

ORIGINAL ARTICLE

Dietary Preferences and Nutritional Information Needs Among Career Firefighters in the United States

美国专职消防员的饮食偏好与营养信息需求

Preferencias alimentarias y necesidades de información nutricional entre bomberos de carrera en Estados Unidos

Justin Yang, MD, MPH, *United States*; Andrea Farioli, MD, *Italy*; Maria Korre, MSc, *United States*; Stefanos N. Kales, MD, MPH, *United States*

ABSTRACT

Background: Considerable cardiovascular disease and cancer risk among firefighters are attributable to excess adiposity. Robust evidence confirms strong relationships between dietary patterns and the risk of chronic disease. Dietary modification is more likely to be effective when the strategy is appealing and addresses knowledge gaps.

Objective: To assess career firefighters' diet practices and information needs, compare the relative appeal of proposed diet plans, and examine how these vary in association with body composition.

Methods: Cross-sectional, online survey distributed to members of the International Association of Fire Fighters.

Results: Most firefighters do not currently follow any specific dietary plan (71%) and feel that they receive insufficient nutrition information (68%), but most are interested in learning more about healthy eating (75%). When presented with written descriptions of diets without names or labels and asked to rank them in order of preference, firefighters most often rated the Mediterranean diet as their favorite and gave it a more favorable distribution of relative rankings ($P < .001$) compared to the Paleo, Atkins, Therapeutic Lifestyle Changes, and Esselsteyn Engine 2 (low-fat, strictly plant-based) diets. Obese respondents reported more limited nutritional knowledge ($P < .001$) and were more likely to feel that they received insufficient nutritional information ($P = .021$) than participants with normal body weight.

Conclusions: Most career firefighters are overweight or obese and do not practice a specific diet; however, 75% want to learn more about healthy eating. Among popular dietary choices, firefighters were most receptive to a Mediterranean diet and least receptive to a strictly plant-based diet.

摘要

背景: 消防员中值得关注的心血管疾病和癌症风险可归因于过度肥胖。据有力证据证实, 饮食模式与慢性疾病风险之间存在密切关联。在策略足具吸引力且能够填补知识缺口的情况下, 饮食调整更有可能奏效。

目的: 评估专职消防员的饮食行为和信息需求, 比较各种拟定的饮食计划的相对吸引力, 并从身体成分方面分析这些饮食计划的差异。

方法: 面向国际消防员协会成员的剖面代表性在线调查。
结果: 大多数消防员当前未遵循任何特定的饮食计划 (71%), 他们感觉自己获知的营养信息不充分 (68%), 但大多数有兴趣更深入地了解有关健康饮食的信息 (75%)。当对一些不带名称或标签的饮食描述语进行喜好排序时, 消防员最经常将地中海饮食评为最喜爱的饮食, 并给它一个相对更高的排名 ($P < .001$), 而将 Paleo (旧石器饮食)、Atkins (阿特金斯低碳饮食)、治疗性的生活方式调整以及 Esselsteyn Engine 2 饮食 (二号消防队饮食, 即低脂纯素食) 排在其次。与正常体重受访者相比, 肥胖受访者报告的营养知识获知程度更为有限 ($P < .001$), 且更有可能认为自己获知的营养信息不足

($P = 0.021$)。

结论: 大多数专职消防员存在超重或肥胖问题, 且不采用特定的饮食; 但有 75% 想了解更多有关健康饮食的信息。在当前流行的饮食选项中, 消防员最能接受地中海饮食, 最不能接受纯素食饮食。

SINOPSIS

Antecedentes: El riesgo considerable de cáncer y enfermedad cardiovascular entre los bomberos es atribuible al exceso de adiposidad. Los sólidos indicios confirman una fuerte relación entre los hábitos alimentarios y el riesgo de enfermedades crónicas. La modificación de la dieta es más probable que sea eficaz cuando la estrategia es atractiva y aborda las lagunas en los conocimientos.

Objetivo: Evaluar las prácticas alimentarias de los bomberos de carrera y las necesidades de información, comparar el atractivo relativo de los planes alimentarios propuestos y examinar cómo varían estos en asociación con la composición corporal.

Métodos: Encuesta transversal en línea distribuida a los miembros de la Asociación Internacional de Bomberos.

