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Prevalence of Myopia in Sekyere East District of Ashanti Region, Ghana

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Abstract: **Myopia is a global public health problem leading to visual impairment and blinding complications. It is the most common type of refractive error and is a complex trait including both genetic and environmental factors. The aim of this study was to determine the prevalence of myopia among senior high school students in Sekyere East District of Ghana.**

The study was a cross-sectional study of students attending senior high schools in the Sekyere East District of Ghana. Out of the six senior high schools in the district, three were randomly selected and students were selected from these schools by systematic sampling method. Questionnaires were administered to all students and non-cycloplegic refraction was carried out for all students who failed the plus one blur test or with improvement of vision with a pin hole on the Snellen chat. Myopia for purposes of this study was defined by the investigators as spherical error of at least –0.50 diopters in one eye.

The prevalence of myopia among the student was 27%. There was also a significant association between myopia and gender, age and socio economic status of students.

This study concludes that myopia is a significant cause of visual impairment among senior high school students in the Sekyere East District of Ghana, and is therefore an issue of public health concern among senior high school students in the district. Cost effective strategies for vision screening of school children will be very beneficial to the school health program of the Ministry of Health.

Keywords: **Myopia/ Prevalence/ Sekyere East/ Ashanti / Ghana.**

1. INTRODUCTION

Myopia, the most common type of refractive error, is a complex trait including both genetic and environmental factors. Numerous studies have tried to elucidate the aetiology of myopia. However, the exact aetiology of myopia is still unclear (Pan, 2011). Old-fashioned traditional medicine state that myopia is an inherited condition and the only solution is to prescribe glasses. In many papers, however, it was reported that today very many people are becoming myopic even though their parents or grandparents were not. On the other hand, life today is very different from that of our ancestors – just to mention the changed working environment and changed nutrition. Therefore, it is rather obvious that these changes in the environment have an impact on the incidence of myopia.

Myopia is the refractive anomaly of the eye in which the conjugate focus of the retina is at some finite point in front of the eye, when the eye is not accommodating. It can also be described as the refractive condition in which parallel light rays from an object at optical infinity are focused by the eye in front of the retina, with accommodation relaxed (American Optometric Association, 1997).

Myopia results from an eye having excessive refractive power for its axial length. This may be due either to the eye having a relatively long axial length or to increased dioptric power of one or more of the refractive elements (Goldschmidt, 1968). Aristotle is credited with first distinguishing nearsightedness. However the term myopia was derived by Galen from the words *myein* (to close) and *ops* (eye) (Borish, 1970).

Myopia presents with various symptoms depending on the vocation of a person and its associated visual demand. The most common symptom associated with uncorrected myopia is blurred distance vision. Myopia can be classified as simple myopia, nocturnal myopia, degenerative myopia or induced myopia. (American Optometric Association, 1997).

In emmetropic eyes, axial length and optical power are inversely correlated. An eye with greater than average optical power can be emmetropic if it is sufficiently shorter than average, as can an eye with less than average optical power if it is sufficiently longer than average. An eye with myopia is an otherwise normal eye that is either too long for its optical power or, less commonly, too optically powerful for its axial length. Corrected visual acuity may be reduced as a result of pathological changes in the posterior segment (American Optometric Association, 1997).

Myopia appears with greater prevalence in young children (Saw, 2002; Lin, 2004) which places these children at greater risk of developing high myopia, with its associated complications. Due to these trends in the prevalence of myopia, there has been a research focus on factors that could increase the risk of myopia. It is well established that the prevalence of myopia in children is greater if their parents are myopic. (Saw, 2002; Zadnik, 1997) but current studies according to Schmid (2013) indicate that this may not always be the case.

According to Morgan (2005), East Asian ethnicity has also been proposed as a possible risk factor. He further goes on to intimate that myopia is generally believed to have a multifactorial etiology. The rapid rise in the prevalence of myopia suggests that rapidly changing environmental factors are predominant in determining the current patterns of myopia.

Problem Statement:

Myopia is a global public health problem leading to visual impairment and blinding complications (Saw, 2005). According to American Optometric Association, (1997), myopia is the most common eye disorder in the world. Mavracanas, (2000) and Pararajasegaram, (1999) have shown that refractive error, and myopia in particular, is one of the five leading causes of visual impairment in the world. Kempen et al, (2004) estimated that, by the year 2020, approximately one third of the world's population (2.5 billion) will be affected by myopia alone. High myopia (myopia greater than minus 6 diopters) may be associated with glaucoma, cataract, retinal degeneration and myopic macular degeneration (American Optometric Association, 1997).

