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Measures of Blood Pressure and Cognition in Dialysis Patients

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Abstract

Background—There are few reports on the relationship of blood pressure with cognitive function in maintenance dialysis patients.

Methods—The Cognition and Dialysis Study is an ongoing investigation of cognitive function and its risk factors in 6 Boston area hemodialysis units. In this analysis we evaluated the relationship between different domains of cognitive function with systolic and diastolic blood pressure, pulse pressure, and intradialytic changes in systolic blood pressure, using univariate and multivariable linear regression models adjusted for age, sex, race, education and primary cause of end stage renal disease (ESRD).

Results—Among 314 participants, mean age was 63 years; 47% were female, 22% African American and 48% had diabetes. Mean (SD) of systolic blood pressure, diastolic blood pressure, pulse pressure and intradialytic change in systolic blood pressure were 141 (21), 73 (12), 68 (15) and -10 (24) mm Hg, respectively. In univariate analyses, the performance on cognitive tests primarily assessing executive function and processing speeds was worse among participants with lower diastolic blood pressure and higher pulse pressure. These relationships were not statistically significant, however, in multivariable analyses. There was no association between cognitive function and systolic blood pressure or intradialytic change in systolic blood pressure in either univariate or multivariable analyses.

Conclusion—We found no association between different measures of blood pressure and cognitive function in cross sectional analysis. Longitudinal studies are needed to confirm these results.

Keywords

Blood pressure; Cognition; Dialysis

Introduction

There has been increased recognition that cognitive impairment is common in dialysis patients¹⁻³ and is associated with adverse outcomes, including decreased compliance with medications, increased hospitalizations and mortality.^{2, 4} In the general population, both high and low blood pressure are associated with cognitive impairment and dementia.⁵⁻¹⁰ High blood pressure may promote cognitive impairment via both small and large vessel cerebrovascular disease, while low blood pressure may lead to hypoperfusion of the brain, particularly in the setting of preexisting vascular disease.⁶ However, there are few studies evaluating the relationship of blood pressure to cognitive function in hemodialysis patients.

Hypertension is highly prevalent in dialysis patients, and higher blood pressure has been associated with increased risk of left ventricular hypertrophy and stroke.¹¹⁻¹³ However, low blood pressure has been associated with all cause mortality in dialysis patients^{14, 15} and with stroke during the earlier stages of CKD.¹⁶ Recent studies also suggest that pulse pressure and intradialytic systolic hypertension may be associated with adverse cardiovascular outcomes in hemodialysis patients.¹⁷⁻¹⁹ Therefore, we evaluated the relationship of systolic and diastolic blood pressure, pulse pressure and intradialytic changes in systolic blood pressure with detailed measures of cognitive function in a cohort of maintenance hemodialysis patients recruited to evaluate risk factors for cognitive impairment.

Methods

Participants

Outpatients receiving chronic in-center hemodialysis at five Dialysis Clinic Inc. (DCI) units and one hospital based unit (St. Elizabeth's Medical Center) in the greater Boston area were screened for the Cognition and Dialysis Study. Reflecting the nature of the cognitive battery, eligibility criteria included English fluency, as well as sufficient visual and hearing acuity to complete cognitive testing. To minimize cognitive testing floor effects and reflecting inability to provide consent, individuals with MMSE ≤ 10 and/or advanced dementia based on medical record review were excluded. Non-access related hospitalization within 1 month, receipt of hemodialysis for less than 1 month, and single pool Kt/V < 1.0 were also temporary exclusion criteria. The Tufts Medical Center/Tufts University Institutional Review Board approved the study and all participants completing detailed cognitive testing signed informed consent and research authorization forms.

Cognitive Function

Subjects were administered a battery of cognitive tests during one dialysis session by research assistants trained by a neuropsychologist (TS) to assure quality and inter-rater reliability. All testing was completed within the first hour of hemodialysis treatment to reduce the impact of fatigue. Reassessment of research assistants by the study neuropsychologist with either mock testing sessions or witnessed testing of study participants occurred at 3-6 month intervals. The neuropsychological battery included well validated and commonly used cognitive tests that possess high inter- and intra-rater reliability and have established age, sex, and education-matched normative scores. Tests

included the Mini-Mental State Examination (MMSE)²⁰ the North American Adult Reading Test (NAART),²¹ the Wechsler Memory Scale-III (WMS-III) Word List Learning subtest,²² the Wechsler Adult Intelligence Scale-III (WAIS-III) Block Design and Digit Symbol-Coding subtests,²² and Trail Making Tests A and B²³ (Table 1). The overall battery assesses a broad range of cognitive functioning including global ability, verbal intelligence, supraspan learning, auditory retention, visual retention, attention/mental processing speed, visual construction/fluid reasoning, and motor speed. Depressive symptoms were assessed using the Center for Epidemiological Studies of Depression (CESD) Scale, with depression indicated by a CESD score ≥ 16 ; a value consistent with the presence of major depression in the general population.²⁴

