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Associations of Body Fatness and Cardiorespiratory Fitness on Central Blood Pressure in Older Adults

Background

- In general, as we age we incrementally acquire risk factors for cardiovascular disease (CVD)
- These risk factors include increased blood pressure, increased body fat and decreased fitness. Each of which are independently associated with increased CVD risk
- In an examination of the effects of BMI and CRF and aging, there was a 2x greater risk for CVD mortality for people who lost fitness and increased their BMI. (Lee et.al 2011)
- Aging leads to increased arterial and arteriolar stiffness which causes increased BP and is strongly associated with the development of CVD.
- Evidence is emerging suggesting that central blood pressure is a better predictor of future cardiovascular events than peripheral blood pressure.

Purpose

To investigate the independent associations of percent body fat (PBF) and cardiorespiratory fitness (CRF) on central blood pressure (CBP)

Methods

Participants

- 302 older adults aged ≥65 years (mean age 72) from the Physical Activity and Aging Study (PAAS), which is an emerging prospective cohort study investigating the effects of lifestyle factors and aging.

Variable Definitions

- PBF was assessed via a DXA scan and divided into sex-specific quartiles
- CRF was evaluated by a 400-meter walk test and divided into sex-specific quartiles based on completion time in minutes
- CBP was analyzed using an Uscom BP+ (Uscom Ltd., Australia). Elevated central BP was defined as sex-specific, central systolic or diastolic BP above the 75th percentile in this sample.

Statistical Analysis

- Logistic regression was used to calculate odds ratios (ORs) and 95% confidence intervals (95% CIs) of having an elevated central BP across PBF and CRF.

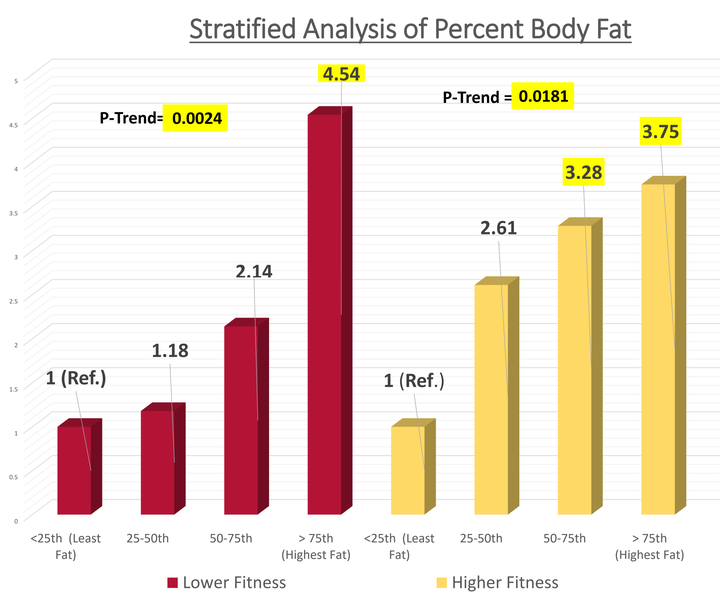
TABLE 1. BASELNE PARTICPANT CHARACTERISTICS

	NORMAL CENTRAL BP	ELEVATED CENTRAL BP	P VALUE
N	198	106	
SEX (WOMEN)	121 (61.1%)	56 (52.8%)	0.1804
AGE	74.1 ± 6.0	74.3 ± 5.5	0.6804
SYSTOLIC BP	114.4 ± 9.5	140.9 ± 16.9	**<.0001**
DIASTOLIC BP	69.2 ± 5.5	79.3 ± 5.9	**<.0001**
CENTRAL SYSTOLIC BP	108.9 ± 9.4	133.5 ± 14.7	**<.0001**
CENTRAL DIASTOLIC BP	70.5 ± 5.4	81.6 ± 5.8	**<.0001**
AUGMENTATION INDEX	102.2 ± 39.1	129.1 ± 58.9	**<.0001**
RESTING HEART RATE	65.4 ± 10.0	66.6 ± 10.8	0.3197
400M WALK TIME (MIN)	4.42 ± 0.72	4.66 ± 0.89	**0.0099**
PERCENT BODY FAT	38.9	41.3 ± 7.9	**0.0088**
BMI	26.2 ± 4.6	28.5 ± 4.9	**<.0001**
SMOKING	2 (.01%)	1 (.01%)	0.4459
BP MEDS	144 (72.7%)	45 (42.5%)	**0.0100**

TABLE 2. ASSOCIATION BETWEEN QUARTILES OF FITNESS AND PBF AND ELEVATED CBP

	Model 1[α] Odds Ratio (95% CI)	Model 2[þ] Odds Ratio (95% CI)
PERCENTILES OF FITNESS		
<25TH *(LEAST FIT)*	1.00	1.00
25-50TH	0.612 (0.31-1.19)	.712 (0.36-1.42)
50-75TH	**0.464 (0.23-0.95)**	0.644 (0.31-1.43)
> 75TH *(MOST FIT)*	**0.341 (0.16-0.74)**	0.577 (0.25-1.34)
P TREND	**0.0053**	0.2075
PERCENTILES OF % BODY FAT		
<25TH *(LEAST FAT)*	1.00	1.00
25-50TH	1.90 (0.87-4.16)	1.79 (0.81-3.94)
50-75TH	**2.99 (1.38-6.48)**	**2.86 (1.31-6.23)**
> 75TH *(HIGHEST FAT)*	**4.94 (2.28-10.70)**	**4.23 (1.85-9.70)**
P TREND	**<.0001**	**0.0002**

[α]Adjusted for age, sex, gender, blood pressure medication usage, and current smoking status
[þ] Adjusted for model 1 plus percent body fat (for fitness quartiles) and time to complete 400m walk test (for percent body fat quartiles).



Conclusion

The principle finding of this study is that higher PBF, independent of CRF, is associated with an increased prevalence of elevated central BP in older adults. However, further prospective studies are warranted.

Acknowledgments

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