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Religiosity and Faith in Relation to Time to Metabolic Syndrome for Hispanic Women in a Multiethnic Cohort of Women—Findings from the Study of Women’s Health Across the Nation (SWAN)

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Contributors

All authors contributed to conceiving and designing the experiments, analyzing and interpreting the data, and writing the paper.

Conflict of interest

The authors declare that they have no conflict of interest.

Ethical approval

Institutional Review Board approval at each site was obtained, and all women provided written consent.

Provenance and peer review

This article has undergone peer review.

Research data (data sharing and collaboration)

SWAN provides access to public use datasets that extend through the tenth annual follow-up visit. Some, but not all, of the data used for this manuscript are contained in the public use data sets. Members of the scientific community who are interested in working with the SWAN data that are not contained in the public use datasets may submit an application to become a SWAN Investigator. Links to each of the public use data sets, as well as instructions for how to apply for SWAN Investigator status, are located on the SWAN web site: <http://www.swanstudy.org/swan-research/data-access/>. Investigators who require assistance accessing the public use data set or applying for SWAN investigator status may contact the SWAN Coordinating Center at the following email address: swanaccess@edc.pitt.edu.

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Abstract

Objectives—We investigated whether faith was associated with a difference in time to incident metabolic syndrome (MetS) among midlife Hispanic women vs women of other ethnicities.

Study Design—The Study of Women’s Health Across the Nation (SWAN) is a community-based, longitudinal study of a cohort of midlife women. Social, demographic, psychosocial, anthropometric, medical, and physiological measures, and incident MetS were assessed in near-annual intervals using questionnaires and assays. Each participant answered key questions related to religion and meaning in her life. Differences in time to MetS were modeled by Hispanic ethnicity (vs. otherwise) among women reporting low and high levels of faith.

Main Outcome Measure—Incident MetS in the 7 years after the SWAN baseline assessment.

Results—Among 2371 women, average baseline age 46, Hispanic women (n=168) were more likely to have higher perceived stress and financial strain than non-Hispanic women (n=2203). Nevertheless, Hispanic women were far more likely than non-Hispanic women to report that faith brought them strength and comfort in times of adversity, that they prayed often, and that their faith was sustaining for them. Hispanic women had the highest incidence rate of MetS of any racial/ethnic group. However, among women with high levels of faith, the incidence rate of MetS was similar in the Hispanic and non-Hispanic groups. Conversely, among women with low levels of faith, Hispanic women had a faster progression to MetS than did non-Hispanic women.

Conclusions—Faith might be associated with a different risk of MetS among women of Hispanic vs other ethnicities. Among women who are not part of a faith community, Hispanic ethnicity might be a risk factor for MetS.

Keywords

faith; religion; metabolic syndrome; stress; Hispanic; midlife; women’s health

Introduction

Heart disease is the leading cause of mortality among women in the United States (22.6%) [1]. Metabolic syndrome (MetS) contributes significantly to cardiovascular morbidity and mortality, and is present in nearly a third of the US population [2]. Hispanic women are particularly vulnerable to cardiometabolic disorders, including MetS [3]. Low socioeconomic status (SES), of which financial strain is a component, is associated with increased prevalence of MetS, particularly among women [4, 5]. Adverse psychosocial factors, including stress, have also been linked to elevated rates of MetS [6] and are conceptualized as one pathway by which low SES may be associated with elevated MetS risk [7]. Enduring discrimination and prejudice [8], adverse social circumstances such as higher poverty rates, less education, and worse access to health care, have been associated

with negative physical and mental health outcomes [9]; Hispanics experience these circumstances disproportionately, with Hispanic women overly represented in low SES positions [10].

Although women of Hispanic ethnicity have a higher prevalence of MetS (38.6%) than non-Hispanic White (37.4%) and non-Hispanic Black women (35.5%) [2], Hispanic women have a lower mortality from cardiovascular disease (20%)[1] compared to women of non-Hispanic white (22.8%) and non-Hispanic black (23.5%) ethnicity and race. Thus even though MetS is a risk factor for cardiometabolic and coronary heart disease and mortality, it is less so for Hispanic persons. The ‘Hispanic Paradox’ [11] is the phenomenon of people of Hispanic ethnicity having equal or better health outcomes and lower mortality rates compared to non-Hispanics, despite a host of economic and social disadvantages, including higher levels of poverty, lower levels of education, and less health care coverage [12]. That the Hispanic community participates in religious services and has high faith is one explanation of this unexpected effect.

