

Social support modifies the negative effects of acculturation on obesity in Mexican Americans



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1. Background & Purpose

- Positive social support may modify the negative influence of acculturation on obesity outcomes.
- This study sought to examine the moderating role of social support in the acculturation-obesity/central obesity association in Mexican American (MA) men and women.

2. Methods

- Cross-sectional data of 2,946 MA adults from NHANES 1999-2008 were examined.
- Acculturation was quantified as a score (0-5) derived from measures of language use, country of birth, and length of residence in the U.S. Social support was derived from measures of emotional and financial support and was treated as a binary variable ("more" vs. "less/no").
- Body Mass Index (BMI) (≥ 30) and waist circumference (≥ 88 cm for women; ≥ 102 cm for men) were used to measure obesity and central obesity, respectively.
- Covariates included age, education, income, marital status, alcohol drinking, smoking, physical activity, and diet quality.
- Interactions between social support and acculturation were tested. Weighted multivariable logistic regressions were applied. All analyses were stratified by sex.

Table 2. Assessment of Interaction between Acculturation and Social Support and Effects of the Interaction on Obesity Outcomes among Mexican-American Men and Women ≥ 40 Years of Age

	Obesity ¹		Central Obesity ¹	
	Men	Women	Men	Women
Model 1²				
Acculturation (ref. less acculturation)	0.53 (0.17) P=0.001	-0.24 (0.12) P=0.06	0.67 (0.13) P<.01	-0.26 (0.15) P=0.08
Model 2²				
Social support (ref. low/no social support)	-0.02 (0.20) P=0.93	-0.23 (0.21) P=0.28	0.02 (0.17) P=0.89	-0.44 (0.21) P=0.03
Model 3				
Acculturation	0.52 (0.22) P=0.02	-0.17 (0.14) P=0.24	0.69 (0.17) P<.001	-0.18 (0.18) P=0.31
Social support	-0.13 (0.21) P=0.53	-0.21 (0.21) P=0.32	-0.12 (0.19) P=0.54	-0.43 (0.21) P=0.04
Model 4²				
Acculturation	0.97 (0.40) P=0.01	-0.17 (0.17) P=0.52	1.01 (0.32) P<.01	-0.31 (0.38) P=0.42
Social support	0.21 (0.33) P=0.52	-0.21 (0.26) P=0.43	-0.11 (0.27) P=0.68	-0.52 (0.33) P=0.12
Acculturation X Social support	-0.75 (0.46) P=0.10	-0.00 (0.31) P=0.99	-0.53 (0.40) P=0.18	0.18 (0.41) P=0.66

¹Obesity: BMI ≥ 30 ; Central Obesity: WC ≥ 102 cm in men; ≥ 88 cm in women.
²Model 1 includes acculturation and all covariates; model 2 includes social support and all covariates; model 3 includes both acculturation and social support, as well as all covariates; model 4 includes acculturation, social support, interaction term, as well as all covariates. Covariates include age, education, income, marital status, alcohol drinking, smoking, physical activity, and diet quality.

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Table 1. Characteristics of Mexican-American Men and Women ≥ 40 Years of Age by Acculturation Status¹, NHANES 1999-2008 (n=2,946)

