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Working environment-related leisure time satisfaction levels and health behaviors of university office workers and ergonomic solutions

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Abstract

The present study aims to investigate the health behaviors of university office workers related to the working environment, compare them with leisure time satisfaction, and suggest ergonomic solutions. Office workers at Bitlis Eren University and Munzur University, which are situated in the eastern part of Turkey, constituted the population of this study. The sample size was 196 based on the formula [n = (N*t2*p*q)/d2*(N-1)+t2*p*q)], which was applied when the number of people in the population was known. The required sample size was determined based on the estimation of a proportion of 0.5 in a finite population of 401, with a 95% confidence interval of ± 0.05 using simple random sampling. The data of Questionnaire and Leisure Satisfaction Scale (LSS) were collected from 178 participants by a face-to-face interview voluntarily. The findings obtained in this study showed that nearly half of the participants did not sufficiently support their wrists and backs and did not adjust their working posture or the screen inclination and brightness. The mean score of leisure time satisfaction was higher for those who worked in places with ideal physical conditions, including heat and sound insulation and in places with good psychological conditions without stress and work overload. The leisure time satisfaction score was significantly higher among those who engaged in leisure time activities, such as recreational activities reading books, and physical activity. It was observed that employees in offices with improved noise, heat, workload and stress had better satisfaction levels in leisure time. One cannot separate leisure activities from workplace activities and both should be conducted in harmony. As an ergonomic solution, the worktable and tools should be comfortable and designed in a way that does not require the back muscles to be strained.

Keywords: Office workers, leisure time satisfaction, ergonomic activities, health behaviors

Introduction

One of the negative features of modern working life is that jobs are becoming less and less active. As technology advances, people find themselves in occupational settings where sedentary work predominates [1].

Over the last two decades, the number of workers operating in the service sector and offices has been increasing. Utilizing computers and other equipment in these workplaces has become an indispensable part of almost all office settings [2]. Office workers sit in front of the computer for long hours while using these tools. Prolonged sedentary behavior is also increasingly accepted as a particular health risk and impacts health adversely [3]. If an ideal body posture cannot be ensured during the working period, discomfort and pain occur in the low back, extremities, and neck [4]. Musculoskeletal disorders are also a considerable health problem for office workers. Several office-related physical risk factors might be determinants in these disorders. The primary physical factors are strange or static body posture while using the computer and unsuitable equipment (monitors, keyboards, and input devices) [5]. The chair/seat has an important place in the healthy execution of work in the office environment. Office workers may not be competent in using equipment, such as chairs and seats [6]. Prolonged sedentary time is associated with musculoskeletal disorders and various illnesses, including diabetes and cardiovascular disease [7].

However, proper use of office equipment alone is not enough to manage work-related pain. Besides, other physical and psychological factors must evolve favorably [8]. Office workers

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must work in a setting that provides optimal lighting, heat, ventilation, sound insulation, and daylight conditions. Individuals working in settings with improved conditions can reduce the adverse health symptoms related to work and complete their tasks efficiently. To illustrate, adequate and regular ventilation can reduce acute and chronic health problems and enhance work performance. Individual control of ventilation and other parameters is considered a remarkable factor impacting satisfaction levels of staff owing to its physical and positive psychological effects [9].

Leisure time is a period that is necessary for the elimination of many negative problems, such as stress, physical fatigue, and psychological weariness in professional life. Leisure time satisfaction is important for the individual to be more productive in his/her working life and a very important factor for his/her social life. Physical and psychological exposure in leisure time is also associated with leisure time satisfaction [10].

Historically, the relationship between work and leisure has been complex and dynamic. [11]. Good time management is essential for an individual to be efficient and effective in leisure time. Directing employees to activities appropriate to their abilities according to their leisure time leads to positive results in business and social life. A person's ability to meet certain needs in different areas of life, quality of life, occupational and life satisfaction is ascertained by the relationship between work and leisure time [12].

This study was conducted to investigate the health behaviors of university office workers related to the working environment, suggest ergonomic solutions, and compare them with leisure time satisfaction.

Materials and Methods

Office working arrangement has changed during the COVID-19 pandemic. With flexible and remote working models, houses of most public employees have also become their offices. Thus, public employees had to perform some of their work at home and some in their offices during the epidemic period.

The scope of this cross-sectional research consisted of 401 active office employees working at Bitlis Eren University and Munzur University, located in the eastern region of Turkey. The sample size was 196 based on the formula [n = (N*t2*p*q) / (d2*(N- 1) + t2*p*q)], which was applied when the number of people in the population was known. The required sample size was determined based on the estimation of a proportion of 0.5 in a finite population of 401, with a 95% confidence interval of ± 0.05 using simple random sampling. A sample of 196 workers was required. Data were collected from the workers through face-to-face interviews between April 20, 2019, and June 30, 2019. Eighteen people whose data were incomplete and refused to participate in the present study were excluded from the assessment, and 178 people were analysed.

