



Effects of Ergonomic Risk Parameters on Gender

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Abstract-This electronic Hotel management in tourism is part of the development of a country, and in this sector, the sales and marketing department has been successfully transferred to the business chain. Today, ergonomics is considered an interdisciplinary science and has become an important part of working life. It actively reflects the comfort of the employee in the working area, the work system, the efforts, and determination of the work to protect human health at the workplace and minimize the possibility of an accident. If the ergonomic conditions of the employees are to be controlled, it can be achieved by increasing the safety and security of the working conditions, the sense of belonging and property, by reducing social and psychological disorders, and by improving work performance. Thus, comfort, and therefore the risks of work accidents are minimized.

The main purpose of this study was to examine the effect of a boutique hotel in the Southeastern Turkey on gender differences operating under possible ergonomic risk conditions. For this purpose, an equal number of surveys were conducted on male and female employees in order to obtain healthy results in this field. In the analysis phase, a questionnaire based on the variables of the environmental and psychological factors of the ergonomic working conditions of the employees was used. The questionnaire filled by the participants was evaluated with the scores between 1 and 5, and the average scores of the two factors were examined separately and the data were compared. After the evaluation questionnaire, it is believed that the parameters that pass the risk assessment for female and male employees can be determined and measures can be determined for the company by creating a healthy working environment by shedding light on other studies in this field and by arranging ergonomic risks.

Keywords-Hotel Management, Ergonomics, Gender, Risk Factors

I. INTRODUCTION

The tourism services sector is one of the main branches of the country that has become the engine of the country's economy, enabling the development of other sectors. In order to provide tourism destinations in accommodation establishments, human power and service, and male and female workforce are required equally. Compared to all other sectors, the tourism sector has important distinctive features.

It is exposed to risk factors like other professions. In this branch, human-oriented service is produced, and the work is

labor intensive. In addition, it is observed that this sector offers the option of working part-time and without seeking female age criteria [1]. This explains that the ergonomic awareness of the professional work-flow is indexed to the quality of service. Considering that the service subject is carried out with human workforce, the human factor is very important in accommodation businesses. Thus, ergonomics should be seen as a branch covering business problems as well as finding solutions and should constantly optimize these disciplines.

Ergonomics, among other things, is an approach that defines and adopts scientific discipline and industries such as engineering and psychology and develops with the awareness of human needs since 1913 [2].

The origin of the word 'ergonomy' is derived from Greek and means "Business Science" with the combination of the words business and rule/law and can be described briefly as the process of harmonizing the physical environment with the employee. According to another definition, ergonomics can be defined as arranging the working and living environment in accordance with the human characteristics, and it aims to create a human-machine-environment harmony that protects the health of the employees, provides the productivity and quality increase in production by balancing the workload and working power of the employees, and emphasizes a multidisciplinary approach [3].

According to Atlı, ergonomics is a tool to develop a multidisciplinary research that tries to reveal the basic laws of system efficiency and human-machine-environment adaptation in the face of organic and psycho-social stresses that may affect all factors in the industrial work environment by considering the anatomical features, physical capacities and tolerances of people [4].

Ergonomics, from Ayanoğlu's perspective, advocates the idea that a positive work environment should be created in terms of psycho-social and humanization of the working life. In order to fulfill these functions, ergonomics examines the physiological and biological features of the human, the energy requirement, the relationship of energy with work, nutrition and its relationship with work, fatigue, human-machine systems, working conditions, studies noise, light and color and contributes to the determination of working and resting periods [5].

In our country, the Occupational Health and Safety law number 6331 was published in the Official Gazette number 28339 dated June 30, 2012, and the regulations related to ergonomics were published within the scope of the law.