Resultados: La mayoría de los bomberos no sigue en la actualidad ningún plan alimentario específico (71 %) y creen que reciben información insuficiente sobre nutrición (68 %), pero la mayoría están interesados en ampliar sus conocimientos acerca de la alimentación saludable (75 %). Cuando se les presentaron descripciones escritas de dietas sin nombres o etiquetas y se les pidió que las clasificaran por orden de preferencia,

Author Affiliations
St Elizabeth's Medical Center, Tufts University School of Medicine, Boston, Massachusetts (Dr Yang); Department of Medical and Surgical Sciences (DIMEC), University of Bologna, Italy (Dr Farioli); Environmental & Occupational Medicine & Epidemiology Program, Department of Environmental Health, Harvard T.H. Chan School of Public Health, Boston (Ms Korre and Kales); Cambridge Health Alliance, Harvard Medical School, Cambridge, Massachusetts (Ms Korre and Kales).

Correspondence
Stefanos N. Kales
Stefanos.Kales@hsph.harvard.edu

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los bomberos clasificaron con más frecuencia la dieta mediterránea como su favorita y le dieron una distribución más favorable de clasificaciones relativas ($P < 0,001$) en comparación con las dietas Paleo, Atkins, Cambios terapéuticos de estilo de vida y Esselsteyn Engine 2 (baja en grasas, estrictamente a base de plan-

tas). Los encuestados obesos informaron conocimientos nutricionales más limitados ($P < 0,001$) y tenían más probabilidades de pensar que recibían información nutricional insuficiente ($P = 0,021$) que los participantes con peso normal.

Conclusiones: La mayoría de los bomberos de carrera tienen sobrepe-

so o son obesos y no llevan una dieta específica; sin embargo, el 75 % quiere ampliar sus conocimientos sobre la alimentación saludable. Entre las opciones alimentarias conocidas, los bomberos eran más receptivos a la dieta mediterránea y menos receptivos a una dieta estrictamente a base de plantas.

INTRODUCTION

A work environment that may promote and reinforce poor dietary habits is considered to be an occupational hazard for the nation's fire service.¹⁻³ In fact, cardiovascular disease (CVD) is the leading cause of on-duty death and lifetime mortality among firefighters in the United States. About 45% of on-duty fatalities result from sudden cardiac death (SCD), while strokes, aneurysms, and other CVD-related pathology cause another 5% of line-of-duty deaths.^{1,4-6} For every fatal on-duty CVD event, there are an estimated 17 nonfatal, line-of-duty CVD events in the US fire service.¹ While some CVD risk factors, such as genetics, age, or gender, cannot be modified, many, including risk parameters like body composition, blood pressure, lipid and glucose metabolism, and inflammation, can be improved with lifestyle changes, including diet.

Cancer accounts for 27% of all-cause, lifetime mortality among US firefighters and is the second-leading cause of death.⁷ Moreover, research suggests that firefighters have statistically increased risks for several types of cancer as compared to the general population.^{7,8} Body composition and dietary patterns can also significantly influence cancer risk.⁹⁻¹²

Unfortunately, current evidence demonstrates a growing obesity problem in the fire service,^{1,13} which is associated with CVD.^{14,15} Firefighters' average body mass index (BMI) and obesity prevalence (now about 40%) have both been steadily increasing within the worldwide obesity epidemic.¹ Moreover, many young firefighters are entering their careers already carrying excess adiposity. Two recent investigations of young firefighters find that 67% to 77% were overweight or obese.^{16,17} The overall societal obesity epidemic, ingrained aspects of "firehouse culture" (sedentary behavior and communal meals high in calories, fat, and unrefined carbohydrates), shiftwork, and habits like the frequent consumption of fast food and sugar-sweetened beverages are major contributors to the problem of excess body weight and fat in the fire service.^{1,18-23} On the other hand, this unique culture of shared meals and camaraderie provides opportunities for improving firefighters' diets.²⁴⁻²⁶ Lifestyle changes could reduce obesity and as a result decrease mortality and morbidity in the US fire service.

