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CORRESPONDENCE

Reply to 'Differences in the association between high blood pressure and cognitive functioning among the general Japanese population aged 70 and 80 years'

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We are grateful for the response to our study in which we presented data on the differences in the association between systolic blood pressure (SBP) and cognitive functioning among individuals aged 70 and 80 years.[1] The letter by Drs Erfan Ayubi and Mohadeseh Sani regarding the misinterpretation of the standardized regression coefficients[2] is important. Thus, we reconfirm that the regression coefficients are significant, but the clinical meaning is not strong when considering all presented data. Therefore, our articles should be discussed considering the interpretation of Dr Mohadeseh Sani *et al.* as a limitation of our study. However, we compared our results with a previous cross-sectional study, and similar standardized regression coefficients and *r*-squared values were observed with a similar sample size of participants.[3] Additionally, our study stratified the age and blood pressure (BP) categories to clarify the differences in the association among individuals aged 70 and 80 years; therefore, the sample size of our study is considered for stratification of the BP/treatment categories and multi-regression analyses. A larger sample size is necessary for examining a small association influenced by numerous confounders; therefore, a greater variation in the variables is needed to control for the confounders. Our interpretation is also based on the epidemiological meaning; that is, a population-based approach in the case that SBP lowering, especially in the uncontrolled BP group, positively prevents the lowering of the cognitive functioning in only 481 participants. It is not a larger effect size. Because of the numerous measurements and statistical methods, the sample size needs to reflect power considerations.[4] We estimated the total sample size as ~680 by G^* power when the defined effect size was 0.2, α error was 0.05, power = $1-\beta$ error was 0.80, and the number of predictors was from 6 to 10 in a multiple linear regression. Therefore, the sample of 481 in the uncontrolled BP group was sufficient for our previous study.[4] Tables 1a and 1b, show the partial regression coefficients and confidence intervals (CIs) of the independent variables based on the suggestion in the letter by Drs Erfan Ayubi and Mohadeseh Sani. The difference in the Montreal Cognitive Assessment Japanese version (MoCA-J) total score with the partial regression coefficient −0.14 (95% CI −0.26 to −0.01) was estimated based on a 10 mm Hg increase in SBP in all participants aged 70 years. This estimate was marked −0.26 (95% CI −0.52 to −0.00) if the SBP/DBP of the participants remained uncontrolled. Although previous studies did not show partial regression coefficients, our study might suggest the clinical meaning

Table 1a Partial regression coefficients (*B*) and 95% confidence interval as predictors of MoCA-J total score at age 70 years

	B (95% CI)		
	All	*Uncontrolled BP*	*Controlled BP*
SBP	−0.14* (−0.26 to −0.01)	−0.26* (−0.52 to −0.00)	−0.15 (−0.46 to 0.17)
Taking medication for HTN	−0.33 (−0.82 to 0.16)	−0.48 (−1.17 to 0.21)	−0.25 (−0.97 to 0.46)
Diabetes mellitus	−0.43 (−1.0 to 0.17)	0.05 (−0.78 to 0.88)	−0.98* (−1.85 to −0.10)
Dyslipidemia	0.29 (−0.19 to 0.8)	0.08 (−0.62 to 0.78)	0.50 (−0.16 to 1.16)
BMI	−0.08 (−0.16 to 0.00)	−0.14* (−0.25 to −0.02)	−0.02 (−0.14 to 0.12)
Smoking	−0.8* (−1.6 to −0.06)	−0.85 (−1.93 to 0.23)	−0.67 (−1.86 to 0.52)
Excessive alcohol intake	0.11 (−0.92 to 1.15)	0.24 (−1.14 to 1.61)	−0.07 (−1.68 to 1.54)
Serum albumin	−0.58 (−1.42 to 0.26)	−0.76 (−1.99 to 0.47)	−0.48 (−1.64 to 0.69)
Frequency of going outdoors	0.44‡ (0.26 to 0.62)	0.45† (0.19 to 0.71)	0.45† (0.18 to 0.71)
Sex	0.54* (0.06 to 1.02)	0.77* (0.07 to 1.47)	0.32 (−0.34 to 0.98)

Abbreviations: B, partial regression coefficient; BMI, body mass index; BP, blood pressure; CI, confidence interval; HTN, hypertension; SBP, systolic blood pressure.
*$P<0.05$; †$P<0.01$; ‡$P<0.001$.
Parameter estimates (B) can be interpreted as differences in cognitive function score for each 10 mm Hg increase in SBP.

Table 1b Partial regression coefficients (B) and 95% confidence interval as predictors of MoCA-J total score at age 80 years

	B (95% CI)		
	All	*Uncontrolled BP*	*Controlled BP*
SBP	−0.06 (−0.20 to 0.08)	−0.14 (−0.38 to 0.12)	0.16 (−0.31 to 0.63)
Taking medication for HTN	0.29 (−0.24 to 0.81)	0.20 (−0.47 to 0.86)	0.39 (−0.47 to 1.25)
Diabetes mellitus	−0.42 (−1.10 to 0.26)	−0.38 (−1.26 to 0.50)	−0.34 (−1.44 to 0.77)
Dyslipidemia	0.21 (−0.33 to 0.74)	0.15 (−0.53 to 0.83)	0.30 (−0.58 to 1.18)
BMI	0.00 (−0.08 to 0.09)	0.00 (−0.12 to 0.11)	−0.02 (−0.17 to 0.12)
Smoking	−0.34 (−1.56 to 0.89)	0.16 (−1.41 to 1.72)	−1.44 (−3.46 to 0.59)
Excessive alcohol intake	0.16 (−1.92 to 2.23)	2.01 (−1.34 to 5.35)	−0.98 (−3.71 to 1.75)
Serum albumin	1.12* (0.19 to 2.06)	0.56 (−0.62 to 1.75)	1.92* (0.38 to 3.45)
Frequency of going outdoors	0.26† (0.07 to 0.45)	0.37† (0.14 to 0.61)	0.07 (−0.25 to 0.39)
Sex	−0.14 (−0.66 to 0.38)	0.05 (−0.60 to 0.71)	−0.55 (−1.42 to 0.32)

*$P<0.05$; †$P<0.01$.

of the association between SBP and cognitive functioning. Furthermore, a 0.6 lower average MoCA-J total score in subjects with uncontrolled BP compared with subjects with controlled BP at the age of ~70 might be meaningful regarding future progression to dementia. Thus, we believe that the findings in our paper[1] will be helpful for the prevention of dementia in the elderly.

We hope that these results will place more emphasis on the longitudinal association between SBP and cognitive functioning at ~70 years of age, as our results were assessed based on a cross-sectional design and followed every 3 years. The suggestions by Dr Mohadeseh Sani *et al.* should be closely considered in future studies.[5,6]

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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