Characteristics	All		P	Men		p	Women		p
	Less Acculturated	More Acculturated		Less Acculturated	More Acculturated		Less Acculturated	More Acculturated	
Age (mean, SE)	51.30 (0.46)	53.25 (0.36)	**	50.45 (0.79)	52.87 (0.53)	**	52.25 (0.61)	53.58 (0.42)	*
Education (n, %) ²			**			**			**
<High school	1165 (79.25)	634 (36.29)		601 (79.93)	294 (35.79)		564 (78.47)	340 (36.72)	
=High school or equiv.	94 (8.90)	277 (23.60)		45 (8.29)	118 (22.82)		49 (9.60)	159 (24.26)	
>High school	120 (11.84)	451 (40.11)		59 (11.77)	209 (41.39)		61 (11.93)	242 (39.02)	
Income (n, %) ³			**			**			**
PIR<1	486 (37.70)	228 (15.88)		246 (36.93)	98 (14.91)		240 (38.59)	130 (16.66)	
1≤PIR<3	630 (52.16)	571 (41.10)		333 (52.95)	261 (40.65)		297 (51.26)	310 (41.50)	
PIR ≥3	112 (10.14)	453 (43.06)		54 (10.11)	215 (44.44)		58 (10.16)	238 (41.85)	
Health insurance (n, %) ⁴			**			**			**
None	619 (53.50)	222 (19.30)		308 (52.75)	106 (19.78)		311 (54.33)	116 (18.88)	
Public	380 (17.16)	497 (25.27)		180 (13.86)	217 (35.22)		200 (20.87)	280 (27.46)	
Private	361 (29.34)	625 (55.43)		207 (33.39)	289 (57.46)		154 (24.80)	336 (53.66)	
Married	949 (72.21)	807 (60.47)	**	561 (79.79)	419 (66.44)	**	388 (63.71)	388 (55.29)	**
Alcohol drinking (n, %) ⁵			**			*			**
Non-drinker	266 (18.08)	176 (11.32)		27 (3.41)	20 (4.40)		239 (34.76)	156 (17.29)	
Former-drinker	349 (24.54)	305 (19.15)		197 (25.15)	149 (18.88)		152 (23.86)	156 (19.38)	
Current-drinker	647 (57.38)	779 (69.53)		441 (71.44)	405 (76.71)		233 (41.38)	374 (63.33)	
Smoking (n, %) ⁶			*						**
Non-smoker	769 (56.36)	674 (50.56)		263 (40.12)	216 (39.35)		506 (74.66)	458 (60.23)	
Former-smoker	394 (25.95)	423 (27.80)		289 (36.31)	257 (35.22)		105 (14.27)	166 (21.39)	
Current-smoker	214 (17.69)	269 (21.64)		153 (23.57)	149 (25.42)		61 (11.07)	120 (18.38)	
Physical activity (n, %) ⁷	493 (38.22)	628 (50.60)	**	267 (39.76)	324 (57.85)	**	326 (36.48)	304 (44.34)	*
HEI total score ⁸ mean (SE)	52.66 (0.56)	49.88 (0.47)	**	51.00 (0.79)	49.47 (0.52)	**	54.52 (0.61)	50.23 (0.63)	**
Social support (n, %) ⁹			**			**			**
No support	130 (30.15)	62 (17.82)	**	80 (32.91)	30 (15.76)	**	50 (26.62)	32 (19.60)	**
Emotional support only	842 (80.0)	946 (91.39)	**	413 (78.02)	439 (91.77)	**	429 (82.07)	507 (91.06)	**
Financial support only	652 (58.97)	767 (74.85)	**	302 (53.27)	348 (75.59)	**	350 (65.01)	419 (74.22)	*
Both emotional and financial support	598 (53.39)	724 (70.00)	**	279 (47.78)	329 (69.86)	**	319 (57.24)	395 (70.12)	*
Obesity (n, %) ⁸	487 (36.94)	523 (41.00)	*	177 (27.43)	215 (36.99)	**	310 (47.80)	308 (44.43)	
Central obesity (n, %) ⁹	759 (52.66)	834 (59.83)	**	255 (34.34)	303 (47.67)	**	504 (73.23)	531 (70.32)	

¹ Acculturation score (0-5) is from the proxy measures on country of birth, language spoken at home and length of time in the U.S. For this set of analyses, scores are used to categorize individuals into less (0-2) and more (3-5) acculturated groups for comparison.
² Percentages were weighted.
³ IIR: Poverty Income Ratio.
⁴ Insurance status: 1) public insurance including Medicare and Medicaid and other forms of government insurance; 2) private insurance; 3) no health insurance.
⁵ PAGA: Physical Activity Guidelines for Americans. Met PAGA is defined as engaging in moderate-to-vigorous physical activity ≥ 150 minutes per week.
⁶ The HEI-2010 is surmised to a total score of 100. Higher score indicates better diet quality.
⁷ For the analysis, social support is composed of an index derived from information of emotional support (yes or no) and financial support (yes or no). The index is dichotomized into low or no (neither or either of two kinds of support) and high (both) social support groups for comparison.
⁸ Obesity is defined as BMI ≥ 30 .
⁹ Central obesity is defined as WC ≥ 102 cm in men; ≥ 88 cm in women.
*P<.05, **P<.001; P-values are from Chi-square tests for testing difference between acculturation levels by sociodemographic groups.
Missing: education 53; income 314; insurance 90; married 125; smoking 51; alcohol drinking 245; physical activity 48; social support 701; obesity 128; central obesity 48.

Table 3. Logistic Regression Models for the Association between Acculturation and Obesity or Central Obesity by Level of Social Support among Mexican-American Men ≥ 40 Years of Age

	Obesity		Central Obesity	
	Low or no social support	High social support	Low or no social support	High social support
Acculturation	OR (95% C.I.)	OR (95% C.I.)	OR (95% C.I.)	OR (95% C.I.)
Less acculturation	1.0	1.0	1.0	1.0
More acculturation	2.48 (1.06-5.83)*	1.21 (0.74-1.97)	2.90 (1.39-6.08)*	1.47 (0.95-2.25)

3. Results & Conclusion

- The modifying effects of social support on acculturation-obesity/central obesity association were observed in MA men but not in MA women.
- Among MA men, acculturation was associated with higher odds of obesity (OR: 2.48; 95% CI: 1.06-5.83) and central obesity (2.90; 1.39-6.08) among those with less/no social support, but not among MA men reporting higher levels of social support.
- The study suggests the significant modifying effect of social support to the acculturation-obesity/central obesity link. Obesity prevention with emphasis on enhancing social support is likely to be effective among acculturated MAs, particularly among MA men.