



Evaluation of the relationship between gastrointestinal symptoms, ultra-processed food consumption, acute stress, and reward-related eating behavior among shift-working healthcare professionals

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ABSTRACT

Aims: Shift-working healthcare professionals (SWHPs) are prone to gastrointestinal symptoms (GSs) due to irregular work schedules, unhealthy eating behavior, and psychological stress. This study examined the interrelationships among GSs, ultra-processed food (UPF) consumption, acute stress, and reward-related eating (RRE) in SWHPs.

Methods: This cross-sectional study included SWHPs. Sociodemographic data, body mass index (BMI), and eating habits were recorded. The GS rating scale (GSRS), the screening questionnaire of highly processed food consumption (sQ-HPF), the self-applied acute stress (EASE) Scale for healthcare providers, and the RRE scale were used to assess relationships between variables.

Results: A total of 301 participants (mean age=32.9±8.1 years; 51.9% female) were included in the study. The mean BMI was 24.1±3.3 kg/m². GSRS total scores correlated positively with sQ-HPF ($p=0.208$, $p<0.001$), EASE ($p=0.353$, $p<0.001$), and RRE ($p=0.313$, $p<0.001$). The EASE score was also positively correlated with all GSRS subdimensions ($p=0.202$ - 0.370 , all $p<0.001$). In multivariable regression analyses, sQ-HPF scores were predicted by age ($\beta=-0.145$, $p=0.011$) and by EASE ($\beta=0.136$, $p=0.017$) ($R^2=0.202$). RRE scores were predicted by EASE ($\beta=0.340$, $p<0.001$) and BMI ($\beta=0.227$, $p<0.001$) ($R^2=0.408$). GSRS total scores were predicted by gender ($\beta=-0.210$, $p<0.001$), sQ-HPF ($\beta=0.137$, $p=0.008$), RRE ($\beta=0.233$, $p<0.001$), and EASE ($\beta=0.201$, $p<0.001$) ($R^2=0.485$).

Conclusions: The findings indicate that GSs are significantly associated with UPF consumption, acute stress, and RRE among SWHPs. These results emphasize the importance of managing acute stress to reduce unhealthy eating behaviors and related GSs in this population.

Introduction

Shift or on-call systems are implemented in healthcare units to ensure the smooth flow of services (1). Working under shift or on-call systems can cause physical or psychological health problems because it disrupts the individual's normal biological rhythms. This is because the human organism is designed to be awake during the day and asleep at night (2). A study conducted on shift and on-call workers demonstrated that shift work negatively affects individuals' physiological and psychological health, as well as their social lives (1). In shift work systems, changes in circadian rhythms can lead to eating disorders, reduced sleep duration and quality, and low physical activity (3). In shift workers, sleep irregularities can lead to changes in energy intake and dietary patterns, which in turn can increase the risk of various chronic diseases, primarily obesity (2). The shift work system causes both stress and a decrease in stress coping skills among workers (4). A study found that, as stress levels increase, individuals tend to consume foods that cause blood glucose to rise more rapidly, particularly ultra-processed foods (UPFs) high in saturated fats, salt, and sugar, including high-calorie snacks consumed instead of main meals. This leads to the development of unhealthy eating habits (5). Another study conducted among shift workers revealed that a significant proportion of individuals experienced unbalanced dietary habits, physical and mental fatigue, and sleep disturbances. Furthermore, most participants reported that their working hours had a negative impact on their physical health (6). It has been suggested that changes in eating habits associated with shift work may be linked to gastrointestinal symptoms (GSs). It has been found that the amount of food consumed during night shifts is lower than that consumed during other meals, and this reduced intake can lead to various stomach disorders (7). Additionally, it has been noted that the number of snacks consumed during night shifts is higher than that of main meals, leading to an increased preference for foods high in carbohydrates, sugar, and fat (8). Shift workers who feel the need for quick consumption and rapid energy intake tend to consume foods low in protein and high in refined sugars and processed carbohydrates. In this context, a relationship between unhealthy nutrition and obesity has been demonstrated among shift workers. It has been stated that foods high in carbohydrates, sugar, and fat should be limited and that individuals should be encouraged to consume foods high in protein (9). Protein-rich foods increase alertness, while fatty foods decrease alertness (8). UPFs are low in micronutrients and fiber, while being high in fat and sodium. The consumption of UPFs, along with increased intake of simple sugars and fats, and decreased fiber intake, can increase intestinal permeability, leading to systemic inflammation. As a result, negative changes in the composition and function of the gut microbiota may occur (10). Recently, eating behavior has been viewed as a way of coping with or rewarding negative situations or emotions. Of

