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ORIGINAL ARTICLE

Nutrition habits and physical activity levels of search and rescue teams in natural disasters: A descriptive study from the Marmara Region (Türkiye)

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Abstract

This descriptive study aimed to evaluate the nutritional habits and physical activity levels of search and rescue teams operating in the Marmara Region. The convenience sampling method was employed in the absence of sample selection, with 116 volunteers participating in the study. Data were collected using a sociodemographic information form, a questionnaire designed to assess dietary habits and the frequency of food consumption, and the International Physical Activity Questionnaire (IPAQ - short form). A statistically significant correlation was identified between water consumption and employment institutions (p<0.05). Employees of the Disaster and Emergency Management Authority (AFAD) generally consume less water, whereas those of the fire brigade consume more water. The total physical activity score was determined to be 3348.31. A significant correlation was identified between sitting time and NGO employment, with higher levels of sedentary behavior observed among NGO employees. No significant differences were observed between the two groups with respect to walking or moderate physical activity. A total of 47.4% of the participants were classified as overweight according to the criteria of body mass index. The results clearly indicate the need for increased awareness of healthy nutrition and support for physical activity among search and rescue teams at the

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institutional level. The study results indicate that improving search and rescue personnel through improved nutrition and physical training is not only a health issue but an unavoidable man-power investment in disaster readiness and resistance.

Introduction

In emergency situations and operations requiring immediate intervention, such as disasters, search and rescue teams are exposed to excessive physical and mental stress. The nutritional intake of a team is not only a source of energy but also a critical factor in operational effectiveness. For instance, insufficient caloric intake results in rapid glycogen depletion, leading to a loss of strength and fatigue after prolonged rescue missions. Dehydration and hypoglycemia have been demonstrated to have a detrimental effect on cognitive abilities, including but not limited to decision-making processes and situational awareness. This can jeopardize the safety of both the rescue teams and the victims. To ensure optimal health and enhance quality of life, it is imperative to obtain the nutrients necessary for the body in sufficient quantities and at opportune times. Nutrition is not merely a physical process; rather, it is a conscious endeavor aimed at achieving optimal health and well-being. It is not a means of suppressing hunger or modifying moods; rather, it is a means of achieving balance. Inadequate nutrition has been demonstrated to exert a deleterious effect on growth and development, whereas excess nutrient intake has been shown to result in fat accumulation within the body, which can, in turn, give rise to health complications. Consequently, ensuring sufficient intake of these nutrients is imperative for optimal growth, development, and long-term productivity [1].

Physical activity is defined as any bodily activity that results in the expenditure of energy through the movement of muscles. The range of activities encompassed by this concept is extensive, extending from engagement in sporting activities to the undertaking of daily walks. The significance of this concept lies in its role in the preservation and enhancement of health. Nevertheless, the significance of physical activity for health is frequently disregarded. A paucity of physical activity has been demonstrated to be a contributing factor to the prevalence of chronic diseases, including obesity, cardiovascular disease, hypertension, diabetes, and osteoporosis. Regular physical activity confers numerous benefits, including the elimination of detrimental habits, reduced stress levels, increased work productivity, and decreased medical and healthcare expenditures. According to the World Health Organization [2], this intervention has been demonstrated to enhance quality of life, particularly regarding socialization and the mitigation of various chronic diseases, in addition to supporting treatment regimens. An imbalance in the intake of nutrients, whether insufficient or excessive, can result in disruptions to bodily functions. Insufficient physical activity has been demonstrated to double the risk of developing diseases such as cardiovascular disease, colon cancer, diabetes, osteoporosis, obesity, high blood pressure, depression, and anxiety [3]. This study considers the physical activity and nutritional status of search and rescue teams, who must be physically, socially, and mentally strong to take an active role in disasters. Relevant factors also include their number of daily meals, the types and amounts of food consumed in main and intermediate meals, as well as their food shopping, preparation, cooking, and serving practices. The necessity for search and rescue teams to function optimally in the aftermath of the earthquakes (Mw=7.8 and 7.6) that impacted 11 surrounding provinces in Türkiye, particularly Kahramanmaraş on February 6, 2023, underscores the importance of evaluating the nutritional and physical activity histories of these teams. This evaluation aims to ascertain their capacity for maximum productivity, duration of effort, and physical resilience. Consequently, the nutritional habits and physical activity levels of search and rescue teams that actively participate in disaster response, both during and after disasters and who operate under strenuous conditions, are important. This will create a direct and powerful bridge, justifying the

operation by explicitly outlining *why* nutrition is a mission-critical, rather than just a general health, issue for search and rescue teams.