A questionnaire form with 37 questions, which the researchers prepared in accordance with the purpose of this study and the Leisure Satisfaction Scale (LSS), were used as data collection tools. The scale was developed by Beard JG, Ragheb MG. (1980) [13]. It was adapted to Turkish by Gokce and Orhan (2011) [14]. The scale consists of 24 items, and each item is scored between 1 and 5. As the LSS score increases, leisure satisfaction also increases. The scale has six sub-dimensions, namely “Psychological,” “Educational,” “Social,” “Physical,” “Relaxation” and “Aesthetics.” A brief description of the LSS sub-dimensions is given below.

Some descriptions, such as fun, feeling of freedom, participation and intellectual challenge, explain the psychological dimension. Individuals who are helping people and those around them to learn explain the educational dimension. The way people communicate with other people explains the social dimension. Getting rid of the tension and stress of daily life explains the relaxation dimension. Improving people's physical fitness and staying healthy explains the physical dimension. The interesting and beautiful design of the leisure time activity of individuals explains the aesthetic dimension.

Shapiro-Wilk test, Skewness, Kurtosis values and Histogram graph were used to analyze whether the data conformed to the normal distribution. Independent samples t-test was used for statistical comparison. The results were considered statistically significant at $p<0.05$.

Ethical approval of the present study was obtained with the decision of Bitlis Eren University Ethical Principles and Ethics Committee dated March 07th, 2019 and numbered 2019/03-XXI-XXII.

The findings obtained in this study can be generalized to two universities that have constituted the scope of this research.

Results

The socio-demographic characteristics of the study group are presented in Table 1. The findings showed that 401 people were actively working in the office in both universities. In the present study, 178 people who were included in the sample were analyzed.

Table 1 The majority of the participants were male, they were married, their income level was medium and they had a university education.

Table 1. Socio-demographic characteristics of the participants

Variables		n	%
Sex	Female	43	24.2
	Male	135	75.8
Age	18-34	89	50.0
	35-65	89	50.0
Marital status	Single/widow	46	25.8
	Married	132	74.2
Educational status	Primary/high school	15	8.4
	University	163	91.6
Position in the office	Officer	160	89.9
	Technical services	18	10.1
Level of income	≤ 2500 TL*	5	2.8
	Between 2500-5000 TL	135	75.8
	≥ 5000 TL	38	21.3

* TL: Turkish lira

Table 2 As shown in Table 2, the majority of employees maintained the distance between the monitor and the eye, adjusted the screen at

a readable level and eye level, adjusted the arm and wrist distance when using the keyboard, provided adequate space between the table and the foot, adjusted their chairs to fit their bodies, moved their necks from time to time, and stood up at least once an hour and adopted correct practices. However, it was observed that nearly half of the participants did not support their wrists and backs, worked in the same position for a long time, and used the screen at an inclined and high brightness.

Table 2. Employees' behaviours for using office tools

Positive behaviors of employees about the use of office	**n**	%
Texts on the Screen is readable	172	96.6
Standing up at least once an hour	158	88.8
Adjusting arm and wrist distance for keyboard use	153	86.0
Chair is adjustable	151	84.8
Tables have enough space for legs	146	82.0
Moving the neck occasionally while working	143	80.3
The placement of the keyboard is parallel to the arms	136	76.4
At least 65cm distance between the monitor and the eye	133	74.7
Using the screen at eye level	126	70.8
Back support	95	53.4
Supporting the wrist in front of the keyboard	81	45.5
Negative behaviors of employees about the use of office		
Sitting without supporting the feet	105	59.9
Sitting in the same position for a long time	104	58.4
Using the screen in a non-proportional way with body	102	57.3
Touching more than two keys per minute continuously over two hours	92	51.7
Using the screen at high brightness	73	41.0
Working in a tilted position for more than two hours	58	32.6
Working in a kneeling position for more than two hours	55	30.9
Data editing in the office for over four hours incessantly	51	28.7

Table 3 There was a significant difference between the office setting's temperature and sound insulation and the mean score of leisure time satisfaction ($p<0.05$). Those who worked in places with adequate office heat and sound insulation had higher leisure time satisfaction.

A significant difference was determined between thinking that the work environment was stressful and the mean score of leisure time satisfaction ($p<0.05$). Leisure time satisfaction level was higher in those who thought that the working environment was stress-free and those who did not have a high workload.

