

# The Beery VMI in Focal Pediatric Epilepsy: Clinical Correlates and Lateralizing Value



Paola Velázquez-González, MS<sup>1</sup> & William MacAllister, PhD, ABPP-CN<sup>2,3</sup>

1-Ponce Health Sciences University, Brain and Behavioral Science Department, Ponce Puerto Rico

2-Alberta Health Services & 3-Alberta Children's Hospital Research Institute, Calgary, AB, Canada;



## BACKGROUND

- The Beery-Buktenica Developmental Test of Visual-Motor Integration (VMI) is a commonly used test of visuo-construction. While many assume this task has lateralizing value in focal epilepsy, this remains untested.
- Objective:** The purpose of this study is to investigate the utility of the VMI in children and adolescents with focal, well-lateralized epilepsy.

## PARTICIPANTS AND METHODS

- 101 children and adolescents with focal epilepsy (ages 4–18, 47 males, 54 females) completed the VMI as part of their neuropsychological evaluation.
- Pearson and Spearman correlations assessed relations between VMI scores and epilepsy severity factors (age of onset, number of antiepileptic drugs [AEDs], seizure frequency, IQ).
- T-tests assessed VMI differences between left (n=56) and right (n=45) hemisphere cases and Chi-square analyses tested differences in impairment rates across groups (defined as standard scores <80).