Materials and Methods

Ethical considerations and consent

The informed voluntary consent form on the questionnaire form was presented to the participants, and after the necessary information was given, the questionnaire form was applied only to those who voluntarily wanted to participate in the study. To carry out this study, Çanakkale Onsekiz Mart University Graduate Education Institute Scientific Research and Publication Ethics Committee Approval (decision date of 05.10.2023 and number 2300249194-12/20) was obtained. In addition, written permission was obtained from Bursa (decision date of 19.01.2024 and numbered 826632), Tekirdağ (decision date of 10.05.2023 and numbered 566991), Edirne (file number 554235) and Kırklareli (file number 689515) Provincial Disaster and Emergency Directorates and Çanakkale Municipality Fire Department (decision date of 16.02.2024 and numbered 101025).

Nutrition can be defined as the process of acquiring the energy and nutrients essential for maintaining a healthy lifespan, facilitating optimal development and growth, and preserving the nutritional value of food while minimizing adverse health consequences. As demonstrated in the scientific literature, the absence or excess of these elements in the human body can impede development and growth, thereby compromising health [4]. The quantity of consumption and the energy provided by nutrition should be directly proportional to the needs of the individual. This involves tailoring nutrition to individual needs based on health, work, age, and gender, while also safeguarding nutritional values. A key part of this is implementing specialized diets for specific groups, including pregnant women, breastfeeding mothers, and individuals with particular health conditions [5].

Nutrition, health and physical activity

Adequate and balanced nutrition refers to the regular and economical provision of the necessary nutrients and energy in appropriate quantity, quality, and diversity according to age, sex, and physiological conditions for individuals to maintain their health and support their growth and development [6]. Inadequate and imbalanced nutrition is a condition in which the energy and nutrients needed by the body are not consumed in the required quantity, variety, or quality. Separately, physical activity is defined as any movement performed in daily life that involves the use of skeletal muscles and results in energy expenditure. A positive correlation has been demonstrated between physical activity and immune system strengthening, with the resulting effect of providing protection against infections [7]. As illustrated in Figure 1, 16.8 percent of individuals at risk of poverty or social exclusion are sedentary, whereas this rate is 31.3 percent for individuals not at risk. A study by TÜİK [8] revealed that 10.1% of individuals at risk of poverty or social exclusion engage in physically demanding work or activities for the majority of their working life.

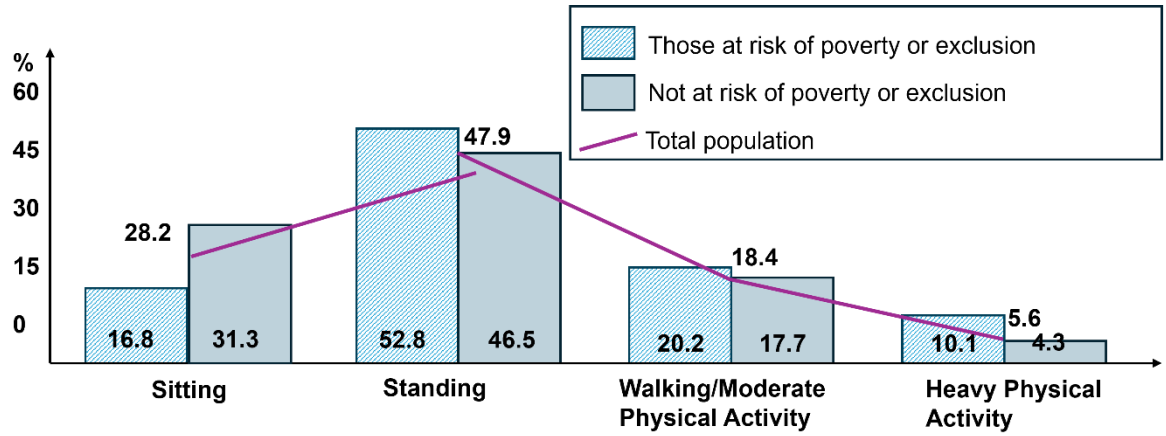

Figure 1. The intensity of physical activity that economically active individuals perform mostly while working [8].

Regular exercise has been demonstrated to reduce the risk of falls by enhancing balance and coordination [9]. A substantial body of research has demonstrated a correlation between insufficient physical activity and an unhealthy diet and the development of various health complications, including cardiovascular disease, hypertension, obesity, and diabetes [10,11]. The search and rescue personnel need to have completed all the necessary training before they can risk their own safety in rescuing unknown individuals. The rescue process can be challenging, and in some cases, the available equipment may be insufficient. In this case, personnel are expected to be more resilient and determined than others are. Each member of a search and rescue team should know various techniques and be able to use the necessary tools to realize the goal of "saving lives" [12,13].

This study focuses on designs and related inferences that aim to identify lifestyle factors affecting the operational readiness of disaster response teams. This study seeks to fill a gap in our understanding of these factors. The primary objective of the study was to systematically assess the dietary habits and physical activity levels of active search and rescue personnel serving in the Marmara Region. The current study was conducted with the following objectives in mind:

- Determine participants' demographic characteristics and Body Mass Index (BMI).
- Document dietary habits, including meal frequency, skipping meals, water consumption, and food choices.
- Measure physical activity and sedentary behavior levels using standard criteria.
- Conduct a comparative analysis of these factors among the three main employment institutions: AFAD, municipal fire departments, and non-governmental organizations (NGOs).

