

PERCEIVED STRESS IN BLACK AND LATINO MALE FIREFIGHTERS: ASSOCIATIONS WITH RISK AND PROTECTIVE FACTORS

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Objective: To compare the prevalence of work-related protective and risk factors among Black and Latino male firefighters and to examine the association of these factors to perceived stress among both ethnic groups.

Design, Setting, Participants: Participants included 1,036 male, career firefighters who self-identified as Black (n=477) or Latino (n=559) from a large fire department in a major metropolitan city in the southwestern United States. As part of a department-wide suicide prevention program conducted in 2008, participants completed an anonymous and voluntary mental health needs survey.

Measures: The needs survey included questions regarding prevalence of work-related protective and risk factors, the RAPS-4 to assess substance abuse problems, and the 10-item Perceived Stress Scale.

Results: Results of regression analyses indicated that for both Black and Latino male firefighters, alcohol abuse ($\beta = .13$, $\beta = .22$), self-reported good health ($\beta = -.23$, $\beta = -.24$) and a positive partner/spouse relationship ($\beta = -.14$, $\beta = -.15$) were related to perceived stress. In addition, having a second job ($\beta = .12$) and a sense of life calling ($\beta = -.10$) were related to perceived stress only among Latino firefighters. All associations were in the expected direction as indicated by the signs of the standardized beta coefficients (β).

Conclusion: Black and Latino male firefighters reported relatively high levels of perceived stress. However, there were both differences and similarities in the factors associated to perceived stress among the ethnic groups. Therefore, interventions to help firefighters reduce or manage stress

INTRODUCTION

Individuals experience stress when they perceive that life demands exceed their capacity to cope. It is believed that perceived stress, particularly chronic stress, leads to anxiety and depression, which in turn may lead to biological processes and/or behaviors that increase disease risk.¹ Research findings suggest that chronic stress and depression compromise cellular and molecular immunological and inflammatory processes linked to the initiation and progression of coronary artery disease and some cancers.²⁻⁴ In addition, maladaptive behavioral responses to stress, such as alcohol abuse and sleep difficulties may increase susceptibility to disease.¹ Because the experience of stress has been associated with psychological and physiological challenges, it is important to identify factors associated with perceived stress that may be amenable to

change among vulnerable populations.

Firefighters serve as a primary response team in emergency situations that routinely expose them to stressful and potentially traumatic situations, including violence to others, death of adults and children, and potential injury to themselves and colleagues.⁵ Continuous exposure to life-threatening events often takes a toll on first-responders' psychological and physical health.⁶ Therefore, it is not surprising that rates of distress among firefighters have ranged from 25% to 32%.⁶⁻⁸ Cancer, cardiovascular disease, sleep disruptions, inadequate nutrition, alcohol abuse and stress management have been identified as salient health concerns among career⁹ and volunteer¹⁰ firefighters. Evidence indicates that a high level of general stress is negatively associated to psychological well-being and physical health.²⁻⁴ Therefore, research that examines factors associated to perceived stress is

need to take into account that factors associated with perceived stress may vary by ethnic group. *Ethn Dis.* 2017;27(4):421-428; doi:10.18865/ed.27.4.421.

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necessary for the development of preventive and treatment interventions to ameliorate negative physiological and psychosocial outcomes among firefighters and other first responders.¹¹

Most of the research that has examined mental health variables among firefighters and other first-responders has included primarily White participants.^{9,12} However, as members of minority racial and ethnic groups, Black¹³ and Latino¹⁴ firefighters are likely to experience additional stress-

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ors associated with discrimination that can have negative effects on their physical and mental health. Because of social, political, and economic factors related to racial segregation and immigration history, it is likely that discriminatory experiences vary across Black and Latino men. In turn, these differences may impact the extent to which Black and Latino male firefight-

ers experience specific stress-related protective and risk factors. Therefore, the objectives of this study were to: a) compare the prevalence of work-related protective and risk factors among Black and Latino male firefighters; and b) examine the association of the protective and risk factors to perceived stress among firefighters from both ethnic groups. We focused on male firefighters because close to 95% of the 300,000-member firefighter force in the United States are men¹⁵ and previous research has shown that men and women differ in factors associated with stress.^{15,16} In addition to male firefighters, findings from the study may generalize to Black and Latino men employed in potentially hazardous professions that involve shift work and frequent exposure to traumatic events.