Blood Pressures

Monthly average pre-dialysis systolic and diastolic blood pressures were used. The pulse pressure was calculated using the difference between mean monthly pre-dialysis systolic and diastolic blood pressure. Intradialytic blood pressure change was calculated as post-dialysis systolic blood pressure minus pre-dialysis systolic blood pressure.

Statistical Analysis

Baseline characteristics of eligible dialysis patients who consented and did not consent to participate were compared using chi-square tests, t-tests and ANOVA as appropriate. Similarly, baseline characteristic of participants enrolled in the study by quartiles of systolic blood pressure were compared. The primary analyses used linear regression to explore the association of systolic blood pressure, diastolic blood pressure, pulse pressure and intradialytic blood pressure change with performance on individual cognitive tests, with the raw test scores serving as the dependent variables. The measures of blood pressure were modeled linearly, with parameter estimates (β coefficients) calculated per 1 standard deviation increase in the continuous predictors. In order to explore nonlinear relationships we also modeled both quartiles and continuous quadratic forms of blood pressure measures with cognitive function. Analyses where performance on the Trails B test was the outcome used Tobit regression, censoring for failure to complete the task within 5 minutes.²⁵ All models adjusted for age, sex, race, education and primary cause of ESRD. All analyses were performed using SAS, version 9.2 (SAS Institute, Cary, NC). Results were considered statistically significant at a p-value of less than 0.05. No correction was made for multiple testing given the hypothesis generating nature of the analyses.

Results

Among 929 patients screened, 414 were ineligible for complete cognitive testing. Reasons included language barriers (n=194, 47%), behavioral and psychiatric issues (n=14, 3%), physical impediments such as blindness, hearing loss, and paralysis (n=62, 15%), recent acute hospitalization or impending death (n=108, 26%), and advanced dementia (n=36, 9%). Of the remaining 515, 314 individuals consented to and underwent detailed cognitive testing. The mean (SD) age of study participants was 63 (16) years; 47% were female, 22% African American, 48% had diabetes and median (25th-75th percentile) of dialysis vintage was 14 (7-35) months (Table 2). Patients with higher baseline predialysis systolic blood

pressure were more likely to be female, never have smoked, have a lower prevalence of coronary artery disease and higher serum albumin levels. Mean (SD) for monthly average of pre-systolic blood pressure, pre-diastolic blood pressure, pre dialysis pulse pressure and intradialytic changes in systolic blood pressure were 141 (21), 73 (12), 68 (15) and -10 (24) mm Hg, respectively. Mean (SD) MMSE was 26.7 (2.8) and mean (SD) NAART was 102.3 (12.2). Twenty two percent of patients met criteria for depression using the CESD (Table 3).

We noted no significant relationship in univariate or multivariable analysis between systolic blood pressure or intradialytic changes in systolic blood pressure with cognitive function using either continuous or quartile analyses (Tables 3 and 4). However, there were significant univariate associations between both lower diastolic blood pressure and higher pulse pressure with worse performance on tasks assessing executive function, including block design, digit-symbol coding, Trails A and Trails B (Table 3). These relationships did not however persist after multivariable adjustment (Tables 3 and 4).

Discussion

In this study, we found in univariate analysis that maintenance hemodialysis patients with lower pre-dialysis diastolic blood pressure and higher pulse pressure perform worse on tasks assessing executive function. However, this finding was no longer significant after multivariable adjustment. We found no significant association between systolic blood pressure or intradialytic changes in systolic blood pressure change with any measure of cognitive function in univariate or multivariable analyses.

