Stress and Development of Metabolic Syndrome in Older Adults

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INTRODUCTION

- Metabolic syndrome (Met. Syn.) is a clinical condition comprised of risk factors for diabetes and cardiovascular disease that may develop from chronic stress [3].
- Older adults who experience chronic stress, such as family caregivers to persons with dementia, have an increased risk of developing metabolic syndrome due to their lower resilience to stress and illness [4].
- The association between work stress and metabolic syndrome has been observed among adults employed in high-stress occupations [1].
- However, few studies have examined the association between caregiving and metabolic syndrome as well as risk of metabolic syndrome in older adults who reported elevated stress at multiple time points (i.e., chronic stress).

RESEARCH GOAL

To examine the association between baseline and chronic stress with prevalent and incident metabolic syndrome among 248 older adults participating in the Health Pathway Study.

METHODS

Sample:
- 248 adults aged 60+ residing in the Boston metropolitan area
- Sample taken from the Health Pathway Study, a 6-year prospective cohort study of stress and health outcomes among older adults in Boston (PI, Lisa Fredman Ph.D.).

Key Measures:
- Perceived stress was measured with the 14-item Perceived Stress Scale [2].
- Perceived Stress was operationalized as a continuous measure for the main analyses and dichotomized according to the top quartile of the sample distribution at baseline.

- Metabolic Syndrome was determined by the presence of at least three of the five following factors: high levels of blood pressure, waist circumference, fasting flood glucose, and triglycerides, and low HDL cholesterol.

Analyses:
- All statistical analyses were performed in SAS.
- Associations were examined after adjusting for confounders such as age, sex, marital status, and walking pace.

RESULTS

Table 1. Baseline Characteristics of 248 Health Pathways Participants by Perceived Stress Level

	Total (n = 248)	Low Perceived Stress (n = 186)	High Perceived Stress (n = 62)	P-Value
Age mean ± SD	73.27 ± 7.88	73.76 ± 7.76	71.74 ± 8.10	0.09
Gender (% female)	70.16%	67.20%	79.03%	0.08
Marital Status (% married)	55.65%	51.61%	67.74%	0.03
Race (% white)	83.87%	83.33%	85.48%	0.69
Walking speed 6m (m/sec) mean ± SD	1.00 ± 0.21	1.01 ± 0.22	0.96 ± 0.17	0.08
Caregiving	**(n = 106)**	**(n = 68)**	**(n = 38)**	
Caregiver	42.74%	36.56%	61.29%	0.007

Summary: Participants who were younger, female, married, and had slower walking pace were more likely to report having high perceived stress. Caregivers were more likely to report high stress compared to non-caregivers.

Table 2. Baseline Characteristics of 189 Health Pathways Participants Who Developed Metabolic Syndrome

		Without Met. Syn. (n=166) With Met. Syn. (n = 23)		P-Value
Age mean ± SD	Without Met.Syn.	73.08 ± 7.91		0.76
	With Met.Syn.	73.60 ± 8.51		
Gender	Male	Without	89.80%	0.62
		With	10.20%	
	Female	Without	87.14%	
		With	12.86%	
Marital Status	Other	Without	83.13%	0.08
		With	16.87%	
	Married	Without	91.51%	
		With	8.49%	
Race	Other	Without	80.65%	0.18
		With	19.35%	
	White	Without	89.24%	
		With	10.76%	
Walking speed 6m (m/sec) mean ± SD	Without Met.Syn.	1.03 ± 0.21		0.09
	With Met.Syn.	0.95 ± 0.18		
Caregiving		**Caregivers Without Met.Syn (n = 72) Caregivers With Met.Syn (n=8)**		
Caregiver	No	Without	85.85%	0.35
		With	14.15%	
	Yes	Without	90.36%	
		With	9.64%	
Stress Variable				
Perceived Stress	Low	Without	87.59%	0.85
		With	12.41%	
	High	Without	88.64%	
		With	11.36%	

Summary: Participants who were not married, non-white, and had slower walking pace were more likely to develop metabolic syndrome in follow-up interviews. Caregivers had similar incidence of metabolic syndrome as non-caregivers. Participants with low perceived stress levels had similar incidence of metabolic syndrome as those with high perceived stress.

RESULTS

Table 3. Risk Ratios and Confidence Intervals for Development of Metabolic Syndrome in Participants with High Perceived Stress

	Risk Ratio	95% Confidence Interval
High Perceived Stress	0.905	0.315, 2.595
High Perceived Stress Adjusted	0.949	0.318, 2.827

Summary: Older adults with high perceived stress level has 0.949 times the risk of developing metabolic syndrome compared to older adults with low perceived stress. There is no association between high perceived stress and the incident of metabolic syndrome in older adults.

CONCLUSION

- At baseline, caregivers were more likely to report high stress compared to non-caregivers (36% vs.17%).
- The prevalence of metabolic syndrome was higher in participants with high stress (27%) than low stress (22%).
- Among the 189 participants without metabolic syndrome at baseline, 23 developed it over the three annual follow-up interviews, for an incidence of 12%.
- There is no observed association between high perceived stress and development of metabolic syndrome (risk ratio = 0.95).
- Limitations to this study include small sample size for incident metabolic syndrome, selection bias, misclassification of perceived stress categorization, and lost to follow up of participants.
- Nevertheless, this study provided insight to the relationship between perceived stress and metabolic syndrome in older adults. Future studies should examine factors that may increase risk for metabolic syndrome in older adult caregivers.

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