II. MATERIAL AND METHODS

The boutique hotel Artuklu Kervansaray, with its 45 rooms, is one of Turkey's oldest buildings with its 800-year history. Located in the center of Mesopotamia which hosted many civilizations, the hotel plays an important role in the tourism sector with its friendly service and well-equipped local cuisine. The main objective of this study was to obtain data with the help of the "sample surveying" on noise, vibration, thermal conditions, lighting, workplace environment conditions, employee-related factors, job management and job satisfaction in a boutique hotel operating in Mardin, in terms of risk parameters of the working conditions of females and males working in the enterprise. Findings are discussed in the study. Based on the research findings, the results were evaluated, and general suggestions were tried to be developed.

The total number of employees, from the receptionist to the cleaning staff and the cook, is 20 people. The workers are working with a 3-shift system. Working hours are 8.00-17.00, 9.00-18.00, and 18.00-9.00. The staff have 20 days of annual leave.

The survey was conducted in the winter season when the occupancy rate of the hotels was low and the research population was carried out with a total of 20 personnel, 10 females and 10 males who agreed to participate in the research. This means that the participation is equally voluntary in terms of gender and explains that the working platform shows equality for both genders.

III. RESULTS AND DISCUSSIONS

A. Environmental Factors

In terms of risk factors, if we analyze the enterprise considering noise, vibration, ambient weather conditions, and lighting.

1) Noise and Vibration

Before analyzing the concept of noise, some definitions need to be made first.

The difference between noise and sound is that, the sound that disturbs people is called noise, whereas sound refers to the pressure created by the atmosphere. According to Camkurt, noise refers to the fact that the work done by the desk workers in noiseless environments is more efficient in terms of psychology, physiology and [6].

A previous study (Sarıkaya) makes a definition close to Camkurt and emphasizes that the noise pollutes the environment with the damage caused to the hearing organ of the human [7]. One of the most important effects of noise above 80 decibels refers to situations that can result in human hearing loss [8]. In this context, noise arrangements were made in the regulation (Regulation 2013). Table 1 shows a view of the effect of noise level on hearing loss.

- Exposure limit value: 87dB
- Highest exposure value: 85dB
- Lowest exposure value: 80dB

TABLE I. THE EFFECT OF NOISE LEVEL ON HEARING LOSS [9]

Noise level (DB)	Loss of hearing ability		
	5 years later	10 years later	20 years later
80	0	0	0
90	4	10	16
100	12	29	42
110	26	55	78

According to the research conducted, the noise caused by the workplace affects the hearing and perception of people negatively, disrupts their physiological and psychological balance, decreases the work efficiency, and increases the work accidents. General measures to control or minimize exposure-related risks are:

- Designing a less noisy working environment and providing its methods
- Choosing the least noisy equipment and training the employees accordingly
- Revising working times with adequate rest breaks (Regulation 2013)

Vibration is described as small and rapid resonance. The disturbing effect of vibration is calculated according to its duration and frequency, and vibration is explained in two main groups. Mechanical; exposure limit values for whole body vibration and hand-arm vibration are as follows:

Mechanical Vibration: Exposure and action value:

Daily exposure limit value for 8 hours of working time: 1.15m / s² Action value: 0.5m / s² Hand-arm Vibration: Exposure and action value: Daily for 8 hours of working time: exposure limit value: 5m / s² Action value: 2.5m s² (Official Gazette, Regulation 2013, number: 28743).

Arrangements that cause vibration exposure should be made according to the average value of the enterprise. These legal regulations and obligations are enforced in Turkey [10].

General Suggestions for Prevention or Mitigation of Risks from Exposure:

- Choosing other working techniques that reduce the vibration parameter
- Using ergonomic work equipment correctly and informing the employee accordingly
- Determining exposure duration and levels and ensuring safe working practices (Regulation 20)

TABLE II. ERGONOMIC PARAMETER DESCRIPTION

1	bad /No/I don't agree
2	Weak/Insufficient
3	Middle
4	Good
5	Very Good /Yes

2) *Ambient thermal Conditions*

Explains the comfort provided by the thermal conditions in the work environment while the employee performs his/her physical and mental activities. The temperature of the human body is around 37 degrees centigrade. In the working environment, the polluted air coming from outside may in some cases spoil the cleaning materials or the food and beverage in the kitchen. Change of the environmental factors: temperature-humidity and airflow rate lead to an increase or decrease in body temperature. (Officialgazete.gov.tr/ancients/2013/07/20130717-2.htm-access 10.05.2020)[11], [13].