The aim of this study was to determine the prevalence of myopia among senior high school students in Sekyere East District of Ghana. The objective of the study was to determine any association between myopia and variables of age, gender and religion. Sekyere East District of Ghana is a multicultural area in the Ashanti Region of Ghana with diversity in religion and socio economic levels.

2. LITERATURE REVIEW

Introduction:

Myopia has been broadly classified as pathological and by age of onset as school age, or adult onset. Pathologic myopia, which usually presents before six years of age, is caused by abnormal and extreme elongation of the axial length of the eye, generally does not progress, and is usually associated with early retinal changes (Curt, Iwamoto and Renaldo, 1979).

The prevalence of myopia remains low, under 2%, until about the age of 7 or 8 years, when there is a consistent rise in prevalence which only begins to level off in the early teens at 15 to 20%. Risk factors for myopia include the influence of parental history and near work during childhood. (Mutti et al 2002).

The consensus today is that both are associated with childhood myopia but that parental history plays a far more important role.21 Nonetheless, clinical trials to evaluate myopia treatment that decreases the negative influence of near work have been reported recently (Edwards, 2002).

School age myopia occurs between 6 and 18 years of age and is thought to progress and stabilize by the late teens or early twenties (Morgan and Rose, 2005). According to Jones et al, (2005) and Wu et al, (2010), school age myopia is associated with higher intelligence quotient scores, more time spent reading, and less hours of exposure to sunlight as compared to non-myopic patients.

American Optometry Association, (1997) indicates that adult onset myopia occurs between 20 and 40 years of age (early adult onset) or after 40 years of age (late adult onset). It has different characteristics as compared to the school age onset myopia; specifically it is associated with focusing anomalies and near vision dominated occupations such as computer viewing (Simensen and Thorud, 1994). Myopia progression in all three groups of pathological, school age and adult onset is due to the elongation of the eye ball, resulting in the eyeball becoming egg shape (Hosaka, 1988).

The concept that myopia evolved from the use and abuse of the eyes during near vision activities was first described by Cohn in 1886 and has been traced back to Kepler (Rosenfield and Gilmartin, 1998). The assumption in most use and abuse theories is that near vision focusing such as reading and writing is somehow indirectly responsible for axial length elongation. Thus those near activities can bring about the onset of myopia.

Prevalence:

The prevalence of myopia varies among countries and age groups. Chow, Dhillon, Chew et al. (1990) conducted a research work among 128 medical students in Singapore. The prevalence of myopia was 82%. This was higher than the prevalence of 36.8% obtained by Mavracanas, Mandalos, Peios et al. (2000), whose study was among Greek students aged between 15-18 years of age. Villarreal, Ohlsson, Cavazos et al. (2003) obtained similar results with a prevalence of 37% among 1035 children aged between 12-13 years in Monterrey, Mexico.

A school based study conducted by Khader et al, (2010) in Amman, Jordan to determine the frequency of myopia among students aged between 12–17 years old showed that the prevalence of myopia was 17.6% with 313 children suffering from myopia. This was much lower compared to a study to estimate the frequency of myopia among medical students of Allama Iqbal Medical College in Pakistan. According to Chaudhry, Hassan and Sheikh (2011), the prevalence of myopia among medical students above 17 years of age was 57.6%.

Chow, Dhillon, Chew et al. (1990) conducted a study among medical students aged between 20 and 22 years of age in Singapore. Prevalence of myopia was 82% among 128 respondents. Prevalence of myopia among Singaporean males aged between 15-25 years however was 30.4% (Tay et al. 1992). This was a little less than the prevalence of myopia among 1738 Greek students between 15-18 years of age, where 36.8% of respondents according to Mavracanas, Mandalos, Peios et al. (2000) had myopia. Lam, Edwards, Millodot et al. (1999) conducted a school based study among children between 6-17 years of age in Hong Kong and found 62% out of the 142 students had myopia.