these emotions, emotional states such as positive emotions (happiness, joy, celebration) or negative emotions (stress, anxiety) can trigger reward-related food cravings (11). In the case of hedonic hunger, defined as the desire to consume food for pleasure without physiological hunger, individuals often prefer UPFs that contain high amounts of fat, sugar, and/or salt (12). These foods are often low in nutritional value due to their inadequate nutrient profiles (high salt, added sugars, and saturated fatty acids, and low dietary fiber) and processing that alters their physical and textural properties, removes water, and incorporates flavor enhancers, colorings, and other additives. Furthermore, the additives in these foods can be potentially addictive for individuals (13).

As no studies to date have examined the relationships between UPF consumption, GSs, acute stress, and reward-related eating (RRE) among shift-working healthcare professionals (SWHPs) in Türkiye, this study aims to investigate these relationships.

Methods

Study design and participants

This cross-sectional study was conducted face-to-face among volunteer SWHPs residing in Ankara between December 2024 and May 2025. Inclusion criteria: Adults aged 18-65 years who signed the informed consent section at the beginning of the questionnaire, completed the survey in full, and were SWHPs. Exclusion criteria: Individuals who did not agree to participate, had incomplete questionnaire data, were younger than 18 or older than 65 years, or were not SWHPs. The study was approved by the University of Health Sciences Türkiye, Gülhane Scientific Research Ethics Committee (approval number: 2024-531, date: 05.11.2024). Was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki. Informed consent was obtained from all participants before data collection.

Data collection

The general characteristics of the individuals (gender, age, education level, marital status, and income level) and anthropometric measurements (body weight and height) were assessed using a questionnaire. SWHPs' consumption of UPFs was assessed via a dedicated questionnaire, GSs were evaluated using the GS rating scale (GSRS), acute stress was assessed using the EASE scale for healthcare professionals, and eating behaviors were evaluated using the RRE scale.

The high-processed food consumption short screening questionnaire (sQ-HPF)

The original development of this brief screening instrument was conducted by Martinez-Perez et al. (14) in 2024, and it was subsequently adapted into Turkish by Erdoğan Gövez et al. (15).

The instrument utilizes an 11-point scoring system to evaluate the frequency of highly UPF, with scores of ≥ 6 indicating high consumption levels.

The GSRS

The GSRS was developed by Revicki et al. (16) to evaluate the severity of GSs based on clinical insights and symptom patterns. Its Turkish adaptation was validated by Turan (17). The scale consists of 15 items scored on a 7-point Likert scale. The scale comprises five subdimensions: reflux, indigestion, diarrhea, constipation, and abdominal pain. Conversely, higher total scores are indicative of greater symptom severity.

The EASE

The EASE scale, developed by Mira et al. (18) in 2021, is a 10-item instrument designed to assess acute emotional stress in healthcare providers. These items are rated on a 4-point Likert scale, with higher scores indicating greater stress. The Turkish version was adapted by Şimşek and Mercan Baspınar (19). The total score ranges from 0 to 30, with cut-off values denoting varying levels of emotional burden: scores ranging from 0 to 9 indicate adequate regulation, while scores between 10 and 14 suggest distress, 15 to 24 indicate an excessive emotional load, and scores of 25 and above signify acute stress.