In addition to frequent exposure to traumatic events, other stressors inherent to firefighting include 24-hour shift schedules that take firefighters away from home three to four days at a time and second jobs that keep them occupied and out of the home during the days they are away from their fire stations. Shift work creates difficulties in firefighters' relationships with their spouses, who must adjust to continuous periods of their partners' presence and absence from the home and from their children's lives.¹⁷ At the same time, firefighters rely on their spouses to keep the household running in their absence and to provide them support and comfort when they return home.¹⁸ Therefore, it was expected that a positive partner/spouse relationship would be related to lower levels of perceived stress among firefighters, while having a second job and increased domestic responsibilities, such as taking care of a

sick family member or children under aged 18 years at home, would be related to higher levels of perceived stress,

Compared with new recruits, experienced firefighters have reported higher levels of perceived stress and depression,¹⁹ which suggests that cumulative exposure to work-related trauma may contribute to lower resilience to stressors both at home and work. Studies have indicated that psychological distress and susceptibility to stress may have reciprocal associations with alcohol abuse and physical health.^{20,21} While alcohol may be consumed to cope and relieve stress, excessive use of alcohol increases vulnerability to stress and negative physical outcomes which, in turn, may lead to greater use of alcohol and additional health problems.²⁰ Therefore, it was expected that alcohol abuse and number of years on the force would be positively related to stress, while self-reported good health would be negatively related to stress.

Typically, it may be expected that a higher educational level and higher firefighter rank would provide participants with additional cognitive, financial and social resources to cope with stress. However, in his seminal review of the relevant empirical literature, Williams¹³ concluded that because of economic and social stressors associated with racial discrimination, middle class socioeconomic status (SES) has not afforded Black men the economic and health-related benefits that have been observed among middle class Black women and White men and women. For example, among Black men, higher SES has been associated with higher levels of stress, hypertension and suicide rates while the opposite has been true for White men.¹³ In

contrast, Latinos in the United States experience lower mortality rates and better health outcomes than Whites, even though, as a group, Latinos demonstrate lower levels of education and wealth than Whites.²² Therefore, it was expected that both higher educational attainment and higher firefighter rank would be negatively related to perceived stress among Hispanic participants, while no predictions were made for Black firefighters.

Belonging to a religious community and frequent church attendance have been associated to positive physical and mental health among Black and Latino^{23,24} men and women. Findings from longitudinal studies suggest that higher levels of social support and optimism and lower levels of depression and smoking, partially explain the relation of church attendance to lower levels of cardiovascular disease, cancer and overall mortality.^{22,24} Religion may also serve as a source of strength and comfort in the face of stressful events by providing a meaning system that allows individuals to reframe difficult experiences and appraise stressors as less threatening and unpredictable and, therefore, more manageable.²⁵ Thus, it was hypothesized that both higher endorsement of church attendance and finding comfort in religious beliefs would be negatively related to perceived stress.

Individuals vary in their attitudes toward work. Those with a job orientation tend to approach work as a means to acquire basic necessities and those with a career orientation tend to focus on attaining personal success and social standing through work.²⁶ However, individuals with a calling orientation typically experience work

as an integral aspect of their identity and as a source of intrinsic meaning and fulfillment.²⁶ A calling orientation toward work has been positively associated with life satisfaction and well-being²⁷ and negatively associated to absenteeism and stress.²⁸ Therefore, it was expected that firefighters who more strongly endorsed a sense of mission or calling in their lives would report lower levels of perceived stress.

In sum, protective factors against stress examined in the study included: education level, firefighter rank, self-appraised health, positive relations with spouse/partner, religious orientation (church attendance and religion as a source of comfort), and a sense of mission or calling in life. Risk factors included: years working as a firefighter, having a second job, number of extra domestic responsibilities (taking care of a sick/disabled family member, children under aged 18 years at home), and alcohol abuse.