Ahuamao and Atowa, (2004) carried out a study among 2,525 school children aged 7 to 17yrs. This study, which was carried out in Abia State of Nigeria showed prevalence of 31.05% for myopia. This was much higher than a similar study done by Ovenseri-Ogbomo and Omuemu, (2010) which produced a myopia prevalence of 6.9%. This was a school based cross-sectional study which was carried out to estimate the prevalence and distribution of refractive error among school children aged between 5-19 years in the Cape Coast Municipality of Central Region of Ghana.

According to the study by Ovenseri-Ogbomo and Assien, (2010), the prevalence of hyperopia, myopia and astigmatism among children was 5.0%, 1.7% and 6.6% respectively. This was a school based cross-sectional study and was carried out to estimate the prevalence and distribution of refractive error among schoolchildren in the Agona Swedru Municipality of the Central Region of Ghana. 637 schoolchildren aged 11-18 years old were randomly selected for the study. Rose et al, (2008.b) reported a higher prevalence than the study by Ovenseri-Ogbomo and Assien, (2010) which compared the prevalence and risk factors for myopia in 6-year and 7-year-old children of Chinese ethnicity in Sydney and Singapore. The prevalence of myopia in 6- 7 year old children of Chinese ethnicity was significantly lower in Sydney (3.3%) than in Singapore (29.1%).

The prevalence of myopia is always affected by the definition of myopia by researchers in their study. Rose et al, (2008.a) and Khader et al, (2010) defined myopia in their study as spherical error of at least –0.50 diopters. In Jones et al's, (2007) study in the United States to identify whether parental history of myopia and or parent-reported children's visual activity levels can predict juvenile-onset myopia, this definition was chosen as −0.75 D of myopia. The definition of myopia in this study was taken as a clinically significant cut off for providing a prescription of spectacles. According to Jones et al. (2007), −0.75 D of myopia is likely to create symptoms of distance blur, and −0.75 D of myopia is clearly beyond the measurement error of the auto refractors used to measure refractive error.

Myopia and Gender:

According to Khader et al, (2010) the prevalence of myopia was significantly higher in females (20.3%) compared to males (15.9%) (P = 0.02). Myopia was also significantly related to age. The prevalence of myopia was lowest for the youngest age group (7.8%) of 12-year-old children and increased until it reached 20.6% for 14-year-old children. The prevalence decreased gradually for children who were much older. Yuddha et al (2008) assessed visual impairment in school children of upper-middle socioeconomic status in Kathmandu for comparison with rural Jhapa District. Myopic visual impairment was associated with grade level, female gender, parental education, in 5th to 9th graders between the ages 9 to 16 years. Female gender was also a significant risk factor for myopia.

A vision screening study was carried out among 749 students (49.7% boys and 50.3% girls). Indian schoolchildren around Kuala Lumpur to determine whether the prevalence of myopia was higher in boys or girls between the ages of 7-18 years. There was no significant difference in the prevalence of myopia between girls and boys among Indian schoolchildren. A study on Chinese schoolchildren in Kuala Lumpur also showed the prevalence of myopia was high as compared to that of Indian schoolchildren in Kuala Lumpur. The proportion of boys with myopia was 41.5% as compared to 43.5% of girls in the Chinese schoolchildren. Chung et al. (1995) found that there was no significant difference in myopia between boys and girls. A study by Zadnik et al. (2003) in Caucasian population also found no significant difference in myopia between girls and boys although girls tend to have steeper cornea, steeper crystalline lens and shorter eyes compared to boys. Lam et al. (2004) found no difference in prevalence of myopia between sexes in Chinese schoolchildren in Hong Kong.

Myopia and Socioeconomic Status:

Wong et al. (2002) in a study to relate indices of education, occupation, and socioeconomic status to ocular dimensions and refraction in an adult population, found that occupations and higher income were similarly associated with longer axial dimensions and more myopic refractions, It was demonstrated that higher educational levels, and higher income were independently associated with longer axial length and more myopic refractions in adults aged 40–81 years.

Myopia and Religion:

Religious practices may present a positive or negative impact on health but Donder et al. (1999) found no significant association between myopia and religion. The research was done to assess the prevalence, distribution, and demographic associations of refractive error in an urban population in southern India. This was done among two thousand five hundred twenty-two subjects of all ages.

Study Type and Design:

The study was a carried out in schools and it was a cross-sectional study of students attending senior high schools in Sekyere East District of Ghana.