The survey questionnaires, which form the basis of this study, were administered to all adult male and female volunteers of search and rescue teams in Çanakkale, Tekirdağ, Edirne, Bursa and Kırklareli Provinces in the Marmara region. In addition to the AFAD search and rescue teams in Bursa, Edirne, Kırklareli and Tekirdağ provinces, the application was extended to fire brigades and nongovernmental organizations (NGOs), including the GEA (Search and Rescue, Ecology and Humanitarian Aid Group). These entities not only are engaged in firefighting operations but also play a pivotal role in disaster relief. The research population consists of AFAD search and rescue teams, Çanakkale fire brigade teams, and Çanakkale GEAs in certain provinces within the Marmara Region. The following regions have been allocated personnel for search and rescue operations: Tekirdağ (18 personnel), Edirne (7 personnel), Kırklareli (15 personnel), Çanakkale (15 personnel), and Bursa (104 personnel). The Çanakkale GEA team comprises 25 individuals. The fire brigade team in Çanakkale comprises 51

individuals. According to the data provided, the study sample comprised 235 individuals, of whom 116 participated. In this particular instance, approximately 49.3% of the study group was reached.

The data set used in the research was collected between January 1, 2022, and December 20, 2023. Some of the data were collected face-to-face, whereas others were collected via Google Forms. This approach was necessitated by the unavailability of teams during specific hours due to their shift work schedules. Using a preliminary information form, the researcher obtained consent from participants about their willingness to join the study. Furthermore, care was taken to ensure that participation was voluntary. The questionnaire is composed of four primary sections: sociodemographic information, nutritional status, frequency of food consumption, and international physical activity. In the development of the Turkish version of the International Physical Activity Questionnaire (IPAQ) Short Form, research was carried out on the validity and reliability of the IPAQ Short Form in Türkiye [14].

According to previous studies, physical activities are categorized as low, moderate, or high, with this classification determined by metabolic equivalent task (MET) units, which are used to ascertain the weekly physical activity levels of individuals [14]:

- Individuals who engage in less than 600 minutes of physical activity per week are categorized as having low-level physical activity.
- The category of "moderate physical activity" encompasses individuals who engage in a weekly total of 600-3,000 metabolic equivalent task (MET) minutes of physical activity.
- According to the latest research, individuals who engage in more than 3,000 minutes of physical activity per week are engaged in high-level physical activity.

Data collection and analysis

To ensure the integrity of the data collected, both online and face-to-face printed surveys were conducted with the institutions in accordance with "Law No. 6698 on the Protection of Personal Data." This approach was adopted to prevent any disruption to the daily operations of the personnel within the scope of the permitted regulations. During the implementation of the surveys, intermittent interruptions occurred due to the demanding nature of the work conducted by search and rescue personnel and fire brigade personnel operating within public institutions (e.g., the February 6, 2023, Kahramanmaras earthquakes, the Çanakkale Fires, and search and rescue missions for missing persons). A total of 116 participants were reached, and the questionnaires were completed. The present study utilizes descriptive statistics, including the number, percentage, mean, standard deviation, median, minimum, and maximum values, to elucidate the phenomena. The assumption of normality was evaluated through the implementation of the Shapiro–Wilk test. The Kruskal–Wallis test was used to compare three or more independent groups that did not conform to a normal distribution. Post hoc adjusted Bonferroni correction was performed to determine the presence of different groups. The analysis of the relationships between categorical variables was performed with the Pearson chi-square test when the sample size assumption (expected value >5) was met and with Fisher's exact test when it was not met. The analysis of multiple-choice questions was conducted through the implementation of a multiple chi-square test. The analyses were executed via IBM SPSS 25 software.

Results

The study addressed several key subjects related to the participants. These included their demographic structure, eating habits, and food consumption frequency. It also analyzed how eating habits and international physical activity scores were distributed and compared across the different institutions where they work. As indicated by the data presented in Table 1, the distribution of the participants according to their demographic characteristics is as follows: with respect to sex, 91.3% of the

participants identified as male, whereas 8.7% identified as female. In terms of age distribution, 32.5% of the participants were within the 36-45 years age range, 28.9% were between 46-55 years old, 23.7% were between 26-35 years old, and 14.9% were between 18-25 years old. With respect to marital status, 67.8% of the participants were married, whereas 32.2% were single.

