

Short Communication

## THE FREQUENCY OF OCULAR DOMINANCE IN THE OKRIKAS AND IKWERRES OF NIGERIA

\*Oladipo GS<sup>1</sup>, Okoh PD<sup>2</sup> and Yorkum KL<sup>1</sup>

<sup>1</sup>Department of Anatomy, Faculty of Basic Medical Sciences  
College of Health Sciences, University of Port Harcourt

<sup>2</sup>Department of Surgery, Faculty of Clinical Sciences, University of Port Harcourt Teaching Hospital  
Port Harcourt, Nigeria

### ABSTRACT

The aim of this study was to determine and compare the frequencies of ocular dominance amongst the Okrikas and Ikwerres of Rivers State, Nigeria. A total of 1000 questionnaires were used, out of which 534 questionnaires were administered to the Okrikas and 466 to the Ikwerres, cutting across all age groups. 92.2% of the subjects used in this study were right-eye dominant, 5.5% were left-eye dominant with only 2.3% using both eyes. 89.7% and 95.1% of Okrikas and Ikwerres respectively were found to be right-eye dominant, while 7.1% and 3.6% of Okrikas and Ikwerres respectively were found to be left-eye dominant. The study also shows that 3.2% of Okrikas use both eyes as against 1.3% of the Ikwerres (equidominant). Most people switch eye preference depending upon the task being carried out, while some do not change their eye preference no matter the task they perform. Majority of the people preferred eye corresponds with their preferred hand, while some change their preferred eye and hand from time to time. In some cases the dominant eye did not match the dominant hand and the eye-hand preference is also influenced by handedness. This study is important as it has provided the necessary data for the Nigerian populations under investigation. The data is recommended to Ophthalmologists, medical practitioners, physical anthropologists, and forensic scientists.

**Keywords:** Ocular dominance, left-eye, right-eye, equidominant, ethnic groups.

### INTRODUCTION

Ocular dominance, sometimes called eye dominance or eyedness is the tendency to prefer visual input from one eye to the other (Khan and Crawford, 2001). It is somewhat analogous to the laterality of right or left handedness. Handedness is the tendency to prefer the use of one hand over the other.

However, the side of the dominant eye and the dominant hand do not always match (Porac and Coren, 1975). This is because both hemispheres control both eyes, but each one takes charge of a different half of the field of vision, and therefore a different half of both retinas. There is thus no direct analogy between handedness and eyedness as lateral phenomena. Approximately two-thirds of the population is right-eye dominant (Reiss, 1997). However, neither eye is dominant in a small portion of the population. Dominance does appear to change depending upon direction of gaze (Quartley, 2004). Binocular sighting and ocular dominance changes with different angles of horizontal gaze. Relative image size, not eye position, determines eye dominance switches (Reiss, 1997). Roughly 90% of people are right-handed, while

slightly less than 10% are left-handed and a small proportion is ambidextrous (McManus and Bryden, 1992). Also, Holder (1992) suggests that 2-30% of any human population is left-handed or ambidextrous with most estimates hovering around 10%, depending upon the criteria used to assess handedness.

There also appears to be a higher prevalence of left-eye dominance in those with Williams-Beuren syndrome (Van Strien *et al.*, 2005) and possibly in migraine sufferers as well (Aygul, 2005). Eye dominance has been categorized as weak or strong (Handa *et al.*, 2005). Highly profound cases are sometimes caused by amblyopia or strabismus. In those with anisometropic myopia (i.e. different amounts of nearsightedness between the two eyes), the dominant eye has been found to be the one with more myopia.

Correlating eyedness and handedness and other bodily function, Manuela (2002) in his research using 628 German (252 Men and 376 Women) aged between 19 and 90 years discovered that right-sided preference for handedness, footedness, eyedness, earedness and leg crossing characterized 86.8, 77.1, 70.9 and 56.6% of the

\*Corresponding author email: oladipogabriel@yahoo.com

population. He also found that older cohorts showed a rightward shift in their bodily functions.

Bourassa *et al.* (1996), in a meta-analysis of hand-eye concordance in 54,087 subjects from 54 populations found that concordance was 2.09 greater in questionnaire rather than performance studies, 1.95 greater in studies using unimanual monocular than performance studies, and 6.29 greater in studies using non-sighting measure of eye dominance. In the remaining studies that seemed no evidence of bias, the odds-ratio for hand-eye concordance was 2.53; in a population with 36.53% left-eyedness and 9.25% left-handedness, 34.43% of right-handers and 57.14 of left-handers are left-eyed.