There are very few studies that have evaluated whether blood pressure is a risk factor for cognitive impairment in dialysis patients. Murray et al. noted a high prevalence of cognitive impairment in 374 hemodialysis patients aged 55 years and older in comparison with an age-matched control group. In that study, a history of stroke, higher Kt/V and lower education level, but not high blood pressure, was independently associated with worse cognitive function.² Kurella Tamura et al. evaluated the association of traditional cardiovascular risk factors with cognitive function using the Modified Mini-Mental State Exam (3MS)²⁶ and the Trail Making Test B in the Frequent Hemodialysis Network Trial and found no significant relationship between either systolic blood pressure or diastolic blood pressure with cognitive function.¹ Finally, Seghal et al. evaluated the prevalence and risk factors for cognitive impairment, assessed using the MMSE, in 336 hemodialysis and reported results that were consistent with our data. Specifically, lower diastolic blood pressure values were associated with lower MMSE in univariate analysis, but not in multivariable analysis.³ Our study adds to these studies by focusing on different forms of blood pressure as the exposure variable of interest, employing a more comprehensive set of cognitive tests, as well as considering nonlinear relationships.

There are several potential explanations for the lack of an independent association between measures of blood pressure and cognitive function. First, although high blood pressure may cause cerebrovascular disease and thereby cognitive impairment in the earlier stages of kidney disease, these relationships may not be discernable in dialysis patients, given, multiple causes of both blood pressure variability and cognitive impairment in this patient

population.²⁷ Second, it is possible that we are limited by the cross sectional nature of the study, which may introduce survivor bias whereby those with either low or high blood pressure may have died. Third, because both low and high blood pressure may be risk factors for cognitive impairment our results may have been null due to these opposite effects. We believe the latter is unlikely, as we evaluated the relationship in both quartiles and continuous quadratic forms, and did not uncover any nonlinear relationships. Finally, it is possible that different mechanisms and treatment of hypertension may play a role in cognitive impairment and these were not distinguished in the current study. In fact, a recent uncontrolled study in dialysis patients suggested that volume control of hypertension may be more important in preserving cognitive function than treatment of hypertension with medications.²⁸

The study has several strengths and limitations. Strengths include a moderately large number of participants with detailed measures of cognitive function, incorporation of various forms of blood pressure, and a dialysis population that is fairly generalizable to the US dialysis population.²⁹ Limitations include the cross sectional nature of the study and the fact that the cognitive testing was completed during the hemodialysis treatment. Although testing during dialysis may potentially lead to worse performance on a particular cognitive test this would not be expected to affect the relationship between blood pressure and cognitive function.

In summary, we found no evidence of an association between any measure of blood pressure and performance on cognitive testing in multivariable analyses. Future studies should incorporate longitudinal analyses to confirm these findings.

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Table 1

Components of the neuropsychiatric battery in the Cognition study

Cognitive Test	Function Assessed	Scoring	Test Details
Mini-Mental State Exam	Cognitive Screen	Number Correct	Thirty-point questionnaire that samples abilities such as arithmetic, memory, and orientation.
North American Adult Reading Test	Intelligence	128.7 -(0.89 * # of pronunciation errors)	Estimation of verbal intelligence quotient that requires subjects to read a list of 61 words out loud.
Immediate Recall *	Supraspan Learning & retention of information	Total initially correct	A test of memory in which a list of 12 words is presented during 4 trials, and retention of these words is tested after a delay of 25 to 35 minutes. Calculated scores include immediate recall (which is the sum of words recalled during the 4 trials), percent retention [(delayed recall) / trial 4 of immediate recall) x 100], and delayed recognition.
Percent Retention *		Percent recall after delay	
Delayed Recognition *		Number of correctly identified words	
Block Design ^A	Visual Construction & Fluid Reasoning	Number completed weighted for time	Subjects are required to reproduce depicted patterns using a set of colored blocks.
Digit Symbol-Coding ^A	Attention, Mental Processing Speed, & Executive Function	Number of copied symbols in 2 minutes	Symbols are decoded by matching a given symbol to a digit provided in an answer key.
Trail Making Test A		Time to Completion	"Connect-the-dots" for a consecutive number sequence from 1 to 25.
Trail Making Test B		Time to Completion	"Connect-the-dots" alternating between numbers (1 to 13) and letters (A to L).