It is ensured that the temperature of the working environment is suitable for the working mode and the power consumed by the employee. All interiors are kept at a sufficient. The lack of humidity balance in the hotel creates problems such as headaches or dry eyes. Rooms require windows, which is essential to prevent infectious diseases. The excessive humidity of the space deteriorates the health conditions by lowering the productivity of the employee and causing problems in the respiratory tract. Apart from this, the systematic operation of the heat-cold balance should be controlled, while the increase of the heat brings the movement and laziness of the employee in the work, the cold in the work environment slows the reflexes of the worker. Work accidents can also arise from these negative features [14]. In addition to this, in sedentary work, the table and its adjustment should be adjusted to the body to prevent occupational diseases that may occur in the long term. As a result of the data average Table 3 and Fig.1, the noise and vibration factor in the working life of women and men were evaluated as bad and negative for both genders.

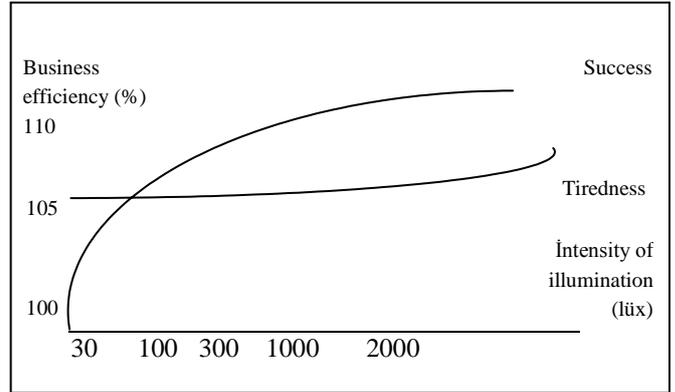


Figure 1. Relationship between luminousness and fatigue and work efficiency [12].

TABLE III. ERGONOMIC PARAMETER NOISE AND VIBRATION

1-Noise: 2-Vibration:	1	2	3	4	5
1-Noise attendant in the work area LEVELS me?	<input type="checkbox"/>				
2-Does the noise cause hearing loss in the hotel?	<input type="checkbox"/>				
3-Noise in work environment, noise work efficiency negatively	<input type="checkbox"/>				
4-Does the level of noise cause work accidents?	<input type="checkbox"/>				
5-Does the hotel's noise levels hinder operation?	<input type="checkbox"/>				
6-The body's hands, arms and legs due to the equipment used is a part like (local) exposed to vibration?	<input type="checkbox"/>				
7-Does it affect the whole body when working, vibrate?	<input type="checkbox"/>				
AVERAGE VALUE WOMEN		2			
AVERAGE VALUE MEN	1				

TABLE IV. ERGONOMIC PARAMETER THERMAL CONDITIONS

3- Ambient Conditions: (temperature-humidity-air flow rate)	1	2	3	4	5
1-Is ambient temperature good in work done by sitting?	<input type="checkbox"/>				
2-If the work done by the worker requires physical force, is the ambient temperature sufficient?	<input type="checkbox"/>				
3-Is the air flow rate of the workplace suitable for the workplace?	<input type="checkbox"/>				
4-Is there a "humidity" rate in the business environment?	<input type="checkbox"/>				
AVERAGE VALUE WOMEN				4	
AVERAGE VALUE MEN					5

General Measures to Control or Minimize Risk Factors:

- Ventilator for high humidity environments
- Periodic maintenance of tools and equipment
- Heat systems

Fig.2 and Table VI show that there are close results for women and men.Both gender are satisfied with the environment conditions in the business working.

