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An Investigation of Sleep Quality, Stress, and Healthy Eating Status Among Shift-Working Firefighters: A Descriptive Cross Sectional Study

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4.This study adhered to the STROBE reporting guidelines. The completed STROBE checklist is provided as Supplementary Digital Content (SDC 1).

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Ethical Considerations: This study was reviewed and approved by the Istanbul Galata University Ethics Committee (Approval No: 2025-02, Date: 18.04.2025). All procedures were conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to data collection.

Clinical Significance

Findings highlight clinically important associations among stress, sleep quality, and healthy eating attitudes in shift-working firefighters. These results underscore the need for targeted workplace interventions to improve sleep health, reduce stress, and support healthier dietary behaviors to enhance overall occupational well-being and safety.

Objective: The aim of this study was to assess perceived stress, sleep quality, and healthy eating attitudes among fire department personnel and to examine the relationships among these variables, working in various units of the department daily. **Methods:** This descriptive cross-sectional study included 188 participants. Data were collected using a sociodemographic form, the Bergen Shift Work Sleep Questionnaire, the Perceived Stress Scale (Short Form), and the Attitude Scale for Healthy Nutrition (ASHN). **Results:** The ASHN total score was 75.84 ± 10.03, indicating generally positive nutrition attitudes. The Bergen score was 62.94 ± 19.15, reflecting moderate sleep disturbance. The Perceived Stress Scale score was 11.50 ± 2.61, showing moderate stress. Weak negative correlations were found between ASHN and the other scales, while Bergen and stress scores were positively correlated. **Conclusions:** Overall, shift-based, stressful firefighting work negatively affected sleep and stress.

Keywords: shift workers, firefighters, stress, sleep quality, healthy eating

BULLETED SMART Learning Outcomes (LO)

- Understand the impact of shift work on firefighters' sleep quality.
- Identify factors contributing to perceived stress in fire department personnel.
- Describe the relationship between stress levels and healthy eating attitudes.

INTRODUCTION

The firefighting profession is physically demanding due to heavy responsibilities, a shift-based work system, and limited rest periods[1]. Among firefighters who work in shifts, health problems such as cancer, cardiovascular diseases[2], post-traumatic stress, anxiety, depression, increased waist circumference, and low HDL levels are common[3]. Irregular shifts increase physical and mental fatigue, thereby reducing quality of life[4]. In addition to physical risks, firefighting also involves serious psychological challenges. The effects of stress in work life become more pronounced in such professions. Stress in the workplace can affect employees' biological, psychological, and social structures. For example, shift systems, heavy workloads, and hazardous working conditions can lead to issues such as emotional exhaustion and lack of concentration[5]. Symptoms of post-traumatic stress disorder (PTSD) are common in this occupational group[6,7]. Studies across multiple countries have shown that the prevalence of PTSD among firefighters ranges from 4.89% to 57%[8,9]. Sleep is a vital process for eliminating metabolic waste and renewing the body[10]. However, stress is one of the strongest factors that disrupt this process. Both occupational and personal stress lead to sleep disorders, resulting in decreased attention, impulse control, and performance. Increased stress levels make it harder to fall asleep, while mental factors such as pain perception, anxiety, and fear of failure further reinforce this condition. Moreover, depression, anxiety, sleep apnea, thyroid diseases, and environmental factors can also negatively affect sleep quality[11]. A balanced diet is one of the fundamental components of a healthy life and plays a critical role in improving quality of life[12]. Although nutrition is critical for firefighters' health and performance, it is often neglected due to irregular shifts, making it difficult to maintain regular and balanced meals[13]. Shift work generally alters individuals' eating habits and shifts meal times across the 24-hour cycle, often including nighttime consumption[14]. As a result, shift workers experience circadian misalignment. Disruption of the circadian rhythm often leads to an increased risk of metabolic syndrome. Consequently, health problems such as hypertension, dyslipidemia, dysglycemia, and abdominal obesity, which develop due to insulin resistance, are commonly observed[15]. The main purpose of this research is to evaluate the perceived stress levels, sleep quality, and healthy eating attitudes of personnel working in the Istanbul Kadıköy 1st District Fire Department together and to examine the possible relationships among these variables.