* Derived from the Word List Learning subtest of the Wechsler Memory Scale - III (WMS-III)

^AFrom the Wechsler adult intelligence scale

Table 2

Characteristics of participants by quartiles of pre-systolic blood pressure

	Total N = 314	Pre SBP, Q1 N = 77	Pre SBP, Q2 N = 80	Pre SBP, Q3 N = 80	Pre SBP, Q4 N = 77	Trend P-value
Age (years)	63 ± 16	65 ± 14	64 ± 18	61 ± 17	63 ± 16	0.42
Female (%)	47	39	43	44	61	0.01
African American (%)	22	17	26	20	26	0.33
Education (%)	10	13	10	9	8	0.51
	High school graduate	55	47	60	59	53
	2+ Years college	35	40	30	33	39
Medical History (%)	Stroke	18	14	25	9	23
	PVD	24	30	23	24	18
	CAD	37	47	38	33	31
	Hypertension	89	81	90	91	95
	Diabetes	48	43	53	44	52
	Heart Failure	36	43	34	29	39
Primary cause of ESRD (%)	Diabetes	36	33	40	32	41
	Glomerulonephritis	19	26	16	24	9
	Hypertension	20	14	21	14	29
	Other	17	16	17	22	13
	Unknown	8	11	5	9	8
Smoking History (%)	Never	38	32	29	44	48
	Past	53	59	59	47	45
	Current	9	8	12	9	7
Monthly Pre Systolic BP (mm Hg)	141 ± 21	115 ± 10	135 ± 4	148 ± 4	168 ± 12	<0.01
Monthly Diastolic BP (mm Hg)	73 ± 12	62 ± 9	70 ± 8	76 ± 9	84 ± 11	<0.01
Monthly Pulse Pressure (mm Hg)	68 ± 15	53 ± 9	64 ± 8	72 ± 10	84 ± 11	<0.01
Intradialytic Blood Pressure (mm Hg)	-10 ± 24	-3 ± 19	-7 ± 20	-12 ± 23	-18 ± 29	<0.01
Intradialytic Weight Gain (kg)	2.6 ± 1.1	2.7 ± 0.9	2.7 ± 1.2	2.6 ± 1.1	2.4 ± 1.1	0.03
Body Mass Index (kg/m2)	28 ± 7	28 ± 6	29 ± 7	28 ± 7	29 ± 8	0.51
Hematocrit (%)	36 ± 4	35 ± 4	36 ± 4	35 ± 4	36 ± 3	0.65

	Total N = 314	Pre SBP, Q1 N = 77	Pre SBP, Q2 N = 80	Pre SBP, Q3 N = 80	Pre SBP, Q4 N = 77	Trend P-value
Serum Albumin (g/dL)	3.8 ± 0.4	3.6 ± 0.4	3.8 ± 0.3	3.9 ± 0.4	3.9 ± 0.4	<0.01
Phosphate (mg/dL)	5.5 ± 1.5	5.5 ± 1.5	5.5 ± 1.8	5.5 ± 1.4	5.4 ± 1.4	0.57
Dialysis Vintage (months)	14 (7–35)	18 (7–40)	13 (5–33)	15 (8–34)	15 (7–27)	0.61
Parathyroid Hormone (pg/ml)	228 (145–396)	216 (148–403)	239 (146–427)	220 (121–336)	249 (163–388)	0.86
spKt/V	1.51 ± 0.24	1.52 ± 0.26	1.49 ± 0.23	1.52 ± 0.25	1.53 ± 0.22	0.68

Continuous data shown are mean ± standard deviation except dialysis vintage and parathyroid hormone which are median (interquartile range); categorical data are presented as percentage. P-values for education primary cause of ESRD and smoking are from Chi-square test. P-values for dialysis vintage and PTH are from Kruskal-Wallis test. Conversion factors for units: albumin in g/dL to g/L, multiply by 10; phosphate in mg/dL to mmol/L, multiply by 0.3229.

* Abbreviations: PVD, peripheral vascular disease; CAD, coronary artery disease; ESRD, End-Stage Renal Disease; SBP, systolic blood pressure

Table 3

Cognitive function in hemodialysis patients

Test	Test Description	N	Mean ± SD
MMSE	Screen	314	26.7 ± 2.8
NAARTVIQ	Intelligence	311	102.3 ± 12.2
Delay Recall	Primarily Cortical (Memory)	309	4.4 ± 2.7
Immediate Recall	Primarily Cortical (Learning)	312	23.8 ± 7.2
Recognition	Primarily Cortical (Recognition)	310	20.7 ± 3.0
Block Design	Primarily Subcortical (executive functioning and processing speed)	307	26.1 ± 10.6
Digit Symbol		282	40.1 ± 17.0
Trails A		293	61.3 ± 39.6
Trails B		289	136.9 (64.7) 20.8% non completers
CESD	Depression	311	10.6 (8.1)