METHODS

Participants and Procedures

Participants included 1,036 male, career firefighters from a large fire department in a major metropolitan city in the southwestern United States who self-identified as Black (n = 477) or Latino (n = 559). As part of a department-wide suicide prevention program conducted in 2008, participants completed a voluntary paper-and-pencil mental health needs' survey that included questions about demographics and mental and physical health. About 3.5% of the participants were aged 19-24 years, 64% were aged 25 to 44 years, and 32% were aged 45 to 66

years. The study was approved by the authors' university institutional review board; all research procedures were in accordance with the ethical standards of the IRB and the Helsinki Declaration of 1975, as revised in 2000.

Instrumentation

Demographic characteristics and protective and risk factors (with the exception of alcohol abuse) were assessed by single questions included in the paper-and-pencil survey. Seven predictors were assessed categorically in terms of two levels: education, years in the force, firefighter rank, having a second job, caregiver responsibilities, child aged <18 years, and alcohol abuse (Table 1). Alcohol abuse was assessed with the RAPS4,²⁹ a four-item alcohol abuse screening instrument that asks about the presence (yes) or absence (no) during the previous year of four problem behaviors after alcohol consumption: remorse, amnesia, performance, and starter drinking behavior. Participants who responded yes to at least one of the four questions were categorized as having alcohol abuse problems, and participants who responded no to the four questions were categorized as not having alcohol problems.²⁹ The following predictors were each assessed with a Likert-type question and scored as a continuous variable: self-reported good health, positive relationship with partner/spouse, church attendance, religion as source of comfort, and sense of calling (see Table 2 for possible range of scores for each continuous variable). In all cases, higher scores indicated higher endorsement of the predictor.

Perceived stress was assessed with the 10-item Perceived Stress Scale

(PSS-10),³⁰ which captures respondents' appraisals of the degree to which they consider their lives to be unpredictable, uncontrollable, and overloaded. Respondents completed the PSS-10 on a Likert-type scale that ranged from 0 (never) to 4 (very often). Total scores may range from 0 to 40. While previous researchers¹⁴ have considered a PSS-10 score >15 as a potential indicator of elevated stress, the clinical validity of cut-off scores for the PSS-10 has not been examined empirically. In a scale that measures a single construct, the internal consistency coefficient indicates the percent of variance in the scale's composite score that is reliable (or true) variance. The internal reliability coefficient for the PSS-10 was calculated using Cronbach's

alpha formula,³¹ which is based on the average inter-correlation of items in the scale. The internal consistency coefficient alpha for PSS-10 scores with study participants was $\alpha = .80$.

Statistical Analyses

A t-test analysis was conducted to examine levels of perceived stress among Black and Latino firefighters. Chi-square tests of independence and t-test analyses were conducted to compare the prevalence of the identified categorical and continuous predictors of stress, respectively, across the two ethnic groups. T-tests and Pearson's correlation analyses by ethnic group were implemented to examine the association of the categorical and continuous predictors, respectively, to

levels of perceived stress. Finally, two multiple linear regression analyses predicting perceived stress were conducted, one for each ethnic group. Only the set of categorical and continuous predictors that were associated with perceived stress for each ethnic group in the analyses described above, were included in each regression analysis. The Beta coefficients, which refer to the slopes or weights of the predictor variables in the regression equation, were examined to assess the relative contribution of each predictor to perceived stress when controlling for all other predictors in the model. The Beta coefficients assess the difference in the predicted value of stress for each one-unit change in the predictor variable. The unstandardized Beta

Table 1. Categorical predictor variables: prevalence and associations to perceived stress means by ethnic group