The positive association between religious faith and better overall health is recognized by many scientists, but how it affects health is has not been established. One recognized pathway by which religious faith might affect health is through reduction of psychological stress and associated psychophysiological processes [13], given that prayer, like hypnosis, is considered a highly focused state of relaxation. Other research suggests attendance at religious services is associated with lower allostatic load in women and among older adults [14] [13]. This association is not be explained by higher physical functioning or greater social integration. Hispanic women have been documented to endorse and have more frequent attendance at religious services compared with women of other ethnicities. That religiosity and faith are important components of health, play a role in health beliefs, and influence participation in one’s own health has been documented through focus group research among Hispanic women [15]. Thus, a higher level of faith, or different practices among Hispanic women could be a part of what buffers this population from the level of cardiovascular disease incidence expected given their physical risk profile.

Our hypothesis is that the difference in the incidence rate of MetS for women of Hispanic vs other ethnicities differs in the presence of religious faith.

Methods

Analyses are based on data from the Study of Women’s Health across the Nation (SWAN). SWAN is a multi-site, longitudinal, prospective cohort study of women traversing menopause. Enrollment criteria included being aged 42-52 years; > 1 menstrual period within the past 3 months; not pregnant, breastfeeding or taking sex steroid hormones over the past 3 months; and having at least one ovary and an intact uterus [16]. Race/ethnicity was self-reported. Each of seven sites included non-Hispanic white participants as well as a racial/ethnic minority group; all Hispanic women were from the New Jersey site. Institutional Review Board approval at each site was obtained, and all women provided written consent. Our analysis includes outcome data through SWAN follow-up 7 (1996-2005) when data collection for women at the New Jersey site was continuous. Among

3302 women who were enrolled in SWAN at baseline, we excluded women missing race/ethnicity (n=12), or with prevalent or missing baseline MetS or diabetes mellitus (Figure 1).

Hormones were included in adjusted analysis to account for associations between hormones and MetS. Laboratory and assay procedures for SWAN are previously published for 17 β -estradiol (E₂), and Testosterone (T).

MetS was defined according to the Adult Treatment Panel III criteria as having at least three of the following metabolic abnormalities: 1) blood pressure >130/85 or self-reported use of antihypertensive medications, 2) HDL cholesterol <1.295 mmol/L (50 mg/dL), 3) triglycerides $\geq$ 1.695 mmol/L (150 mg/dL), 4) Fasting glucose $\geq$ 5.55 mmol/L (100 mg/dL) and/or type 2 diabetes, and 5) Waist circumference $\geq$ 80 for Chinese and Japanese women or $\geq$ 88 cm for women of other ethnicities [17, 18]. Two sequential values of seated blood pressure were averaged. Diabetes was defined as a fasting blood glucose level $\geq$ 6.993 mmol/L (126 mg/dL) or self-reported use of insulin or any other antidiabetic agent, or self-reported diabetes diagnosis.

Self-reported data were collected using standard questionnaires for depression, smoking, economic strain, and perceived stress. A Center for Epidemiologic Studies Depression (CES-D) scale score of $\geq$ 16 defined ‘depressive symptoms’. Smoking history was defined as never smoking (<20 packs of cigarettes in lifetime, and <1+ cigarette/day in the past year), past smokers (not currently smoking cigarettes), current smokers (no to previous 2 criteria). Financial strain was defined by response “somewhat hard” or “very hard” to the question of economic (financial) hardship: “how hard is it to pay for basics”, the other possible response was not very hard. Perceived stress was defined by the sum of the responses to four variables about feelings and thoughts over the past two weeks: 1) “Felt unable to control important things in your life” 2) “Felt confident about your ability to handle your personal problems?” 3) “Felt that things were going your way?” and 4) “Felt difficulties were piling so high that you could not overcome them?” Possible responses were 1=Never, 2=Almost never, 3=Sometimes, 4=fairly often, and 5=Very Often.

