{1 + e^{-0.5152}} = 51%.
\] (4)

The probability of the student not being myopic is 51%, which means the student will not be myopic.

4. Discussion

The univariate analysis showed that factors like playing video games, parental myopia, reading posture, writing posture, distance to the TV screen, daily time spent on homework, breaks while studying, reading extracurricular books, daily time spent in reading in extremely weak or strong light, eating whole grains and vegetables, visual acuity tests, and regular eye examinations are influencing factor for myopia, which is consistent with Luo’s study [11]. Students who play digital devices for a long time every day might have eye strain even keratitis [12]. The incidence of myopia in girls was higher than that in boys, which is consistent with the results of Wen’s study [5]. The difference may be due to different environments. Girls like to be quiet and study harder, while boys prefer outdoor activities. Parental myopia, long daily reading time, and less outdoor activity time are the risk factors associated with the increased incidence of myopia [13].

With the popularity of electronic products, most adolescents are equipped with learning and game devices. They often spend 3–4 hours reading, writing, and doing homework without rest, and sometimes they even stay up until the wee hours of the morning, which increases the burden on their eyes. The muscles inside and outside the eyes get tense and cannot get a good rest, which might lead to eye muscle spasms. The multivariate analysis of the significant factors was conducted after the univariate analysis of myopia, and the significant factors obtained by multivariate analysis were regarded as the independent influencing factors of myopia. Through binary logistic regression analysis, it was found that gender, parental myopia, staying up late playing smartphones, daily time spent on digital devices, and regular eye examinations were the independent influencing factors of myopia. According to these independent factors affecting myopia, this study attempted to give a formula for predicting the probability of becoming myopic.

The results of the univariate analysis of the correlation between physical activities and myopia showed that the incidence of myopia was lower in those that took part in regular physical activities and actively participated in sports (basketball, volleyball, and football). Continuous variables such as daily time spent on in-school physical activities, after-school physical activities, eye exercises, and attitude towards physical education are also influencing factors of myopia. Outdoor activities and physical activities are beneficial to reduce the incidence of myopia. For adolescents, sports such as basketball, volleyball, and badminton can effectively reduce the risk of becoming myopic [14]. Factors such as more outdoor activities, exposure to natural light, and outdoor environment are protective for the eyes of adolescents [15–18]. Through binary logistic regression analysis, it is found that regular physical activities, daily time spent on in-school physical activities, after-school physical activities, eye exercises, and attitude towards physical education are the main influencing factors in the prevention of myopia. Based on these independent factors, the prediction formula for preventing myopia is given and the probability of nonmyopia can be calculated according to the specific conditions of the students.

Potential limitations of our study should be mentioned. First of all, it is difficult to investigate the change of myopia...
with time by a cross-sectional study, and a multilevel linear model should be adopted to obtain a causal explanation in the future. Secondly, compared with previous review studies, this study may only be a potential myopia control strategy, and in future surveys, the time of physical activities and its impact on myopia need to be better defined and quantified.

5. Conclusions

(1) The results of the univariate analysis showed the influencing factors of myopia in adolescents and the factors related to physical activities that affect the prevalence of myopia. (2) The results of the multivariate analysis showed the independent influencing factors of myopia in adolescents and the independent influencing factors related to physical activities that affect the prevalence of myopia. (3) The significant factors in multivariate analysis were used to provide 2 formulas to predict the probability of becoming myopic and the probability of preventing myopia.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

No financial or nonfinancial benefits have been received or will be received from any party related directly or indirectly to the subject of this article.

Authors’ Contributions

YY was responsible for conceptualization, data curation, formal analysis, investigation, methodology, project administration, supervision, validation, visualization, writing—original draft, and writing—review and editing; CQ was responsible for conceptualization, formal analysis, methodology, project administration, resources, supervision, and writing—review and editing; YFQ was responsible for investigation, methodology, supervision, and writing—review and editing. Cheng Qiu and Yin Yao contributed equally to this work.

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