Original Article

# The Prevalence and Severity of Myopia among Suburban Schoolchildren in Taiwan

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## Abstract

Introduction: We aimed to determine the prevalence and severity of myopia in suburban schoolchildren. The refractive error, best corrected visual acuity (BCVA) and other ocular indices of 6069 schoolchildren (aged 6 to 15 years) from elementary and junior high schools in Chiayi County, Taiwan were examined in 2013-2015. Materials and Methods: Spherical equivalent (SE) was stratified into 4 categories: emmetropia, mild myopia, moderate myopia, and high myopia for underlying analysis. Chi-squared ($\chi^2$) tests were used to determine significant associations between myopia and BCVA and age levels. To compare statistical significance among different age levels, $P$ values of Bonferroni tests were calculated. Receiver operating characteristic (ROC) curves and correlation coefficient were calculated to assess the correlation between myopia and each ocular index. Results: The youngest subject diagnosed with myopia was a 7-year-old. Myopia had significant associations with both BCVA and age levels (95% confidence intervals [CI] = 2.553, 2.713 and -0.284, -0.248, respectively), under $P$ <0.05. Among the calculated ROC values, BCVA had the highest area of 0.676 with myopia. This further confirmed that BCVA was highly correlated with myopia in schoolchildren. Other ocular indices like intraocular pressure (IOP), pupil distance, ocular alignments, or ocular height had ROC curves below 0.5 to myopia. Conclusion: This study concluded that the onset of myopia started earlier and progressively worsened with years of investigation among the suburban schoolchildren. Myopia had significant associations with BCVA and age levels. To effectively reduce the prevalence and severity of myopia, it is time to take actions on eye care education for suburban schoolchildren.

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Key words: Mean refractive index, Ocular condition, Visual acuity

## Introduction

The prevalence and severity of myopia has been studied in 5 large-scale, population-based, and cross-sectional surveys of schoolchildren aged 7 to 18 years old.[1,2,3] Researchers found that the increase in prevalence of myopia among schoolchildren was caused by the onset at an early age, and then the severity was alleviated progressively with age. In Asia, the prevalence of myopia is still high, especially among the Chinese[3-5] and the Japanese.[6,7] In 1944, Motegi et al did a survey on ocular refraction in Taiwan and revealed that over 80% of the studied population were emmetropic.[8-11] In 1982, Chung et al studied 227 aboriginal students, aged 6 to 13 years old and residents in mountainous areas of Pingtung County, Taiwan, and found 59.3% with hypermetropia, 38.3% with emmetropia, and 2.4% with myopia.[12] In a study conducted by Chen et al in the mountainous areas of Hwalian County in 1984, 366 elementary schoolchildren were examined, of whom 295 (80.6%) were aboriginal.[13] They found that 9.73% of non-aboriginal students and 3.06% of aboriginal students had myopia.

On 15 May 2014, Taipei Times reported that myopia had become a serious health problem for elementary school students, especially for more than 35% of second grade students in Taipei. A myopia prevention programme