Diet is a major component of an individual's lifestyle. The intake of single nutrients, food groups, and even more so, overall dietary patterns can be used as

markers of health status. Moreover, dietary modifications have been demonstrated to produce significant positive effects on various health outcomes.^{27,28} Among healthy eating patterns, much recent attention has focused on the Mediterranean diet, which is strongly associated with beneficial effects on CVD risk factors such as obesity, hypertension, diabetes mellitus, and metabolic syndrome.²⁸⁻³² More importantly, the Mediterranean diet is also linked with large risk reductions in all-cause mortality, CVD morbidity and mortality, and cancer mortality by a plethora of evidence.³³⁻³⁹ The latest US nutritional guidelines recognize the Mediterranean diet as one of three recommended healthy options for Americans.⁴⁰

Recently, we demonstrated that among career firefighters, those whose eating habits most resembled the Mediterranean diet had more favorable CVD risk profiles and lower metabolic syndrome prevalence and reported a lower risk of weight gain in the past 5 years.¹⁸ However, very little is known about firefighters' preferences towards dietary change and perceived needs for nutritional information. This study aimed to (1) investigate US career firefighters' current diet pattern practices; (2) assess their needs for and receptivity to additional nutritional information; (3) compare the relative appeal of various proposed diet plans; and examine how these aims vary in association with firefighters' individual body composition.

METHODS

Study Design

We conducted a cross-sectional survey using a 19-question online instrument that used multiple choice, rankings, and short answer questions (Appendix, available at www.gahmj.com). We developed the questionnaire by modifying surveys previously administered in our ongoing firefighter studies^{13,18} and added specific questions to assess satisfaction with current nutritional knowledge, determine dietary preferences, and gauge perceived needs for additional nutrition information.

Part 1 of the survey asked if the respondent was currently practicing any of the diets listed on the *US News and World Report's* "Best diets rankings" (2014) website.⁴¹ In Part 2, we asked respondents their opinions regarding their own nutritional knowledge and dietary information needs.

Parts 3 and 4 of the survey asked firefighters about their interest level and receptivity to 5 specific diets

Table 1 Proposed Diets and Their Respective Text Descriptions and Basis for Inclusion

Dietary Pattern	Text Description for Survey	Inclusion Basis
Atkins	A diet that eliminates sugars and starches like potatoes, white bread, and rice. Heavy consumption of proteins and fats like chicken, red meat, and eggs.	Well-known, potential appeal based on commonalities with fire service culture (high meat and fat consumption), presents a “low carb” option and included in the <i>US News and World Report’s</i> “best diets” rankings (2014) ⁴¹
Esselsteyn (“Engine 2) Diet	A diet that is low-fat and plant-based and focuses on immediately or gradually removing all animal products, processed foods, and vegetable oils from the diet.	Developed and promoted by a prominent former firefighter, presents a plant-based diet, ³⁹ included in the <i>US News and World Report’s</i> “best diets” rankings (2014) ⁴¹
Mediterranean Diet	A diet that emphasizes fruits/vegetables, whole grains, beans, nuts, legumes, and olive oil; eating fish and seafood at least a couple of times a week; enjoying poultry, eggs, cheese, and yogurt in moderation; and low consumption of sweets and red meats. Moderate wine consumption is also encouraged in this diet.	Robust scientific evidence of health benefits, popular press coverage after the PREDIMED ^{32,26} and other recent studies, included in the <i>US News and World Report’s</i> “best diets” rankings (2014) ⁴¹
Paleo Diet	A diet that focuses on whole natural foods including meat, fish, poultry, fruits, and vegetables. Avoids eating dairy, legumes, and grains; as well as avoidance of processed foods and artificial ingredients such as refined sugar.	Popular among athletes, fitness trainers, and many firefighters, included in the <i>US News and World Report’s</i> “best diets” rankings (2014) ⁴¹
Therapeutic Lifestyle Changes Diet	A diet that sharply reduces saturated fats (fatty meat, whole milk dairy, and fried foods), increases consumption of fruits/vegetables, whole grains, low-fat or nonfat dairy, fish, and poultry without the skin.	Low-fat dietary pattern developed by the National Cholesterol Education Program, endorsed by the American Heart Association, included in the <i>US News and World Report’s</i> “best diets” rankings (2014) ⁴¹

that we considered the most trendy, popular, or healthy based on the most recent research and/or perceived popularity both in general population and among firefighters^{36,41-44}: the Atkins diet, the Engine 2 (Esselsteyn) diet, the Mediterranean diet, the Paleo diet and the Therapeutic Lifestyle Changes (TLC) diet. For this section, the diets’ names or labels were not provided; rather, short descriptions of the dietary patterns/practices were given (Table 1). In part 4, where the participants assigned relative preference rankings to the diet descriptions, the survey software included a randomization function. This ensured that the sequence of the diet descriptions was presented in a randomized order to each participant. This strategy was designed to adjust the aggregate survey results for any bias that participants might infer from the relative orders of the diets to be ranked as they read the survey.