Spirituality and faith were measured by dichotomizing responses to five questions: 1) “How much is religion /spirituality a source of strength and comfort to you?” (*A great deal* vs. *none or a little*). 2) “How often do you pray or meditate?” ($\geq$ 4 times a week vs. less frequently or never). The final three questions were prefaced by the language: “The next statements are about your general views of life. Please tell me whether you agree, feel neutral (have no opinion) or disagree with them”; for analysis responses were grouped as *agree* vs. *neutral or disagree*. 3) “I have a mission or purpose in life”. 4) “My faith sustains me”. 5) “I have something meaningful in my life that helps me to get through difficult times”. Agreement with “My Faith Sustains Me” is referred to as high faith.

For time to event analyses, time was defined by number of study years after baseline through visit 7, with all non-events censored at follow-up 7. Participant characteristics were categorized as marital status (married vs. otherwise), education level (beyond high school vs. otherwise), menopausal status (premenopausal, early perimenopausal, late perimenopausal,

and postmenopausal), baseline smoking (current vs. otherwise), and geographic region of study site (east, midwest, or west).

We compared rates by which we excluded women by Hispanic ethnicity based on baseline rates of MetS and diabetes among women not missing race or prevalence of either condition. In the analytical sample, demographic and clinical characteristics of Hispanic and non-Hispanic women were summarized and compared. Differences were tested with chi-square for categorical and two-sample t-tests for continuous measures. Skewed variables were analyzed on the log-scale and back-transformed with presentation as geometric mean and 95% confidence interval (CI). The individual associations between of stress and faith on incident MetS were estimated in a proportional hazards model with discrete ties (i.e. a discrete logistic model) separately for each predictor, with results reported as hazard ratio with 95% CI. To evaluate the effect of stress on that of faith, we added stress to a model of faith and ethnicity predicting time to MetS. Relaxing the assumption of continuous-time, time to incident MetS across 5-category ethnicity was estimated using the Kaplan Meier method, with differences tested using the log rank test with Dunnett-Hsu corrected p-values reported. A proportional hazards model with discrete ties of years to incident MetS was then estimated, covariates included in model selection were based on clinical input. Geographic region, baseline marital status, education, CES-D, and smoking; as well as time-varying BMI, E/T ratio, menstrual cycle day of blood draw from which E and T were measured, menopausal status and age were included in a parsimonious final model if p-value < 0.05. Within this model of MetS, the effect of ethnicity was estimated at both dichotomous levels of faith “My faith sustains me (yes/no)”; the p-value from this parameterized interaction between Hispanic Ethnicity and faith is reported. Sensitivity analyses evaluated the robustness of these analyses. All three models were re-estimated with the outcome of time to metabolic syndrome censored at menopause or initiation of hormone therapy. All three models were re-estimated with the outcome redefined as time to metabolic syndrome or diabetes. Statistical analysis conducted in SAS 9.4.

Results

At baseline, Hispanic ethnicity was associated with a higher prevalence (33.9% vs. 23.5%, $p<0.001$) of MetS ($n=3171$). At baseline, diabetes trended higher ($n=3282$, 6.9% vs. 4.6%, $p=0.08$) among women of Hispanic ethnicity compared to other women. All women with baseline MetS ($n=775$) or diabetes ($n=157$) were excluded from further analyses (Figure 1).

Among 2371 women included in these analyses, 7% were Hispanic. The average BMI among Hispanic women was higher than that of non-Hispanic women, and Hispanic women were more likely to be married, less likely to have been educated beyond high school or to have completed school in the USA, and had approximately twice the rate of high CES-D score than non-Hispanic women, indicative of increased depressive symptoms. Testosterone, and T/E₂ were lower among Hispanic women (Table 1).

Hispanic women reported finding strength and comfort from spirituality (82% vs. 60%, <0.001), more frequent prayer (71% vs. 47%, <0.001), and being sustained by faith (94% vs. 75%; $p<0.001$) more frequently than non-Hispanic women. Both Hispanic and non-Hispanic

women reported a ‘mission or purpose in life’ at 91%. Hispanic women were slightly less likely to report ‘something meaningful in life’ than non-Hispanics (92% vs. 96%, $p=0.01$). Both perceived stress (43% vs. 16%, $p<0.001$) and financial strain (81% vs. 33%, $p<0.001$) were higher among Hispanic than non-Hispanic women (Table 2).