Table 4 As shown in Table 4, the overall mean scores of the participants' leisure satisfaction and the mean scores in each domain were at a medium-high level.

Table 5 Comparison of the work environment characteristics, the activities of the participants and leisure time satisfaction subcomponents are shown in Table 5.

A significant difference was found between all sub-components of physical activity and leisure time satisfaction. Psychological, physical, social, relaxation and aesthetic scores were higher in employees who did the physical activity. Relaxation and aesthetics were higher in those with good nutrition, and there was a significant difference. A significant difference was found between all sub-components of the leisure time satisfaction scale in those who engaged in hobbies. Those who had hobbies feel better in multiple ways.

A significant difference was determined between physical and aesthetics, which were subcomponents of the leisure satisfaction scale, scores of those who stated that they were working in a stressful environment. Physical relaxation and aesthetics scores were lower in those who worked in stressful environments. There was a significant difference between the high workload and physical, psychological, and aesthetic components. Physical, psychological, and aesthetic scores were lower in those with a high workload.

Table 3. The comparison of leisure time scale by office environments or working environments

For the office		**n**	**Mean**	**SD**	**p**
Temperature	Adequate	132	3.46	0.62	0.000*
	Inadequate	46	3.04	0.66	
Lightening	Adequate	156	3.35	0.65	0.868
	Inadequate	22	3.33	0.72	
Ventilation	Adequate	143	3.37	0.66	0.384
	Inadequate	35	3.26	0.65	
Sound insulation	Adequate	107	3.43	0.72	0.022*
	Inadequate	71	3.22	0.53	
Daylight	Adequate	141	3.37	0.65	0.358
	Inadequate	37	3.26	0.70	
Working environment	Stressful	87	3.22	0.68	0.012*
	Not stressful	91	3.47	0.61	
Trust-based communication	Yes	146	3.36	0.66	0.529
	No	32	3.28	0.63	
Mobbing from Superior	Yes	28	3.21	0.77	0.243
	No	150	3.37	0.63	
Workload	Overload	70	3.20	0.72	0.014*
	Normal	108	3.44	0.59	

*$p<0.05$

Table 4. Leisure Satisfaction Scale and mean score of its subcomponents

Variables	n	Mean	SD	Min	Max
Overall score	178	3.35	0.66	1.46	5.00
Psychological	178	3.26	0.83	1.00	5.00
Educational	178	3.44	0.86	1.00	5.00
Social	178	3.37	0.80	1.00	5.00
Physical	178	3.72	0.89	1.00	5.00
Relaxation	178	3.00	0.89	1.00	5.00
Aesthetic	178	3.29	0.87	1.00	5.00

SD: Standard deviation, min: minimum score, max: maximum score

Table 5. Comparison of the leisure time satisfaction domains according to characteristics of the work environment and activities of the participants

Working environment	Psychological	Educational	Social	Physical	Relaxation	Aesthetic
Temperature (Adequate-Inadequate)	t:2.169 p:0.031*	t:3.454 p:0.001*	t:4.037 p:0.000*	t:3.641 p:0.000*	t:1.748 p:0.820	t:2.501 p:0.013*
Lightening (Adequate-Inadequate)	t:-0.189 p:0.850	t:0.095 p0.924	t:-0.453 p:0.651	t:-0.310 p:0.757	t:0.517 p:0.606	t:1.041 p:0.299
Ventilation (Adequate-Inadequate)	t:-0.229 p:0.819	t:-0.265 p:0.791	t:0.525 p:0.600	t:0.768 p:0.444	t:1.013 p:0.312	t:2.143 p:0.033*
Sound insulation (Adequate-Inadequate)	t:0.876 p:0.382	t:1.520 p:0.130	t:0.877 p:0.382	t:1.770 p:0.079	t:3.509 p:0.001*	t:1.432 p:0.154
Daylight (Adequate-Inadequate)	t:1.288 p:0.200	t:0.302 p:0.763	t:-0.238 p:0.812	t:1.104 p:0.271	t:0.993 p:0.322	t:0.721 p:0.472
The work environment is stressful	t:-1.630 p:0.105	t:-1.798 p:0.074	t:-1.319 p:0.189	t:-2.785 p:0.006*	t:-1.324 p:0.187	t:-2.648 p:0.009*
Mobbing from superior (Yes-No)	t:-1.405 p:0.162	t:-1.012 p:0.313	t:-1.392 p:0.166	t:-0.485 p:0.629	t:-0.354 p:0.724	t:-0.827 p:0.410
Workload (Overload-Normal)	t:-2.146 p:0.033*	t:-1.445 p:0.150	t:-0.952 p:0.342	t:-2.136 p:0.034*	t:-1.833 p:0.068	t:-2.803 p:0.006*
Trust-based communication (Yes-No)	t:-0.599 p:0.550	t:0.221 p:0.825	t:0.638 p:0.524	t:0.541 p:0589	t:0.883 p:0.378	t:1.161 p:0.247
Activities of the participants outside of working hours						
Physical activity (Yes-No)	t:3.516 p:0.001*	t:4.482 p:0.000*	t:5.219 p:0,000*	t:3.536 p:0.001*	t:5.144 p:0.000*	t:2.196 p:0.029*
Regular sleep (Yes-No)	t:1.307 p:0.193	t:1.093 p:0.276	t:1,385 p:0,168	t:1.298 p:0.196	t:1.234 p:0.219	t:2.393 p:0.018*
Nutrition (Yes-No)	t:0.134 p:0.893	t:-0.128 p:0.898	t:0,928 p:0,355	t:0.202 p:0.840	t:2.246 p:0.026*	t:2.655 p:0.009*
Hobby (Yes-No)	t:2.872 p:0.005*	t:2.930 p:0.004*	t:3,049 p:0,003*	t:2.789 p:0.006*	t:2.318 p:0.022*	t:2.775 p:0.006*
Reading (Yes-No)	t:1.852 p:0.066	t:1.614 p:0.108	t:1,871 p:0,063	t:1.628 p:0.105	t:1.722 p:0.087	t:1.252 p:0.212