Test results are mean ±standard deviation. Raw scores represent number correct, except for Trails A and B, which are reported in seconds required to complete the task. For Trails B 21% were unable to complete the testing within 300 seconds. MMSE=mini mental state exam. NAARTVIQ= North American Adult Reading Test Verbal IQ. CESD=Center for Epidemiological Studies of Depression

Table 4

Relationship between blood pressure measures and cognitive function

Cognitive Test	Unadjusted		Adjusted*	
	β (95% CI)	p-value	β (95% CI)	p-value
Systolic Blood Pressure				
MMSE	-0.21 (-0.52, 0.11)	0.19	-0.22 (-0.52, 0.09)	0.16
NAART	-0.84 (-2.20, 0.52)	0.23	-0.24 (-1.47, 0.99)	0.70
Percent Retention	-0.39 (-3.52, 2.74)	0.81	-0.61 (-3.78, 2.57)	0.71
Recognition	-0.16 (-1.49, 0.17)	0.35	-0.21 (-0.53, 0.11)	0.19
Block Design	0.16 (-1.03, 1.36)	0.79	0.20 (-0.87, 1.28)	0.71
Digit-Symbol Coding	0.48 (-1.52, 2.49)	0.64	0.07 (-1.56, 1.70)	0.93
Trails A	-1.64 (-6.25, 2.97)	0.49	-0.30 (-4.72, 4.12)	0.89
Trails B	-4.81 (-17.67, 8.05)	0.46	-4.29 (-15.46, 6.89)	0.45
Diastolic Blood Pressure				
MMSE	0.03 (-0.35, 0.28)	0.84	-0.23 (-0.57, 0.11)	0.19
NAART	-0.80 (-3.15, -0.46)	0.01	-0.48 (-1.86, 0.90)	0.49
Percent Retention	1.71 (-1.42, 4.84)	0.28	-0.60 (-4.16, 2.96)	0.74
Recognition	0.20 (-0.13, 0.54)	0.23	-0.23 (-0.58, 0.13)	0.22
Block Design	1.44 (0.26, 2.62)	0.02	0.15 (-1.05, 1.35)	0.80
Digit-Symbol Coding	3.86 (1.90, 5.81)	<0.001	-0.30 (-2.12, 1.52)	0.75
Trails A	-5.16 (-9.73, -0.58)	0.03	1.88 (-3.05, 6.82)	0.45
Trails B	-18.88 (-31.38, -6.35)	<0.001	-0.95 (-13.38, 11.47)	0.88
Pulse Pressure				
MMSE	-0.27 (-0.58, 0.04)	0.09	-0.19 (-0.52, 0.14)	0.27
NAART	0.31 (-1.05, 1.67)	0.66	-0.03 (-1.35, 1.30)	0.97
Percent Retention	-1.97 (-5.10, 1.15)	0.21	-0.55 (-3.99, 2.89)	0.75
Recognition	-0.39 (-0.72, -0.06)	0.02	-0.18 (-0.53, 0.17)	0.30
Block Design	-0.99 (-2.18, 0.21)	0.11	0.22 (-0.94, 1.37)	0.71
Digit-Symbol Coding	-2.50 (-4.48, -0.53)	0.01	0.35 (-1.42, 2.13)	0.69
Trails A	1.95 (-2.63, 6.54)	0.40	-1.97 (-6.74, 2.80)	0.42

Cognitive Test	Unadjusted		Adjusted*	
	β (95% CI)	p-value	β (95% CI)	p-value
Trails B	9.22 (-3.59, 22.03)	0.16	-6.50 (-18.67, 5.67)	0.30
Intradialytic Blood Pressure				
MMSE	-0.20 (-0.51, 0.12)	0.23	-0.16 (-0.46, 0.14)	0.28
NAART	0.46 (-0.92, 1.84)	0.51	-0.14 (-1.36, 1.08)	0.82
Percent Retention	-0.76 (-3.94, 2.41)	0.64	0.16 (-2.98, 3.31)	0.92
Recognition	0.14 (-0.20, 0.48)	0.42	0.31 (-0.01, 0.62)	0.06