Rate of incident MetS differed significantly across the five ethnicities ($p<0.001$, Figure 2) with pairwise tests indicating significantly greater likelihood of developing MetS for Hispanic compared to Chinese women ($p=0.03$), white women ($p=0.006$) and Japanese women ($p=0.04$); there was not a significant difference when compared to women of black race ($p=0.3$). In bivariable analyses, higher levels of both categorical measures of stress were predictive of higher levels of incident MetS (Table 3).

Rate of incident MetS for Hispanic vs. non-Hispanic women was significantly different (interaction $p=0.04$) for women who report being sustained by their faith (high faith) and those who were neutral or in disagreement with the phrase “my faith sustains me” (low faith). Among with women of low faith, Hispanics were significantly more likely (5.2, 1.4-18.9) to develop incident MetS. In contrast among women of high faith, the HR’s for metabolic syndrome were similar for Hispanic and non-Hispanic women (HR: 1.2, 0.82-1.81, Figure 3, Model 1).

To understand the effect of financial stress on these relationships, we added stress to the model of time to MetS including the interaction between faith and ethnicity. Stress was positively associated with MetS although the association did not reach statistical significance (HR: 1.2 CI: 0.98, 1.45). The interaction between Hispanic Ethnicity and faith remained marginally significant ($p=0.04$) and the HR for MetS associated with Hispanic ethnicity decreased in magnitude by 7% in the group with higher faith and 11% among women with lower faith (Figure 3 model 2), indicating that stress contributed to a portion of the risk of MetS.

In a model adjusting for baseline education, smoking, geographic region, financial strain, and time-varying BMI, E:T ratio, and age (Figure 3 model 3), the pattern of effect with Hispanic ethnicity and faith on MetS was similar (interaction $p=0.03$). Here, financial strain was negligibly associated with MetS (HR: 1.1 [0.88, 1.34] $p=.4$). Compared to model 1, the magnitude of the HR for Hispanic women increased among both women reporting high faith and low-faith.

In sensitivity analyses where the outcome was 1) censored at menopause or initiation of hormone therapy, or 2) redefined as time to metabolic syndrome or diabetes, associations of Hispanic ethnicity at each level of faith were similar to reported results (data not shown).

Discussion

Our findings suggest that among women of Hispanic ethnicity, a higher level of faith could provide a buffer from the level of cardiovascular disease incidence expected given their physical risk profile. Part of the ‘Hispanic paradox’ may be explained by high faith among Hispanic populations, which reduces the likelihood of developing MetS and may also attenuate the development of adverse outcomes from cardiometabolic compromise.

In the SWAN, Hispanic women have higher levels of stress, higher levels of religiosity, and a worse health profile at baseline. The majority of Hispanic SWAN participants come from socioeconomically disadvantaged neighborhoods within Hudson County, NJ, and had lower educational attainment and far more financial insecurity and perceived stress than their counterparts from other sites. These adverse social factors were associated with more rapid progression to MetS in the entire cohort. However, despite their less advantaged socioeconomic status, Hispanic women of high faith had progression to MetS similar to that of non-Hispanic women. We have previously identified differences in cardiometabolic risk factors and menopausal and psychological symptoms based on country of origin within our SWAN Hispanic cohort. [19–21] Here we found the HR of MetS among Hispanic women with high measures of religious faith was of similar magnitude and not significantly different from that of non-Hispanic women, whereas Hispanic women who were not sustained by their faith had a large and more frequent onset of MetS than non-Hispanic women. Stress from financial strain partially accounted for the increased MetS risk among Hispanic women, however when allowing changes with time in BMI, E:T ratio, and age, the stress from financial strain no longer had a significant association with MetS.

Alternative approaches to addressing the primary question in sensitivity analysis included different definitions of morbidity (incorporation of diabetes) and censoring at menopause. The pattern of a large HR associated with Hispanic ethnicity (vs. other ethnicities) among women of low-faith, and a HR close to 1.0 for Hispanic ethnicity vs. other ethnicities among women of high-faith suggests a robustness of this finding. Among women sustained by faith, Hispanic women and women of other ethnicities have a similar risk of MetS, whereas among women who are not sustained by faith, Hispanic women are at increased risk of incident MetS.

