

# ASSOCIATION OF 2D:4D DIGIT RATIO WITH FRAILITY AND MMSE IN COMMUNITY-DWELLING OLDER ADULTS

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## INTRODUCTION

The 2D:4D ratio is an indicator of prenatal testosterone exposure (Fink, Manning, & Neave, 2006) and it is a fairly stable one (Anders, 2007). While there are some studies about the role of testosterone on frailty (Srinivas-Shankar & Wu, 2009) and cognitive decline (Moffat, 2005) in older adults, very few analyze the impact of prenatal testosterone exposure (Halil et al., 2013). Our aim was to understand the relation between 2D:4D ratio, frailty and cognitive decline in community-dwelling elderly people.

## MATERIAL AND METHOD

175 community-dwelling elderly people were recruited. We included the following instruments: Tilburg Frailty Indicator; Survey of Health, Ageing and Retirement in Europe; Mini-Mental State Examination; scanner assessment of 2D and 4D fingers lengths of each hand; Barthel Index; and Lawton and Brody scale. Statistical analyses were conducted using software SPSS Statistics (v. 23.0, SPSS Inc, IL) and were based on Pearson correlations and regressions.

## RESULTS

**Table 1.** Descriptive statistics of the sample

	Total sample (n= 175)		Men (n= 54)		Women (n= 121)	
	Mean	sd	Mean	sd	Mean	sd
Age	75.730	7.699	75.440	7.327	75.850	7.886
School Education (0-12)	3.660	2.291	4.350	2.300	3.350	2.228
Weight (Kg)	72.228	12.502	76.240	10.599	70.438	12.906
Height (cm)	162.765	6.976	167.703	6.694	160.562	5.908
DLBA	18.525	3.130	18.851	3.194	18.380	3.104
IADL	16.325	7.015	15.833	5.859	16.545	7.486
Mean 2D:4D	0.961	0.033	0.957	0.032	0.962	0.033
Right hand 2D:4D	0.952	0.038	0.945	0.031	0.955	0.041
Left hand 2D:4D	0.967	0.036	0.964	0.038	0.968	0.036
Dr-l	-0.014	0.037	-0.019	0.034	-0.012	0.038

DLBA: Daily Life Basic Activities (Barthel Index); IADL: Instrumental Activities of Daily Living (Lawton and Brody Scale)

**Table 2.** Pearson Correlation coefficients for the relationships between 2D:4D ratios and TFI, SHARE-FI and MMSE

	Total sample (n= 175)			Men (n= 54)			Women (n= 121)		
	Right hand 2D:4D	Left hand 2D:4D	Dr-l	Right hand 2D:4D	Left hand 2D:4D	Dr-l	Right hand 2D:4D	Left hand 2D:4D	Dr-l
TFI Total	0.103 (p=0.177)	0.141 (p=0.62)	0.034 (p=0.658)	0.002 (p=0.987)	0.124 (p=0.370)	-0.137 (p=0.322)	0.100 (p=0.273)	0.140 (p=0.127)	-0.024 (p=0.793)
TFI B1	0.096 (p=0.205)	0.147 (p=0.052)	-0.046 (p=0.544)	-0.061 (p=0.660)	0.140 (p=0.312)	-0.213 (p=0.123)	0.127 (p=0.166)	0.144 (p=0.114)	-0.001 (p=0.993)
TFI B2	0.102 (p=0.181)	0.071 (p=0.350)	0.035 (p=0.649)	0.150 (p=0.278)	0.117 (p=0.399)	0.004 (p=0.974)	0.046 (p=0.614)	0.034 (p=0.710)	0.017 (p=0.850)
TFI B3	0.005 (p=0.948)	0.040 (p=0.598)	-0.035 (p=0.649)	-0.065 (p=0.639)	-0.102 (p=0.461)	0.056 (p=0.687)	-0.016 (p=0.862)	0.080 (p=0.382)	-0.093 (p=0.313)
SHARE-FI Total	-0.069 (p=0.362)	-0.001 (p=0.991)	-0.071 (p=0.353)	-0.015 (p=0.915)	0.021 (p=0.880)	-0.037 (p=0.791)	-0.083 (p=0.364)	-0.009 (p=0.924)	-0.081 (p=0.380)
MMSE	0.164* (p=0.030)	0.185* (p=0.014)	-0.013 (p=0.860)	0.137 (p=0.325)	-0.002 (p=0.990)	0.125 (p=0.366)	0.227* (p=0.012)	0.263** (p=0.004)	-0.005 (p=0.961)

TFI: Tilburg Frailty Indicator; TFI B1: TFI Physical component; TFI B2: TFI Psychological component; TFI B3: TFI Social component; MMSE: Mini Mental State Examination; SHARE-FI: Survey of Health, Ageing and Retirement in Europe; Dr-l: difference between right and left hand 2D:4D. \*P<0.05, two-tailed; \*\*P<0.01, two-tailed

## DISCUSSION AND CONCLUSIONS

We did not find any correlations between 2D:4D ratio and frailty measures, but we found a significant correlation between 2D:4D ratio and MMSE scores in the women sample.

It is not possible to ascertain any contribution of prenatal exposure to androgens to the frailty status of community-dwelling elderly people, but we found that reduced prenatal exposure to testosterone in women may contribute to prevent cognitive decline in elderly women.

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