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CORRELATION BETWEEN REFRACTIVE ERROR, AXIAL LENGTH, CORNEAL CURVATURE AND AL/CR RATIO AMONG FIRST YEAR UNDERGRADUATE STUDENT IN UITM PUNCAK ALAM, SELANGOR

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ABSTRACT

Purpose: This study was designed to study the correlation between refractive error, axial length, corneal curvature, AL/CR ratio and lens power among first year undergraduate students in UiTM Puncak Alam, Selangor. ***Methods:*** In this cross sectional study, 203 of first year undergraduate students in UiTM Puncak Alam, Selangor of mean age 20.78±0.93 years old volunteed themselves to participate as subjects. They underwent 3 procedures which were subjective refraction without cycloplegia by using Logmar chart, corneal radius (CR) of curvature by using NIDEK Corneal Topography and axial length (AL) by using TOMEY Biometer AL-100. The subjects were characterized according to these 3 variables to establish correlation between them. After determining the value of CR and AL, the ratio were calculated by dividing axial length with corneal radius to use in the analysis. Individuals with a history of ocular trauma, ocular surgery and take medication for systemic or ocular disease were excluded. ***Result:*** Out of 400 targeted subjects, 200 were included in the analysis. 71.5% of the subject were myopia (<-0.50D), 22.5% were emmetropia (>-0.50D - < +0.50 D) and 6% were hyperopia (<+0.50D). The correlation coefficient between spherical equivalent SE and CR, and AL/CR ratio were 0.187, and 0.829, respectively. The correlation between AL and CR was 0.253. The correlation between lens power and AL/CR ratio was 0.185. The r^2 value of 0.687 suggests that 68.7% of the variance in refractive error can be accounted for the variation in AL/CR ratio. Mean AL/CR ratio was 3.12±0.18. ***Conclusion:*** The correlation between SE and AL/CR ratio was significantly stronger as compared to with AL and CR alone.

Keywords : AL/CR ratio, axial length, corneal radius, refractive error.

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

1.1.1 Refractive errors

Myopia is a common health problem in China and other countries in East Asia (He et al., 2015). During the past several decades, the prevalence of myopia has increased rapidly, the age of onset myopia has decreased, and the severity of myopia has increased (He et al., 2015). 80% to 90% of the high school students in urban area are myopia while 10-20% may have a possibility to have high myopia. In order to achieve a normal vision, our eyes require suitable optical power of the eyes to the axial length of the eye during the development. Therefore, the image of a distant object will be focused on the retina. This process is called emmetropization. The essence of myopia is that the axial length grows beyond the combined optical power of the cornea and the lens. Most children have hyperopia (He et al., 2015). The first to second years of birth, their eyes will undergo the emmetropization process in order to shape the distribution of refraction. After this process, the cornea will relatively stable throughout the development, while axial length increases and lens power decreases. Axial length is one of the key variable determining the refractive status of the eyes (He et al, 2015).

The development of eyes takes place in the first 18 months of life until the growth rate getting slow. Myopia is more common in urban areas of East Asia such as Hong Kong, Taiwan and Singapore (Rosman et al, 2009). Over 70% children in Taiwan become myopic during their school years. The decreased amount of time spent outdoors and increased academic pressure most likely are the underlying factors that have caused faster shifts in the refractive errors among the student. (Chen et al, 2014).