The RRE

The RRE scale, a 13-item instrument developed by Mason et al. (20), in 2017, utilizes a 5-point Likert scale to evaluate reward-driven eating behaviors. Saruhan and Konaşkan (21) conducted their Turkish adaptation. The scale is composed of three subscales: satiety impairment, food-related cognitive preoccupation, and loss of control over eating. Elevated scores indicate higher levels of craving, particularly for sweet or palatable foods.

Anthropometric measurements

Participants self-reported their body weight and height following standardized guidance. Anthropometric indices were calculated based on self-reported height and weight. Body mass index (BMI) was determined and categorized according to WHO criteria (22).

Statistical Analysis

An a priori power analysis for the screening questionnaire of highly processed food consumption (sQ-HPF) and GSRS was conducted using G*Power. Assuming a two-tailed $\alpha=0.05$ and an expected correlation of $r=0.25$, the required sample size for 95% power was calculated to be 210. All analyses were conducted using the Statistical package for the Social Sciences version 22.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including median, frequency, and percentage, were used to evaluate the data (Table 1). The distribution of the data was assessed using histograms, the coefficient of variation, Skewness and Kurtosis,

Table 1. Distribution according to general characteristics of individuals

Characteristics	Value
	n (%)
Gender	
Female	116 (51.9)
Male	135 (44.9)
Education level	
High school	17 (5.6)
University	236 (78.4)
Master's degree/doctorate	48 (15.9)
BMI classification	
Underweight (<18.50 kg/m ²)	5 (1.7)
Normal (18.50-24.99 kg/m ²)	196 (65.1)
Overweight (25.00-29.99 kg/m ²)	86 (28.6)
Obese (≥ 30.0 kg/m ²)	14 (4.7)
Marital status	
Married	141 (46.8)
Unmarried	160 (53.2)
Income status	
Income exceeds expenses	70 (23.3)
Income equals expenses	138 (45.8)
Income is less than expenses	93 (30.9)
Highly processed food consumption	
High consumption	205 (68.1)
Low consumption	96 (31.9)
Acute stress classification	
Good emotional adjustment	206 (68.4)
Emotional distress	75 (24.9)
Emotional overload	19 (6.3)
Extreme acute stress	1 (0.3)
Mean \pm SD	
Age (years)	32.9 \pm 8.1
BMI (kg/m²)	24.1 \pm 3.3
GSRS total score	33.8 \pm 15.0
GSRS score subdimensions	
Abdominal pain	7.0 \pm 3.7
Reflux	4.6 \pm 3.0
Diarrhea	5.1 \pm 3.0
Indigestion	10.8 \pm 5.6
Constipation	6.2 \pm 3.7
sQ-HPF score	6.7 \pm 2.5
EASE scale score	7.4 \pm 4.5
RRE scale total score	31.8 \pm 10.6
RRE scale score subdimensions	
Loss of control over eating	17.0 \pm 5.5
Lack of satiety	7.9 \pm 3.9
Preoccupation with food	6.8 \pm 2.8
BMI: Body mass index, SD: standard deviation, GSRS: Gastrointestinal symptom rating scale, sQ-HPF: Screening questionnaire of highly processed food consumption, EASE: Self-applied acute stress, RRE: Reward-related eating	

and Kolmogorov-Smirnov tests. Spearman's correlation analysis was used to assess associations among GSRs, sQ-HPF, EASE, and RRE variables (Table 2). Multiple linear regression analyses were performed to identify predictors of sQ-HPF, RRE, and GSRs scores. For the multiple regression analyses, we employed a backward elimination method. All potential predictor variables were initially included in the model, and non-significant variables were sequentially removed based on their p-values. The final models presented in Tables 3 and 4 include only the statistically significant predictors. Statistical significance was set at $p < 0.05$, and results were interpreted within a 95% confidence interval.