The beneficial association with faith that we observed could be the result of increased social interactions that are involved in participation in religious services or within religious organizations. In particular, religious participation might enhance social connections to people from other Spanish speaking countries. Three main hypotheses predominate in the literature as possible explanations for how religious participation relates to improved health. The first proposes that religious participation reduces or constrains some behaviors that are deleterious to health [22, 23]. A second posits that religious participation promotes greater social integration, resulting in better health [24]. Last, religious participation may serve as a coping strategy to deal with life's stresses [14, 25], indicating a bolstering of resilience among some who have higher faith. Moreover, the sense of community that evolves from consistent religious participation may also improve health by improving social support and providing behavioral norms and examples for an individual to follow. Alternatively, mobilization of resources and support in the form of donations, and assistance with healthcare navigation, for sick members of a religious community may provide critical tangible sustenance during times of illness [14]. Religious participation (i.e., denomination, attendance, community, values) and health and well-being positively associated, particularly in the domains of physical and psychological health [13, 26, 27]. Disentangling effects of religious participation from more general social relationships on health remains a challenge. To explore greater complexity in underlying relationships, future work could analyze

relationships between measured variables and latent sociodemographic and psychosocial constructs with other methodology, such as structural equation modeling.

Strengths include the prospective, longitudinal study design, permitting temporality to be established between exposure, covariates, and outcome, reinforcing the potential for a causal relationship, compared to other designs. SWAN is the only large, multi-ethnic cohort study of the menopausal transition that has been carried out to date. The use of detailed questionnaires and concomitant biomarkers and physical measures, all of which were collected in a rigorous, systematic fashion, enhanced our ability to draw conclusions from the data and establish previously undetectable inferences. Nevertheless, there are several limitations and caveats that should be noted. While Hispanics in the US are predominately from Mexico [28], Hispanics in this sample were from other Spanish-speaking regions. Our sample size did not allow us to check for heterogeneity among subgroups of Hispanic women from different countries of origin. Other potential sources of bias include misclassification in responding to questions about faith and financial strain, as well as the limited ability to adjust for the nuanced profile of potential stressors among women in this age range.

We have found that among midlife women with high measures of religious faith, across ethnicities women were similar in frequency of incident development of MetS. Conversely, among women less sustained by faith, Hispanic women had 4 or more times the risk of developing MetS as women from other ethnicities. This association sustained even when adjusting for stress, and other risk factors that change over time. Thus, feeling sustained by one's faith may exert a beneficial effect on the health of Hispanic women at midlife. Given the increasing size and diversity of the US Hispanic population [29], research is needed to examine psychosocial and cultural factors that may have both positive and negative consequences on health and well-being in this group that is at high risk of MetS. This research can help shed partial light on protective factors on health in this population.

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Highlights

- More Hispanic women than women of other ethnicities reported that faith brought strength and comfort in the midst of adversity.
- Among women with high levels of faith, the incidence of metabolic syndrome did not differ according to ethnicity.
- Among women with low levels of faith, Hispanic women had a faster progression to metabolic syndrome.
- Faith might be associated with a different risk of metabolic syndrome among Hispanic women.

Figure 1.
Population for Analysis

Figure 2.

Progression to metabolic syndrome (MetS) over time by ethnic/race group, unadjusted.

Overall KM p-value < 0.001, pairwise comparisons with Hispanic significantly different for race/ethnicities: White (p=0.006), Chinese (p=0.03), Japanese (p=0.04), but not Black (0.3)

Figure 3.

Hazard Ratio of MetS for Hispanic vs. all other ethnicities

Model 1 (●) adjusted for marital status (married v otherwise) and education level (beyond HS vs. otherwise),

Model 2 (■) variables listed in model 1 as well as financial stress

Model 3 (▲) day of cycle blood draw occurred, marital status (married v otherwise), time-varying menopausal status (post v otherwise) and CES-D score were removed with $p > 0.05$.

Faith and Ethnicity adjusted for: region, baseline education, smoking, financial strain, and time-varying covariates: BMI, age, and E/T ratio.