Table 1. Distribution of people according to demographic characteristics,

Variables	Status	n	%
Gender (n=115)	Female	10	8.7
	Male	105	91.3
Age (n=114)	18-25	17	14.9
	26-35	27	23.7
	36-45	37	32.5
	46-55	33	28.9
Marital status (n=115)	Married	78	67.8
	Single	37	32.2
Education status (n=115)	High school	22	19.1
	Associate degree	37	32.2
	Bachelor	45	39.1
	Graduate	11	9.6
Working Institution (n=115)	Non-Governmental Organization (NGO)	33	28.7
	AFAD	50	43.5
	Fire Department	32	27.8
Income status (n=112)	11501-23000	12	10.7
	23001-34500	24	21.4
	34501-46000	51	45.5
	46001 +	25	22.3
Body Mass Index BMI (n=116)	Underweight	11	0.9
	Normal	44	37.9
	Overweight	55	47.4
	Obese	16	13.8
	Min–Max	**Mean ± Standard Deviation (Median)**	
Height	150.0-191.0	176.09±7.37(177)	Height
Weight	50.0-115.0	81.87±12.22(80)	Weight
BMI	15.43-38.22	26.39±3.57(25.71)	BMI

With respect to educational attainment, 39.1% of the participants obtained a bachelor's degree, 32.2% had earned an associate degree, 19.1% had completed high school, and 9.6% had attained postgraduate levels of education. With respect to the institution of employment, 43.5% of the participants were employed by AFAD, 28.7% by NGO, and 27.8% by fire brigades. According to the height and weight indices, one person was underweighted, 44 people were normal weight, 55 people were overweight, and 16 people were obese.

Table 2. Distribution of people according to their dietary habits.

Question	Answer	n	%
What is the typical frequency of main meals (breakfast, lunch, and dinner) consumed daily?	1 meal	7	6.1
	2 meals	55	47.8
	3 meals	53	46.1
How many snacks do you usually consume per day?	1 meal	40	34.5
	2 meals	29	25
	3 meals	4	3.4
	More than 3 meals	1	0.9

Question	Answer	n	%
	No snack consumption between meals	41	35.3
Do you usually skip meals during the day?	Yes	66	56.9
	No	42	36.2
	Sometimes	8	6.9
If the answer to the previous question is “yes”, which meal do you skip the most?	Breakfast	33	44
	Lunch	38	50.7
	Dinner	4	5.3
	Not enough time	23	29.5
	No appetite.	11	14.1
Your reason(s) for skipping meals?	No habit	29	37.2
	I want to lose weight	8	10.3
	Economic problems	2	2.6
	Others…	5	6.4
How do you evaluate the speed at which you eat your food?	Slow (Min20 min)	9	7.8
	Normal (11-19 min)	61	52.6
	Fast (max 10 min)	46	39.7
	Less than 1 litter	12	10.3
	1-2 litter	57	49.1
What is your average daily water consumption?	2-3 litter	33	28.4
	3-4 litter	12	10.3
	More than 4 litters	2	1.7
Do you add extra salt to your food at the table?	Yes	32	27.6
	No	52	44.8
	Sometimes	32	27.6
	8-10 hour	20	17.2
What is your average daily sleep duration?	6-8 hour	76	65.5
	4-6 hour	19	16.4
	Less than 4 hours	1	0.9
Do you eat late at night?	Yes	31	26.7
	No	39	33.6
	Sometimes	46	39.7
	Every day	18	15.5
	2-3 times per week	40	34.5
How often do you eat outside the home?	Once a month	15	12.9
	2-3 times a month	36	31
	Not consume food outside the home	7	6
	Eat in fast food places	26	22.6
When you eat out, where do you usually prefer to eat?	Eat at home-cooked food restaurants	31	27
	Barbecue grill places	39	33.9
	Bakeries	0	0

Question	Answer	n	%
What is the most important factor determining your food choice?	Others	19	16.5
	Healthy	52	46
	Tasty	77	68.1
	Calorie balance	9	8
	Price satisfies	47	41.6
	Hearty food	42	37.2
Which of the cooking methods do you prefer most often?	Boiling	17	15.2
	Baking	45	40.2
	Grilling	33	29.5
	Deep-frying Panfrying	13	11.6
	Pan roasting	16	14.3
	Heat treatment	14	12.4
Which storage method(s) do you mostly use for food?	Freezing	92	81.4
	Dried	14	12.4
	Fermented	9	8
	Others	7	6.2
Have you ever been on a diet before? If your answer is “yes”, for what purpose did you apply your diet?	To lose weight	40	36.4
	To get weight	3	2.7
	Due to illness and special conditions (cholesterol, blood pressure, diabetes, etc.)	5	4.5
	To feel more vigorous, stronger	13	11.8
	Never dieted before	49	44.5
Are there any obese members in your family?	Yes	11	9.6
	No	104	90.4

