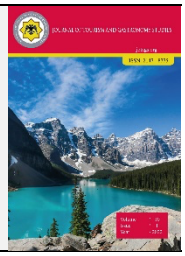
JOURNAL OF TOURISM AND GASTRONOMY STUDIES

ISSN: 2147 – 8775

Journal homepage: www.jotags.org



A Research on Hygiene and Ergonomics in Kitchens

*** Mehmet SARIOĞLAN** [a], **Sevcan BATTAL** [b]

[a] Balıkesir University, Faculty of Tourism, Department of Gastronomy and Culinary Arts, Balıkesir/Turkey

[b] İstanbul Rumeli University, Vocational School Hotel Restaurant and Catering Services, Department Cooking, İstanbul/Turkey

Article History

Received: 11.01.2022

Accepted: 14.02.2022

Keywords

Kitchen

Hygiene and

Ergonomics

Abstract

This can be met effectively with ergonomics. Today's restaurants have a modern and stylish appearance. However, the interaction between hygiene, an indispensable element in industrial kitchens, and ergonomics should provide the same quality in the kitchens. In the literature, it is seen that hygiene is promoted more effectively and easily in workplaces designed under ergonomic conditions. Accordingly, the main purpose of the study can be expressed as the determination of the relationship between ergonomic factors and hygienic conditions in the kitchen of an international five-star hotel in Istanbul. The study was carried out by interview method, a qualitative data collection tool, with 31 chefs working at different hierarchical levels in a five-star international hotel in Istanbul. As a result, the concluded that the promotion of hygiene in ergonomically designed kitchens is more difficult than the kitchens without ergonomic design, the planning of the working areas in a way that will ensure the safety and efficiency of the staff can maximize the efficiency to be obtained from that business, and the ergonomically designed kitchens can increase the productivity of the staff and hygiene of the equipment.

Article Type

Research Article

** Corresponding Author*

E-mail: mehmets@balikesir.edu.tr (M. Sarıoğlan)

DOI:10.21325/jotags.2022.979

INTRODUCTION

The concept of hygiene consists of the words “Hygiela”, which is the hymn of health in Ancient Greek history, and “Hygieinas”, which means conducive to health. Hygiene covers all the measures that should be applied to increase body resistance and avoid diseases. These are known as the medical term. In other words, hygiene means the knowledge of protecting health conditions and relieving them from all kinds of health factors (Türkmen, 2004, p. 3; Songur, 2009, p. 14; Lee et al., 2012, p. 15). In another definition, hygiene is explained as taking the necessary precautions by complying with the necessary rules during the formation, processing, storage, and distribution (serving) of food with the aim of creating a healthy and perfect food production (Denizer, 2005, p. 203).

With the developments in the service industry, the tools and machines produced have now taken their place as fixtures in the home and business kitchens. This situation has caused some discomfort in people who will use them for a long time. For instance, standing for a long time may cause varicosity while the low height of the kitchen counters leads to severe back pain. In order to deal with and eliminate possible problems, a term called "Ergonomics" has emerged. In the past, people did not attach necessary importance. However, some scientists and academics have contributed to the understanding of this term as a branch of science by researching its meaning, purpose, and scope in recent years. In the phenomenon of ergonomics, staff motivation and productivity have become among the most important issues, and the demand by staff to design their workplaces according to their needs and to ensure their safety has increased rapidly. With the assumption that creating suitable and comfortable work areas for the staff will positively affect the productivity and performance, designing the work areas under ergonomic conditions indicate that hygiene will be promoted more comfortably and easily in those areas.

Literature Review

The Concept of Ergonomics and Its Purpose

Ergonomics is derived from the Greek words "Ergon" meaning work and "Nomos" meaning naturally occurring law or order. Ergonomics is recognized as a science. People dealing with this branch of science are not interested in the work done, but in the people who perform this work (Joshi, 2016, p. 54). “Ergonomics is an engineering branch that investigates the physical and mental characteristics, tendencies, abilities, and limitations of people regarding machines and various work environment conditions, and applies the principles developed with the data obtained to the design and regulation of machines, machine systems, work, and environmental conditions.” The aim of ergonomics is to increase the safety of the person performing the work, to increase the production level, and to improve the conditions and well-being (Dul et al., 2012, p. 24; Hollnagel, 2014, p. 41). The word ergonomics is a word that originated in England in 1949. In the studies conducted on the concept of ergonomics until that year, similar nomenclatures have been made providing an approach to the concept of ergonomics from different angles (Zander, 1972, p. 14; Güler, 1997, p.9). Today, while the concept of "Ergonomics" is used in European countries, the concept of "Human Engineering" is preferred instead of this concept in the USA (Mathews & Just, 1967, p. 14).