In the final section, Part 5, we requested basic demographic and body composition information from the participants.

Participants and Data Collection

The International Association of Fire Fighters (IAFF), which represents more than 300 000 full-time professional firefighters representing all 50 states and Canada, repeatedly emailed to its members an electronic link to the questionnaire on the SurveyMonkey (Palo Alto, California) platform. The emails explained the purpose of the study and built in privacy protections to reassure the members that any participation was voluntary and anonymous. The respondents were not given any feedback or monetary incentives for

completing the survey. Participants were also aware they might withdraw from the survey at any given time. The online survey was opened on March 4, 2014, and closed May 5, 2014. Data collection and storage were completed using Survey Monkey’s online platform and were programmed to remain anonymous and not record any email or IP addresses.

Data Analysis

Participants were permitted to skip any question they did not wish to answer; however, an individual survey was regarded as “complete” when the participant pressed the “done” button at the end of the questionnaire. We excluded “incomplete” surveys, as well as surveys from respondents with missing information on BMI (n=466) or diet (n=15). Finally, we excluded several subjects (n=4) who provided implausible answers on age (<18 years) or height and weight (calculated BMI <10).

We compared categorical variables, described as number and percentage, with the Pearson’s chi-square test. Continuous variables were presented as mean and standard deviation (SD).

Relative rank order preferences of dietary patterns (ie, 1-5, with 1 being the most favorite and 5 being the least favorite) were further compared using a favorability index. The index was calculated in aggregate for the population’s rankings and each BMI category’s rankings as follows:

Favorability = Group probability of high rankings (1st or 2nd) minus Group probability of low rankings (4th or 5th).

Trends across ordered groups were analyzed with

Table 2 Self-reported Demographics of Respondents Stratified by Body Mass Index (N=3172)

Characteristic	Body Mass Index								P value
	All subjects (n=3172)		<25 kg/m ² (n=633)		25–29 kg/m ² (n=1593)		≥30 kg/m ² (n=946)		
	N	%	N	(%)	N	(%)	N	(%)	
Gender									
Female	233	(7.4)	116	(49.8)	86	(36.9)	31	(13.3)	<.001 ^a
Male	2901	(92.6)	514	(17.7)	1490	(51.4)	897	(30.9)	
Missing	38		3	(7.9)	17	(44.7)	18	(47.4)	
Age (y)									
18-29	376	(11.9)	107	(28.5)	191	(50.8)	78	(20.7)	<.001 ^a
30-39	999	(31.6)	229	(22.9)	509	(51.0)	261	(26.1)	
40-49	983	(31)	182	(18.5)	497	(50.6)	304	(30.9)	
50+	808	(25.5)	114	(14.1)	391	(48.4)	303	(37.5)	
Missing	6		1	(16.7)	5	(83.3)	0	(0.0)	

^aThe Chi Square test performed excluding the "missing" category.

a score test for linear trend of the log odds. Statistical analyses were performed using Stata 12.1 SE (Stata Corp, College Station, Texas). We defined as statistically significant a 2-sided *P* value of <.05.

Ethical Statement

The study was approved by the Institutional Review Board (IRB) of the Cambridge Health Alliance, a teaching affiliate of the Harvard Medical School. The IRB review was submitted by JY and SNK and received approval in January 2014. Participation was strictly voluntary, and no identifiable information was recorded into the database.

RESULTS

Overall, 3657 firefighters responded to the survey, and 3172 questionnaires (87%) met all inclusion criteria. In Table 2, we summarize self-reported demographics stratified by the respondents' BMI categories. Males comprised more than 90% of the respondents and more than 80% of the men reported heights and weights consistent with overweight or obese BMI categories. In contrast, 50% of female participants reported height/weight values consistent with a normal BMI.

