Effects of a 12-week Minimal Contact Walking Program on CVD Risks among Rural Men and Women

E. Laurette Taylor, PhD
Jordan N. Parham, MS
Dannielle R. Brittain, PhD
Allen Knehans, PhD

the university of OKLAHOMA

Presenter Disclosures E. Laurette Taylor, PhD

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12:

NO RELATIONSHIPS TO DISCLOSE

Trends in Physical Inactivity and CVD Costs

- Heart disease has been the leading cause of death in the United States for the past 80 years [1]
  - Heart disease causes 26% of all deaths per year [2]
  - In 2006, 631,636 people died of heart disease [2]
- Coronary heart disease cost an estimated $151.6 billion in direct and indirect costs in 2007 [3]
- In 2010, just over half (50.6%) of U.S. adults met the CDC/ACSM physical activity recommendation Improved mental health [4]

CVD Risk Factors

- Risk Factors for Cardiovascular Disease [5]
  - Health Conditions
    - Hypercholesterolemia
    - Hypertension
    - Obesity & overweight
    - Diabetes mellitus
  - Lifestyle Behaviors
    - Diet
    - Tobacco smoke
    - Physical inactivity

Benefits of Regular Physical Activity

- Improved physical functioning [6]
- Improved physical fitness [6]
- Improved mental health [6]
- Reduction in CVD risk factors: [7-10]
  - Cholesterol
  - Blood Pressure
  - Overweight/obesity

Walking and CVD Risk Reduction

- Walking related reductions in CVD risk
  - Decrease BP, CVD risk [7, 9]
  - Increase functional capacity [7]
  - Increase HDL[8]
  - Decrease TC and triglycerides [8]
- Dose response between PA and CVD risk[11]
  - Inverse linear dose response between PA and all-cause mortality
  - Inverse linear dose response between PA and both the incidence and mortality rates for all CVD and coronary heart disease

Use of Pedometers in Minimal Contact Walking Intervention

- Recommendation of 10,000 steps/day activity goal [12]
- Goal of increasing steps progressively to
- Use of pedometers and step logs as self-monitoring tools [7, 13-15]
- Use of minimal contact with efficacy enhancing messages [13-15]

Purpose

- To study the impact of a 12-week minimal contact walking intervention among insufficiently active rural adults (35-64 years), who are at risk for CVD on:
  - Antecedent variables associated with behavior change
  - Physical activity level
  - Risk factors for CVD

Research Questions

RQ1: Does participation in a 12 week program result in positive changes in antecedent (SE and behavioral intent) variables associated with behavior change?

RQ2: Does participation in a 12 week program result in positive changes in level of MIPA, VIPA, walking behavior, and MET/min/wk?

RQ3: Does participation in a 12 week program result in positive changes in CVD risk factors?

Inclusion Criteria

- Men and Women 35-64 years old
- Insufficiently active
  - <150 minutes of moderate exercise per week or
  - <75 minutes of vigorous exercise per week
- Two or more CVD risk factors
  - ≥55 years old (women) or ≥50 years old (men)
  - High cholesterol
  - High blood pressure
  - BMI ≥ 27
  - Family history of CVD
  - Current smoker

Sample

- n=29 volunteer participants
- Gender
  - Female: 83% (n=24)
  - Male: 17% (n=5)
- 35-65 years of age
- Independent community dwellers in a rural Oklahoma community

Dependent Variables

- **Research Design** - One-group pre/post test design
- **Antecedent variables** – Self-efficacy, Intent to walk
- **Physical Activity** – IPAQ Short Form
  - Days of moderate/vigorous activity, hours/day of moderate/vigorous activity
  - Walking days, hours/day
  - Met/min/wk **–** MET level X minutes/day of activity X days/ wk

Dependent Variables

- **Body composition**– BMI, Body fat % (BF%), Waist:hip (WHR)
- **Clinical variables**
  - Resting heart rate (HR), Systolic BP (SBP), Diastolic BP (DBP)
  - Fasting lipids (TCHOL, LDL, HDL, TRIG)
  - Fasting glucose
  - Framingham risk – heart age (Hrtage), 10 yr risk for coronary event (10yrrisk)

Walking Intervention

- Pedometer (Accusplit Eagle 120) – 10,000 step daily target
- Step-logs for self-monitoring
- Physical activity brochure and review of PA guidelines
- Weekly reminder to submit step-logs + a motivational email/telephone call intended to enhance exercise self-efficacy

Statistical Analysis

- SPSS 17.0
- Descriptive Statistics
- Dependent t-tests
- Effect Size – Cohen's *d*
  - 0.2 small effect size
  - 0.5 medium effect size
  - 0.8 large effect size

Demographics

Sample	n=29		**Income**	<$20K	7%
				$20-35K	7%
Age	range = 35-63			$35-50K	35%
	mean = 51±8			$50-75K	24%
Race	White	90%		>$75K	28%
	Black	3%			
	Hispanic	7%	**Marital**	Single	3%
				Married	90%
Edu.	HS	28%		Widowed	3%
	College	17%		Separated	3%
	Degree	55%			

Effects on Psychosocial Variables

Variable	Possible Range	Observed Range	Pre- M (SD)	Post- M (SD)	p-value	ES
Self-Efficacy	0-10	0-10	7.1 (2.1)	7.6 (2.5)	0.121	--
Intent days	0-14	3-14	11 (2.4)	11 (2.7)	0.354	--