3) *Lighting*

In our country, in accordance with the regulations, it is required that the workplaces be adequately illuminated by daylight. If daylight lighting cannot be applied, suitable artificial light must be provided. (Official gazete.gov.tr/ancients/2013/07/20130717-2.htm-access 10.05.2020) [15].

In addition, it is necessary to ensure compliance with lighting conditions and employee health conditions. The eye functions of a young worker and an elderly worker are not the same and therefore, the lighting they need cannot be at the same level [16].

TABLE V. ERGONOMIC PARAMETER LIGHTING

4-Lighting:	1	2	3	4	5
1-Is the level of illumination stable in the corridors, the kitchen and all the rest of the hotel?	<input type="checkbox"/>				
2-Is it such that I do not disturb eye health in the light work areas?	<input type="checkbox"/>				
3-Is lighting level sufficient?	<input type="checkbox"/>				
4-Do you need continuous lighting in the hotel?	<input type="checkbox"/>				
5-Do I need special lighting for workbench or work tables?	<input type="checkbox"/>				
6-Does the person experience eye-wrinkling during the working process?	<input type="checkbox"/>				
AVERAGE VALUE WOMEN			3		
AVERAGE VALUE MEN		2			

There is a very close relationship between lighting and efficiency. While good lighting increases efficiency, bad lighting causes eye fatigue and decreases efficiency significantly. In Table V and fig.2 the result from the average values of men and women is given as a lightening medium for both genders, explaining that this factor is of great importance in the study of human beings. It would be beneficial to give importance to vision comfort and to realize all lighting principles that will provide this comfort, especially in workplaces where fine work is done for long periods

General Precautions to Control or Minimize Risk Factors:

- Periodic eye examination for the employee
- Regular maintenance of lighting systems
- Adequate lighting design, intensity and criteria installation in the interior

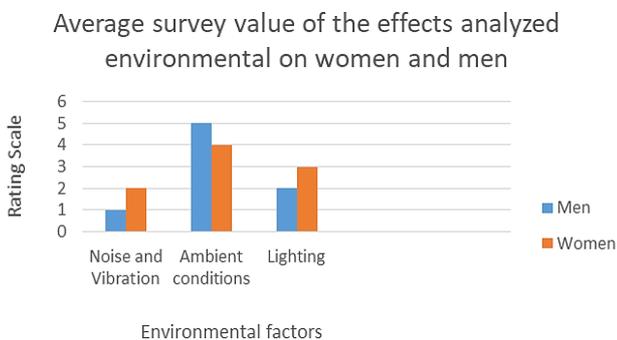


Figure 2. Average graph of environmental factors on gender

B. Psychological Factors

1) Factors Stemming from Employees

Ceven and Özer emphasize that it is very important to arrange the working environments by considering the ergonomic elements for the physical, psychological health,

performance, and efficiency of the employees Fig.3 highlights women’s poll result. In this way, a comfortable work environment is provided for the employee, and obstacles are reduced to a minimum [17].Ulucan and Zeyrek express the factors that are not caused by the employees as follows: sadness, forgetfulness, occupational problems, economic problems, and disrupted communication in the workplace [18].

TABLE VI. ERGONOMIC PARAMETERS FACTORS STEMMING FROM EMPLOYEES

1-Employe factors:	1	2	3	4	5
1-Is there time to social life at the end of the shift?	<input type="checkbox"/>				
2- Does the Night Shift system create psychological pressure?	<input type="checkbox"/>				
3-Fatigue, sleep disturbance, loss of appetite, intestinal and do you have heart complaints?	<input type="checkbox"/>				
4-Mr. and Mrs.'s ideas and suggestions in the establishment are equal	<input type="checkbox"/>				
5-Does anyone experience insomnia during night work?	<input type="checkbox"/>				
6-Does the wage meet the expectations of the employee?	<input type="checkbox"/>				
7-Employee self-sufficient in the field of work.Do you find it? or does it give routine?	<input type="checkbox"/>				
AVERAGE VALUE WOMEN			3		
AVERAGE VALUE MEN	1				

Ergonomic risk factors arising from the psychology of both male and female employees must be reduced. The reason why women may not find time for many activities today is that they are getting stuck between playing the role of a housewife and motherhood, and on the other hand, to play the role of businesswoman.