The concept of ergonomics is expressed as a branch of science that investigates the workplace layout planning by considering the structural characteristics, physical dimensions, capacity and tolerance characteristics of the individual and the compatibility of the human-machine environment according to natural and psychological reactions, which are formed by the effect of the variables in the environment, and the theories of the interaction between them (Sabancı

& Sumer, 2015, p. 14). Ergonomics, or in other words, human factors engineering, provides the formation of a discipline by taking into account the relationships between the people in the system. It is seen as a branch of science that applies theories, rules, knowledge, and methods in design to optimize human health and their safety against threats that may occur in the environment (Dul & Weerdmeester, 2008, p. 14). The comfort of the staff, the fast execution, and the facilitation of the work are the subjects of ergonomics. What is meant here is not only enabling physical comfort, but also providing comfort in terms of psychological and environmental factors (Bridger, 1995, p. 24; Blair, 2003, p. 14). In this context, ergonomics is a multidisciplinary research-development area that tries to reveal the system efficiency and the basic rules of human-machine-environment interaction in the face of natural and psychosocial concerns that may occur with the effect of factors in the industrial work environment, taking into account the structural characteristics, anthropometric characteristics, physiological competencies, and distinctions of individuals (Erkan, 2003, p. 22; Frable, 1996, p. 21).

Considering that staff spends a significant part of their daily lives in enterprises, it is important to eliminate various factors that threaten health conditions negatively (Demirdiler & Üçdoğruk, 1995, p. 605). The main purpose of ergonomics can be expressed as eliminating different health problems, revealing how the necessary working environment will be shaped in order to increase work efficiency and how to adapt to the worker (El-Gammal et al., 2011, p. 24). Another purpose of ergonomics is to determine the machine and environmental factors in accordance with the formation characteristics of human beings and to increase the efficiency of working with machines and tools by taking the necessary precautions (Yavuzcan et al. 1987, p. 57). The priority of ergonomics is to increase the safety, efficiency, and effectiveness of staff. Although increasing job satisfaction is seen as ensuring working in healthy conditions in terms of life science, physiology and spirituality, ergonomics should not be expressed as a series of improvement measures only for staff. Ergonomics has several organizational benefits. We can also say it as occupational safety, improvement in occupational health, and increase in efficiency. The decrease in the error rates, the decrease in the production and service costs, and the increase in the production process can be given as examples of these benefits (Tutar, 2000, p. 24; Barnett et al., 2002, p. 14). Ergonomics is collected under 4 headings as physical, cognitive, administrative, and organizational ergonomics. These types of ergonomics are explained with the following sub-headings;

Physical Ergonomics: Conditioning the physical elements of the offices according to ergonomic conditions affects the productivity, job satisfaction, and health of the staff (Çeven & Özer, 2013, p.21). The concept of physical ergonomics is a type of ergonomics aimed at taking the necessary measures by considering the health conditions of the staff and the factors that threaten them. It is within the scope of this type to provide the necessary design for people to use the necessary machines in a convenient, comfortable, and easy way. Physical ergonomics is concerned with the body dimensions, biomechanics, and physical characteristics of the person (Saygı, 2016: 24). Physical ergonomics aims to minimize the destruction of physiological factors on people by preparing a work environment that does not harm the staff and ensures that they are positive. It deals with the relationship between the equipment used by the staff, their posture during work, repetitive movements, safety and health measures, and the skeletal system of the person involved in the work (Karsh et al. 2013, p. 12).

Cognitive Ergonomics: Cognitive ergonomics is also used as informatics-oriented ergonomics or software ergonomics. It emerged as a result of the investigation of pilot errors during World War II. The priority of cognitive

ergonomics is to develop software code in order to provide easy access to information during the design phase, which requires advanced technology, and to optimize the role of the human factor in these processes (Saygı, 2016, p. 14, Feyen et al., 2000: 291; Çivril et al., 2013, p. 233).