The mean age of the participants was 42 (SD 10) years, and about two-thirds of them were between 30 and 49 years of age. The prevalence of obesity was lowest among the youngest firefighters and increased with age. Likewise, the likelihood of reporting a normal BMI decreased with increasing age (Table 2).

In Table 3, we summarize self-reported dietary patterns, firefighters' perceptions of their nutritional knowledge, and their needs for additional nutritional information stratified by BMI categories. A large majority (71%) of participants denied following any specific diet. Obese firefighters were less likely to practice a diet plan (25%) than normal-weight firefighters (33%) (*P*=.003). Among the 18 diets listed on

the survey, the Paleo diet was the most frequently practiced (9%) followed by a low-carbohydrate diet (8%) and a low-fat diet (4%). Less than 2% firefighters reported following a commercial diet plan, and only 1% reported following the Mediterranean diet.

Obese respondents were significantly less likely to report their own nutritional knowledge "somewhat or very sufficient" (62%), whereas 86% of participants with a normal BMI felt they possessed somewhat or very sufficient nutritional knowledge (*P*<0.001). Regarding the nutritional information firefighters receive from the fire service, statistically significant differences were observed across the 3 BMI categories in the distribution of responses; nonetheless, these differences were small, and 68% to 69% of all three groups expressed they were "somewhat or very" dissatisfied (Table 3).

When comparing interest in learning more about a proposed dietary description ("somewhat or very interested"), the Mediterranean Diet text description received the highest level of interest (68%), closely followed by TLC (67%). A majority were also interested in the Paleo and Atkins diets, 60% and 51%, respectively. The Engine 2 description received the lowest level of interest (21%).

Results of rank order preference ratings for the 5 diet descriptions are presented in Figure 1. The Mediterranean diet received the most favorable distribution of rankings and was ranked in first place by almost 40% of firefighters, while the Engine 2 diet had the least favorable distribution, being ranked fifth (last place) by nearly 70% of respondents. In Figure 2, we further compared dietary pattern preferences using the favorability index. The findings for the favorability indices did not show any differences across BMI subgroups for relative favorability. However, normal weight and overweight firefighters' rankings gave the Atkins description a modestly negative favorability, while the rankings of obese

Table 3 Self-reported Dietary Practices, Self-perceived Nutritional Knowledge and Nutritional Information Needs Stratified by Body Mass Index (N=3172)

Characteristic	Body Mass Index								P value
	All subjects (N=3172)		<25 kg/m ² (n=633)		25–29 kg/m ² (n=1593)		≥30 kg/m ² (n=946)		
	N	(%)	N	(%)	N	(%)	N	(%)	
Following a diet									
No	2249	(70.9)	424	(67)	1119	(70.2)	706	(74.6)	.003
Yes	923	(29.1)	209	(33)	474	(29.8)	240	(25.4)	
Nutritional knowledge possessed									
Very limited	42	(1.3)	2	(0.3)	13	(0.8)	27	(2.9)	<.001 ^a
Somewhat limited	264	(8.3)	30	(4.7)	108	(6.8)	126	(13.3)	
Neither limited nor sufficient	490	(15.5)	56	(8.9)	229	(14.4)	205	(21.7)	
Somewhat sufficient	1726	(54.5)	352	(55.7)	885	(55.6)	489	(51.7)	
Very sufficient	646	(20.4)	192	(30.4)	356	(22.4)	98	(10.4)	
Missing	4		1		2		1		
Sufficient information on nutrition received from the Fire Service									
Strongly Disagree	1077	(34)	229	(36.2)	516	(32.5)	332	(35.1)	.021 ^a
Disagree Somewhat	1063	(33.6)	204	(32.3)	538	(33.8)	321	(34)	
Neither agree or disagree	623	(19.7)	120	(19)	302	(19)	201	(21.3)	
Agree Somewhat	355	(11.2)	70	(11.1)	202	(12.7)	83	(8.8)	
Strongly Agree	49	(1.5)	9	(1.4)	32	(2)	8	(0.8)	
Missing	5		1		3		1		

^aTest performed excluding the “missing” category.