Study Population:

The total number of students in the three selected schools who were present on the day of data collection was 1880.

3. METHODOLOGY

Study Type and Design:

The study was a carried out in schools and it was a cross-sectional study of students attending senior high schools in Sekyere East District of Ghana.

Profile of Study Area:

The Sekyere East District was created in 1988 and is one of the 27 districts in the Ashanti Region of Ghana. It has Effiduase as the district capital. The district is located in the North-eastern part of the region, it lies approximately between Latitude 6° 45’ - 7° 32’ North and Longitude 0° 22’ West. The district shares common boundaries with some districts in Ashanti Region.

The district shares boundaries with Afigya Sekyere to the north-west, Sekyere West to the west, Ashanti Akim North to the south-east and Ejisu-Juaben to the south-west. It also shares boundaries with Sene and Atebubu Districts in the Brong Ahafo Region and Kwahu North District in the Eastern Region. Sekyere East District is the largest of all the twenty seven (27) Districts in Ashanti and covers a total land area of about 4,231.4sqkm. Towns in this district are Effiduase, Asokore, Oyoko, Seniagya, Dadease, Drobonso, Sekyere, Baniko, Nkwankwanua, Abotanso, Ntunkumso, Senkye (Senchi), Okaekurom, Pepease, Anyinofi, and Bomen.

In terms of ethnicity the district is quite homogenous, particularly in the southern part where the indigenous people (the Ashantis) and other Twi speaking Akan group who are the majority co-exist with the few Northern tribal groups such as the Dagabaas, Kotokolis, Fulanis and others. In the northern (Afram Plains) portion of the district, the Akan land owners co-exist with the predominant migrant farmers of northern descent such as the Moshies, Konkonbas and the Krachies as well as fishermen who are mostly Ewes and Gas. The indigenous people (Ashantis) constitute 70.6% of the population in the district, tribes from the North 27%, Ewes and Gas 2.1% and non Ghanaians 0.3%.

The district has six senior high schools. These are Tweneboa Kodua Secondary School, Effiduase Secondary/Commercial School, Asokore T.I. Ahamadiyya Secondary School, Dadease Agricultural Senior High School, Tijaniyya Senior High School and Wesphalian Senior High School. Between 2003 and 2005, the total enrolment in schools increased from 3045 to 3780.

For effective management, the district has been demarcated into five sub-districts. They are Effiduase/Asokore, Mponua, Bira - Onwam, Kumawu and Afram Plains. There are fourteen government and non-government health facilities in the district. The hospitals are Effiduase District Hospital, Asokore Ahamadiyya Hospital and Oyoko Westphalian Hospital. These last two hospitals are non-governmental.

Government health centres in the district are located at Kumawu, Woraso, Banko, Akokoaso, Okaikrom and Anyinofi. Other non-governmental health centres are at Seniagya, Drobonso and Sekyere. All the fourteen facilities provide curative care on twenty-four hour services delivery, with Effiduase Hospital functioning as a referral centre. The three hospitals at Effiduase, Asokore, Oyoko and the health centre at Kumawu have laboratory facilities but the rest have none. Surgical operations are also performed at Effiduase, Westphalian and Ahamadiyya hospitals. The Westphalian Hospital is a specialist hospital for eye care.

Study Population:

The total number of students in the three selected schools who were present on the day of data collection was 1880.

Sample Size and Sampling Techniques:

Using the expression $n = Z^2 (1–p)(p)/b^2$ (where n = minimum sample size, p = anticipated prevalence [assumed to be 15%], b = desired error bound taken as 5% and Z = the standard score at 95%), a minimum sample of 196 was calculated. To account for a 10% non response and missing data rate, the sample size became 216 and this was rounded up to 220.

Out of the six senior high schools in the district, three were selected by simple random sampling. The three selected schools were Asokore T.I. Ahamadiyya Secondary School, Dadease Agricultural Senior High School, and Wesphalian Senior High School. Students were selected from these schools by systematic sampling method.

Data Collection Techniques and Tools:

Institutional Ethics approval to carry out the study was obtained from the Committee on Human Research, Publications and Ethics of the Kwame Nkrumah University of Science and Technology (KNUST). Additionally, permission was sought and obtained from the local health service authority in the district. Authorities of senior high schools were asked for permission for students to participate in the study and heads of selected schools were briefed on the purpose of the research.