METHODS

Study Design and Participants

The study was designed as descriptive and cross-sectional. The population of the study consisted of 365 firefighters working in the Kadıköy 1st District Fire Stations of the Istanbul Anatolian Side Fire Department. The sample was deemed representative of the study population. Considering the total number of firefighters, the sample size was determined as 188 using the formula $n = N.t^2pq / [d^2(N-1) + t^2pq]$.

N: Number of individuals in the target population: 365

n: Number of individuals to be included in the sample

p: Expected frequency of the investigated event: 0.5

q: Probability of non-occurrence of the investigated event: 0.5

t: Theoretical value corresponding to a specific significance level from the t-distribution table: 1.96

d: Accepted sampling error according to the frequency of the event: 0.05

The inclusion criteria for the study were being an actively employed firefighter at the relevant fire station, being 18 years of age or older, voluntarily agreeing to participate in the research, and signing the informed consent form. Additionally, participants were required to complete all data collection instruments accurately and in full. The exclusion criteria included personnel who were not actively on duty (such as those on long-term leave, medical leave, administrative assignment, or retirement), incomplete or incorrectly completed questionnaires, any neurological, psychiatric, or cognitive condition that would prevent participants from responding to the surveys (based on self-report), and refusal to participate or withdrawal of consent.

This study was reviewed and approved by the Istanbul Galata University Ethics Committee (Approval No: 2025-02, Date: 18.04.2025). All procedures were conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to data collection.

This study adhered to the STROBE reporting guidelines. The completed STROBE checklist is provided as Supplementary Digital Content (SDC 1, http://links.lww.com/JOM/C337).

Questionnaire Form

In the first part of the questionnaire, gender, education level, marital status, and the presence of sleep problems were questioned by the researchers based on the literature.

The second section included the Bergen Shift Work Sleep Questionnaire, the third section included the Perceived Stress Scale Short Form, and the final section included the Attitude Scale for Healthy Nutrition (ASHN).

Bergen Shift Work Sleep Questionnaire

The Bergen Shift Work Sleep Questionnaire was developed by Moen et al.[16] This scale was specifically designed to assess the sleep patterns of nurses working in a three-shift system. The Turkish adaptation of the scale was conducted by Bütün et al.[17] In the Turkish adaptation study, the scale consisted of 22 items and six subdimensions, with a Cronbach's alpha coefficient of 0.90. The six subdimensions are: difficulty falling asleep after lights out (min–max: 4–20), inability to achieve main sleep (min–max: 4–20), difficulty falling back asleep (min–max: 4–20), not feeling rested after sleep (min–max: 4–20), feeling tired/sleepy at work (min–max: 3–15), and feeling tired/sleepy during leisure time (min–max: 3–15). The total score ranges from 22 to 110, with higher scores indicating greater levels of insomnia. If the "Not applicable" option is selected, those responses should be treated as missing data.

Perceived Stress Scale - Short Form

The Perceived Stress Scale (PSS) was developed by Cohen et al. It was initially developed in a 14-item format (PSS-14). Later, shorter versions (PSS-10 and PSS-4) were derived for use in research[18]. The PSS-4 was adapted into Turkish and validated by Kocapınar and Ekşi. The scale includes four items and consists of two subdimensions: Self-Efficacy (SE) and Helplessness (H). Self-Efficacy (SE): Measures an individual's confidence in coping with stressful situations. Helplessness (H): Focuses on how helpless a person feels when facing stressful situations. The Cronbach's alpha coefficient was found to be 0.76. Higher scores on the scale indicate higher perceived stress levels. The scale uses a 5-point Likert-type scoring system. Negative items are scored directly, while positive items are reverse-scored. The total score ranges between 0 and 40, with higher scores indicating greater perceived stress[19].

Attitude Scale for Healthy Nutrition - (ASHN).

The Attitude Scale for Healthy Nutrition (ASHN) was developed by Demir and Cicioğlu, and its validity and reliability were tested. The scale was designed to assess individuals' attitudes toward healthy eating. The Cronbach's alpha coefficient of the scale is 0.87. ASHN consists of 21 items and four factors. These factors are named Information on Nutrition (IN), Emotion for Nutrition (EN), Positive Nutrition (PN), and Malnutrition (MP).