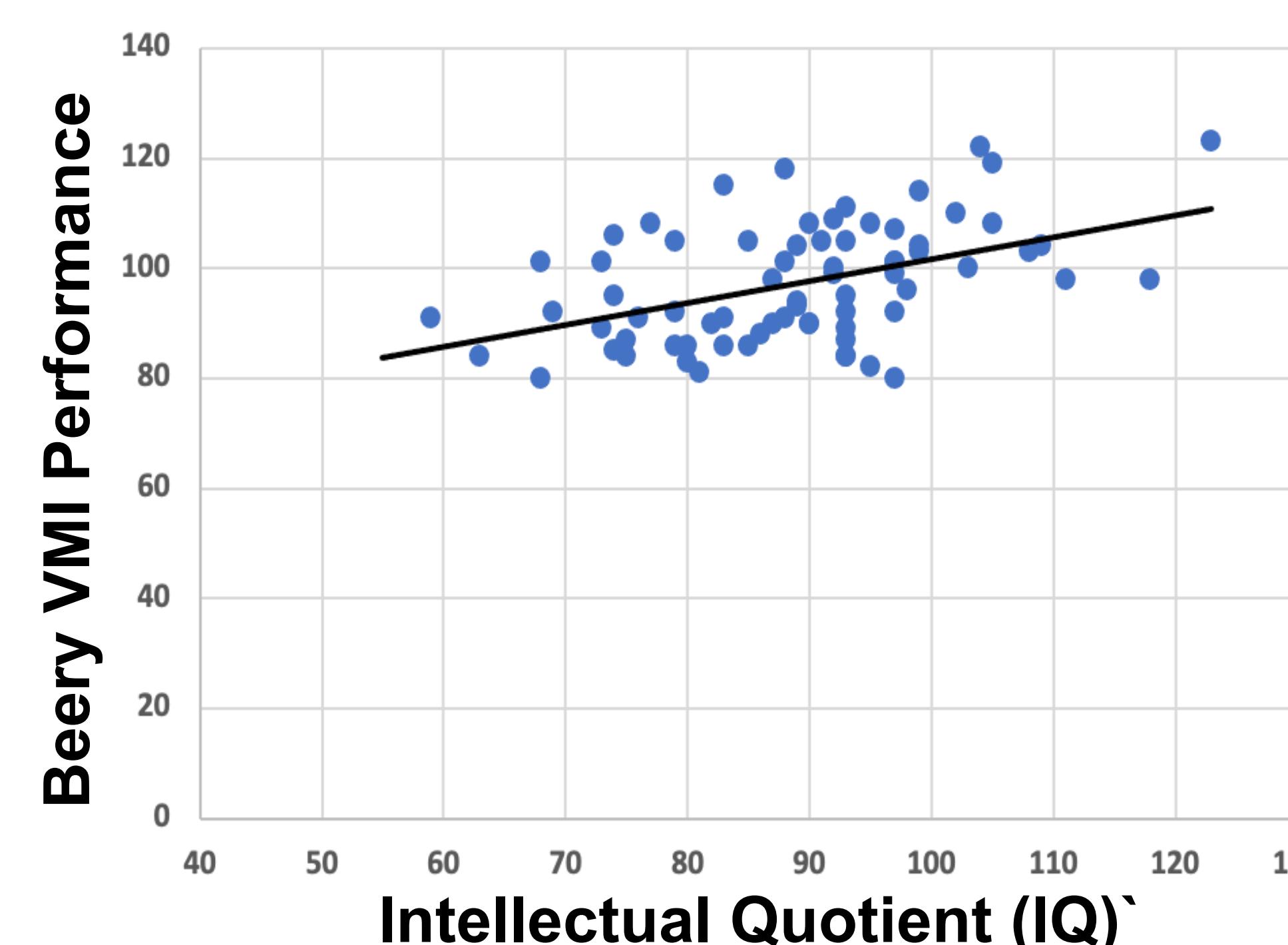
**Table 1. Patient Characteristics**

<i>N</i>	101
Age at testing in years, <i>M</i> (SD)	10.5 (3.8) Range 4-18
Sex, male / female	47 / 54
Number of AEDs	1.6(.10)
Age of onset, <i>M</i> (SD)	5 yrs. (.41)
Seizure frequency	6 months
Lateralization Left/Right	56 / 45
Intellectual Quotient range	SS: 40-123