Administrative Ergonomics: Administrative ergonomics is the management process that aims to increase the efficiency of the relationship between the person and the machine, to ensure work safety, to establish a systematic order in the work, and to ensure that the equipment used by the people and the machines are in harmony with human characteristics (Saygı, 2016, p. 14).

Organizational Ergonomics: Organizational culture is a concept that determines how things are carried out in businesses. Whether ergonomic equipment is given importance in the working environment or not, and the quality of the organizational culture that has been created is within the scope of this type of ergonomics. Organizational ergonomics determines subjects such as the organization's purpose, appearance, management style, goals, perspective, and social integration. For this reason, there are occasional connections between the studies and organizational culture (Güler, 1997, p. 14). Organizational ergonomics is concerned with bringing organized structures, socio-technical orders, politics, and processes into optimal conditions. Its topics are the management of the resources used by the team, the degree of communication between them, the design of the work, the distribution of tasks among the teams, the determination of working hours, community ergonomics, the designs that the participants think, the organizations established in the digital environment, and quality management. This type of ergonomics directs individuals to organize the work in the most efficient way (Wickens, 1992, p. 24).

The Concept of Hygiene and Sanitation

In general, the science of hygiene serves to protect the health of people from possible dangers and to make it sustainable. The concept of hygiene emerged as a result of protecting lives and avoiding the elements that threaten health (Sökmen, 2001, p. 16-17; Ersin & Beyhan, 2015, p. 23). When we look at the factors that threaten health negatively, facilitating the entrance and exit between countries as a result of tourism, chemical pollution, trade, nuclear explosions, and climate-atmosphere changes come to the fore. When personal hygiene factors are given importance, the spread of the aforementioned diseases can be prevented (Erkal, 1997, p. 13). From this point of view, when the hygiene of food and beverage is taken into account, it is seen that individual hygiene practices should be considered as one of the most important issues (Ertopcu, Avcıkurt & Çetinkaya, 2019, p. 2189).

Sanitation is a term that should not be confused with cleaning and has a wider use than cleaning. In the curriculum of this concept, each area has different cleaning methods and a written schedule program is created that regulates how the area should be cleaned and disinfected in regular periods when necessary (Shaikh & Hussain, 2012, p. 253). Sanitation provides the necessary hygiene conditions to obtain a safe and healthy food product in general (Bilici et al., 2008, p. 45). It can also be called the control of positive or negative environmental factors that affect health. Sanitation is thought to be a process that ensures that the microbes in the equipment used in food production enterprises have a reliable level by using the necessary heat and chemical substances (Denizer, 2005, p. 17; Koçak, 2010, p. 18).

The most important difficulty encountered during the realization of sanitation is the carrier staff. The carrier staff causes the spread of infectious diseases by spreading the disease-causing microbes in their body without being

affected and to the surfaces they come into contact with (Bulduk, 2007, p. 18; Mahami & Odonkor, 2012, p. 19). The purpose of the food sanitation process is to prevent the losses and damages that may occur from the contamination of food products (Koçak, 2010, p. 41; Todd, 2004, p. 34). The food sanitation process provides the preservation of the chemical nutritional factors in the structure of the food. The increase in the number of processes performed during the preparation of a food product also increases the possibility of contamination (Sökmen, 2010, p. 17). The most important issue in the safe food supply is ensuring the hygiene and sanitation conditions in the best way from the purchase of the food product to its consumption. The quality of the produced food and its long-term preservation are among the benefits of sanitation in terms of producers and consumers (Bilici et al., 2008, p. 42).

Method

In this study, data were collected and analyzed by using the semi-structured interview technique. The interview method was preferred due to the fact that it covers a long period, detailed information can be obtained, verbal communication is established, the correctness of the answer given to the questions can be understood with the emotional state, behavior, and attitudes of the participants, and the possibility of completing by others and the probability that the person to be filling out the questionnaire will not put an effort because he or she considers the questionnaire unimportant can be eliminated. The ethics committee permission document required for the collection of the data used in this study was obtained from the Balıkesir University Ethics Committee with the date 08.04.2021 and the decision/number 2021/2.