Before commencement of field work, the clinical team was briefed on the purpose of the study and received training on carrying out Visual Acuity Tests. Members of the research team were also made conversant with the instructions required in filling out questionnaire. The questionnaire was designed with the help of an ophthalmologist. The views which were obtained were used to modify the questionnaire accordingly and these were administered to all students by trained members of the research team who explained the purpose of the study and how to complete the questionnaire properly. The students were asked to fill the questionnaire independently and in privacy.

Consent forms were signed by students before Visual Acuity Tests were conducted. Non-cyclopleigic refraction was done where appropriate and final prescription and the best-corrected Visual Acuity were recorded. Students afterwards took their time to fill questionnaire in private. Information on visual acuity and ophthalmic refraction was collected on the filled questionnaire and checked for completeness.

Clinical Examination:

Non-cycloplegic refraction was carried out for all students who failed the plus one blur test or with improvement of vision with a pin hole on the Snellen chat. This is similar to the protocol used by Adegbehingbe et al. (2005) in their study of students in Nigeria in order not to disrupt academic work for the day used non-cycloplegic method of refraction. To ensure that accommodation was relaxed, a +1.50 D lens was used to fog the eye monocularly during refraction.

Visual acuity (VA) was measured with the Snellen chart at a distance of 6 metres. Children who wore glasses also had their VA taken while they removed their glasses and refracted. Students who read 6/9 or worse were refracted. Those who read 6/6 or better had their VA measured again with a +1.50 D. If the VA was 6/9 or worse they were also refracted.

Pre-Testing:

The data collection techniques and tools for the study were pretested with 75 students of the in Juaben Senior High School in Ejisu-Juaben District . Sekyere East District shares boundary with Ejisu-Juaben to the south-west. Pre-testing was done to test the adequacy of the research instrument and for assessing the feasibility of the survey. Through pre-testing, some questions which were not very clear to the students were identified. Those questions were modified to give a better understanding to the respondents before the survey. Logistical problems were also identified where it was found that two optometrists were not enough to perform refraction and another optometrist was added to the final survey. Collecting preliminary data during pre-testing aided in arriving at a suitable sample size. Out of the 78 students who were randomly selected, 12 had myopia representing a prevalence of 15% which was factored in arriving at the final sample size.

4. DATA HANDLING, STORAGE AND ANALYSIS

Data collected from each facility was kept in an envelope, labelled and kept safely under lock and key for analysis. Data was collected using questionnaires and they were checked for accuracy and completeness in the field and kept in envelopes under key and lock. The data were double entered by pairs of data clerks and consistency checks were run on batches of data sets to pick up errors which were cleaned. Data entry started shortly after data collection had started and run concurrently with data collection for the rest of the data collection period. Final data cleaning lasted two months.

The final data sets were kept on a pass-worded computer at the Department of Ophthalmic Practice at the Dosonec Health Institute and were only accessible to the principal investigator and the data manager. The consent forms were kept separately in a locked safe at the Department. No imputations were done for missing data. All analyses were conducted using only students for whom complete data were available. Data analysis was done with STATA (2010) as well as Microsoft Excel (2007; Microsoft). A baseline comparison of myopes and emmetropes was carried out to compare age, sex, religion, number of hours spent in reading and writing after class and exposure to childhood stress.

Ethical Consideration:

In this research study, the students were assured of the confidentiality of information given. Informed consent was sought from participants. Participants were also assured that they will have the right to withdraw from the study at any stage and will not suffer any consequences for doing so. There was no coercion of participants at any stage of research work. Permission was sought from the Institutional Review Board as well as Ghana Health and Ghana Education Services in this district.

Limitations of Study:

Non-response is a particular problem that could likely affect the study and could result in bias due to the fact that the characteristics of non-responders differ from responders. The purpose of the study was spelt out through written and oral communication and efforts were made to build rapport to remove perceptions and prejudices of participants which could result in non-response.

Participants were instructed to answer questionnaires in a conducive environment free from distractions and invasion of privacy.

5. RESULTS

Description of Sample:

Out of the 220 respondents, students with amblyopia and infectious eye conditions were excluded from the examination which brought the number down to 202. Out of 202 students who were examined and interviewed, 82 were males and 120 females constituting 41% and 59% respectively. Ages of respondents ranged between 12- 25 with mean age of 17.5 years.