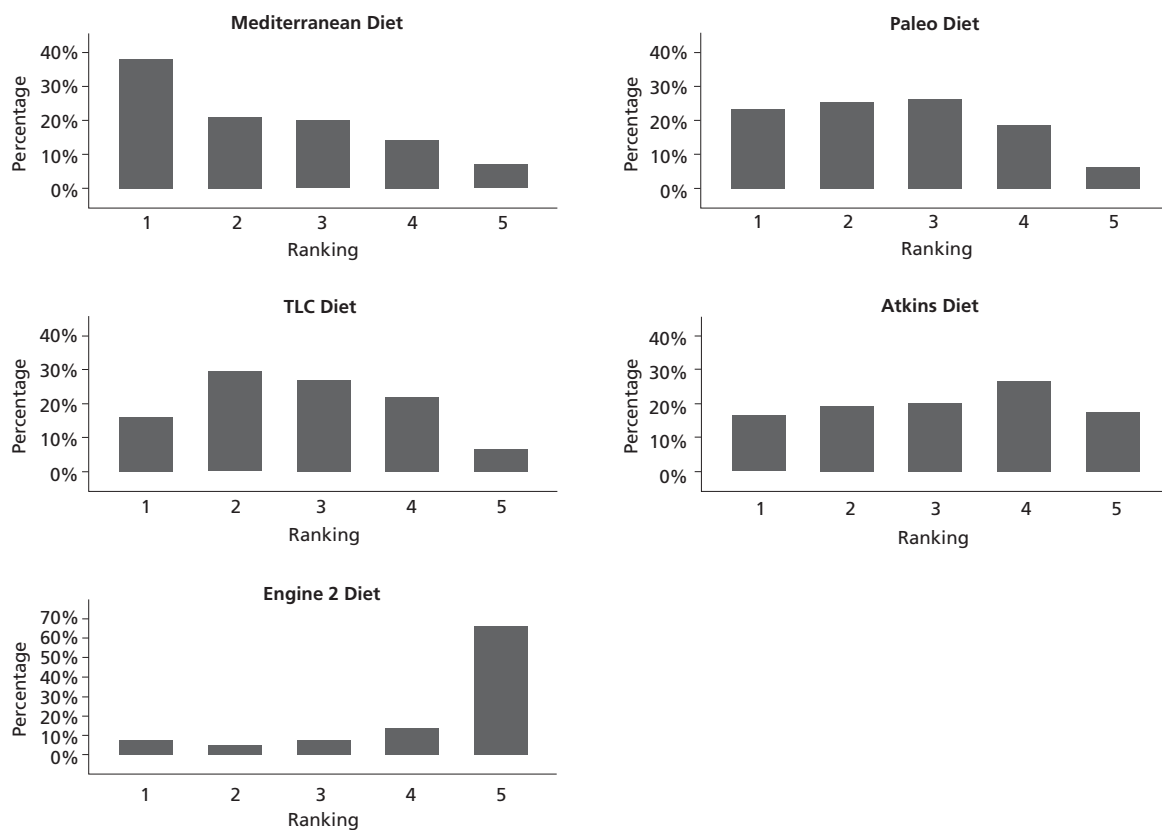


Figure 1 Respondents’ rank order favorability ratings of the 5 proposed diet descriptions in percentages, with 1 representing most favored and 5 representing least favored diet (N= 3172).

Abbreviation: TLC, Therapeutic Lifestyle Changes.