According to the findings presented in Table 2, the population can be categorized on the basis of their dietary habits as follows: Furthermore, the data indicates that 47.8% of the participants consumed two main meals, whereas 46.1% consumed three main meals per day. To elucidate the consumption patterns of snacks, the survey revealed that 35.3% of the participants did not consume snacks, whereas 34.5% consumed one snack. Moreover, the data indicates that 56.9% of the participants regularly skip meals during the day, with lunch being the most frequently skipped meal, accounting for 50.7% of all skipped meals. The predominant rationale for the practice of skipping meals was a lack of habitual adherence, accounting for 37.2% of the observed cases. With respect to the rate of consumption, 52.6% of the participants ingested food at a typical pace, spending between 11 and 19 minutes per meal. The daily average water consumption ranged from 1 to 2 liters, with 49.1% of the population falling within this range. With respect to the addition of salt to food items on the table, 44.8% of the participants did not increase their salt content. Regarding average daily sleep duration, 65.5% of the participants reported sleeping for 6–8 hours. Regarding the consumption of sustenance during nocturnal hours, 39.7% of the study participants acknowledged occasional nocturnal consumption of food. With respect to the frequency of eating out of home, 34.5% of the participants reported eating out of home 2-3 times a week. In the context of dining out, a significant proportion of the population exhibits a predilection for kebab shops, with 33.9% of individuals reporting a preference for this dining option. The most significant factor in food selection is taste, with 68.1% of respondents indicating this as their primary consideration. The most prevalent cooking method is oven cooking,

accounting for 40.2% of all cooking methods. The prevailing storage method for food is freezing, accounting for 81.4% of all storage practices. Among the participants who had previously engaged in dietary regimens, 36.4% had done so with the objective of weight reduction. A significant proportion of the participants, specifically 90.4%, reported the absence of obese members within their immediate families.

Table 3. Distribution of individuals according to the frequency of food consumption.

Food type	Every day		2-3 times a week		1 time in 15 days		1 time a month		Never	
	n	%	n	%	n	%	n	%	n	%
Eggs and egg products	35	30.2	64	55.2	13	11.2	1	0.9	3	2.6
Milk and dairy products (yoghurt, buttermilk, etc.)	45	38.8	60	51.7	7	6	2	1.7	2	1.7
Cheese varieties	62	53.4	47	40.5	3	2.6	2	1.7	2	1.7
Vegetable dishes	23	20	68	59.1	19	16.5	3	2.6	2	1.7
Dried legumes (dried beans, chickpeas, lentils, etc.)	5	4.3	72	62.1	31	26.7	7	6	1	0.9
Fish and seafood	1	0.9	24	20.7	57	49.1	29	25	5	4.3
Red meat	6	5.2	54	46.6	38	32.8	16	13.8	2	1.7
Chicken and other poultry	11	9.5	56	48.3	33	28.4	11	9.5	5	4.3
Offal (liver, kidney, etc.)	2	1.7	4	3.5	38	33	45	39.1	26	22.6
Processed meats (sausage, sausage, salami, etc.)	1	0.9	27	23.3	41	35.3	23	19.8	24	20.7
Fresh fruit	26	22.4	55	47.4	28	24.1	5	4.3	2	1.7
Dry fruit	8	6.9	30	25.9	30	25.9	30	25.9	18	15.5
Oily seeds (hazelnuts, walnuts, almonds, etc.)	14	12.2	59	51.3	30	26.1	12	10.4	0	0
White bread	54	46.6	35	30.2	9	7.8	4	3.4	14	12.1
Brown/whole grain bread	18	15.5	31	26.7	19	16.4	14	12.1	34	29.3
Cereal group foods (rice, bulgur, wheat, pasta, noodles, etc.)	25	21.6	72	62.1	16	13.8	3	2.6	0	0
Salty bakery products (bagels, pastries, etc.)	11	9.6	45	39.1	40	34.8	13	11.3	6	5.2
Fast food type products (hamburgers, pizzas, etc.)	5	4.3	21	18.3	33	28.7	32	27.8	24	20.9
Bakery products containing sugar (cakes, cookies, biscuits, etc.))	8	7.0	38	33	45	39.1	20	17.4	4	3.5
Junk food (chips, wafers, etc.)	9	7.8	28	24.3	32	27.8	27	23.5	19	16.5
Sugar, honey, jam, molasses	17	14.7	54	46.6	28	24.1	7	6	10	8.6
Milk desserts	2	1.7	27	23.3	52	44.8	24	20.7	11	9.5
Sherbet desserts	2	1.7	13	11.3	48	41.7	40	34.8	12	10.4
Carbonated and sugary drinks (cola, soda, fruit juice, etc.)	11	9.5	23	19.8	23	19.8	22	19	37	31.9
Instant fruit juices	6	5.2	12	10.3	21	18.1	30	25.9	47	40.5
Herbal teas (green tea, white tea, linden, etc.)	16	13.9	33	28.7	26	22.6	27	23.5	13	11.3
Coffee-tea	105	90.5	7	6	1	0.9	2	1.7	1	0.9

According to the data presented in Table 3, the distribution of participants according to the frequency of food consumption is as follows. Furthermore, the data specifies that 55.2% of the participants consumed eggs and egg products two to three times per week. The frequency of milk and dairy product consumption is estimated to be two to three times per week, with 51.7% of individuals reporting this frequency. The daily consumption of cheese varieties constituted 53.4% of the total cheese consumption. Vegetable dishes are consumed 2-3 times a week by 59.1% of the population. The consumption of dried legumes is reported to occur 2-3 times per week, with 62.1% of the population adhering to this dietary practice.

