Lehigh Valley Health Network

Department of Medicine

Are Cardiovascular Risk Factors Responsible for the U-shaped Relationship Between Running and Longevity? The MASTERS Athletic Study

Adrian C. Bell DO Lehigh Valley Health Network, Adrian_C.Bell@lvhn.org

Courtney Bennett DO Lehigh Valley Health Network, Courtney_E.Bennett@lvhn.org

Martin E. Matsumura MD Lehigh Valley Health Network, Martin_E.Matsumura@lvhn.org

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Are Cardiovascular Risk Factors Responsible for the U-shaped Relationship Between Running and Longevity? The MASTERS Athletic Study Adrian Bell DO, Courtney Bennett DO, Martin Matsumura MD Lehigh Valley Health Network, Allentown, Pennsylvania

Background:

- Recent studies have noted a U-shaped relationship between running and longevity. While running was generally associated with increased life span, the subgroup who reported training on average >20 miles or >2.5 hours² per week did not experience significantly longer lifespan vs non-runners. It is hypothesized that this U-shaped mileage/longevity relationship is due to detrimental cardiac effects of higher mileage training.
- Detrimental effects that have been described are micro-tears of the atria and ventricles due to acute volume overload associated with chronic vigorous exercise.¹
- These micro-tears are thought to be a precursor to myocardial fibrosis and remodeling with a reduction in cardiac function and efficiency, and ultimately a substrate for malignant ventricular arrhythmias.¹ Imaging studies have demonstrated variable rates of fibrosis, possibly as a result of these processes.
- In the present study we examined the hypothesis that confounding factors associated with longer distance training, specifically differences in cardiac risk factors or medication use, account for this U-shaped dose-response curve of running and longevity. Included in these confounders is the use of nonsteroidal antiinflammatory drugs (NSAIDs), which has been the topic of recent studies examining an association with increased cardiovascular events in runners and the general public.³

Methods:

- The MASTERS Athletic Study is a longitudinal, web based study of training and health habits of runners ages 35 and older. Participants were stratified by self-reported average weekly mileage into those running < 20 and those running >20 miles/week.
- Comparisons between the low- and high-mileage groups included typical cardiac risk factors and use of both protective (aspirin) and potentially harmful (NSAIDs) medications.

Results:



- are reported in Table 1.
- Table 3: Training mileage and intensity comparing low and high mileage runners.

Table 1. Baseline Participant Characteristics and Reported Training Intensity			
Mean age, years (Range)	46.6 (35-85)		
Sex, male (%)	66.7		
Average miles/week (%)			
<10	168 (4.3)		
11-20	1003 (25.9)		
21-30	1318 (34.0)		
31-40	769 (19.9)		
41-50	359 (9.3%)		
Average training pace, minutes/mile (% total)			
<6min/mile	19 (0.5)		
6-7 min/mile	165 (4.3)		
7-8 min/mile	881 (22.8)		
8-9 min/mile	1093 (28.3)		
10-11 min/mile	460 (11.9)		
11-12 min/mile	202 (5.2)		
>12 min/mile	102 (2.6)		
Family History of CAD	1566 (40.7)		
Hypertension	825 (21.5)		
Rx'ed HTN Meds	271 (7.0)		
Hypercholesterolemia	858 (22.6)		
Rx'ed Cholesterol Meds	246 (6.4)		
Diabetes Mellitus	47 (1.2)		
Use Analgesic Medicines for Running-related Pain	1393 (36.0)		
Use Aspirin Daily	208 (5.4)		

Table 2. Potential Confounders and Reported Medica Follow-up				
	Low Mileage	High Mileage	p-Value	
Demographics				
Median age, years (25-75%)	45 (40-52.2)	45 (40-52)	0.895	
Mean age, years (SD)	46.5 (8.62)	46.4 (8.40)	0.758	
Sex, %male	58.6	70.3	<0.001	
Risk Factors				
Hypertension (%)	263 (22.7)	562 (21.0)	0.256	
Family History CAD (%)	483 (41.5)	1083 (40.4)	0.543	
Hyperlipidemia (%)	310 (26.9)	548 (20.8)	<0.001	
Smoking History (%)	379 (32.7	801 (30.1)	0.117	
Diabetes (%)	15 (1.3)	32 (1.2)	0.941	
Medicine Use				
Any NSAID use (%)	761 (65.0)	1627 (60.2)	0.005	
NSAID use >1 dose/week (%)	252 (21.5)	405 (14.5)	<0.001	
NSAID use >1 dose/day (%)	20 (1.7)	33 (1.2)	0.285	
Daily aspirin use (%)	69 (5.9)	134 (5.0)	0.268	
Hyperlipidemia Dx on meds (%)	87 (28.1)	159 (29.0)	0.840	
Hypertension Dx on meds (%)	88 (33.5)	183 (32.6)	0.860	
Medical Evaluation				
Primary doctor visit in past year (%)	675 (59.3)	1488 (56.3)	0.103	
No primary doctor identified (%)	51 (4.5)	113 (4.3)	0.849	
Had stress test within last 5 years (%)	197 (17.2)	509 (19.3)	0.137	
Had ECG within past 5 years (%)	462 (40.6)	1116 (42.5)	0.294	
Discussed risk/benefits of running with doc (%)	540 (47.0)	1329 (50.5)	0.055	

References:

- cohort study. BMJ Open, 2013.

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Financial Disclosures:

• Of 3,875 respondents, 2,704 (69.8%) reported training >20 miles/wk. Comparisons of weekly mileage and potential confounders

• Table 2: Prevalence of potential confounders of CAD risk factors and medication use by low and high mileage runners.