Information on Nutrition (IN) : Consists of items 1.,2.,3.,4.,5.

Emotion for Nutrition (EN): Consists of items 6.,7.,8.,9.,10.,11.

Positive Nutrition (PN): Consists of items 12., 13., 14., 15., 16.

Malnutrition (MP): Consists of items 17., 18., 19., 20., 21.

The internal consistency coefficients were 0.90 for Information on Nutrition, 0.84 for Emotion for Nutrition, 0.75 for Positive Nutrition, and 0.83 for Malnutrition.

The minimum possible score on the (ASHN) is 21, and the maximum is 105.

Scores of 21 indicate very low, 23–42 low, 43–63 moderate, 64–84 high, and 85–110 ideal levels of positive attitudes toward healthy nutrition[20].

Statistical Analysis

The study data were analyzed using SPSS Statistics 26.0. Results were presented as mean, standard deviation, frequency, and percentage, and statistical values were displayed in tables. Pearson correlation was used for normally distributed variables, and Spearman correlation was used when the distribution was non-normal. The significance level was set at 95%.

RESULTS

Table 1 presents the sociodemographic findings of the participants. Among the participants working in the fire department, 98.6% (n=283) were male and 1.4% (n=4) were female. Of the firefighters who participated in the study, 35.9% (n=103) held an associate degree, 34.1% (n=98) a bachelor's degree, 26.8% (n=77) had completed primary, secondary, or high school, and 3.1% (n=9) held a master's degree. 81.2% (n=233) of the firefighters were married, while 18.8% (n=54) were single. Among the firefighters, 48.8% (n=140) reported experiencing sleep problems, whereas 51.2% (n=147) did not. Of the participants, 46.3% (n=133) were between 35–45 years old, 29.6% (n=85) were over 45, and 24.0% (n=69) were under 35. The mean age of the participants was 40.55 ± 7.92 years.

Table 2 presents the mean scores of participants on the ASHN scale. The scores for the Information on Nutrition (IN) subscale ranged between 5 and 25, with a mean of 19.82 ± 3.88. Scores on the Emotion for Nutrition subscale ranged between 6 and 30, with a mean of 19.37 ± 4.47. The Positive Nutrition subscale scores ranged from 8 to 25, with a mean of 17.55 ± 3.54. Conversely, the Malnutrition (MP) subscale scores ranged between 5 and 25, with a mean of 19.10 ± 3.86. Finally, total ASHN scores ranged from 49 to 105, with a mean of 75.84 ± 10.03.

Table 3 presents the mean scores of the participants on the Bergen Shift Work Sleep Questionnaire. The "Difficulty Falling Asleep After Lights Out" subscale scores ranged between 0 and 20, with a mean of 11.47 ± 4.72. The mean score for the "Inability to Achieve

Main Sleep" subscale was 10.26 ± 4.22. The "Difficulty Falling Back Asleep" subscale had a mean score of 12.58 ± 4.89, indicating a moderate-to-high level. The "Not Feeling Rested After Sleep" subscale had a mean score of 11.39 ± 4.34.The subscales measuring daytime fatigue—"Feeling Tired/Sleepy at Work" and "Feeling Tired/Sleepy During Leisure Time"—had mean scores of 8.83 ± 3.41 and 8.40 ± 3.27, respectively.Finally, the total BERGEN scores ranged between 0 and 115, with a mean of 62.94 ± 19.15.

Table 4 presents the mean scores of participants on the Perceived Stress Scale (PSS). The Self-Efficacy subscale scores ranged from 2 to 10, with a mean of 5.17 ± 1.72. The mean score for the Helplessness subscale was 6.33 ± 1.67. Total PSS scores ranged between 4 and 18, with a mean of 11.50 ± 2.61.