When the literature is examined, it is seen that there is no rule determining the sample size in studies using qualitative methods. The researcher decides to determine the number of participants to be included in the sample in line with the purposes of the research. The validity and significance of qualitative research depend on the information-load of the sources and the analytical thinking and observational ability of the researcher rather than the size of the sample (Patton, 2014, p. 24).

The sample includes an international 5-star hotel business located in Istanbul. The study was carried out with 31 participants working in an international 5-star hotel in Istanbul in 2020. Since in-depth interviews were conducted with the group used in the sample, it was concluded that the number of participants was sufficient.

The criteria while determining the sample are as follows;

- The business being international
- The participant working in the same enterprise,
- The participant having at least one year of experience.

The qualitative research method was used in the study and the semi-structured interview method was preferred as a data collection tool. This technique was used in order to ensure that the answers given by the participants were unbiased and to obtain detailed answers from the data. The questions to be asked in the interview were created after a comprehensive and detailed literature review.

The questions in the semi-structured interview were prepared by the researcher in line with the aims of the research based on the information obtained from the literature (Erdal, 2003; Güneş, & Koçyiğit, 2018; Jones & Kapple, 1975; Özdamar. 1999; Şimşek, 2010; Türkan, 2000; Yetiz & Mimarlık, 2009). Questions were prepared in such a way that

they could measure and evaluate how the ergonomics and hygiene of the kitchen in the food and beverage business were provided. With the help of these questions, the relationship between ergonomics and hygiene in the kitchen was revealed and the answers were recorded. With the recording of the interviews, the information was written clearly, completely, directly, and without addition. The answers given by the participants were categorized and a table was created for each question and coding was done. In line with the answers given, the researcher interpreted the data by making inferences.

Some participants answered the questions by making interpretations based on their previous businesses. Some participants expressed their answers in a short and clear way, while others gave detailed answers. In line with the answers given, the interview lasted at least 7 minutes and at most 41 minutes. The participants were told that their names would be kept confidential and they answered the questions comfortably and clearly. First, the research topic was investigated in detail and the resources available in the literature were examined. After reviewing the literature, 14 questions were created about the topic of the study.

Considerations when preparing interview questions;

- Open-ended questions were preferred.
- Care was taken to ensure that some of the questions were answered by making use of their knowledge and experience.
- Care was taken to ensure that the questions were clear, unambiguous, and brief.
- Care was taken to ensure that the questions progress in a way that is interconnected.

After the questions were prepared, they were revised and approved by experts with academic qualifications. For the interview process, the participants were called by phone and an appointment date was determined. A different day, date, and time was selected for each participant. The data of the research were collected by audio recording in April, May, and June 2020.

The interview was first made through the ZOOM application, but after a few interviews, it was thought that the research could not progress and a face-to-face interview was decided. The interviews lasted a minimum of 7 minutes and a maximum of 41 minutes. Face-to-face interviews were completed in about 2 months, and the interviews were transcribed and analyzed in one month.

The process of discovering and revealing the hidden meaning, rather than the apparent meaning, by examining and synthesizing the information (data) obtained from the research, deciding how much of the revealed information will be used, and turning it into a report is known as data analysis (Yıldırım & Şimşek, 2018, p. 45).

The audio recordings used in the study were recorded with the permission of the participants. The recordings were listened to over and over again in order to convey them accurately and clearly. After the interviews were expressed in writing, generalizations were made by categorizing and tables were created for each question. The findings obtained from the answers given to the questions were written without interpretation and then expressed by interpreting.

Findings and Discussion

In the table below, information about the participants' age, gender, education level, occupation, title, and duration of experience in the profession are given.