Predictors	Prevalence by ethnic group			Association to levels of perceived stress	
	Black	Latino	P	Black	Latino
	%	%		Mean (SD)	Mean (SD)
Education					
High school degree	54.6	70.1	.001	13.66 ^{a,*} (6.54)	13.58 (6.44)
2- or 4-year degree	45.4	29.9		12.33 ^a (6.09)	13.11 (6.10)
Years in fire department					
10 or less	44.9	55.1	.001	12.72 (6.50)	13.56 (6.65)
10 or more	55.1	44.9		13.34 (6.29)	13.28 (5.94)
Firefighter rank					
Cadet/firefighter	58.3	54.7	.25	13.29 (6.27)	13.97 ^{d,*} (6.67)
Engineer/captain or above	41.7	45.3		12.72 (6.58)	12.81 ^d (5.86)
Second job					
No	34.0	34.5	.87	13.01 (5.96)	12.65 ^{e,*} (6.01)
Yes	66.0	66.5		13.10 (6.58)	13.91 ^e (6.47)
Caregiver sick family member					
No	92.6	93.7	.52	12.78 ^{b,*} (6.38)	13.36 (6.41)
Yes	7.4	6.3		15.18 ^b (6.08)	14.60 (6.56)
Child aged <18 years					
No	41.9	42.6	.82	12.38 (6.27)	12.92 (6.27)
Yes	58.1	57.4		13.42 (4.45)	13.84 (6.37)
Alcohol Abuse					
No	75.7	66.7	.002	12.44 ^{c,+} (6.41)	12.08 ^{f,*} (6.16)
Yes	24.3	33.3		14.84 ^c (6.14)	16.14 ^f (5.85)

a, b, c, d, e, f: Differences in means with similar superscript were statistically significant. Possible range of scores for perceived stress was 0-40.
 *. P<.05.
 †. P<.01.

Table 2. Continuous predictor variables: prevalence and correlations with stress by ethnic group

Predictors	Prevalence, means by ethnic group		Correlations with perceived stress	
	Black	Latino	Black	Latino
	Mean (SD)	Mean (SD)	Pearson's r	Pearson's r
Good health ^a	3.76 (.86)	3.78 (.85)	-.26†	-.26†
Positive partner relation ^b	2.33 (.98)	2.44 (.98)	-.17†	-.19†
Church attendance ^c	3.79 ^a ‡ (1.49)	3.03 ^a (1.46)	-.02	-.06
Religion comfort source ^d	2.71 ^b ‡ (.55)	2.40 ^b (.69)	-.07	-.10*
Life mission/calling ^e	3.40 ^c ‡ (.76)	3.23 ^c (.75)	-.08	-.16†

a, b, c, d, e: Differences in means with similar superscripts were statistically significant. Possible range of scores for predictor variables: a. 1-5; b. 0-3; c. 1-6; d. 1-3; e. 1-4.

*. P<.05.

†. P<.01.

‡. P<.001.

coefficients (B) represent the values in the measurement scale of each predictor, and, therefore, cannot be compared with each other. Because the standardized Beta coefficients (β) are calculated with all variables standardized, their magnitude can be compared with each other. The value of β indicates the number of standard deviations that perceived stress changes when each predictor changes by one standard deviation. All analyses were conducted utilizing SPSS Statistics 24.

RESULTS

Results of a t-test analysis indicated that Black (mean = 13.06, SD = 6.39) and Latino (mean = 13.45, SD = 6.34; P>.05) male firefighters reported similar levels of perceived stress. Chi-square tests of independence conducted to compare the prevalence of the identified categorical predictors of stress across the two ethnic groups indicated that Black and Latino firefighters differed in the prevalence of three categorical predictors of stress. As reported in Table 1, a larger proportion of Black than La-

tino firefighters had a college degree, $\chi^2 (1, N = 1032) = 26.17, P<.01$ and had worked in the fire department for at least 10 years, $\chi^2 (1, N = 1032) = 10.76, P<.01$; in contrast, a larger proportion of Latino than Black firefighters reported alcohol abuse problems, $\chi^2 (1, N = 1032) = 9.55, P<.01$.

Results of t-test analyses, conducted to compare the prevalence of the identified continuous predictors of stress across the two ethnic groups, indicated that, compared with their Latino peers, Black firefighters endorsed higher mean levels of church attendance, $t(1021) = 8.29, P<.001$, the experience of religion as a source of comfort, $t(1021) = 7.94, P<.001$, and the experience of a sense of calling in life, $t(998) = 3.60, P<.05$ (Table 2). There were no significant differences between the two ethnic groups in firefighters' rank, whether they had a second job, family responsibilities (caregiver for a sick family member, children under the age of 18), perceived levels of physical health, or supportive relationship with a partner.