Table 5 presents the correlations among the ASHN, BERGEN, and PSS scales. Generally, weak negative correlations were found between the ASHN subscales and total scores and those of the BERGEN scale. For example, a correlation of $r = -0.152^{*}$ ($p < 0.05$) was found between ASHN-Total and BERGEN-Total. Similarly, weak but significant negative correlations were observed between the ASHN total and subscale scores and PSS Self-Efficacy (e.g., ASHN-Positive Nutrition and PSS-Self-Efficacy, $r = -0.256^{**}$, $p < 0.01$). Moderate positive correlations were found between the BERGEN subscales and total score and the PSS total and subdimensions. For instance, a correlation of $r = 0.338^{**}$ ($p < 0.01$) was identified between BERGEN-Total and PSS-Total. Significant positive relationships were also observed between all BERGEN subscales and both PSS-Helplessness and PSS-Total scores ($r = 0.203–0.324^{**}$, $p < 0.01$).

DISCUSSION

This study is one of the few that examines the relationships between nutritional attitudes, sleep quality, and post-traumatic stress symptoms among firefighters. The findings indicate that shift work patterns affect both dietary and sleep behaviors in this occupational group and may have implications for psychological well-being.

When evaluated alongside studies conducted in similar populations, the results suggest that firefighters' eating and sleeping behaviors are key determinants not only of physical health but also of psychological resilience. In a study assessing the physical fitness levels of 102 national firefighters in Seoul, 84 participants were male and 18 were female[21]. Similarly, in

the present study, 98.6% of the participants were male, and only 1.4% were female. Both studies found that the number of female firefighters was considerably lower than that of males. In a study conducted by Lim et al.[22] in South Korea, 48.7% of participants were found to experience sleep disorders. Similarly, in this study, 48.8% of the firefighters reported having sleep problems. The mean age of participants in this study was 40.55 ± 7.92 years, with the largest age group being 35–45 years (46.3%). These findings are similar to Aydın's[23] study, which reported a mean age of 38.54 years. In both studies, most participants were middle-aged, aligning with the experience-based nature of the firefighting profession. Regarding education level, Aydın reported that 50% of participants held a bachelor's degree, followed by 42.5% who were high school graduates. In this study, 34.1% had a bachelor's degree, 35.9% an associate degree, and 26.8% had completed primary, secondary, or high school. Accordingly, the proportion of participants with lower-than-high-school education was slightly higher than that reported by Aydın. On the other hand, the proportion of participants with a master's degree was notably low in both studies. In terms of marital status, Aydın's study reported that 83% were married, 13.5% single, and 3.5% divorced/widowed, while in the present study, 81.2% were married and 18.8% single. The proportion of married individuals was quite similar in both studies.

In the study by López-Bermudo et al[24]., firefighters consumed 433 more calories on duty days than on rest days, with 2.4% and 3.1% higher intakes of fat and monounsaturated fatty acids, respectively. This finding parallels the high scores observed in the poor nutrition subdimension in the present study. Increased fat intake generally indicates a decline in dietary quality, which aligns with higher poor nutrition scores. Studies on shift workers in the literature have shown that this work pattern negatively affects metabolic health. Karlsson et al.[25] and Axelsson et al.[26] found that shift work contributes to increased cardiovascular risk factors such as overweight and obesity (both general and abdominal), elevated triglyceride and total cholesterol levels, and reduced HDL cholesterol. This provides strong evidence that shift work increases the risk of heart disease. Moreover, the significantly higher "Information on Nutrition" scores among women ($p=0.026$) indicate that female participants were more knowledgeable about nutrition. The fact that women show an advantage in nutritional knowledge highlights the importance of designing educational programs that consider gender differences. It was observed that shift work conditions may increase metabolic risk factors in male firefighters and that nutritional knowledge levels are associated with gender. This underscores the necessity of considering both work schedules and gender factors when

designing health interventions for occupational groups. In this study, the total score of the ASHN was determined as 75.84, and the highest subscale score was found in “Malnutrition” with 19.10. This indicates that firefighters’ overall eating habits are particularly unfavorable and that there are significant problems regarding dietary quality.