The consumption of fish and seafood occurs on a biweekly basis, with 49.1% of the population partaking in this dietary practice. The consumption of red meat is observed to occur at a frequency of two to three times per week, with a proportion of 46.6%. The data indicate that chickens and other poultry are consumed two to three times per week, with 48.3% of respondents reporting this frequency. The consumption of offal occurs monthly, with 39.1% of the population partaking in this practice. The frequency of consumption of processed meat is once every 15 days, with 35.3% of the population reporting this practice. Fresh fruit is consumed 2-3 times per week by 47.4% of the population. The consumption of dried fruits is estimated to occur two to three times per week, with a frequency of once every 15 days or once a month. This frequency is observed in 25.9% of the population. Oilseeds are consumed 2-3 times per week, with 51.3% of the population reporting this frequency.

The daily consumption of white bread is a prevalent dietary practice, with 46.6% of the population partaking in this consumption pattern. Brown/whole grain bread is not consumed by 29.3% of the population. The frequency of cereal consumption was found to be two to three times per week, with 62.1% of the population adhering to this dietary pattern. The frequency of consumption of salty bakery products is two to three times per week, with 39.1% of the population reporting this frequency. The frequency of fast-food consumption is once every 15 days, with 28.7% of the population reporting these actions. The frequency of consumption of bakery products containing sugar is once every 15 days, with 39.1% of the population reporting this practice. The consumption of junk food occurs once every 15 days, with 27.8% of the population reporting this comportment. Sugars, honey, jam, and molasses are consumed 2–3 times per week by 46.6% of the population. The frequency of milk desserts is once a fortnight, with 44.8% of individuals reporting this consumption pattern. The frequency of consumption of sherbet desserts is once every 15 days, with a percentage of 41.7%. The data indicate a complete absence of consumption of carbonated and sugary beverages among 31.9% of the population. The consumption of ready fruit juices is negligible, with a mere 40.5% of the population reporting its consumption. The consumption of herbal teas is reported to occur two to three times per week, with 28.7% of respondents reporting this frequency. The data indicate that coffee and tea are consumed daily by 90.5% of the population.

This study comparatively examined the dietary habits of AFAD, Fire Department, and NGO personnel working in the Marmara Region. The dietary habits of the subjects included the number of daily meals, water consumption, cooking preferences, and diet history, according to the institutions. The analysis revealed that most of the participants consumed two or three main meals per day and frequently skipped snacks. While oven and grill cooking were the predominant cooking methods, significant differences in water consumption levels were observed between institutions (p=0.017). The findings indicate the necessity for the formulation of strategies aimed at fostering healthy eating activities among teams engaged in disaster relief operations. Furthermore, the results underscore the potential impact of institutional structure on nutritional habits, suggesting that it may serve as a determining factor in the adoption of specific dietary practices.

The results of the present study demonstrated statistically significant relationships between average daily water consumption and cooking technique (p<0.05). The findings of this study indicated that individuals who consumed less than 1 liter of water predominantly engaged in work at AFAD, whereas those who consumed 3-4 liters of water primarily worked at the fire department. Furthermore, the results of the study indicated that individuals who preferred the grill method were predominantly employed by AFAD, whereas those who preferred the oven method were primarily engaged by NGOs. The research examined the relationships between a wide range of factors—including meal and snack patterns, eating behaviors, sleep, and family obesity—and the institutions of employment. However, none of these relationships were found to be statistically significant (p>0.05). On the other hand, the distributions and comparisons of the international physical activity scores of individuals according to the institutions where they work are given in Table 4.

Table 4. Distribution and comparison of international physical activity scores of individuals according to the institutions in which they worked (*p<0.05).

Activity type	Ins.	Min.-Max.	Mean ± standard deviation (Median	Test statistics	p
Sitting	NGO	180-5400	974.45±1154.66(585)	14.581	**0.001***
	AFAD	0-1440	428.94±253.21(405)		
	Fire department	7.2-4500	567.79±744.26(450)		
Walking	NGO	3.3-6930	1127.70±1450.55(693)	0.051	0.975
	AFAD	0-4158	1000.76±999.87(742.5)		
	Fire department	13.2-11088	1419.10±2325.78(594)		
Moderate physical activity	NGO	0-1440	303.76±420.7(120)	2.611	0.271
	AFAD	0-12960	623.84±2251.76(0)		
	Fire department	0-1920	345.63±497.18(10)		
Vigorous physical activity	NGO	0-6720	928.24±1810.72(40)	8.354	**0.015***
	AFAD	0-4800	742.40±1398.65(0)		
	Fire department	0-15360	1873.25±3056.57(888)		
Total	NGO	841.5-14955	3334.15±2990.31(1899)	3.800	0.150
	AFAD	0-13284	2795.94±2794.99(1651)		
	Fire department	389-22740	4205.77±4990.29(2731.5)		

As indicated in Table 4, the distribution of the International Physical Activity scores of the individuals according to the institutions where they were employed is presented. Furthermore, the Kruskal–Wallis test was employed to facilitate comparison. The findings of the present study indicate statistically significant differences between sitting and vigorous physical activity scores according to institution (p<0.05). According to the results of the Bonferroni correction for sitting scores, statistically significant differences were identified between NGOs, AFADs, and fire brigades (p=0.001 and p=0.018). The mean sitting scores of individuals employed by NGOs were higher than the mean sitting scores of individuals employed by AFAD and the fire brigade. According to the results of the Bonferroni correction for vigorous physical activity, a statistically significant difference was found

between the AFAD and fire brigades (p=0.012). The scores obtained by individuals employed in the fire department exceed those of individuals employed in AFAD.