Table 1

Baseline Demographics, Stress, and Metabolic History for women of Hispanic vs. other ethnicities, and high vs. low faith

Label	Hispanic Women n=168	Non-Hispanic Women n=2203	p-value	High Faith n=1770	Low Faith n=565	p-value
Race/Ethnicity ¹			–			<.001
Hispanic	168(100.0)			156(8.8)	6(1.1)	
Non-Hispanic White		1166(52.9)		804(45.4)	342(60.5)	
Non-Hispanic Black		597(27.1)		548(31.0)	43(7.6)	
Japanese		238(10.8)		115(6.5)	121(21.4)	
Chinese		202(9.2)		147(8.3)	53(9.4)	
Age at baseline (years) ²	45.5(0.2)	45.8(0.1)	0.279	45.7(0.06)	45.8(0.11)	0.36
Obese (Body Mass Index > 30kg/m ²) ¹	19(14.7)	320(14.8)	0.974	278(16.3)	57(10.4)	<.001
Smoking Status (ref: Never) ¹			0.981			0.098
Not Current	141(84.4)	1845(84.4)		1471(83.7)	486(86.6)	
Current Smoking	26(15.6)	342(15.6)		286(16.3)	75(13.4)	
Premenopausal (vs. early peri-menopausal) ¹	98(60.9)	1176(54.4)	0.11	945(53.8)	322(57.4)	0.141
Marital Status, Married ¹	126(76.8)	1465(67.3)	0.012	1181(66.8)	404(71.5)	0.037
Education HS or less ¹	119(70.8)	400(18.2)	<.001	426(24.2)	85(15.1)	<.001
Completed education outside of USA ¹	118(71.5)	286(13.0)	<.001	1490(84.4)	445(78.9)	0.003
CES-D > 16 ¹ [30] ↑ depressive symptoms	62(37.1)	461(20.9)	<.001	400(22.6)	113(20.0)	0.19
17β Estradiol (average, pg/mL) ³	60 (53, 68)	59 (57, 61)	0.778	59 (57, 61)	57 (53, 61)	0.245
Testosterone (ng/dL) ³	35 (32, 38)	40 (39, 41)	0.001	40 (39, 41)	40 (39, 42)	0.661
T/E ₂ MolarRatio BL ³	5.5 (4.8, 6.4)	6.5 (6.2, 6.7)	0.037	6.3 (6.1, 6.6)	6.7 (6.2, 7.2)	0.214
Day of Cycle ¹						
2	22(15.3)	317(16.5)	<.001	266(17.3)	68(13.6)	0.06
3	65(45.1)	470(24.4)		408(26.6)	119(23.8)	
4	30(20.8)	533(27.7)		408(26.6)	146(29.1)	
5	24(16.7)	461(23.9)		348(22.7)	128(25.5)	

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Label	Hispanic Women n=168	Non-Hispanic Women n=2203	p-value	High Faith n=1770	Low Faith n=565	p-value
6	3(2.01)	98(5.1)		77(5.0)	23(4.6)	
7	0(0.0)	46(2.4)		29(1.9)	17(3.4)	

¹ N (%), due to item non-response, some percentages differ slightly in denominator from column total.

² Arithmetic Mean and Standard Error

³ Geometric Mean and 95% Confidence Interval

Table 2

Baseline faith and religiosity and stress, of women of Hispanics vs. other ethnicities

Label	Hispanic Women n=168	Non-Hispanic Women n=2203	p
How much is religion /spirituality a source of strength and comfort to you? (A great deal vs. none or a little)	139(82.7)	1299(59.1)	<.001
How often do you pray or meditate? (>4 times a week vs. less frequently or never)	116(69.0)	1022(46.5)	<.001
I have a mission or purpose in life *	147(91.3)	1969(90.6)	0.7
My faith sustains me *	156(96.3)	1614(74.3)	<.001
I have something meaningful in my life that helps me to get through difficult times *	150(92.0)	2084(96.0)	0.016
Perceived Stress ²	9.84(0.2)	8.35(0.1)	<.001
High (12+) Perceived Stress	69(43.1)	338(15.8)	<.001
Difficulty Paying for Basics (financial hardship)			
somewhat/very hard	135(80.8)	716(32.6)	<.001
not very	32(19.2)	1479(67.4)	

* Agree vs. neutral or disagree.

Frequency and percentage (%) reported unless indicated otherwise.

¹ Geometric Mean and 95% Confidence Interval

² Arithmetic Mean and Standard Error

Table 3

Stress and financial strain as predictors of incident MetS

Description	Hazard Ratio	95% CLM		p-value
Perceived Stress (5 unit)	1.12	0.95	1.30	0.17
Perceived Stress (>12)	1.27	1.01	1.60	0.04
Financial strain: Somewhat or very hard to pay for basics	1.36	1.13	1.64	0.001