In the study by Baltacı and İşeri[27], 16.5% of firefighters were diagnosed with PTSD. In the present study, only post-traumatic stress symptoms were measured, not PTSD prevalence. Harvey et al.[28] reported a 13% prevalence of PTSD among Australian firefighters, while Wagner et al.[29] found an 18% rate among German firefighters. Despite cultural and operational differences, these rates collectively indicate that firefighters are generally at risk for traumatic stress. These studies also demonstrated a high level of stress burden among participants. In contrast, Del Ben et al.[30] reported a lower PTSD prevalence of 5%; in the present study, only post-traumatic stress symptoms were evaluated. From a broader perspective, Salleh et al.[8] stated in their systematic review that PTSD prevalence among professional firefighters ranges between 6% and 57%. This wide range reveals the influence of measurement methods, sample characteristics, and cultural factors on the results. The total PSS score obtained in the present study appears to be close to the mid-range of these reported values. Bastug et al. [31] reported a high PTSD prevalence among firefighters in Ankara; in our study, we measured only post-traumatic stress symptoms, not PTSD prevalence. This finding suggests that urban factors, incident frequency, and the types of interventions may play a significant role. The studies by Akcanbaş & Zor[6] and Sofuoğlu & Cankardaş[7] examined post-traumatic stress in terms of occupational health and psychological determinants. In this context, the present study contributes to the literature by similarly revealing that individual factors (such as self-efficacy and helplessness) may be associated with post-traumatic stress symptoms. In this study, post-traumatic stress symptom levels among firefighters were evaluated using the PSS, with mean scores of 5.17 for PSS-Self-Efficacy, 6.33 for PSS-Helplessness, and a total score of 11.50. These scores indicate that the participants experienced both a decrease in perceived self-efficacy and an increase in feelings of helplessness in response to traumatic events.

The correlations found between nutritional attitudes, sleep quality, and psychological variables in this study are consistent with similar findings in the literature. Our findings particularly highlight a significant relationship between higher “Malnutrition” subscale scores and sleep problems, supporting this interaction. Similarly, studies conducted on firefighters

working under shift conditions also confirm this relationship. For instance, a study conducted in Spain reported that firefighters consumed approximately 433 kcal more energy on shift days than on rest days, with increased fat and monounsaturated fat intake and an average of 2 hours and 18 minutes less sleep[24]. This finding suggests that working conditions may simultaneously affect both dietary and sleep quality. Similarly, a study conducted in the United States found that firefighters with lower sleep quality and duration had higher body weight, waist circumference, and body fat percentage[32]. This result is in line with the correlations observed in the present study between sleep problems and psychological determinants.

Furthermore, a study conducted in Northern California reported that firefighters experiencing high occupational stress had approximately 3.5 times higher odds of sleep disturbances[33]. This finding supports the current study's observed relationship between sleep problems, helplessness, and low self-efficacy. Another study conducted in Switzerland reported that firefighters had inadequate fiber and micronutrient intake and generally low dietary quality[34]. This result is consistent with the low dietary quality observed among participants in our study. In addition, a randomized controlled protocol investigating the effects of 10-hour time-restricted eating among firefighters working 24-hour shifts emphasized that meal timing may also influence dietary quality and metabolic health[35]. Taken together, these findings suggest that shift work conditions create mutual interactions among nutrition, sleep, and psychological well-being, and thus these factors should be addressed holistically.

This study has several limitations. First, its cross-sectional design prevents any causal inferences between nutritional attitudes, sleep quality, and stress levels. All data were obtained through self-reported questionnaires, which may be subject to recall and social desirability biases. The sample was drawn from a single fire department, limiting the generalizability of the findings to other regions or firefighter populations.

CONCLUSIONS

This study examined the stress levels, sleep quality, and attitudes toward healthy nutrition of the personnel working in the Istanbul Kadıköy 1st District Fire Department and revealed the relationships among these variables. The findings indicate that the shift-based and stressful nature of the firefighting profession negatively affects both sleep quality and stress levels. Although participants generally demonstrated positive levels of nutritional knowledge and

attitudes, it was found that unhealthy eating behaviors persisted to some extent. The presence of a positive relationship between sleep quality and stress level, and weak but significant negative relationships between nutritional attitudes, sleep, and stress, suggests that healthy eating behaviors may have a protective effect on stress management and sleep quality. These results emphasize the importance of developing holistic approaches to improve dietary habits, strengthen stress-coping skills, and enhance sleep hygiene among firefighters working in shift systems. Therefore, implementing regular nutrition education, stress management programs, and supportive interventions for sleep regulation at the institutional level may be effective in improving employees' overall health status and job performance.