Out of the 202 respondents, 39 (19%) of respondents were classified as belonging to the high Socio Economic Status (SES), 109 (54%) were in the middle Socio Economic Status (SES) and 54 (27%) in the low Socio Economic Status (SES).. A total number of 134 (66%) respondents were Christians, 54 (27%) were Muslims and 14 respondents (7%) practiced Traditional African Religion.

Out of the 202 students, 55 students were found with myopia representing a prevalence 27% of students with myopia. Among myopes, 76% were females and 13% were males. Pearson Chi-Square test of association showed a test statistic of 6.539 with a p-value of 0.01. There were significantly more female students suffering from myopia than males.

Among myopes, 48% were of Low SES, 44% were of Middle SES and 4% were of High SES. This indicates that socio economic status of student is significantly associated with myopia ($p<0.001$) Socioeconomic status of students is significantly associated to myopia. It is evident that lower socioeconomic status is associated to myopia and as one climbs up the socioeconomic status ladder the less one is likely to suffer from myopia.

Among myopes, 65% were Christians, 30% were Moslems and 5% were Traditionalists. A chi-square test of association between myopia status and religious affiliation of students reported showed that there was no association between them (p-value- 0.85),

6. DISCUSSION

Prevalence:

The occurrence of myopia varies in different countries as well as in different localities. (Resnikoff et al. 2004). This study was done among students aged 11-26 years. The prevalence of myopia in this study was 27%. This was lower than the prevalence of myopia of 36.8% obtained by Mavracanas, Mandalos, Peios et al. (2000), whose study was among Greek students aged between 15-18 years. Prevalence of myopia in our study was also lower than the prevalence obtained by Ahuamao and Atowa, (2004) who carried out a study among school children aged 7 to 17years in Abia State of Nigeria with a prevalence of 31.0% for myopia. Prevalence of myopia obtained in this study was also lower than the prevalence in a study by Tay et al. (1992) among Singaporean males aged between 15-25 years, who had a prevalence of was 30.4% .

Chow, Dhillon, Chew et al. (1990) had results about three times higher than results obtained in our study. Prevalence of myopia was 82% conducted among medical students aged between 20 and 22 years of age in Singapore. This group of medical students were much older than high school students and course of study and these differences could have accounted for the difference in prevalance. Lam et al. (1999) conducted a school based study among children between 6-17 years in Hong Kong and obtained much higher prevalence than our study with 62% out of the 142 students suffering from myopia. Our results was also lower than results obtained by Villarreal, Ohlsson, Cavazos et al. (2003) who obtained similar results with a prevalence of 37% among 1035 children aged between 12-13 years in Monterrey, Mexico. It was also lower than results obtained by Sheikh (2011) who conducted a study among medical students of Allama Iqbal Medical College in Pakistan above 17 years of age and came out with prevalence of 57.6%.

Prevalence of myopia obtained from our study was higher than the prevalence of myopia among school- children in Amman, Jordan which was 17.6% among students aged between 12–17 years old conducted by Khader et al. (2010). Interestingly, the prevalence of myopia in our study was much higher than studies done in Ghana. Our prevalence was higher than a study done by Ovenseri-Ogbomo and Omuemu, (2010) which produced a result of 6.9% prevalence of myopia among school children aged between 5-19 years in the Cape Coast Municipality of Central Region of Ghana. The prevalence was **much higher than a** school based cross-sectional study among students aged 11- 18 years in the Agona Swedru Municipality of the Central Region of Ghana done **by Ovenseri-Ogbomo and Assien,** (2010), which had prevalence of 1.7%.

Rose et al, (2008.b) compared the prevalence and risk factors for myopia in 6- 7 year old children of Chinese ethnicity in Sydney and Singapore. The prevalence of myopia in these children was significantly lower. In Sydney this was 3.3% which was lower than our reported prevalence and the prevalence of children in Singapore (29.1%) was higher than our reported prevalence. The prevalence of myopia is always affected by the definition of myopia by researchers in their study. Students involved in this research were much younger than the ones used in our study which could have accounted for this difference.

