

Accommodative Dysfunction and Visual Status Among Indigenous School Children at Tanah Rata, Cameron Highlands, Pahang, Malaysia

Mohamad Khamal Haqqim A. Rahim
Post Graduate Center, Management & Science University

Mohd Zaki Awg Isa^{1,2}

¹Department of Optometry and Vision Science, Management & Science University

²MSU Centre of Excellence for Vision and Eyecare (MSU-iCARE), Management and Science University

Corresponding authors:

khamal93@gmail.com; m_zaki@msu.edu.my



Abstract

Accommodation plays a vital role in maintaining a clear focus on the object seen. Inability to sustaining a clear focus on activities at school will disturb the learning process for school children. In Malaysia, indigenous school children not only have a problem getting access to proper eye examinations but also have poor literacy. This study aimed to assess accommodative dysfunctions among indigenous school children in Malaysia. The assessment of accommodation dysfunction was done with a standard R.A.F rule chart and subjective methods to determine refractive errors and accommodation facilities. Seventy School Children from ethnic Semai which subs into three tribes, Semai, Lanoh and Temiar, were selected for this study. The mean age of the participants was 9.5-year-old. The incidence of accommodative insufficiency was 10% (n=7), followed by Accommodative excess 20% (n=14) and accommodative infacility 14.3% (n=11), respectively. Out of 70 subjects, 14.3% (n=11) were myopia, and 55% (n=39) were hyperopia and 30% (n=21) remained were having emmetropia with standard deviation recorded was 14.601. The study concludes that indigenous school children were tilting towards having accommodative excess and Hyperopia conditions. More studies with a larger sample size are needed to evaluate accommodative dysfunctions among the indigenous population.

Keywords:

Accommodation Dysfunction, Myopia, Hyperopia, Visual status

Introduction

Accommodation plays a vital role in the eye to change focus and maintaining a clear focus of the object. Inability to sustaining a clear focus on activities at school will disturb the learning process for school children (Sewunet et al., 2014). Accommodative dysfunctions are parts of binocular vision problems commonly found in paediatric eye care practices (Gable E., 2002). They may go undetected if poor quality of eye examinations conducted or the examiner focus on visual acuity testing only. In general, accommodative dysfunctions consist of three main types i.e. accommodative insufficiency, accommodative excess and accommodative infacility (Scheiman et al., 2014). Accommodative insufficiency and accommodative infacility are the two most common accommodative dysfunctions present in schoolchildren.

Grosvenor (2007) stated that accommodative ability is highest in amplitude at infancy and tends to deteriorate as one age due to the lens losing its elasticity. Uncorrected visual acuity and colour vision are part of annual school eye examinations in many countries, however, is not part of public health program in Malaysia (Cacho et al., 2002). The uncorrected visual acuity easily detected during school eye screening (Carter et al., 2013). However, binocular dysfunctions conditions such as blurriness at near workloads, headache, asthenopia, lacking understanding and concentrating, or repeating the same line, are harder to identify and rarely be part of the school physical examination or eye screening (Wick & Hall, 1987). A significant number of children with binocular vision anomalies will go undiagnosed if VA alone is tested (Abdul Kabir et al., 2015).

A study conducted in suburban area in Kelantan, Malaysia found that 4.8% of students had visual acuity worse than 6/12. The study also stated that 14.0% had convergence insufficiency, 28.3% had poor accommodative amplitude, and 26.0% showed signs of accommodative infacility (Shatriah et al., 2012). The data shows the eye examination including visual acuity and binocular visions is less accessible to rural areas and particularly in indigenous groups of school children. The accommodative dysfunction may left undiagnosed among the indigenous children if only VA taken into account during eye screening or eye examination. This research aimed to examine the accommodative dysfunctions and visual status among indigenous population at Tanah, Rata, Cameron Highlands, Malaysia.

Methods

Study Design and sample size

This cross-sectional study was conducted at Bukit Rata, Cameron Highland, Malaysia involved threeribes of indegenous school children. A random sampling technique was used with the calculated sample size based on the formula by Anderson & Kish, (1966):

$$N = \frac{(Z_{1-\alpha})^2 (P (1-P))}{D^2}$$

Where,

N = the sample size of the population tested.

$Z_{1-\alpha}$ = the statistic level of confidence, 1.96(CI=95%, $Z=1.96$; normal distribution table)

P = the estimation of prevalence from previous studies

D = precision that is 0.05.

The total population of children were counted a total of 197 numbers of students. The sample size calculated for this study was 70 subjects with a margin of error of ten percent. The confidence level chosen is 95%.

Data Collection

Data collected include history taking, preliminary test, and accommodations were examined using RAF ruler and subjective refraction. The accommodative dysfunctions assessments were done using the