Results

Descriptive characteristics of the participants

A total of 301 participants (mean age 32.9 ± 8.1 years; 55.9% female) were included. The mean BMI was 24.1 ± 3.3 kg/m². Most participants (78.4%) held a university degree; 15.9% had a master's or doctoral degree; and 5.6% had completed high school. By BMI category, 1.7% were underweight, 65.1% were normal weight, 28.6% were overweight, and 4.7% were obese. Regarding income, 23.3% reported income above expenses, 45.8% reported income equal to expenses, and 30.9% reported income below expenses. High UPF consumption was observed in 68.1% of participants, compared with low consumption in 31.9%. Acute stress classification showed that 68.4% had good emotional adjustment, 24.9% had emotional distress, 6.3% had emotional overload, and 0.3% had extreme acute stress (Table 1).

Correlations among GSRs, sQ-HPF, EASE, and RRE scores

A significant positive correlation was observed between GSRs total score and sQ-HPF ($p = 0.208$, $p < 0.001$), EASE ($p = 0.353$, $p < 0.001$), and RRE ($p = 0.313$, $p < 0.001$) (Table 2). The EASE scale correlated positively with all GSRs subdimensions ($p = 0.202$ - 0.370 , all $p < 0.001$).

Predictors of sQ-HPF and RRE scores

A multivariable linear regression model (Table 3) predicting sQ-HPF scores was statistically significant ($R^2 = 0.202$, $p < 0.001$); within this model, age emerged as a significant negative predictor ($\beta = -0.145$, $p = 0.011$), and the EASE score was a significant positive predictor ($\beta = 0.136$, $p = 0.017$). Likewise, the regression model for RRE total scores was significant ($R^2 = 0.408$, $p < 0.001$), with both EASE score ($\beta = 0.340$, $p < 0.001$) and BMI ($\beta = 0.227$, $p < 0.001$) being significant positive predictors.

Predictors of GSRs

The regression model predicting GSRs total score (Table 4) was statistically significant ($R^2 = 0.485$, $p < 0.001$), with gender emerging as a negative predictor ($\beta = -0.210$, $p < 0.001$), and sQ-

HPF ($\beta = 0.137$, $p = 0.008$), RRE ($\beta = 0.233$, $p < 0.001$), and EASE ($\beta = 0.201$, $p < 0.001$) emerging as positive predictors.

Discussion

This study investigated the associations between UPF consumption, GSs, acute stress, and eating behaviors among SWHPs. The findings revealed that participants exhibited a high level of UPF consumption. Moreover, greater UPF intake was associated with increased GSs, increased acute stress levels, and RRE. Shift work disrupts an individual's normal biological rhythm, leading to sleep disorders, stress, changes in eating habits, and physical or psychological disorders (23,24).

Studies examining the relationship between UPF consumption and gastrointestinal findings have noted that the types and amounts of food consumed, especially during night shifts, may cause stomach discomfort, and that increased consumption of simple sugars and fats and decreased fiber intake associated with UPF consumption may increase intestinal permeability. Consequently, increased inflammation affects the gut microbiota and leads to gastrointestinal disorders (GDs) (25). A study examining the relationship between UPF consumption and GDs found that high UPF consumption increases the risk of irritable bowel syndrome (IBS) and, consequently, dyspepsia (26).

In this study, similar to the findings reported by Haghghatdoost et al. (27), a positive correlation was found between UPF consumption and the total GSRs score. Furthermore, increased UPF consumption was associated with more GSs, such as indigestion, abdominal pain, constipation, diarrhea, and reflux. A substantial body of evidence has emerged, showing an association between diets rich in UPFs and the development of intestinal diseases such as inflammatory bowel disease (IBD), IBS, diarrhea, and constipation. A diet that is rich in saturated or trans fats, meat proteins, reduced sugars, and salt, and deficient in fiber, has been shown to trigger dysbiosis by altering the microbiota. Microbial dysbiosis is thought to play a role in the development and exacerbation of GDs.