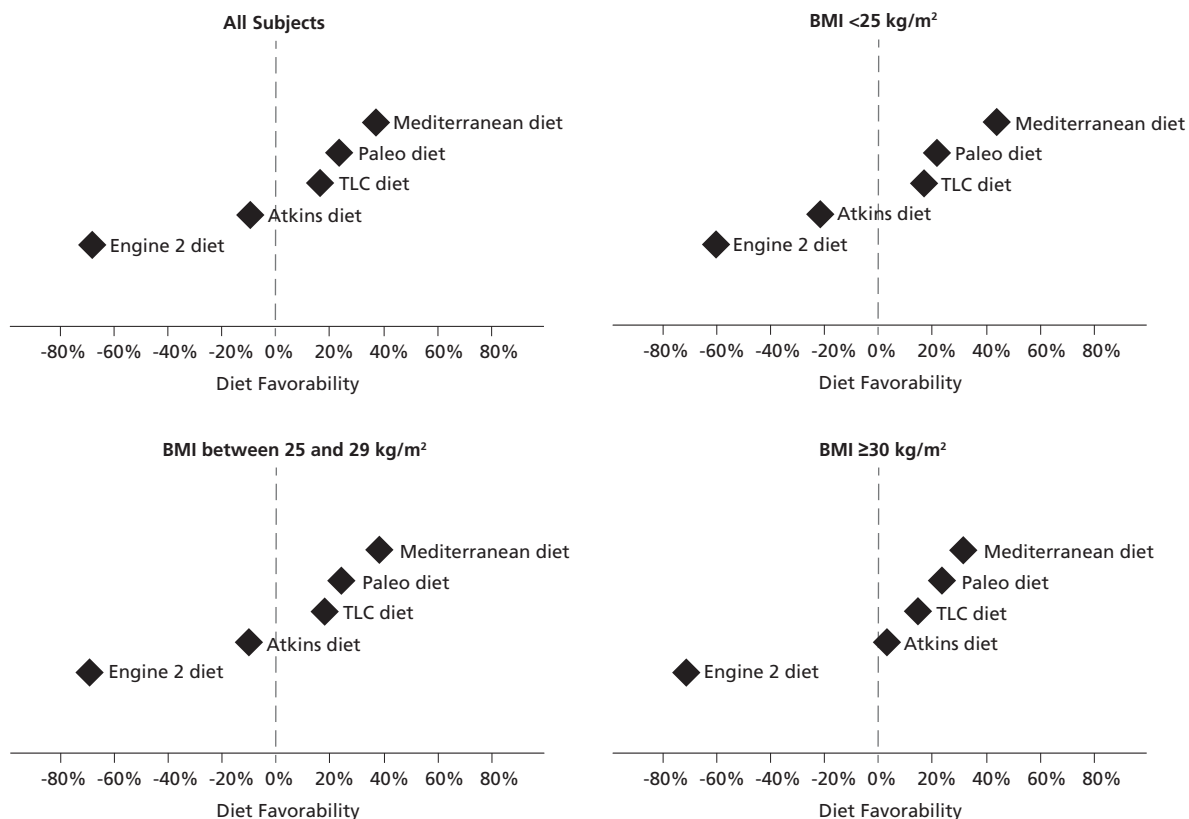


Figure 2 Diet favorability indices for all subjects as well as stratified by self-reported body mass index. Favorability was calculated by group probability of high rankings (1st or 2nd) minus group probability of low rankings (4th or 5th).

Abbreviations: BMI, body mass index; TLC, Therapeutic Lifestyle Changes.

participants yielded neutral favorability towards the Atkins description. In contrast, favorability indices for the other 4 diets for obese firefighters were lower when compared to the respective indices of normal-weight participants.

DISCUSSION

Our study provides an initial impression of dietary practices, self-perceived nutritional knowledge and dietary information needs, and potential interest for several proposed diets as well as how these may vary according to body composition. Therefore, it may provide some direction toward the development of effective nutrition interventions tailored to the career fire service.

In agreement with multiple previous studies,^{1,14,15} a large majority of our national sample of career firefighters were overweight or obese men. Not surprisingly, less than 30% of the firefighters reported following a specific dietary pattern. Significantly more normal-weight firefighters followed diets than their obese colleagues. It is not uncommon in cross-sectional studies to find the opposite, where heavier participants who are trying to lose weight report more dieting.⁴⁵ Although only a cross-sectional survey which cannot determine causality, the pattern of our results suggests some true association where following a specific dietary plan

increases the probability of reaching and maintaining a healthy weight. Moreover, obese firefighters were also significantly less likely than their normal-weight counterparts to report sufficient nutritional knowledge, suggesting that knowledge is a factor that informs lifestyle practices and results. Given that 70% of career firefighters do not currently follow any diet, there is ample room for potential interventions to increase the rate of adopting healthier eating patterns. These interventions should pay particular attention to addressing the concerns and needs of obese firefighters.

