Published in final edited form as:

Diabetes Metab Syndr. 2010 ; 4(4): 187–189. doi:10.1016/j.dsx.2010.09.006.

Cynicism: Incident diabetes and worsening of metabolic syndrome in postmenopausal women

Judith Wylie-Rosett^{a,*}, Aaron K. Aragaki^b, Barbara Cochrane^b, Michael G. Perri^c, Milagros C. Rosal^d, and Stephen R. Rapp^e

^aAlbert Einstein College of Medicine, New York Clinic, 1307 Belfer Building, 1300 Morris Park Avenue, Bronx, NY 10461, United States

^bFred Hutchinson Cancer Research Center, United States

^cUniversity of Florida at Gainesville, Seattle, WA, United States

^dUniversity of Massachusetts Medical School, Worcester, MA, United States

^eDepartment of Psychiatry and Behavioral Medicine, Wake Forest University Health Sciences, Winston-Salem, NC, United States

Abstract

Objective—To determine if self-reported cynical hostility predicted incident diabetes or increase in number of symptoms associated with metabolic syndrome in postmenopausal women.

Design—Prospective study of a subsample of women ($n = 3,658$) participating in the Women's Health Initiative Clinical Trial.

Methods—*Subjects*: Postmenopausal women aged 50 to 79 years at baseline who were enrolled in the Women's Health Initiative Dietary Modification Trial, Hormone Trial or both. Measures: The Cynicism subscale of the Cook-Medley Hostility Questionnaire was used to assess cynical hostility at baseline. Incident diabetes was ascertained by self-report of treatment with insulin or oral hypoglycemic medication at one year. Metabolic syndrome was defined based on number of Adult Treatment Panel (ATP) III criteria met at one year. Statistical Analysis: The relationship between baseline cynical hostility and incident diabetes and worsening of metabolic syndrome was assessed from baseline to one year using multivariable Cox proportional hazards models and multivariable logistic regression models, respectively.

Results—Incident diabetes was 36% higher among women in the upper tertile for baseline cynical hostility compared to the lowest tertile (p -trend = 0.05). The odds of a worsening of metabolic syndrome was 27% greater in the highest cynical hostility tertile compared to the lowest tertile (p -trend = 0.04).

Conclusions—Cynical hostility may increase the risk for developing diabetes and worsening of the metabolic syndrome in postmenopausal women.

Keywords

Diabetes; Metabolic syndrome; Mood; Cynicism; Cynical hostility; Postmenopausal women

1. Introduction

Metabolic syndrome, diabetes and increased cardiovascular disease risk are associated with negative emotions and associated attitudes including cynical hostility or cynicism which is defined as a low opinion of human nature and distrust of others [1–3]. The metabolic syndrome may mediate the relationship between cardiovascular disease and cynicism [3]. Lifestyle plays a major role in the risk of developing diabetes and metabolic syndrome [4]. This prospective analysis of Women's Health Initiative (WHI) participants assesses the how cynicism is related to incident diabetes and metabolic syndrome progression considering lifestyle risk factors.

2. Methods

2.1. Subjects

Participants were postmenopausal women ages 50–79 years at baseline enrolled in either the WHI Dietary Modification (DM) randomized controlled trial, the Hormone Therapy (HT) vs. placebo-controlled trial or both trials. An overall description of the WHI is reported elsewhere [5]. Women were excluded based on component-specific safety, competing risk and adherence criteria. The study protocol was approved by the institution review boards at each of the WHI clinical centers and the coordinating center. All participants provided written consent. Analysis for current manuscript is from a subset (6% of the clinical trial participants; $n = 3658$) of randomly selected for evaluation of lipids, fasting glucose, insulin and other parameters.

2.2. Measures

Self-reported diabetes was evaluated by questionnaire at baseline and 1 year later [6]. Participants were included in present analysis if they self-reported that they were not being treated for diabetes (pills or injections) at baseline and if both blood specimens, baseline and year 1, were available.

Height and weight were measured, and body mass index (BMI) was calculated (kg/m^2). A blood specimen was obtained after a 12-h fast at baseline and at year 1 using standardized procedures. Two consecutive measurements of blood pressure obtained by standardized procedures were averaged.

The 13-item Cynicism Subscale of the Cook-Medley Hostility Questionnaire has good reliability and validity and is predictive of cardiovascular outcomes [7,8].