* p<0.05; t: Independent sample t-test,

Table 6. Activities of the participants outside of working hours and leisure time satisfaction score

Characteristics	n	Mean	SD		p
Physical activity	Yes	77	3.62	0.60	0.000*
	No	101	3.14	0.62	
Regular sleep patterns	Yes	69	3.46	0.67	0.059
	No	109	3.27	0.64	
Adjusting ergonomics	Yes	23	3.44	0.56	0.492
	No	154	3.34	0.67	
Having regular diet	Yes	65	3.44	0.68	0.189
	No	112	3.30	0.64	
Engaging in a hobby	Yes	56	3.61	0.64	0.000*
	No	122	3.23	0.63	
Reading	Yes	101	3.44	0.60	0.032*
	No	77	3.23	0.71	
Having brisk walking	Yes	101	3.37	0.69	0.596
	No	77	3.32	0.61	

*p<0.05, SD: Standard deviation

In the independent sample t-test comparison, there was a significant difference between the temperature of the setting and the scores obtained from subcomponents of the leisure satisfaction scale, psychological, social, physical, aesthetic, and educational. The values for these components were higher in working settings with ideal temperatures. There was a significant difference between having sufficient ventilation and aesthetics. The scores for the aesthetic subdomains of those who worked in settings with sufficient ventilation were higher. There was a significant difference between those with adequate sound insulation and relaxation. The findings showed that those working in settings with adequate sound insulation had higher relaxation scores.

Table 6 The comparison of the activities performed by the participants outside the working hours and the leisure time satisfaction score is presented in Table 6. The leisure time satisfaction of those who did a regular physical activity outside the office, those who had hobby activities and those who read books were statistically and significantly higher.

Discussion

In this study conducted on office workers, it has been observed that employees achieve more leisure time satisfaction if the office environment is physically ideal together with ideal noise level and ideal temperature, psychologically stress-free and workload is low. Moreover, those who do physical activity in their free time, those reading books and being engaged in hobbies were found to have better self-satisfaction. Considering the behaviors of the employees in the working environment, it was determined that they did not act ergonomically in terms of health such as sitting without supporting their feet (59.9%), sitting in the same position for a long time (58.4%) and not using the monitor proportionally to their body (57.3%). If working individuals feel comfortable in the working environment, their working efficiency can increase. However, the environments with poor business conditions, such as inadequacies in lighting, ventilation, heating and similar conditions, as well as negative effects in physical conditions like noise, more or less humidity, may negatively affect both mental and physical health.

Today, rapidly developing technology substantially reduces the difficulty of manual labor, but the increasing speed of work and the decrease in preparing work time increase the psycho-physical workload. These changes, which enable workers to relieve their fatigue and regain their energy, require breaks within certain periods during the working day. The implementation of a continuous working day shortens the free time of the workers and makes the recovery process insufficient. Consequently, it may cause different fatigue and lead to occupational accidents [15]. The findings showed that 58.4% of the individuals who were included in our study sat in the same position for a long time in the working setting. Moreover, it was observed that of the individuals participating in our study, 32.6% worked by bending over for more than two hours, 45.5% supported their wrist in front of the keyboard, 30.9% worked by kneeling for more than two hours, and 53.4% of them used back support. Based on the data of the individuals included in our study, it can be concluded that the risk of developing spine, waist-neck, and muscle-joint disorders may increase over time, given that there are deficiencies in their ergonomic behaviors. Accordingly, drawing on the findings obtained in a study in the literature, back pain was the most common health problem with an average of 2.58, while low back pain was the second with 2.75 and neck pain was in third place with 2.79. The least common health problem was weakness and tingling in the fingers, with an average of 3.57 [16].

