



## ORIGINAL ARTICLE

# Refractive error among school children in Jhapa, Nepal

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### KEY WORDS

Refractive errors;  
Amblyopia;  
Children

### Abstract

**Purpose:** To evaluate the pattern of refractive errors among school children in Jhapa, Nepal.

**Methods:** A cross-sectional study was designed to evaluate refractive status of 2236 school children in three government schools and a private school. A complete eye examination was carried out in all children including slit lamp examination, fundus examination, retinoscopy and subjective refraction. Chi-square test was performed to analyze incidence of refractive error in gender; age groups; type of schools.

**Results:** Out of 2236 students, refractive error was present in 192 (8.58%). Unaided, presenting, and corrected visual acuity less than 6/12 (0.5) were present in 3.8%, 2.6%, and 0.2% respectively. After refractive correction, visual acuity was significantly improved ( $\chi^2 = 81.3$ ,  $df = 3$ ,  $p < 0.01$ ) to 6/6 in 98% students. Forty-five students (2.01%) were amblyopic. Refractive error was significantly prevalent ( $\chi^2 = 3.707$ ,  $df = 1$ ,  $p = 0.05$ ,  $ODD = 1.3$ ) in male (9.76%) than in female students (7.48%). refractive error was significantly high in private school than government schools ( $\chi^2 = 6.7$ ,  $df = 1$ ,  $p < 0.01$ ) Myopia was the most common type (44.79%) of refractive error. The myopia of 2-6 diopters was most common in 48.8%. Myopia was found to increase as age advanced. Hyperopia and astigmatism initially increased but later decreased with age.

**Conclusions:** Refractive error was a significant problem in schoolchildren in Jhapa. Myopia was the most common refractive problem. Private schoolchildren had significantly higher refractive errors.

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**PALABRAS CLAVE**  
Errores refractivos;  
Ambliopía;  
Niños

## Error refractivo en niños en edad escolar de Jhapa, Nepal

### Resumen

**Objetivo:** Evaluar el patrón de errores refractivos entre niños en edad escolar de Jhapa, Nepal. **Métodos:** Se diseñó un estudio transversal para evaluar el estado de 2.236 niños de tres escuelas públicas y una escuela privada. Se realizó una exploración completa de los ojos de todos los niños que incluyó examen con lámpara de hendidura, oftalmoscopia, retinoscopia y refracción subjetiva. Se realizó la prueba estadística de la  $\chi^2$  para analizar la incidencia de error refractivo por géneros, grupos de edad y tipos de escuelas.

**Resultados:** Se encontró error refractivo en 192 de 2.236 niños (8,58%). Se observó una agudeza visual espontánea, inicial y corregida inferior a 6/12 (0,5) en el 3,8%, 2,6% y 0,2% respectivamente. Tras la corrección refractiva, la agudeza visual mejoró significativamente ( $\chi^2 = 81,30$ ,  $df = 3$ ,  $p = 0,00$ ) hasta 6/6 en el 98,0% niños. Se observaron 45 niños ambliopes (2,01%). El error refractivo fue significativamente más prevalente ( $\chi^2 = 3,707$ ,  $df = 1$ ,  $p = 0,05$ , ODD = 1,3) en los varones (9,76%) en comparación con las mujeres (7,48%). El error refractivo fue significativamente más alto en la escuela privada en relación con las escuelas públicas ( $\chi^2 = 6,7$ ,  $df = 1$ ,  $p = 0,00$ ). La miopía fue el tipo de error refractivo más frecuente (44,79%). La miopía de 2-6 dioptrías fue la más frecuente en el 48,8%. Se observó que la miopía aumentaba con la edad. Inicialmente la hipermetropía y el astigmatismo aumentaron, pero luego disminuyeron con la edad.

**Conclusión:** El error refractivo era un problema significativo en los niños en edad escolar en Jhapa. La miopía era el problema de refracción más frecuente. Los niños de escuelas privadas presentaron un número significativamente mayor de errores refractivos.

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## Introduction

An estimated 153 million people over 5 years of age are visually impaired as a result of uncorrected refractive errors, of which 8 million are blind. Approximately 12.8 million children in the age group 5-15 years are visually impaired from uncorrected or inadequately corrected refractive errors, estimating a global prevalence of 0.96%.<sup>1</sup>

Poor vision and an inability to read material on the chalkboard due to refractive error can profoundly affect a child's participation and learning in the classroom.<sup>2</sup> It also has serious social implications for the child in school. According to the National Blindness Survey of Nepal of 1981, refractive error was identified as a primary ocular disorder in 1.3% of the 39,887 examined persons of all ages (Brilliant, 1988).<sup>3</sup> In the study done by the Refractive Error Study in Children (RESC) group, refractive error was the major cause of visual acuity of 0.5 (20/40) or worse in at least one eye in 89.5% of children in China and 56% in Nepal. The study further reported that reduced vision, because of myopia, was an important public health problem in school-age children; and more than 9% of children could benefit from prescription glasses.<sup>4,5</sup>

The purpose of this study was to gather information on the refractive status of students so that an effective approach can be planned to tackle the burden of readily correctable refraction problems in school children. Children were also provided with glasses and medicines when found necessary. When encountered with diseases that could not be managed at schools, they are brought to Mechi Eye Hospital for appropriate management.

## Methods and methodology

### Sample size and study design

A cross-sectional school-based study was conducted in 1150 students in three government schools of Jhapa: 429 students in Durga SS, 413 students in Amarjyoti SS, and 308 in Gyan Niketan SS; and 1086 students in a private school of Jhapa: Little Flower English HHS from June, 2009 to October 2009. Distribution of students is given in Table 1. All the children attending the schools visited were included in the study. Very few children, who were absent at the time of the school visit, were left out. There were around 18 private schools (available at <http://enepal.asia/schoolout.htm#Jhapa>. Accessed on December 26, 2010) and 376 government schools in Jhapa.<sup>6</sup> As the population was drawn from the schools which were easily accessible to the hospital, it was anticipated that prevalence of refractive error different than that found in earlier studies in Jhapa. Among these school children, 48.6% were male and 51.4% were female giving ratio of 0.94.

Jhapa is the easternmost and one of the developed districts of Nepal, lies in fertile Terai plane of Mechi Zone, covers an area of 1,606 km<sup>2</sup> with Chandragadhi as its district headquarters, and has a total population of 217,608 children below 14 years of age. Male female ratio is 1.03. Jhapa borders Ilam district in the north, Morang district in the west, the Indian state of Bihar in the south and east, and the Indian state of West Bengal in the east. The district is divided into 47 Village Development Committees (VDCs) and three municipalities. Jhapa is the home to about

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