The Women's Health Initiative [9] Food Frequency Questionnaire (WHI FFQ) [10,11] and physical activity questions [12] are described in greater detail elsewhere. Incident diabetes was ascertained by self-report of treatment with insulin or oral hypoglycemic medication at year 1. Metabolic syndrome was defined based on the Adult Treatment Panel (ATP) III

criteria for women of having three of the following abnormalities at year 1: waist circumference greater than 88 cm; serum triglycerides level of at least 150 mg/dL (1.69 mmol/L); high-density lipoprotein cholesterol level of less than 50 mg/dL (1.29 mmol/L); blood pressure of at least 130/85 mm Hg; or serum glucose level of at least 100 mg/dL (5.6 mmol/L). Blood specimens were analyzed by Medial Research Laboratories (Highland Heights, KY) using established procedures [13], certified by the National Heart, Lung and Blood Institutes (NHLBI) Centers for Disease Control (CDC) part III program [14]. Glucose was measured using the hexokinase method [15].

2.3. Statistical analysis

Demographic, psychosocial, health, and metabolic characteristics of participants were evaluated by cynicism score tertiles using univariate tests of association (Pearson's chi-squared or ANOVA). To determine whether baseline cynicism was a risk factor for incident diabetes at year 1, a multivariable Cox proportional hazards model ratio was used stratifying by age, HT and DM treatment assignment(s) and adjusting for clinical, demographic and lifestyle variables. To determine if cynicism was a risk factor for worsening in metabolic syndrome score, we fit a logistic regression model adjusting for the same covariates as in the diabetes model and also adjusting treatment assignment(s). Cox Hazard ratios for incident diabetes and odds ratios for worsening of metabolic syndrome were calculated for each baseline cynicism score tertile, and statistical significance was gauged by a one degree of freedom test for trend. All statistical tests were two-sided and all statistical analyses were performed using SAS/STATA software Version 9.1 (SAS Institute, Inc., Cary, NC).

3. Results

For the lowest, middle and highest cynicism tertiles, the mean BMI was 28.6 ± 6.1 , 29.1 ± 5.7 and 29.9 ± 6.3 kg/m², respectively ($p = 0.001$) which corresponded to higher energy intake and decreased energy expenditure. Energy intake was 1659.9 calories for the lowest tertile, 1734.9 calories for the middle tertile and 1767.0 for the highest tertile of cynicism ($p < 0.001$). The level of physical activity was inversely related to the increase in cynicism ($p = 0.05$). The proportion of White women and college education were inversely related to increasing cynicism tertile while the proportion of Black women and women with less than a high school education increased by cynicism tertile ($p < 0.001$). In the Cox proportional hazards model, incident diabetes was 36% higher among women in the upper tertile for cynical hostility compared to the lowest tertile referent category (p -trend = 0.05) after adjusting for age, BMI and other diabetes risk factors. The odds of a worsening of metabolic syndrome was 27% greater in the highest tertile for baseline cynicism compared to the lowest tertile referent group (p -trend = 0.04) after adjustment.

4. Discussion

Higher baseline cynicism scores were associated with higher BMI, higher energy intake, lower educational level, being Black, history of CVD, and antihypertensive therapy as well variables associated with diabetes-related health disparities, namely age, race and BMI. An earlier WHI cross-sectional analysis [16] reported ethnic and racial differences in the

clustering of metabolic risk factors in relation to cardiovascular disease but did not examine mood. Surwit et al. [17] reported that the association between hostility and fasting glucose was attenuated by risk-related behaviors and BMI in White adults, but hostility was independently related to fasting glucose in Black adults. Raikkonen et al. [18] found that middle-age women with higher scores for depression, tension and anger were more likely to develop metabolic syndrome, although having metabolic syndrome also predicted subsequent increases in anger and anxiety.

Study limitations include: (1) having only one fasting glucose measurement as a marker of incident diabetes, (2) measurement characteristics of the study instruments to assess dietary intake, physical activity, medical history, and demographic characteristics, and cynicism, and (3) possible “healthy participant effect” bias. Our findings suggest that cynicism may play role in the risk for developing diabetes and in the worsening of the metabolic syndrome that is independent of lifestyle and traditional risk factors.

Acknowledgments

Work Supported by: National Heart, Lung and Blood Institute (NHLBI); National Institute of Arthritis and Musculoskeletal and Skin Disease (NIAMS); National Cancer Institute (NCI); and National Institute on Aging (NIA).