• Figure 1: Percentage of runners reporting use of NSAIDs> 1x/week stratified by training distance/pace groups

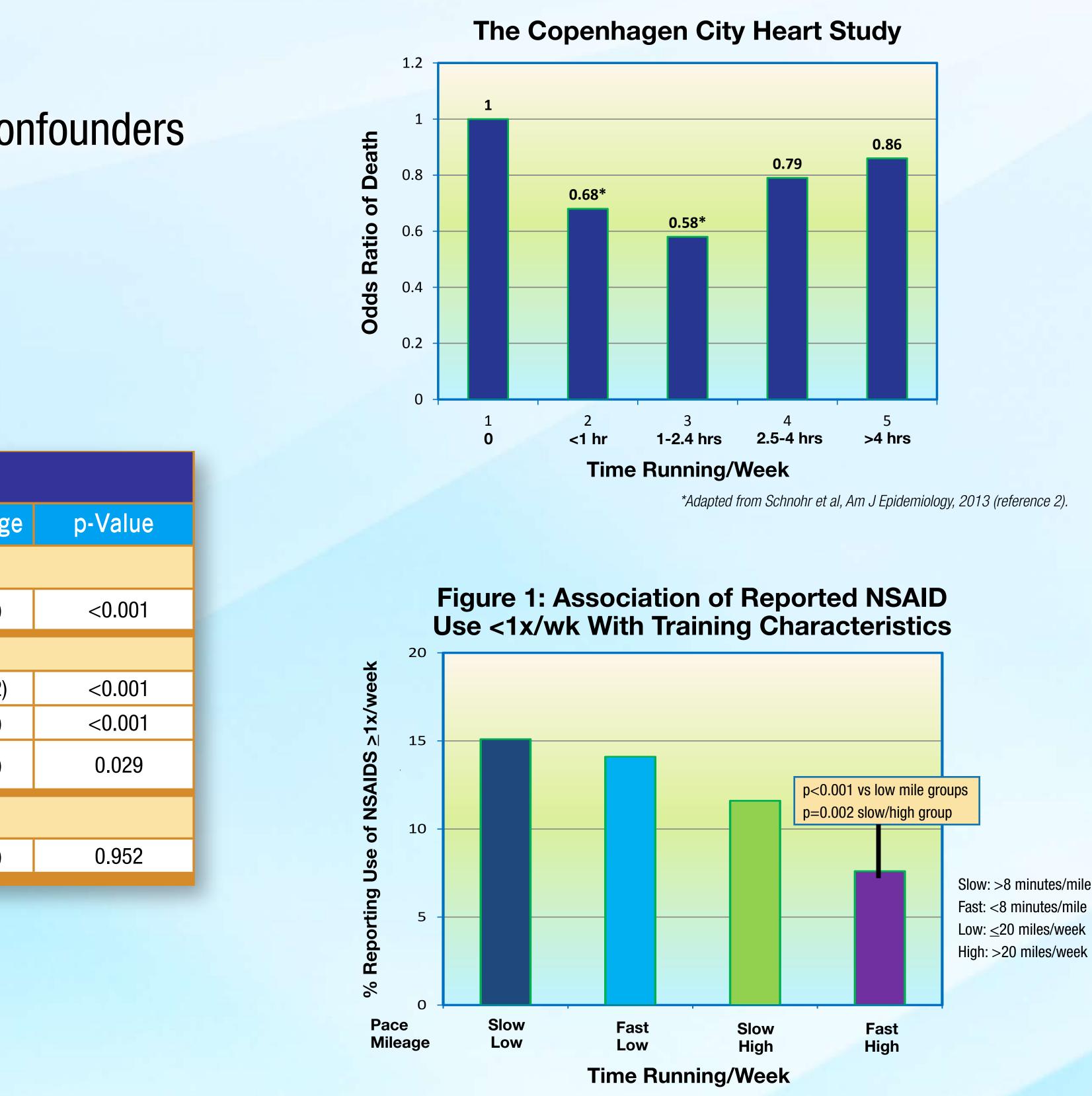
Table 3. Reported Training Characteristics				
	Low Mileage	High Mileag		
Training Characteristics				
Training pace < 8 minutes/mile (%)	164 (14.0)	901 (33.4)		
Competition Characteristics				
Longest race marathon or greater (%)	322 (28.9)	1838 (68.2)		
Longest race ultramarathon (%)	23 (2.0)	349 (13.0)		
Compete in triathlons/multisport events (%)	427 (36.9)	889 (33.2)		
Miscellaneous				
Consume > 4 cups coffee/day (%)	164 (10.3)	274 (10.5)		

Conclusion:

- in the primary preventative use of daily aspirin.

. O'Keefe JH. Lavie CJ. Heart 2013

2. Schnohr P. Assessing prognosis: a glimpse of the future. Jogging healthy or hazard? In: Cardiology ESo, ed. EuroPrevent 2012. Dublin, Ireland: European Heart Journal, 2012. Kuster M, Renner B, Oppel P, Niederweis U, Brune K. Consumption of analgesics before a marathon and the incidence of cardiovascular, gastrointestinal, and renal problems: a



• Decreased longevity in runners averaging >20 miles/week vs those who run lower average weekly mileage could not be explained by higher prevalence of CAD risk factors or differences

In addition, we found that frequent NSAID use was paradoxically more common in runners reporting lower average weekly mileage and slower average pace.

• The underlying cause of the observed U-shaped relationship between training mileage and longevity remains unclear and should be the topic of further study.

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