This pattern of eye-hand association, he further explained poses problems for genetic models of cerebral lateralization, which must invoke pleiotropic alleles at a single locus or epistatic interaction between multiple loci. There was evidence that the association between eyedness and handedness, differed between sexes.

Research carried by Ehrenstein *et al.* (2005) sighting dominance was leftward in 32% and rightward in 68% of the cases and was highly correlated with eyedness. Further significant associations were restricted to stereoscopic prevalence which correlated with sighting dominance eyedness, and rivalry dominance. Enright (1998) argued that binocular eye movements are monocularly controlled. He proposed that the control of one eye is 'preferred', in the sense that in a goal-directed binocular saccade the preferred eye is accurately brought to the target location, with the movement of the fellow eye imperfectly yoked to the movement of the preferred eye. Eye preference seems to be essentially reflected by eyedness, sighting dominance, and stereoscopic prevalence, but largely unrelated to fixation disparity, accommodation, and visual acuity Ehrenstein *et al.* (2005).

## MATERIALS AND METHODS

A total of 1000 questionnaires were administered in this study, out of which 534 and 466 questionnaires were distributed randomly amongst the Okrikas and Ikwerres respectively.

Subjects with age range less than 15 years were selected from, Early days Nursery and Primary School, Kumoni

International Secondary School, and Obiye Academy, all in Port Harcourt, while the age range 16 years and above were selected randomly in different communities in Okrika and Ikwerre descents. All subjects were either from Ikwerre or Okrika ethnic group by both parents and genealogies. For the 0-15 age grade, the questionnaires were distributed to those in junior and senior classes in secondary schools while only those in primary 4 and 5 were given the questionnaires in the primary school. This is because these ones could clearly identify eye preference. Most of the persons within 15-60 age grade filled the questionnaire themselves except for a few that were not literate. For, the illiterate ones, they were interviewed to determine their eye preference. The various percentages amongst the groups were calculated and results tabulated.

## RESULTS AND DISCUSSION

The percentage ocular dominance amongst the Okrikas and Ikwerres were shown in table 1. The study shows an overall percentage of 92.2, 5.5, and 2.3% for dominant right-eye, dominant left-eye and both eyes respectively.

Among the Okrika ethnic group, 89.7% were right-eye dominant, 7.1% were left-eye dominant and only 3.2% uses both eyes, while among the Ikwerres, 95.1% were right-eye dominant, 3.6% were left-eye dominant and only 1.3% use both eyes.

Based on the result of this study, it is obvious that a greater proportion of Ikwerres were right-eye dominant than the Okrikas and only few of the Ikwerres were left-eye dominant. The Okrikas were more left eye-dominant than the Ikwerres. This difference in eye side preference may be due to the fact that, the Ikwerres are predominantly hunters and are more right-handed than the Okrikas which are predominantly fishermen. The dominant eye and hand did not always match amongst the Ikwerre and the Okrika ethnic groups.

Roughly 90% of the people are right-handed while slightly less than 10% are left-handed and a small proportion is ambidextrous (McManus and Bryden, 1992). Also, Holder (1992) suggests that 2-30% of any human population is left-handed or ambidextrous with most estimates hovering around 10%, depending upon the criteria used to assess handedness. Correlating eyedness and handedness and other bodily function, Manuela (2002)

Table 1. Percentage of Ocular Dominance between the Okrikas and Ikwerres.

Ethnic groups	Right-eye dominant	Left-eye dominant	Both-eye dominant
Okrika	89.7%	7.1%	3.2%
Ikwerre	95.1%	3.6%	1.3%
Total	92.2%	5.5%	2.3%

in his research using 628 German (252 Men and 376 Women) aged between 19 and 90 years discovered that right-sided preference for handedness, footedness, eyedness, earedness and leg crossing characterized 86.8, 77.1, 70.9 and 56.6% of the population. He also found that older cohorts showed a rightward shift in their bodily functions. The frequency of right sided preference in this study is higher compared to that carried out by Manuela (2002) in Germany. It is evident that there is a decline in the population of left-handers with aging which follows Coren's (1993a and b) discovery.

## CONCLUSION

This study has shown that greater proportions of the population in this research were right-eye and right hand dominants with only few left-eye dominants. The overwhelming majority of right-eye and right-hand has contributed to the right side configuration of these two ethnic groups. Therefore the study reveals that the dominant eye does not always match the dominant hand and the eye-hand preference is also influenced by their daily activities. It is therefore recommended to ophthalmologists, medical practitioners, physical and forensic anthropologists.

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