Different definitions of myopia may contribute to the differences in prevalence between our study and others. Jones et al, (2007) study in the United States for example chose the definition of myopia as −0.75 D. The definition of myopia in our study was chosen as -0.50D in at least one eye. Prevalence of myopia in our study did not include those with myopia and astigmatism in the same eye. Thus Equivalent Sphere for respondents with both astigmatism and myopia in one eye was not calculated to classify them as myopes or otherwise. Disparities of classifying myopia may contribute to different prevalence in our study and that of other researchers. Different age group of subjects used may also contribute to different figures of prevalence.

Myopia and Gender:

Female students were significantly more likely to suffer from myopia in our study ($p<0.02$). This results was similar to a study conducted by Khader et al, (2010) in Amman, Jordan where the prevalence of myopia was significantly higher in

females (20.3%) compared to 15.9% of males (p<0.02). Our results was also consistent with a study by Yuddha et al. (2008) assessing visual impairment in school children aged between 9 – 16 years of upper-middle socioeconomic status in Kathmandu compared to children from rural Jhapa District. It was concluded that the female gender was a significant risk factor for myopia. Females living in areas where these studies were conducted may be more at risk of other exposures which contributes to the development of myopia. It is interesting to note that other studies did not find the female gender as a risk factor of the development of myopia. A vision screening study was carried out among 749 Indian schoolchildren around Kuala Lumpur to determine whether the prevalence of myopia was higher in boys or girls between the ages of 7-18 years. There was no significant difference in myopia between girls and boys among the Indian schoolchildren.

A study on Chinese schoolchildren in Kuala Lumpur also showed the prevalence of myopia in Chinese children was higher than those of Indian schoolchildren in Kuala Lumpur. The proportion of boys with myopia was 41.5% as compared to 43.5% of girls and there was no statistically significant difference in gender. A study by Zadnik et al. (2003) in Caucasian populations also found no significant difference in myopia between girls and boys although girls tended to have steeper corneas, steeper crystalline lenses and shorter eyes compared to boys. Lam et al. (2004) found no difference in prevalence of myopia between sexes in Chinese schoolchildren in Hong Kong. Further research is needed to determine the differences in lifestyle and other exposures which might offer an explanation to what makes the female gender a risk factor in certain places while other areas do not report similar findings.

Myopia and Age:

According to Khader et al, (2010), myopia was also significantly related to age. The prevalence was lowest for the youngest age group (7.8%) and increased until it reached 20.6% for 14-year-old children. After this age, the prevalence decreased gradually. Yuddha et al (2008) assessed visual impairment in school children of upper-middle socioeconomic status in Kathmandu for comparison with children in rural Jhapa District. Myopic visual impairment was associated with grade level, female gender and parental education in 5th to 9th graders between the ages of 9- 16 years. Female gender was also a significant risk factor for myopia.

Myopia and Socio Economic Status:

Our student found out that students of high socioeconomic status had significantly lower prevalence of myopia (p<0.001) than students in the middle socioeconomic status in our study. Prevalence of myopia among students of low socioeconomic status had a significantly higher prevalence of myopia. (p<0.001). It can be inferred from our study that the higher a student's socioeconomic status, the lesser the likelihood of developing myopia.

Our results are consistent with a study done by Wong et al (2002) which found that higher socioeconomic status was associated with longer axial dimensions and more myopic refractions. It was demonstrated in their study that higher socioeconomic status was independently associated with longer axial length and more myopia among adults aged 40–81 years.

Myopia and Religion:

Religious bodies may have practices that may expose one to the development of a disease condition. Religion in our study is a predictor variable which was not found to be significantly related to myopia. (p=0.85); Hence we can report that there was no association between religion and myopia.

7. CONCLUSION AND RECOMMENDATIONS

From our study, we can conclude that myopia is a common cause of visual impairment among senior high school students in the Sekyere East District of Ghana, with a prevalence of 27%. , and is therefore be an issue of public health concern among senior high school students in the district.

It is recommended that cost-effective strategies for vision screening of school children be incorporated into the school health program of the Ministry of Health and the Ministry of Education in order to prevent the devastating impact of myopia on student's education and development, then such cost-effective strategies will prove essential.

A better understanding of the risk factors for myopia would enable better public health interventions, such as health education efforts, to advise the public about the types and circumstances under which myopia can occur. Cohort studies examining the effects of changes in lighting, types of close-up work, distance from reading material, or type sizes can provide a basis for public health interventions.

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