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Table 1. Sociodemographic Characteristics of the Participants

General İnformation		N	%
Gender	Famale	4	1,4
	Male	283	98,6
Education Level	High school or below	77	26,8
	Associate degree	103	35,9
	Bachelor's degree	98	34,1
	Master's degree or higher	9	3,1
Marital Status	Married	233	81,2
	Single	54	18,8
Do you have sleep problems?	Yes	140	48,8
	No	147	51,2
Age Category	Under 35	69	24,0
	35-45 years	133	46,3
	Over 45	85	29,6
Total		287	100,0
	Mean±sd	**Min**	**Max**
Age	40,55±7,92	24	60,0

Table 2. The Mean Scores of the Participants on the ASHN

ASHN SCORE	N	Minimum	Maximum	Mean	Sd
ASHN - Information on Nutrition	287	5,00	25,00	19,82	3,88
ASHN - Emotion for Nutrition	287	6,00	30,00	19,37	4,47
ASHN - Positive Nutrition	287	8,00	25,00	17,55	3,54
ASHN - Malnutrition	287	5,00	25,00	19,10	3,86
ASHN –Total Score	287	49,00	105,00	75,84	10,03

Table 3. The Mean Scores of the Participants on the Bergen Shift Work Sleep Questionnaire

BERGEN SCORE	N	Minimum	Maximum	Mean	Ss
BERGEN – Difficulty Falling Asleep After Lights Are Turned Off	287	0,00	20,00	11,47	4,72
BERGEN – Inability to Initiate Main Sleep	287	0,00	20,00	10,26	4,22
BERGEN – Difficulty Returning to Sleep	287	0,00	25,00	12,58	4,89
BERGEN- Feeling Unrested After Sleep	287	0,00	20,00	11,39	4,34
BERGEN -Feeling Tired/Sleepy at Work	287	0,00	15,00	8,83	3,41
BERGEN – Feeling Tired/Sleepy During Leisure Time	287	0,00	15,00	8,40	3,27
BERGEN – Total Score	287	0,00	115,00	62,94	19,15

Table 4. The mean scores of participants on the Perceived Stress Scale

PSS SCORE	N	Minimum	Maximum	Mean	Sd
PSS- Self-Efficacy	287	2,00	10,00	5,17	1,72
PSS- Helplessness	287	2,00	10,00	6,33	1,67
PSS-Total Score	287	4,00	18,00	11,50	2,61

Table 5. Correlation of the ASHN, BERGEN, and PSS Scales

		[a]ASHN-Information on Nutrition	[a]ASHN-Emotion for Nutrition	ASHN - Positive Nutrition	ASHN - Malnutrition	ASHN - Total Score	BERGEN I	BERGEN II	BERGEN III	BERGEN IV	BERGEN V	BERGEN VI	BERGEN-Total Score	PSS-Self-Efficacy	PSS-Helplessness	PSS-Total Score
[a] ASHN-Information on Nutrition	R	1	,011	,272**	,185**	,559**	-,087	-,067	-,103	-,069	-,151*	-,113	-,124*	-,214**	,024	-,125*
	p		,847	,000	,002	,000	,143	,261	,082	,242	,010	,057	,036	,000	,684	,034
ASHN - Emotion for Nutrition	R	,011	1	,069	,539**	,683**	-,121*	-,051	-,080	-,065	-,055	-,098	-,103	-,046	-,030	-,049
	p	,847		,244	,000	,000	,040	,393	,179	,276	,354	,097	,083	,438	,618	,406
ASHN - Positive Nutrition	R	,272**	,069	1	,141*	,543**	-,032	-,015	-,022	-,081	-,037	-,018	-,045	-,256**	-,116*	-,243**
	p	,000	,244		,017	,000	,584	,801	,712	,169	,536	,763	,448	,000	,049	,000
ASHN - Malnutrition	R	,185**	,539**	,141*	1	,747**	-,055	-,060	-,157**	-,035	-,075	-,124*	-,109	-,135*	-,038	-,113
	p	,002	,000	,017		,000	,351	,312	,008	,558	,204	,036	,064	,022	,521	,056
ASHN - Total Score	R	,559**	,683**	,543**	,747**	1	-,120*	-,077	-,143*	-,098	-,125*	-,141*	-,152*	-,245**	-,060	-,200**
	p	,000	,000	,000	,000		,041	,195	,015	,099	,034	,016	,010	,000	,314	,001
BERGEN I	R	-,087	-,121*	-,032	-,055	-,120*	1	,573**	,484**	,485**	,512**	,389**	,764**	,157**	,233**	,252**
	p	,143	,040	,584	,351	,041		,000	,000	,000	,000	,000	,000	,008	,000	,000
BERGEN II	R	-,067	-,051	-,015	-,060	-,077	,573**	1	,622**	,422**	,563**	,494**	,800**	,117*	,223**	,219**
	p	,261	,393	,801	,312	,195	,000		,000	,000	,000	,000	,000	,048	,000	,000