Suggestions for Regulating Psychological Workplace and Reducing Their Exposure Levels:

- Working with music broadcasting
- Color arrangements, colors have a great place in human psychology.
- Placing plants and flowers in the indoor and outdoor of the hotel business
- Systematic workload and task distribution
- Sizing of the working clothes suitably to the employee and adapting the surface texture to the thermal conditions in summer and winter,
- Using motivation tools: Job rotation responsibility and choosing a team manager
- Developing hobbies for both genders: sports activities, cinema, theater, exhibition, book
- Exercises: meditation, prayer-worship, to relieve stress and relax
- Factors Related to the Business Organization

Hotel management, which belongs to the tourism sector, must be a business organization that ensures the quality of the service provided to the guests to be perfect in order to be successful. For this, in the first place, technological equipment must work fully, and the safe working environment condition of the employee must be provided.

The workplace observed in the hotel business is listed as follows:

Guest rooms, staff entrance and exit, reception, front desk, accounting, kitchen, laundry, drying, social media hall, men's and women's dressing rooms were visited separately.

TABLE VII. ERGONOMIC PARAMETERS BUSINESS ORGANIZATION

2-Business organization:	1	2	3	4	5
1-Is it enough for rest breaks, working and working hours?	<input type="checkbox"/>				
2- Does the employee have changing job duties?	<input type="checkbox"/>				
3-The amount of responsibility given to the employee is the same as for men or women?	<input type="checkbox"/>				
4-Is there a comfortable working area in terms of body position?	<input type="checkbox"/>				
5-Is there enough free movement area if standing up?	<input type="checkbox"/>				
6-Is there chair comfort (cushion / support) in the work done by sitting? Is there a danger of overturning?	<input type="checkbox"/>				
7-Is workplace equipment easily accessible?	<input type="checkbox"/>				
8- Is there any comfort that can rest on arms or elbow? Is it possible to adjust the comfortable working distance	<input type="checkbox"/>				
AVERAGE VALUE WOMEN				4	
AVERAGE VALUE MEN					5

2) Business Management Factors of Psychological Factors:

Businesses Should Do Improvement Works in Mission and Vision in Order to Reach Production-Service-Efficiency and Quality Improvement Goals.

General Suggestions to Achieve These Goals:

- 4-shift per day working shift for hotel businesses
- Weekly holiday period for 2 days
- Taking breaks during working hours to a sufficient level
- In this way, the hotel business will become attractive in terms of working conditions.
- Providing job security in the process of being successful and hardworking
- Fair wages, to increase work efficiency and happiness
- To give importance to in-service training

- Providing training seminars and similar skill development courses

3) Job Satisfaction

Job satisfaction, as a definition, is an emotional response of the employee to his/her duties besides physical and social conditions [19]. To put it briefly, it can be said that the job satisfaction is the sum of the attitudes towards various aspects of the job. Ergonomics is a science that protects the health of the employee, ensures his/her confidence, increases his/her productivity and also increases his/her job satisfaction. Especially since there are part-time and seasonal works in the service sector, providing job security in this field and ensuring that the wage is a sufficient motivating factor are among the satisfaction factors of the employee. It has been stated that there is a positive relationship between job satisfaction and job security [20].

TABLE VIII. ERGONOMIC PARAMETER JOB SATISFACTION

3-Job satisfaction:	1	2	3	4	5
1-Are the working hours suitable for your social needs?	<input type="checkbox"/>				
2-Do the intense working hours strain the life and health balance?	<input type="checkbox"/>				
3-Can it meet the needs of the resting area / facility / gardener during meals?	<input type="checkbox"/>				
4- Are you promoted in career or career opportunities?	<input type="checkbox"/>				
5-Are wage payments made on time in this enterprise?	<input type="checkbox"/>				
AVERAGE VALUE WOMEN					5
AVERAGE VALUE MEN			3		

As shown in the fig.3, job satisfaction differs for male and female employees. This shows in the Table VIII. female employees are more satisfied with the workplaces and conditions.