Table 5

Multivariable relationship between quartiles of blood pressure measures and cognitive function *

Cognitive Tests	Trend p-value	Q1 vs. Q4		Q2 vs. Q4		Q3 vs. Q4	
		β (95% CI)	p-value	β (95% CI)	p-value	β (95% CI)	p-value
Systolic Blood Pressure Quartiles							
MMSE	0.07	0.68 (-0.19, 1.56)	0.12	0.80 (-0.04, 1.65)	0.06	-0.11 (-0.95, 0.74)	0.80
NAART	0.10	-1.13 (-4.67, 2.41)	0.53	2.65 (-0.77, 6.07)	0.13	-1.13 (-4.55, 2.28)	0.51
Percent Retention	0.46	0.84 (-8.36, 10.05)	0.86	5.97 (-2.93, 14.87)	0.19	4.92 (-3.97, 13.80)	0.28
Recognition	0.04	0.48 (-0.43, 1.40)	0.30	0.90 (0.01, 1.79)	0.05	-0.28 (-1.16, 0.61)	0.54
Block Design	0.94	-0.53 (-3.66, 2.61)	0.74	0.43 (-2.59, 3.45)	0.78	0.19 (-2.83, 3.21)	0.90
Digit-Symbol Coding	0.31	0.75 (-4.02, 5.51)	0.76	1.96 (-2.55, 6.47)	0.39	4.02 (-0.49, 8.53)	0.08
Trails A	0.35	-1.74 (-14.60, 11.13)	0.79	-9.75 (-21.98, 2.48)	0.12	-7.58 (-19.72, 4.57)	0.22
Trails B	0.71	8.26 (-24.24, 40.75)	0.62	-7.32 (-38.28, 23.65)	0.64	8.29 (-22.33, 38.91)	0.60
Diastolic Blood Pressure Quartiles							
MMSE	0.20	1.01 (0.06, 1.95)	0.04	0.73 (-0.24, 1.69)	0.14	0.42 (-0.43, 1.27)	0.33
NAART	0.18	2.53 (-1.29, 6.36)	0.19	2.66 (-1.24, 6.56)	0.18	3.82 (0.40, 7.25)	0.03
Percent Retention	0.90	2.79 (-7.11, 12.69)	0.58	0.62 (-9.50, 10.74)	0.90	2.76 (-6.08, 11.59)	0.54
Recognition	0.31	0.74 (-0.26, 1.73)	0.15	0.13 (-0.89, 1.15)	0.80	-0.06 (-0.95, 0.82)	0.89
Block Design	0.17	-0.04 (-3.34, 3.26)	0.98	-2.31 (-5.67, 1.06)	0.18	1.21 (-1.76, 4.19)	0.42
Digit-Symbol Coding	0.40	2.04 (-2.99, 7.08)	0.42	-0.91 (-6.00, 4.18)	0.73	2.52 (-1.95, 7.00)	0.27
Trails A	0.56	-8.47 (-22.11, 5.17)	0.22	-0.91 (-14.66, 12.83)	0.90	-4.39 (-16.59, 7.81)	0.48
Trails B	0.88	-5.47 (-39.80, 28.86)	0.76	-5.00 (-39.77, 29.77)	0.78	-12.29 (-42.91, 18.32)	0.43
Pulse Pressure Quartiles							
MMSE	0.38	0.56 (-0.34, 1.46)	0.22	0.75 (-0.11, 1.62)	0.09	0.37 (-0.48, 1.21)	0.39
NAART	0.75	0.40 (-3.23, 4.02)	0.83	1.71 (-1.80, 5.21)	0.34	0.04 (-3.39, 3.46)	0.98
Percent Retention	0.66	2.92 (-6.48, 12.32)	0.54	1.20 (-7.94, 10.33)	0.80	5.26 (-3.53, 14.06)	0.24
Recognition	0.47	0.54 (-0.41, 1.48)	0.27	0.52 (-0.40, 1.44)	0.27	0.69 (-0.20, 1.57)	0.13
Block Design	0.96	0.84 (-2.33, 4.00)	0.60	0.60 (-2.46, 3.66)	0.70	0.58 (-2.41, 3.56)	0.70
Digit-Symbol Coding	0.49	0.78 (-4.03, 5.60)	0.75	3.16 (-1.62, 7.94)	0.19	-0.03 (-4.58, 4.52)	0.99