Two sets of t-tests were implemented to examine the association of the seven categorical predictors to

levels of perceived stress within each ethnic group (see Table 1 for perceived stress mean values). Only among Latinos, a lower firefighter rank ($t(553) = 3.53, P<.05$) and having a second job ($t(533) = .66, P<.01$) were associated with higher levels of stress. Only among Black respondents, a lower level of education ($t(463) = .55, P<.01$) and serving as a caregiver for sick family members were associated with higher levels of perceived stress ($t(453) = .43, P<.01$). Among both Black ($t(430) = 2.95, P<.01$) and Latino firefighters ($t(526) = 1.14, P<.01$), alcohol abuse related problems were positively related to perceived stress.

Pearson's correlation analyses by ethnic group were performed to examine the association of the five continuous predictor variables to perceived stress. Self-rated good health status and a positive partner relationship were negatively associated with perceived stress for both ethnic groups (Table 2). Religion as a source of comfort and a sense of calling in life were negatively associated with perceived stress only for Latino firefighters (Table 2).

Finally, results of two multiple linear regression (one for each ethnic

Table 3. Regression analysis predicting perceived stress for Black firefighters

Predictors	B ^a	Standard error	β ^b	95% CI for B ^a	
Education	-.99	.60	-.08	-2.17	.20
Caregiver	1.36	1.18	.06	-.92	3.68
Alcohol abuse	1.95	.70	.13†	.58	3.32
Good health	-1.71	.35	.23‡	-2.41	-1.02
Partner spouse relation ^c	-.91	.31	-.14†	-1.52	-.30

R² = .20, P<.001.

a. B = Unstandardized beta coefficients.

b. β = Standardized beta coefficients.

†. P<.01.

‡. P<.001.

group) were conducted to examine the set of categorical and continuous predictors that were associated with perceived stress for each ethnic group in the analyses described above. Results indicated that among both Black (Table 3) and Latino (Table 4) firefighters, the following three variables predicted stress levels when controlling for all other variables in the regression models: alcohol abuse, self-reported good health and a positive relationship with partner/spouse. Only among Latino firefighters, having a second job and a sense of calling in life also predicted stress. All associations were in the expected direction (Tables 3 and 4).

DISCUSSION

Results indicated that Black and Latino firefighters reported similar high levels of stress, which is consistent with the demands of their jobs and with previous findings.^{14,19} There were both differences and similarities in the factors associated with stress across ethnic groups. When considered individually, more factors were associated with stress for Latino (n = 7) than for Black firefighters (n = 5). However, results of the regression

analyses indicated that when controlling for all the variables in each model, alcohol abuse, self-reported good health and a positive partner/spousal relationship predicted stress for both Black and Latino firefighters. These results suggest that the development and implementation of stress management strategies need to take into account potential ethnic differences and similarities in predictors of stress across Black and Latino firefighters.

A relatively large proportion of Black (24%) and Latino (33%) firefighters reported problematic alcohol use, and for both groups alcohol abuse was associated with higher levels of stress. Previous studies have indicated that firefighters report using alcohol to unwind and manage stress related to emergency calls.³² However, alcohol abuse compromises firefighters' health, which may increase their vulnerability to stress. It is very likely that the observed relationship of self-reported health status to perceived stress is also reciprocal. While some studies have suggested that the experience of stress has a negative impact on the regulation of immune and inflammatory processes that may lead to disease,²⁻⁴ it is also likely that health-related problems compound the experience of stress.

Taken together, these findings imply that efforts to promote well-being among firefighters and other emergency responders should integrate physical and behavioral health interventions that include self-care training before, during, and after critical incidents.³³ It may be most effective to provide firefighter recruits prevention interventions to raise awareness about problematic drinking behaviors early on in their training and to follow up such efforts, once they join the force, with comprehensive support and substance abuse referral ser-

A relatively large proportion of Black (24%) and Latino (33%) firefighters reported problematic alcohol use, and for both groups alcohol abuse was associated with higher levels of stress.