Leisure time satisfaction is crucial for the individual to be more productive in his/her working life and social life. Physical or mental influences of individuals in their free time are also reflected in their leisure time satisfaction [10]. The fact that there is a significant association between the temperature of the office setting, sound insulation, and the average score of leisure time satisfaction in our study indicates that individuals working in settings where the heat and sound insulation of the office environment are sufficient to have a higher leisure time satisfaction. The association between ergonomic conditions and leisure time satisfaction similarly indicates that ergonomic improvements in the office environment can help employees achieve more satisfaction in the activities they do in their free time.

The degree of difficulty of the work to be done in the working environment and the unsuitability of the tools and equipment for the personnel or the job may lead to a decrease in work efficiency. Furthermore, loud noise in the working environment, noise pollution, lighting malfunctions, ventilation problems, excessive heat, or coldness create some effects on the employee that adversely impact the performance. Combining improvements in ergonomics, which substantially affect productivity, with psycho-social techniques would produce more favorable outcomes [17]. In our study, the findings have shown that there is a significant difference in the mean scores of leisure time satisfaction between levels of workload and whether or not the office environment was stressful. Besides, leisure time satisfaction level has been higher in those who think that the working environment is stress-free and those who do not have a high workload. Based on this result, it is considered that working individuals were not satisfied with their leisure time activities due to their stressful work and high workload. On the other hand, it is noticed that those who stated that the working environment was not stressful and that their workload was low reached more satisfaction with the activities they did in their leisure time. In our study, when some physical, psychological features of the work environment and the leisure time satisfaction subcomponents of the participants were compared, many significant differences were found.

Based on these data in our study, employees who do physical activity are psychologically, physically, socially, relaxed, and aesthetically better. Relaxation and aesthetics are higher in those with good nutrition, and there is a significant difference. A significant difference was found between all sub-components of the leisure time satisfaction scale in those who engage in hobbies. Those who have hobbies feel better in multiple ways. A significant difference was determined between physical and aesthetics, which are subcomponents of the leisure satisfaction scale, scores of those who stated that they were working in a stressful environment. Physical relaxation and aesthetics scores are lower in those who have worked in stressful environments. There is a significant difference between the high workload and physical, psychological, and aesthetic components. Physical, psychological, and aesthetic scores are lower in those with a heavy workload. When the relevant literature is reviewed, it is seen that the level of leisure

time satisfaction is affected by gender, economic income, and environmental factors. Sources in the literature also support this situation [18,19].

Ergonomics and working conditions in the office may affect the employee's leisure time satisfaction, as well as the activities and environmental conditions outside the office can be reflected in the employee's leisure satisfaction. This study addresses the relationship between ergonomics, office behaviors and leisure time satisfaction of office workers. Although a significant relationship has been ascertained between some variables, there is a need for more comprehensive studies on this subject in a way to include the different characteristics of the employees.

Conclusion

It has been observed that the leisure time satisfaction levels of those who work in an ergonomically noise-free environment, ideal room temperature, and those who work in a normal workload and stress-free environment are better. A well-ventilated office environment and ideal workload are related to the aesthetic satisfaction of individuals in leisure time. Moreover, physical activity, reading books and hobby activities in leisure time contributed to leisure time satisfaction. One cannot separate leisure activities outside the workplace from workplace performance. Leisure time satisfaction activities can contribute to the workplace orientation of staff to the workplace in many ways.

As an ergonomic solution, the posture while working should be as comfortable as possible. Ergonomic precautions should be taken for jobs that need to be done sitting or standing. The office setting should be designed so that the workers do not exert excessive effort and do not require strain, especially on the back and lower back muscles.

The findings obtained in this study are limited to the two universities within the scope of this research. There is a need for ergonomic education and intervention-oriented studies involving more universities.

Conflict of interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
The authors declare that they have received no financial support for the study.

Ethical approval
Ethical approval of the study was obtained with the decision of Bitlis Eren University Ethical Principles and Ethics Committee dated March 07th, 2019 and numbered 2019/03-XXI-XXII.

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