Effects on Physical Activity Variables

Variable	Possible Range	Pre- M (SD)	Post- M (SD)	p-value	ES
Vigorous days	0-7	0.8 (1.5)	2.6 (3.1)	0.003	0.74
Vigorous min.	0-1440	25.3 (55.7)	58.3 (64.9)	0.008	0.55
Moderate days	0-7	1.1 (1.4)	2.1 (2.0)	0.006	0.58
Moderate min.	0-1440	33.2 (53.7)	72.8 (93.6)	0.009	0.52
Walk days	0-7	3.0 (2.3)	5.5 (1.6)	0.000	1.26
Sitting hours	0-24	6.7 (3.4)	5.8 (2.8)	0.008	0.29
Met/min/wk	--	2081(3185)	4912(6097)	0.009	0.61

Effects on Clinical Variables

Variable	Normal Range	Observed Range	Pre- M (SD)	Post- M (SD)	p-value	ES
HR	60-100	52-104	73.5 (12)	69.4 (7)	0.020	0.43
DBP	60-80	60-98	80 (8)	78 (7)	0.036	0.28
BF%	< 25/31%	21.3-55.9	41.6 (8)	40.5 (8)	0.043	0.14
Glucose	< 100	56-104	96 (16)	78 (13)	0.000	1.23
Heart age	--	38-80	63.7 (14.8)	59.2 (13.2)	0.002	0.40
10 year risk	--	2.1-30	12.0 (8.3)	9.2 (6.5)	0.000	0.38

Conclusions

- Antecedent Variables
  - No changes in self-efficacy and intent to walk, however both were relatively high at pre-test
  - Suggests that antecedent conditions needed to facilitate behavior change existed at baseline and/or other targeted behavioral antecedents not measured were important (ex. Social support)
- Physical Activity
  - Significant improvements in all but one PA measure
  - Effect sizes ranged from 0.29-1.26 (mostly medium effects)
  - Suggests the intervention was effective in motivating and increase in physical activity

Conclusions

- Clinical Variables
  - Significant, yet small effect sizes for HR, DBP, heart age, and 10 year risk for coronary event
  - Significant, yet large effect size for fasting glucose
- Program efficacy
  - Effective in increasing self-reported PA (IPAQ)
  - Volume of PA adequate to impact glucose, resting HR, DBP, BF%, and Framingham risk status, but not lipid levels or SBP
  - May require longer duration or greater volume of activity to impact lipids

References

1. Greenlund KJ, Giles WH, Keenan NL, et al. Heart disease and stroke mortality in the 20th century. In: Ward J, Warren C, eds. Silent victories: the history and practice of public health in twentieth century America. Oxford, England: Oxford University Press; 2006.
2. Heron MP, Hoyert DL, Murphy SL, Xu JQ, Kochanek KD, Tejada-Vera B. Deaths: Final data for 2006. National Vital Statistics Reports. 2009; 57(14), Hyattsville, MD: National Center for Health Statistics
3. Rosamond W, Flegal K, Friday G, et al. Heart disease and stroke statistics---2007 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation* 2006;113:e69--171.
4. Center for Disease Control and Prevention (http://apps.nccd.cdc.gov/brfss/index). Accessed September 5, 20116.
5. USDHHS/National Heart Blood and Lung Institute. What are coronary heart disease risk factors? [Web page]. http://www.nhlbi.nih.gov/health/health-topics/topics/hd/. Accessed September 25, 2011.
6. U.S. Department of Health and Human Services. *2008 Physical Activity Guidelines for Americans*; 2008.
7. Tully MA, Cupples ME, Chan WS, McGlade K, Young IS. Brisk walking, fitness, and cardiovascular risk: a randomized controlled trial in primary care. *Prev Med.* 2005;41:622-628.
8. Murphy M, Nevill A, Neville C, Biddle S, Hardman A. Accumulating brisk walking for fitness, cardiovascular risk and psychological health. *Med Sci Sports Exerc.* 2002;34:1468-1474.

References

9. Cox K, Burke V, Morton A, Gillam H, Beilin L, Puddey I. Long-term effects of exercise on blood pressure and lipids in healthy women aged 40-65 years: the sedentary women exercise adherence trial (SWEAT). *J Hypertens.* 2001;19:1733-1743.
10. Colley R, Hills A, O'Moore-Sullivan T, Hickman I, Prins J, Byrne N. Variability and adherence to an unsupervised exercise prescription in obese women. *Int J Obes (Lond). 2008;32:837-844.*
11. Rankinen T, Bouchard C. Dose-response issues concerning the relationship between regular physical activity and health. *President's Council on Physical Fitness and Sports Research Digest.* 2002;Series 3(18):1-8.
12. Tudor-Locke C, Bassett D. How many steps/day are enough? Preliminary pedometer indices for public health. *Sports Med.* 2004;34(1):1-8.
13. Dinger MK, Heesch KC, Cipriani G, Qualls M. Comparison of two email-delivered, pedometer-based interventions to promote walking among insufficiently active women. *J Sci Med Sport.* 2007;10:297-302.
14. Dinger MK, Heesch KC, McClary KR. Feasibility of a minimal contact intervention to promote walking among insufficiently active women. *Am J Health Promot.* 2005;20(1):2-6.
15. DuVall C, Dinger MK, Taylor EL, Bemben D. Minimal-contacCloyd-Jones D, Adams R, Carnethon M, et al. Heart disease and stroke statistics 2009 update. A report from the American Heart Association statistics committee and stroke statistics subcommitee. *Circulation.* 2008.