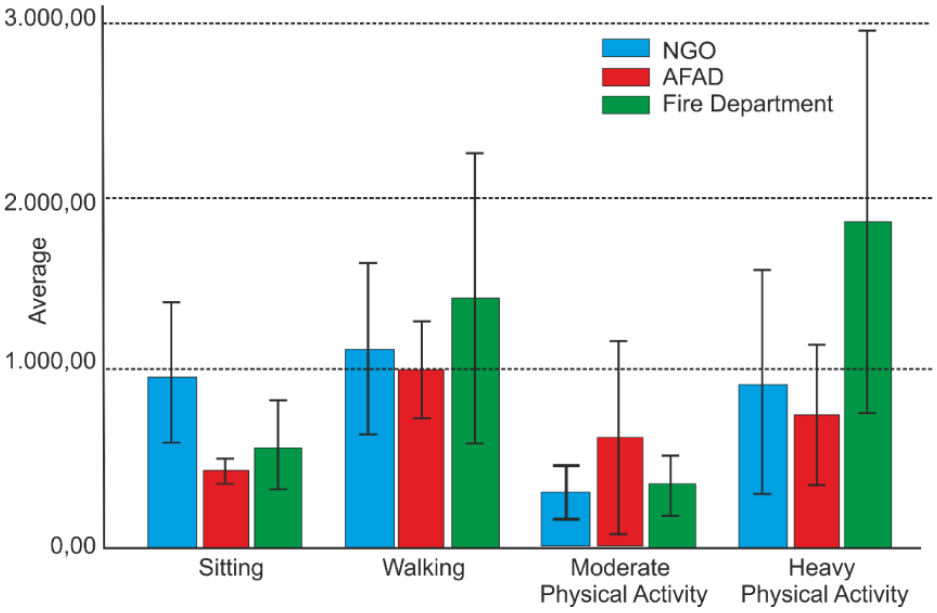

Figure 2. Histogram of the distribution of international physical activity scores of individuals according to the institutions where they work.

A comparative analysis of the severe physical activity scores of individuals employed by the fire brigade and those employed by the AFAD revealed that the former exhibited higher levels of physical activity (Figure 2). A statistically significant discrepancy was not observed between the Walking, Moderate Physical Activity, and Total scores according to the institutions of employment (p>0.05).

Discussion

Studies conducted in Türkiye indicate that many individuals have irregular eating habits. A large proportion of health professionals have been found to skip meals and exhibit unhealthy eating manners. Similarly, our study revealed that 56.9% of the participants skipped lunch. University staff also consumed irregular snacks and made unhealthy choices. National studies have shown irregularities in individuals' eating habits, especially high rates of skipping meals. Skipping meals is a common problem among university students and health professionals alike. This situation, combined with unhealthy choices such as the consumption of fast food and white bread, negatively affects individuals' health. In a study of adolescents, individuals with internet addiction skipped meals more frequently and consumed unhealthy snacks. These findings align with those of a study in Austria, which reported that unhealthy eating tendencies are prevalent among individuals with high digital media use [15].

Although the current study targets the Marmara region, it would be limited to suggesting a model for Türkiye with all regions. Nevertheless, studies and trends of similar reference have appeared in other countries across the globe under threat of disaster risks. For example, inadequate fluid intake during long-duration missions has also occurred in FEMA rescue workers in the United States, due to limited and often insufficient water sources and high-intensity work environments [16]. On the other hand, a Japanese survey of SAR personnel following the 2011 Tōhoku earthquake (Mw=9.1) showed that institutional protocols for regular fluid intake and electrolyte replenishment successfully reduced

fatigue and heat illness [17]. European NGOs such as the International Search and Rescue of Germany and the UK-based Rescue Global have used hydration monitoring systems to ensure at least 3-4 liters daily water intake during operations [18]. In comparison with the international data shown herein, the diminished water use observed within this research among AFAD staff further serves to highlight the importance of these findings in relation to providing evidence of the need for comparable structured regimes of hydration to be adopted in Türkiye.