BERGEN III	R	-,103	-,080	-,022	-,157**	-,143*	,484**	,622**	1	,486**	,470**	,453**	,783**	,155**	,203**	,232**
	p	,082	,179	,712	,008	,015	,000	,000		,000	,000	,000	,000	,008	,001	,000
BERGEN IV	R	-,069	-,065	-,081	-,035	-,098	,485**	,422**	,486**	1	,572**	,479**	,747**	,162**	,248**	,265**
	p	,242	,276	,169	,558	,099	,000	,000	,000		,000	,000	,000	,006	,000	,000
BERGEN V	R	-,151*	-,055	-,037	-,075	-,125*	,512**	,563**	,470**	,572**	1	,707**	,799**	,172**	,318**	,316**
	p	,010	,354	,536	,204	,034	,000	,000	,000	,000		,000	,000	,004	,000	,000
BERGEN VI	R	-,113	-,098	-,018	-,124*	-,141*	,389**	,494**	,453**	,479**	,707**	1	,726**	,161**	,307**	,302**
	p	,057	,097	,763	,036	,016	,000	,000	,000	,000	,000		,000	,006	,000	,000
BERGEN-Total Score	R	-,124*	-,103	-,045	-,109	-,152*	,764**	,800**	,783**	,747**	,799**	,726**	1	,199**	,324**	,338**
	p	,036	,083	,448	,064	,010	,000	,000	,000	,000	,000	,000		,001	,000	,000
PSS-Self-Efficacy	R	-,214**	-,046	-,256**	-,135*	-,245**	,157**	,117*	,155**	,162**	,172**	,161**	,199**	1	,188**	,779**
	p	,000	,438	,000	,022	,000	,008	,048	,008	,006	,004	,006	,001		,001	,000
PSS-Helplessness	R	,024	-,030	-,116*	-,038	-,060	,233**	,223**	,203**	,248**	,318**	,307**	,324**	,188**	1	,762**
	p	,684	,618	,049	,521	,314	,000	,000	,001	,000	,000	,000	,000	,001		,000
PSS-Total Score	R	-,125*	-,049	-,243**	-,113	-,200**	,252**	,219**	,232**	,265**	,316**	,302**	,338**	,779**	,762**	1
	p	,034	,406	,000	,056	,001	,000	,000	,000	,000	,000	,000	,000	,000	,000	

Table 5. Correlation of the ASHN, BERGEN, and PSS Scales (continued)

*p<0,05

The data were analyzed using the Pearson Correlation test.

[a]The data were analyzed using the Spearman Correlation test.

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	X(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		X(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	X Explain the scientific background and rationale for the investigation being reported
Objectives	3	X State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	X Present key elements of study design early in the paper
Setting	5	X Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	X (*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7	X Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	X For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	X Describe any efforts to address potential sources of bias
Study size	10	X Explain how the study size was arrived at
Quantitative variables	11	X Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	X (*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	X (a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14* X	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		X (b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	X Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a

		meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18	X Summarise key results with reference to study objectives
Limitations	19	X Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	X Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	X Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	X Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.