Another study showed that UPF consumption was positively associated with higher total energy intake, and that inflammatory gastrointestinal diseases and low fruit and vegetable consumption were positively associated with specific fecal microbiota taxa (28). A study examining the relationship between UPF intake and IBD development found a positive correlation between higher UPF intake and IBD onset. The study's findings indicated that consumption of processed foods (carbonated beverages, refined sugar, and other sugary foods) is associated with an increased risk of adverse health outcomes. The study's findings showed a correlation between IBD and higher risk ratios for various UPF subtypes, including processed meat and poultry (29). In this study, a significant and positive correlation was found between the GSRs and sQ-HPF total

Table 2. Correlation coefficients between scale scores

	1	2	3	4	5	6	7	8	9	10	11	12
1. GSRS- total score	p	-										
	p											
2. Abdominal pain	p	0.846***	-									
	p	<0.001										
3. Reflux	p	0.739***	0.718***	-								
	p	<0.001	<0.001									
4. Diarrhea	p	0.542***	0.347***	0.297***	-							
	p	<0.001	<0.001	<0.001								
5. Indigestion	p	0.879***	0.723***	0.549***	0.327***	-						
	p	<0.001	<0.001	<0.001	<0.001							
6. Constipation	p	0.688***	0.390***	0.372***	0.539***	0.481***	-					
	p	<0.001	<0.001	<0.001	<0.001	<0.001						
7. sQ-HPF score	p	0.208***	0.244***	0.142*	0.072	0.202***	0.050	-				
	p	<0.001	<0.001	0.014	0.212	<0.001	0.391					
8. EASE scale score	p	0.353***	0.302***	0.202***	0.325***	0.231***	0.370***	0.140*	-			
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.015				
9. RRE scale total score	p	0.313***	0.265***	0.176***	0.156**	0.342***	0.233***	0.110	0.335**	-		
	p	<0.001	<0.001	0.004	0.007	<0.001	<0.001	0.056	<0.001			
10. Loss of control over	p	0.324***	0.283***	0.188***	0.077	0.374***	0.196***	0.196***	0.258***	0.881***	-	
	p	<0.001	<0.001	0.001	0.185	<0.001	0.001	0.001	<0.001	<0.001		
11. Lack of satiety eating	p	0.232***	0.170**	0.119*	0.237***	0.206***	0.254***	0.011	0.354***	0.799***	0.480***	-
	p	<0.001	0.003	0.039	<0.001	<0.001	<0.001	0.851	<0.001*	<0.001	<0.001	
12. Preoccupation with food	p	0.188*	0.177**	0.097	0.115*	0.208***	0.150**	0.009	0.251***	0.841***	0.592***	0.747***
	p	0.001	0.002	0.092	0.047	<0.001	0.009	0.882	<0.001	<0.001	<0.001	<0.001

*, p<0.05, **, p<0.01, ***, p<0.001, Spearman's correlation analysis was used to calculate the p-value. Gastrointestinal symptom rating scale sQ-HPF: Screening questionnaire of highly processed food consumption, EASE: Self-applied acute stress, RRE: Reward-related eating

Table 3. Linear regression model for screening questionnaire of highly processed food consumption and reward-related eating prediction

Screening questionnaire of highly processed food consumption score					
Model	Standardized beta	t	p-value	95% confidence interval	
				Lower	Upper
Age (years)	-0.145	-2.553	0.011	-0.081	-0.011
EASE scale score	0.136	2.402	0.017	0.014	0.140
$R^2=0.202$; $p<0.001^*$					
Reward-related eating scale total score					
Model	Standardized beta	t	p-value	Lower	Upper
EASE scale score	0.340	6.424	<0.001	0.550	1.036
BMI (kg/m ²)	0.227	4.284	<0.001	0.395	1.066
$R^2=0.408$; $p<0.001^*$					
*: Significant at p-value <0.05 EASE: Self-applied acute stress, BMI: Body mass index					