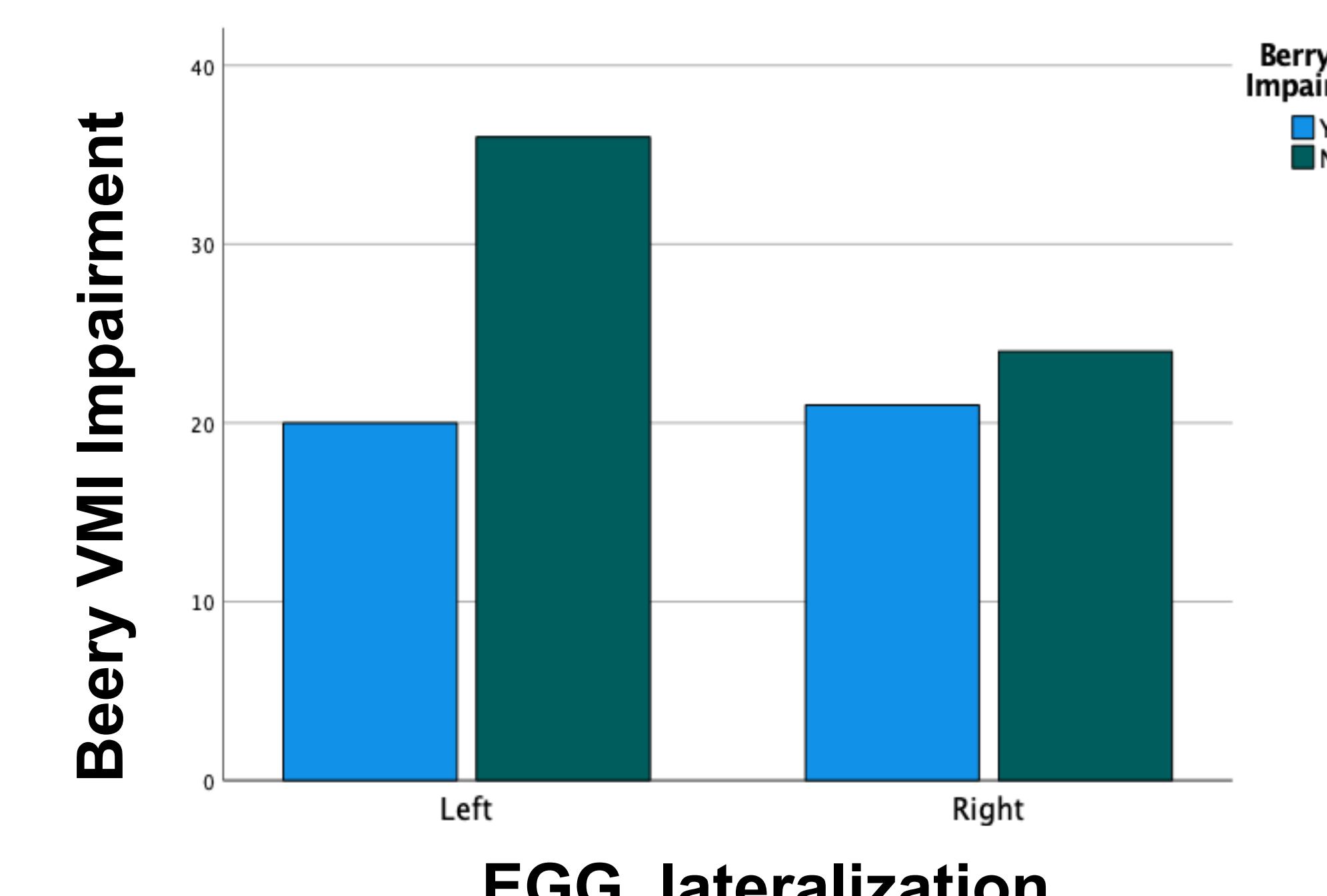
## RESULTS

- VMI correlated significantly with IQ ( $r=.673$ ,  $p<.001$ ), but not age of onset ( $r=-.080$ ,  $p=.428$ ), seizure frequency ( $\rho=.013$ ,  $p=.895$ ), or number of AEDs ( $r=-.181$ ,  $p=.071$ ).
- VMI scores did not differ between left (84.43 [16.06]) and right (81.89 [14.31];  $t=.839$ ,  $p=.403$ ) sided seizures, nor did impairment rates differ (left 35.7%, right 46.7%, chi-square=1.24,  $p=.265$ ).
- Post hoc analyses showed that when restricting the sample to those with low average IQ or better ( $\text{IQ}<80$ ), VMI performance and lateralization differed significantly between left (91.9[11.4]) and right (85.9 [12.7]);  $t= 1.13$ ,  $p=.037$ ) sided seizures.
- However, the relation between VMI base rate for impairment and lateralization was not significant  $\chi^2 (1, N = 72) = 3.77$ ,  $p=.052$ .