General Suggestions for Job Satisfaction Factor as One of the Psychological Factors:

- Managers adopting and praising the work done by the employee is the biggest investment in human work.
- Providing job security in the long run increases the sense of commitment to the business.
- Recruiting qualified personnel in a given branch eliminates the problem of adaptation of employees in the team.
- Promotion opportunities and bonuses should be offered in career.
- Equipped communication technologies should be presented in private use.
- Rewarding, special rewards, holiday opportunities
- Providing housing and transportation opportunities

- Organizing periodic meetings to get the opinion of the staff
- Shelves and adjustable workbenches can be placed in the kitchen and service departments for the employees to reduce the workload
- Non-slippery foot support can be offered for sedentary work

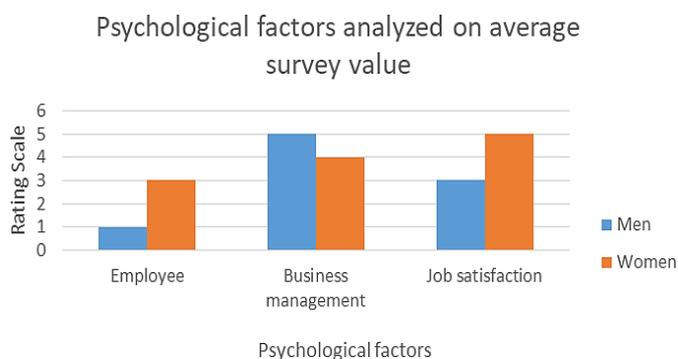


Figure 3. Average graph of psychological factors on gender

IV. CONCLUSIONS

Analysis of the effects of Ergonomic Risk factors on gender

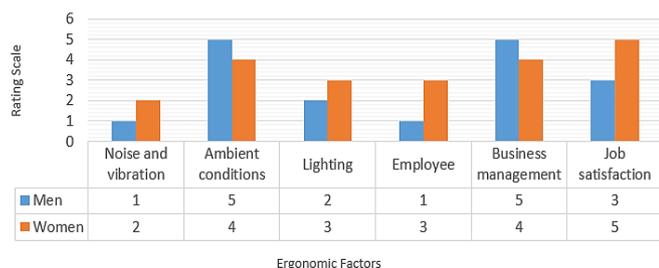


Figure 4. Analysis of the effects of Ergonomic Risk factors on gender

C. Evaluation of the Findings Obtained in the Research and Summary of the Suggestions provided for the Business:

• The environmental and psychological factors for the six are listed in Fig's 2-7. The survey analysis shows that the six species tested there are some differences between the specified characteristic. Among the six species studied, Job satisfaction had the highest average values and noise and vibration had the lowest average values. The main result of this study is that the employee is a "human being" and the effects of ergonomics on gender affect the performance of work with positive or negative effects. Since this research was carried out only with the hotel business in Mardin, it has certain limitations and includes a sample of boutique hotel employees. Each factor was examined separately, and suggestions were

made for each table. Here, brief general outcomes will be presented.

• This study represents in Fig.2 and Table 3 that Noise and Vibration: As environmental conditions, results obtained from the noise and vibration factors were evaluated as inadequate and having negative effects on both sexes. In this context, arrangements should be made. As a suggestion, revision of working time is recommended with adequate rest breaks for both sexes. Also, as an improving approach, employees should be aware of taking a break during working hours and breaks by listening to music broadcasting in the business environment. Intermittent breaks, when tired, provide relaxation, and the employee performs his/her responsibility. Hotel staff should use their movements to walk and take a break in jobs they practice with their personalities. Otherwise, physical and mental performance is impaired, and irritability occurs. In addition, it is recommended to design a working environment and method with less noise and provide training for the employees to use ergonomic work equipment correctly. The arrangements of noise and vibration factors in the enterprise by hotel managers will boost motivation and efficiency and will also increase efficiency, and the possibility of work accidents will be reduced without affecting the hearing health and perception of the employees negatively and without disturbing their physiological and psychological balance.