vices endorsed by the organization.^{34,35}

Findings indicated that partner/spousal support is a potential protective factor in the experience of stress among male Black and Latino firefighters. Therefore, support services for first-responders should include interventions to address family and spousal related conflicts. While prolonged work days in the firehouse and its related "brotherhood" culture often provide firefighters a supportive peer group, spouses often feel discon-

nected and isolated.³⁶ Interventions and activities that promote interaction and mutual aid among families are recommended to provide a support system for the unique needs of firefighters' spouses with the goal of strengthening spousal bonds and relationships and increasing adaptive strategies to facilitate work-family fit.¹⁸

Compared with Latinos, Black participants reported higher levels of church attendance and stronger endorsement of both religion as a source of comfort and a sense of calling in their lives. However, religion as a source of comfort and the experience of a sense of calling in life were associated with lower levels of perceived stress only for Latinos. A limitation of the study is that these constructs were assessed with one-item measures that may not have captured the complexity of the constructs of religiosity and a sense of calling. Given the importance of spirituality and the church in relation to well-being within the Black community,³⁷ research that utilizes stronger measures of religiosity and calling is needed to further examine the relation of these constructs to stress among Black firefighters and other first responders. In addition, research is needed to understand how a sense of calling contributes to lower levels of stress among Latino firefighters. Previous studies have suggested that people who experience a sense of calling in their work tend to feel highly motivated in life and develop closer bonds with co-workers, characteristics that are likely to buffer the experience of stress and lead to higher levels of work and life satisfaction.²⁸

Results of chi square analyses indicated that a higher level of education was associated with lower levels

Table 4. Regression analysis predicting perceived stress for Latino firefighters

Predictors	B ^a	Standard error	β ^b	95% CI for B ^a	
Firefighter rank	-.60	.54	-.046	-1.65	.46
Second job	1.62	.55	.12†	.54	2.70
Alcohol abuse	3.04	.57	.22‡	1.92	4.15
Good health	-1.85	.32	-.24‡	-2.47	-1.23
Partner/spouse relation	-1.02	.28	-.15‡	-1.57	-.47
Religion comfort	-.50	.40	-.05	-1.28	.28
Life calling	-.87	.37	-.10*	-1.59	-.15

R² = .20, P < .001.

a. B = Unstandardized beta coefficients.

b. β = Standardized beta coefficients.

*. P < .05.

†. P < .01.

‡. P < .001.

of stress only for Black firefighters, while a higher rank within the force was associated with lower stress levels only for Hispanic firefighters. However, when included in their respective regression models, neither education level nor firefighter rank were uniquely associated to stress. These findings differ from previous studies¹³ that have shown a positive relation of SES to perceived stress among middle class Black men. In terms of employment stability, educational attainment and income level, Black male firefighters are likely to be distinct from their middle-class counterparts, which may explain the discrepant findings.

Limitations

Limitations of the study include the use of self-report measures to assess perceived stress and risk and protective factors associated to stress. Therefore, social desirability in responses cannot be ruled out. Common method bias may have inflated the correlations. Because the study implemented a correlational, cross-sectional design, inferences regarding the extent to which the predictors examined caused higher or lower levels of stress cannot be as-

certained. Finally, the study's findings may only generalize to urban, career, male firefighters and Black and Latino men in first response occupations such as police officers and emergency medical personnel. Study findings may not generalize to female firefighters or males who do not work as first responders.

CONCLUSION

In conclusion, firefighters in the study reported relatively high levels of perceived stress. For both ethnic groups, alcohol abuse was associated with higher levels of perceived stress while self-reported good health and a positive spousal relationship were associated with lower levels of stress. Having a second job and a sense of calling in life were correlated to stress only for Latino participants. Because there were both differences and similarities in the factors associated with stress among Black and Latino firefighters, interventions to help firefighters and other first responders reduce or manage stress need to take into account that factors associated with perceived stress may vary by ethnic group.

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CONFLICT OF INTEREST

No conflicts of interest to report.

AUTHOR CONTRIBUTIONS

Research concept and design: Arbona, Long, Olvera; Acquisition of data: Pao; Data analysis and interpretation: Arbona, Pao, Long; Manuscript draft: Arbona, Pao, Olvera; Administrative: Arbona, Pao, Long, Olvera

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