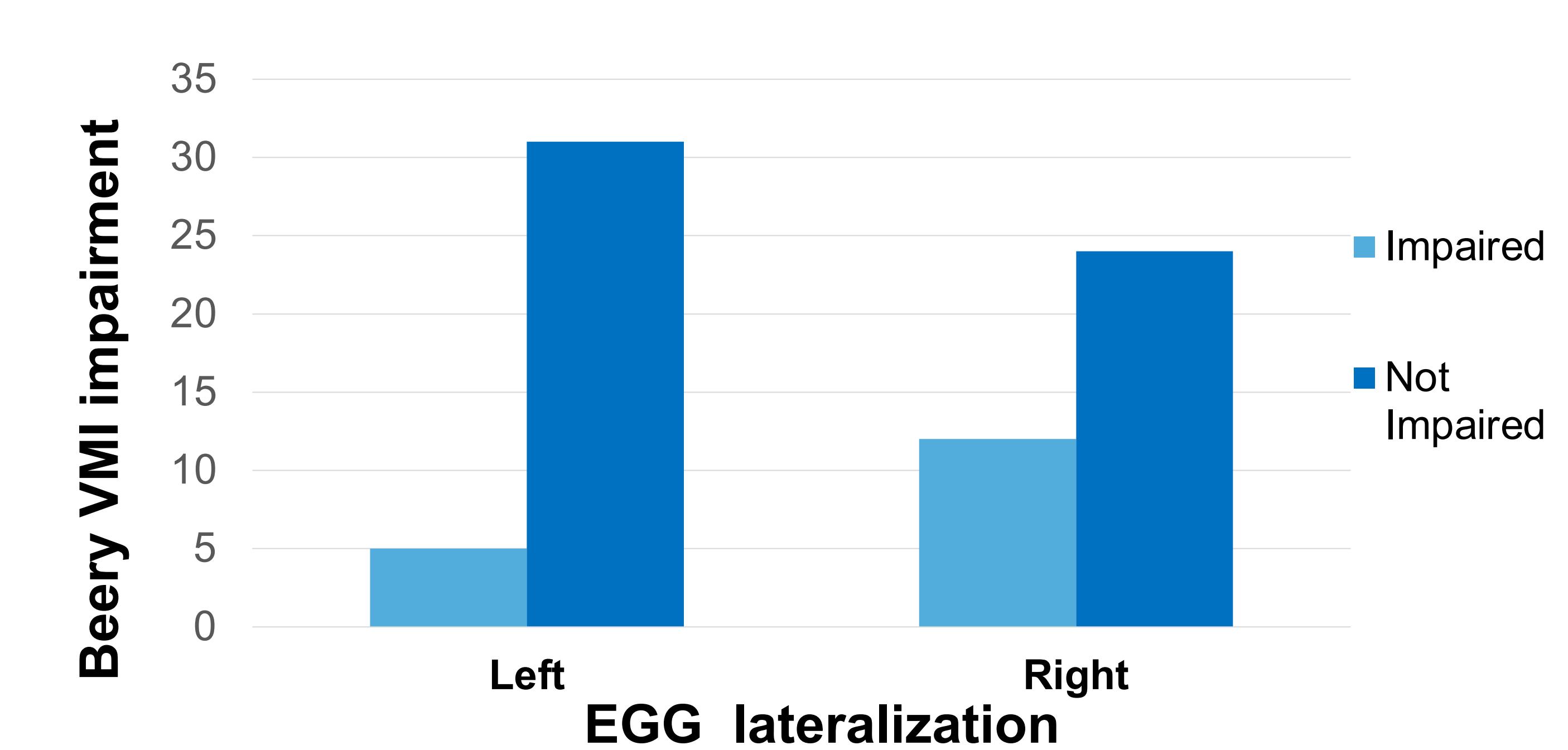
**Fig.1 VMI Performance Correlation for IQ ( $r=.673$ ,  $p<.001$ .)**



**Fig.2 VMI performance and lateralization comparison ( $t=.839$ ,  $p=.403$ )**



**Fig 3. VMI impairment and lateralization comparison in average IQ sample ( $\chi^2 =3.77$ ,  $p=.052$ .)**



**Table 2. T-tests comparison between VMI performance and lateralization with an average IQ range**

n	Left		Right		t(70)	p	Cohen's d
	M	SD	M	SD			
36	91.9	11.4	85.9	12.7	2.13	.037	.502

## CONCLUSION

- While the VMI is related to IQ, relations with other epilepsy severity variables were minimal, contrary to our expectations. Despite popular belief, VMI does not strongly lateralize left versus right hemisphere cases.
- While means differences were significant when considering those with low average or better IQ, base rates of impairment were not.
- These findings likely reflect functional reorganization and subsequent “crowding effects” that may occur in left hemisphere epilepsy in children. More specifically, those with seizure focus on the left hemisphere often show bilateral or right hemisphere language dominance, but this occurs at the expense of visual spatial skills.