• Lighting factor represent in Fig.1-Fig.2: While the mean score for lighting in the survey was low in male respondents, female employees generally gave the lighting a moderate score. Hotel businesses are obliged to have adequate lighting provided either with natural daylight or suitable artificial lighting (official gazete /2013/07/20130717-2.htm). In a hotel business with good lighting, both the comfort assurance of the guests arriving, the health and efficiency of the employee, and the efficiency of the work are increased. Lighting has a very close connection with potential work accidents. In a dark working environment, eye disorders and fatigue and accident risks occur in the long term

• Factors Stemming from the Employee in Table VI and Fig.3 meaning: The scores of the women who answered the questionnaire were evaluated as moderate, while men's evaluation was 'disagree'. Makes stated that they disagreed with the psychological factors that would occur in the night shifts and explained that they were not affected. However, female employees evaluated the concept of overtime here as moderate in average value. The roles of today's women in life prove that they can continue their existence in roles like working women, housewives and mothers at home, by being forced to work as employees but still by adapting their working conditions in life. Regarding the wages, on which all employees have expectations, men regarded it bad, while women considered it as average, thereby indicating that it meets their expectations. The explanation for this is the fact that the business presents job opportunities and job security in this region which is a place where women's level of education is not high. Among the suggestions that can be given to the business management are to motivate the employees to do their best in order to increase their performance and to strengthen their business performance by applying a reward system.

- Ambiance conditions results revealed Table IV. and Fig.2:The working conditions of men and women, temperature, humidity and air flow, and work areas requiring standing and physical strength were given a score of good and very good by the women in the questionnaire. Despite the warm weather conditions of the region, and even when the winter months are harsh, the hotel administration offers its employees a healthy work environment with technological equipment without restricting the use of heating and cooling and displays a moderate management to the employees. Ergonomic posture positions were evaluated as good and very good by both genders in standing or sedentary jobs.

- The evaluation of the Table VIII and Fig.3 Work Organization and Job Satisfaction says: Working women stated that they were comfortable / satisfied in the hotel they worked in and wanted to work as part of this business in the long term, and evaluated the organization's organizational chart as good and the job satisfaction value with the highest score. Male employees, on the other hand, gave the hotel a moderate job satisfaction value in this assessment, but with a reverse picture, they considered the organization of the enterprise to be very good. Respondents stated that ergonomic risk factors had a strong relationship with job satisfaction.

- Overview, All Risk Factors: In addition, it is thought that as a result of the data obtained from the questionnaire, problems can be easily solved with minor corrections in environmental and psychological factors by the hotel management. Different and colorful planting should be done in order to provide a dynamic appearance in the interior and exterior of the hotel, which can be presented as a suggestion for visuality. This also provides mobility to the historical texture and adds quality to the space. The mood that colors awaken in humans is reflected positively by energizing the working environment of the employee, which strengthens the motivation to work.

- In the interior design of the historical hotel in the center, which has very little green space, a better perception can be created with color variations or herbal aesthetics without playing with its original structure, thus increasing the satisfaction quality by making the customer happy. In this direction, it provides long-term job security by ensuring the continuity of the business.

- As a result, it is seen that all ergonomic risk factors in the Artuklu Kervansaray Hotel in Mardin do not differ much in the mean score differences between men and women. This emphasizes that the job done by a gender in tourism can be done under equal working conditions. With the completion of the deficiencies and suggestions of the analysis studies, operational efficiency and security will be ensured by reducing the psychological factors and minimizing the accidents that may occur in the workplace and the occupational diseases, traumas, and discomfort. Analysis of the effects of the physical factors of ergonomic risk conditions on gender in the hotel business can be conducted in a separate study and compared with other factors and may constitute a new research area for other studies.

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