Studies conducted in Türkiye have shown that physical activity levels differ significantly by occupational group. For example, firefighters were found to have high physical activity levels in this study. The intense physical demands of the firefighter profession may explain these high activity levels. Conversely, NGO workers were observed to have more sitting time. Like Türkiye, Japan is another country that manages various natural disasters. Japan, which is also frequently affected by catastrophes, is utilizing search and rescue teams with physical exercise programs designed for professional athletes for maintenance of VO_2 levels [19]. In most European countries, however, activity levels of programs utilized on NGO volunteers, especially different age groups [20], appear to be at par with those in this study. But if one compares the different institutional programs of countries, then one realizes these standards are in lower forms in European countries compared to the US and Japan. While this is concerning given the high levels of inactivity observed among NGO volunteers, it is acceptable in disaster management work where tasks with coordination and planning demands, such as in emergency call centers, must be static [21]. This was also found in disaster assessments following the 2011 Tōhoku earthquake (Mw=9.1) in Japan, which was more popularly known as the mega-earthquake.

Consequently, during or after a disaster, nutrition problems of wellness and physical activity adequacy or deficiency, especially among search and rescue personnel in the field, are an ongoing concern in all the disaster management systems worldwide, including Türkiye. Studies in Türkiye analyzing the physical activity levels of individuals in different occupational groups according to their workload and work environment conclude that occupational requirements directly affect physical activity. This can be explained by the high scores observed in occupations that require intensive physical activity, such as firefighters and AFAD workers, and the low scores observed in individuals with sedentary lifestyles, such as NGO workers. The results of this study revealed significant differences in the sociodemographic characteristics, eating habits, and physical activity levels of individuals. Most participants were male, and most were between 36 and 45 years old. Higher levels of education and income have the potential to positively affect eating habits. However, the high rate of skipped meals reveals the need for improved eating habits. Since lunch is the most skipped meal, appropriate arrangements should be made regarding working hours to improve diets.

Limitations

Despite the findings obtained from the survey results, this study may have some limitations that should be considered when interpreting the results. These limitations can be summarized as sample size and sampling method, data set based on individual reporting, cross-sectional design, lack of detailed nutritional assessment, and other confounding factors. Due to the study being limited to the Marmara Region, its generalizability is restricted in terms of establishing a framework for search and rescue teams in other regions of Türkiye. One limitation is the uncertainty regarding the possibility of errors arising from participants' responses being based on their immediate or temporary recollections of their dietary habits and physical activity levels. Feedback on physical activity obtained from the IPAQ may be overestimated. In institutions such as AFAD, city fire departments or some civil organizations, search and rescue personnel work, although the correlation between dietary habits, physical activity and health outcomes may be identifiable, it may not be possible to establish a definite link between these factors. The most notable finding among the study results is that a detailed dietary analysis, for

example, an assessment based on a 24-hour basis, cannot be presented in any way as a model that could reflect food intake and total energy consumption. On the other hand, the shift-based work schedule of search and rescue teams, pre- and post-disaster institutional food provision and quality, alongside psychosocial stress factors, may also be sub-studies that positively influence the detailed results of similar future studies.

Conclusion

This study revealed low awareness of healthy nutrition and the prevalence of poor eating habits. Notably, the high consumption of processed foods and fast food is an important obstacle to healthy nutrition. This situation prevents most participants from developing healthy eating habits, even though many of them have previously dieted to lose weight. The participants were found to have long sitting hours and low levels of vigorous physical activity. This analysis suggests that their sedentary lifestyle may be having a negative effect on health. Therefore, changes in people's lifestyles are highly important. Considering these findings, the following suggestions can be made:

- Nutrition training programs: Individuals working in institutions such as AFAD, NGOs and fire brigades should be continuously trained on balanced nutrition, the importance of water consumption, the dangers of skipping meals and healthy cooking methods.
- Increasing Water Consumption: Provide information and implement practices that encourage water consumption among AFAD employees, such as providing water bottles and filtering systems.
- Meal Arrangement: Considering the high rate of skipping meals among participants, providing lunch breaks in line with working hours will improve dietary patterns.
- The following snacks have been deemed conducive to maintaining good health: individuals who do not consume snacks are recommended to be provided with healthy snack options.
- The promotion of physical activity: Given the sedentary nature of work in CSOs, it is imperative to promote regular physical activity programs and designated exercise breaks for these individuals to mitigate the adverse health consequences associated with prolonged sitting.
- Weight management and diet counselling: These services should be designed to provide guidance and support to individuals as they move towards achieving and maintaining a healthy weight.
- Family Health Programs: Although there were no obese individuals in the families of the participants, family health programs should be organized against the risk of obesity, and awareness of healthy lifestyles should be increased.
- Healthy Cooking Methods: Training programs should be organized to encourage healthy cooking methods in institutions, and the health advantages of methods such as grilling and baking should be emphasized.
- Social Support Groups: Social support groups can be established to improve employees' eating habits and physical activity levels.
- Relationship between Nutrition and Physical Activity: Significant differences were observed between sitting and vigorous physical activity scores according to the institution of employment. Therefore, further research should be conducted to better understand the link between nutrition and physical activity, and policies should be developed on the basis of these results.

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Conflict of interest

The authors declare that there is no conflict of interest

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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