Table 4. Linear regression model for gastrointestinal symptoms prediction

Gastrointestinal symptom rating scale total score					
Model	Standardized beta	t	p-value	95% confidence interval	
				Lower	Upper
Gender	-0.210	-4.005	<0.001	-9.451	-3.223
sQ-HPF	0.137	2.654	0.008	0.206	1.388
RRE scale score	0.233	4.297	<0.001	0.178	0.480
EASE scale score	0.201	3.607	<0.001	0.302	1.026
$R^2=0.485$; $p<0.001^*$					
*: Significant at p-value <0.05, variables: gender (0: female, 1: male) sQ-HPF: Screening questionnaire of highly processed food consumption, RRE: Reward-related eating, EASE: Self-applied acute stress					

scores. The SQ-HPF score showed a significant correlation with abdominal pain, gastroesophageal reflux, and indigestion.

Examination of the relationship between UPF consumption and health problems reveals that obesity is also a significant issue. One study examined the relationship between UPF consumption and weight gain over nine years. As noted in the findings of this study, individuals with the highest level of UPF consumption were found to be 26% more likely to develop overweight or obesity compared to those in the lowest quartile of consumption (30). In another study, individuals in the top fifth of UPF consumption had a 32% higher likelihood of obesity compared to those in the bottom fifth. Furthermore, shift workers may be more prone to obesity due to imbalances in the secretion of hormones such as leptin and ghrelin, which are associated with sleep irregularities, dietary changes, and changes in meal times (31). Although previous studies have linked UPF consumption to weight gain and obesity, participants in this study had BMIs within the normal range. This likely reflects the relatively young and health-conscious profiles of healthcare workers rather than an absence of risks associated with UPF consumption.

Increased UPF consumption may cause functional abnormalities in the intestinal microbiota, which may affect

neurological development and lead to negative consequences on mental health, such as stress and depression (32). A meta-analysis has revealed a positive correlation between excessive UPF consumption and increased stress and anxiety symptoms. Furthermore, it has been proven that individuals working rotating shifts experience a decline in sleep quality and exhibit psychological distress symptoms, including stress and anxiety (33). In this study, consistent with the literature, participants experienced emotional distress, emotional overload, and excessive acute stress. Studies have shown that the main mechanisms linking UPF consumption to mental health are inflammation, oxidative stress, and microbiota. However, the prevalence of mental illness is associated with increased consumption of UPFs (34).

Stressed individuals may also turn to unhealthy eating as a coping mechanism. One study found that individuals with higher UPF intake were significantly more likely to report mentally unhealthy and anxious days. It has been suggested that UPFs may affect cognitive function and mental health by altering the gut-brain axis (35). In this study, the linear regression model predicting sQ-HPF scores was statistically significant, and the EASE score was a significant positive predictor.

RRE tendency is defined as an individual's desire to overconsume palatable foods and to derive intense pleasure from eating these foods. Positive emotions such as happiness and celebration (positive reinforcement) and negative emotions such as stress or anxiety (negative reinforcement) can trigger RRE, thereby enhancing or reducing emotional state (36). Furthermore, it has been suggested that the activation of the hypothalamic-pituitary-adrenal axis associated with chronic stress and the resulting excessive glucocorticoid exposure may play a role in the development of excessive food intake. It has been proposed that cortisol levels associated with stress and reward circuits may promote the intake of calorie-dense foods (37).

This study found that high scores on the RRE scale were associated with increased appetite and cravings for sweets. It was emphasized that consumption of UPFs, which are high in energy content and typically contain simple sugars, showed a positive correlation with RRE scale scores (20). Additionally, another study highlighted that stress-related RRE behavior increases the consumption of highly processed foods, and this situation increases susceptibility to infections by disrupting the gut microbiota (38). Furthermore, another study suggested that psychological stress and reward-seeking eating behavior affect gastrointestinal motility in acute or short-term stress responses by inhibiting gastric emptying and stimulating colonic transit (39). In this study, the linear regression model predicting total RRE scores was also statistically significant. In this model, the EASE Scale score and BMI were significantly positively associated with RRE.