Additional results from our study also strongly support potential nutrition interventions in the career fire service. More than two-thirds of respondents were dissatisfied with nutrition information they received through their profession, and 75% indicated that they want to learn more about healthy eating. Clearly, these findings indicate that dietary education received from the national fire service (eg, fire academies, the union and other national organizations, and local fire departments) could be improved and that most career firefighters would be receptive to additional information. Social cognitive theory (SCT) is a strategy commonly used in nutrition education intervention.⁴⁶ SCT posits that individuals in environments supportive of behavioral change are more likely to achieve the targeted changes.⁴⁷ SCT suggests that dietary habits could be

improved by creating positive community support and providing informative nutritional guidance. Several previous studies have demonstrated positive outcomes using team-based health promotion approaches in the fire community.^{24,25,48} The importance of a workplace-oriented approach is further underlined by the fact that career firefighters consume on average 6 meals per week at their firehouses and report that they consume less healthy fats, oils, and carbohydrates at work than they do in their own homes.¹⁸

A key question in designing a workplace nutrition intervention is what dietary pattern to promote. In order to be most effective, the proposed dietary pattern should have proven efficacy for producing health benefits while also having the highest possible degree of appeal to the target population. Our results are also most interesting and informative in this regard. Among the popular dietary choices with which they were presented, firefighters were by far most receptive to a Mediterranean-style diet and least receptive to a strictly plant-based diet (Esselsteyn Engine 2). Though the latter arguably would provide considerable health benefit, its appeal was quite limited and it received mostly unfavorable ratings. This is most likely because it advocates for the complete removal of popular oils and animal-derived foods (eggs, meats, dairy) from the diet. On the other hand, the Atkins diet was also viewed by most firefighters as unfavorable despite encouraging high consumption of meats and eggs. This may be due to common reasonable concerns that a diet rich in animal fat raises potential health issues. The fact that the Atkins diet received better rankings from obese compared to non-obese firefighters is possibly consistent with other findings from the study that obese firefighters are more likely to have insufficient nutritional knowledge.

The TLC and Paleo diets were viewed considerably more favorably, but by far, the Mediterranean diet received the most favorable responses both in terms of the proportion of firefighters who expressed interest in learning more about the diet (68%) and based on relative rankings vs the other 4 choices. The health benefits of the Mediterranean diet are thoroughly supported by several decades of literature in a variety of cultural settings,^{28,35-39,49} and Mediterranean-style diets are now accepted as a recommended dietary pattern in the latest US government nutrition guidelines.⁴⁰ Results from the current nationwide survey show clear interest in and receptivity from career firefighters, across all BMI categories, which along with its proven health benefits support the implementation of Mediterranean-style diets in future workplace interventions.

Our study has several strengths and limitations. The first limitation of our study is that, like any voluntary survey, it was subject to participation bias and response bias. The IAFF has roughly 300 000 members, and our sample represents about 1% of the membership who volunteered to complete the survey. Further, those participants may answer in ways they perceive as

socially desirable. Second, our survey was limited to career firefighters and did not include volunteer firefighters. Volunteers actually represent a larger group whose fire service work is structured differently from that of career firefighters. Therefore, our results may not be generalizable to volunteers. We are currently conducting a parallel survey of the volunteer fire service. Third, we did not collect information on race or geographic regions of the participants. Another limitation was that the cross-sectional design does not permit us to draw conclusions regarding causation for differences in responses we observed across BMI categories. Finally, the survey did not address food consumption frequencies, food preparation, or food purchasing.

A particular strength of our study was the large sample size we obtained on a national level. The demographic and gender distribution characteristics of our respondents and their BMI distribution are similar to those from previous studies of the US fire service,^{1,50,51} indicating that our survey sample is representative of US career firefighters. Second, while several prior studies have investigated some aspects of nutrition in local fire services,^{2,18,52} to the best of our knowledge, this is the first study to assess career firefighters' nutritional needs and preferences on a national basis. Third, we were also able to compare responses in association with varying body composition with adequate statistical power. Finally, the 5 diets we presented for relative levels of interest and head-to-head rankings included examples representative of 3 diets career firefighters reported they were most likely to follow: Paleo, low-carbohydrate (Atkins), and low-fat (TLC).

In conclusion, the present study provides several rationales for potential dietary interventions in the fire service. Large majorities of career firefighters are overweight or obese and do not follow any specific diet. However, they are interested in learning more about healthy eating and would like to receive more nutritional guidance from the fire service. Of the 5 dietary descriptions proposed to the firefighters, they expressed the highest interest in and gave the most favorable relative rankings to the Mediterranean diet.

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