References

- [1]. Goldbacher EM, Matthews KA. Are psychological characteristics related to risk of the metabolic syndrome? A review of the literature. *Ann Behav Med.* Nov-Dec;2007 34(3):240–52. [PubMed: 18020934]
- [2]. Chaput LA, Adams SH, Simon JA, Blumenthal RS, Vittinghoff E, Lin F, et al. Hostility predicts recurrent events among postmenopausal women with coronary heart disease. *Am J Epidemiol.* Dec; 2002 156(12):1092–9. [PubMed: 12480653]
- [3]. Nelson TL, Palmer RF, Pedersen NL. The metabolic syndrome mediates the relationship between cynical hostility and cardiovascular disease. *Exp Aging Res.* Apr-Jun;2004 30(2):163–77. [PubMed: 15204630]
- [4]. Wylie-Rosett J, Herman WH, Goldberg RB. Lifestyle intervention to prevent diabetes: intensive and cost effective. *Curr Opin Lipidol.* Feb; 2006 17(1):37–44. [PubMed: 16407714]
- [5]. Design of the Women's Health Initiative clinical trial and observational study. The Women's Health Initiative Study Group. *Control Clin Trials.* Feb; 1998 19(1):61–109. [PubMed: 9492970]
- [6]. Margolis KL, Lihong Q, Brzyski R, Bonds DE, Howard BV, Kempainen S, et al. Validity of diabetes self-reports in the Women's Health Initiative: comparison with medication inventories and fasting glucose measurements. *Clin Trials.* 2008; 5(3):240–7. [PubMed: 18559413]
- [7]. Barefoot JC, Larsen S, von der Lieth L, Schroll M. Hostility, incidence of acute myocardial infarction, and mortality in a sample of older Danish men and women. *Am J Epidemiol.* Sep; 1995 142(5):477–84. [PubMed: 7677126]
- [8]. Barefoot JC, Peterson BL, Dahlstrom WG, Siegler IC, Anderson NB, Williams RB Jr. Hostility patterns and health implications: correlates of Cook-Medley Hostility Scale scores in a national survey. *Health Psychol.* 1991; 10(1):18–24. [PubMed: 2026126]
- [9]. Langer RD, White E, Lewis CE, Kotchen JM, Hendrix SL, Trevisan M. The Women's Health Initiative Observational Study: baseline characteristics of participants and reliability of baseline measures. *Ann Epidemiol.* Oct; 2003 13(9 Suppl.):S107–21. [PubMed: 14575943]
- [10]. Patterson RE, Levy L, Tinker LF, Kristal AR. Evaluation of a simplified vitamin supplement inventory developed for the Women's Health Initiative. *Public Health Nutr.* Sep; 1999 2(3):273–6. [PubMed: 10512561]

- [11]. Patterson RE, Kristal AR, Tinker LF, Carter RA, Bolton MP, Agurs-Collins T. Measurement characteristics of the Women's Health Initiative food frequency questionnaire. *Ann Epidemiol.* Apr; 1999 9(3):178–87. [PubMed: 10192650]
- [12]. Pettee Gabriel K, McClain JJ, Lee CD, Swan PD, Alvar BA, Mitros MR, et al. Evaluation of physical activity measures used in middle-aged women. *Med Sci Sports Exerc.* Jul; 2009 41(7): 1403–12. [PubMed: 19516161]
- [13]. Warnick GR, Albers JJ. A comprehensive evaluation of the heparin-manganese precipitation procedure for estimating high density lipoprotein cholesterol. *J Lipid Res.* Jan; 1978 19(1):65–76. [PubMed: 202660]
- [14]. Myers GL, Cooper GR, Winn CL, Smith SJ. The centers for disease control-national heart, lung and blood institute lipid standardization program. An approach to accurate and precise lipid measurements. *Clin Lab Med.* Mar; 1989 9(1):105–35. [PubMed: 2538292]
- [15]. Yee HY. Automated hexokinase procedure for assaying glucose in urine, serum, or plasma. *Clin Chem.* Nov; 1972 18(11):1416–9. [PubMed: 4652841]
- [16]. Howard BV, Criqui MH, Curb JD, Rodabough R, Safford MM, Santoro N, et al. Risk factor clustering in the insulin resistance syndrome and its relationship to cardiovascular disease in postmenopausal white, black, hispanic, and Asian/Pacific Islander women. *Metabolism.* Mar; 2003 52(3):362–71. [PubMed: 12647277]
- [17]. Surwit RS, Williams RB, Siegler IC, Lane JD, Helms M, Applegate KL, et al. Hostility, race, and glucose metabolism in nondiabetic individuals. *Diabetes Care.* May; 2002 25(5):835–9. [PubMed: 11978677]
- [18]. Raikonen K, Matthews KA, Kuller LH. The relationship between psychological risk attributes and the metabolic syndrome in healthy women: antecedent or consequence? *Metabolism.* Dec; 2002 51(12):1573–7. [PubMed: 12489070]