Consequently, the changes mentioned above may be associated with an increased frequency of dyspepsia and other GSs in patients with stress-related functional GDs, potentially due to underlying pathophysiological processes (40). In this study, consistent with these findings, significant positive correlations were observed between GSs and the subdimensions of the RRE Scale. Additionally, the total RRE score was significantly associated with all gastrointestinal subdimensions, with the strongest correlations observed for indigestion, constipation, abdominal pain, reflux, and diarrhea. Furthermore, the EASE score showed positive correlations with all gastrointestinal subdimensions. The sQ-HPF, RRE, and EASE scores were identified as positive predictors of the GSRS.

Study Limitations

A number of limitations should be acknowledged in the context of this study. Moreover, the cross-sectional nature of this study limits the possibility of drawing definitive conclusions regarding causality. The study's findings reveal a homogeneous distribution, with a preponderance of individuals with a high level of education. This phenomenon has been linked to the adoption

of healthier eating habits, although the findings are not widely generalizable.

Additionally, the present study has several strengths. As far as we are aware, this is the first investigation to explore the association between UPF consumption and stress, RRE behavior, and GSs among healthcare workers. The data obtained from this study will underscore the significance of the repercussions of stress and eating habits on gastrointestinal well-being in SWHPs and their ramifications for the individual. The current findings are likely to guide further inquiry in this area.

In future research, the implementation of dietary guidelines that include food-processing procedures should be supported by long-term and clinical studies to facilitate the examination of causal relationships. Furthermore, analogous studies across diverse age groups can be conducted. In addition, structural equation modeling or path analysis could be employed to examine the potential mediating role of acute stress in the associations among UPF consumption, stress, and BMI outcomes.

In clinical nutrition practice, screening of healthcare professionals' eating behaviors could also include the evaluation of factors such as UPF consumption, acute stress, and RRE patterns.

Conclusion

This study found significant positive associations among UPF consumption, GSs, acute stress, and RRE in SWHPs. This study demonstrates that SWHPs can lead to physiological imbalance, hormonal changes, unhealthy eating behaviors, and stress. These changes can lead to increased consumption of UPFs and the development of RRE behaviors as a coping mechanism. Increased UPF consumption leads to higher intake of refined sugar, salt, and saturated fat, while reducing intake of protein, fiber, vitamins, and minerals. This can lead to various adverse health outcomes, particularly GDs.

In response to the growing food industry, countries need to develop national policies that promote healthy eating, facilitate access to unprocessed foods, and encourage balanced eating habits. Furthermore, screening for UPF consumption, acute stress, and GDs during clinical dietitian assessments of groups with high stress levels, such as healthcare workers, can contribute to early risk detection.

Developing effective intervention programs targeting UPF consumption, acute stress, and GSs can help improve both health outcomes and quality of life. Strategies developed for shift workers should include practices that both enhance work performance and support quality of life. Addressing issues such as UPF consumption, acute stress, GSs, and RRE behaviors is expected to enhance work performance, improve quality of life, and reduce chronic disease risks.

Ethics

Ethics Committee Approval: The study received approval from the Gülhane Scientific Research Ethics Committee of the University of Health Sciences Türkiye (approval number: 2024-531, dated: 05.11.2024). Was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki.

Informed Consent: Informed consent was obtained from all participants before data collection.

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Footnotes

Authorship Contributions

Concept: F.E.E., B.A.G., Ö.M.Ç., Design: F.E.E., B.A.G., Ö.M.Ç., Data Collection or Processing: F.E.E., Analysis or Interpretation: Ö.M.Ç., Literature Search: F.E.E., B.A.G., Writing: F.E.E., B.A.G., Ö.M.Ç.

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