Table 1. Demographic characteristics of the participants

Participant Code	Gender	Age	Education	Occupation	Title	Total Professional Experience
P1	Male	46	High school	Chef	Executive Chef	30 years
P2	Male	35	Undergraduate	Chef	Executive Sous Chef	15 years
P3	Male	41	Primary school	Chef	Chef de Cuisine	25 years
P4	Male	39	Undergraduate	Chef	Sous Chef	24 years
P5	Male	35	High school	Chef	Sous Chef	15 years
P6	Male	35	Associate Degree	Chef	Junior Sous Chef	19 years
P7	Male	33	Associate Degree	Chef	Junior Sous Chef	15 years
P8	Male	41	High school	Chef	Sushi Chef	18 years
P9	Male	38	High school	Chef	Chef de Partie	18 years
P10	Male	34	High school	Chef	Chef de Partie	15 years
P 11	Male	30	Associate Degree	Chef	Chef de Partie	14 years
P 12	Male	35	High school	Chef	Demi Chef	17 years
P 13	Male	30	High school	Pastry Chef	Demi Chef	12 years
P 14	Male	27	High school	Chef	Demi Chef	10 years
P 15	Male	28	High school	Chef	Demi Chef	8 years
P 16	Male	26	Associate Degree	Chef	Demi Chef	7 years
P 17	Female	27	Undergraduate	Chef	Commis 1	3 years
P 18	Female	26	Undergraduate	Chef	Commis 1	4 years
P 19	Female	26	Undergraduate	Chef	Commis 1	2 years
P 20	Female	25	Undergraduate	Chef	Commis 1	5 years
P 21	Male	22	High school	Chef	Commis 1	4 years
P 22	Male	22	High school	Chef	Commis 1	3 years
P 23	Female	26	Undergraduate	Chef	Commis 2	2 years
P 24	Female	25	Undergraduate	Chef	Commis 2	1 year
P 25	Female	23	Associate Degree	Chef	Commis 2	3 years
P 26	Female	23	Associate Degree	Chef	Commis 2	3 years
P 27	Female	23	Associate Degree	Pastry Chef	Commis 2	2 years
P 28	Male	22	High school	Chef	Commis 2	3 years
P 29	Male	22	Undergraduate	Chef	Commis 2	1 year
P 30	Female	24	Undergraduate Student	Student	Trainee	1 year
P 31	Female	23	Undergraduate Student	Student	Trainee	1 year

When Table 1 is examined, it is seen that 20 of the participants were male while 11 were female. The mean age of the participants was 29 years. When their professional status is examined, it is seen that 29 people were chefs and two were students. Considering the education levels, one person was a primary school graduate, 12 people were high school graduates, 7 people graduated with an associate degree, 9 people were undergraduates, and two people were still at the undergraduate level.

Ergonomics rules, advantages of ergonomically designed kitchens, hygiene and sanitation processes in kitchens were examined and it was revealed that there is an interaction between ergonomics and hygiene. The priority in kitchen design is expressed with definite judgments.

Table 2. Priority in kitchen design

P1	Functional and convenient	P 17	Practical and functional
P2	Functional and convenient	P 18	Functional and convenient
P3	Functional and convenient	P 19	Functional and convenient
P4	Functional and convenient	P 20	Practical and functional
P5	Functional and convenient	P 21	According to the physiological characteristics of the staff
P6	Functional and convenient	P 22	Practical and accessible
P7	Functional and convenient	P 23	Functional and convenient
P8	Functional and convenient	P 24	According to the physiological characteristics of the staff
P9	Practical and accessible	P 25	Practical and functional
P10	Functional and convenient	P 26	Practical and functional
P 11	Practical and accessible	P 27	Functional and convenient
P 12	Functional and convenient	P 28	According to the service type
P 13	Practical and accessible	P 29	According to the service type
P 14	Practical and accessible	P 30	According to the physiological characteristics of the staff
P 15	Functional and convenient	P 31	Functional
P 16	According to the characteristics of the staff		

Of the participants (N=12) working in the hotel business, 38.70% stated that the kitchen should be functional and convenient, 16.12% expressed that it should be practical and accessible, 16.12% said that the kitchen should be practical and functional, 12.90% argued that the kitchens should be designed according to the physiological characteristics of the staff, 6.45% advocated that the kitchen should be designed according to the service type, and 3.22% stated that the kitchen should be functional.

Considering the answers given by the executive chefs and sous chefs (N=7) working in the hotel business, 4 of them argued that the kitchen should be functional and convenient, one stated that the kitchen should be practical and accessible, and two claimed that the kitchen should be designed according to the type of service.

As for the answers given by the chef de partie (N=4) working in the hotel business, 50% advocated that the kitchen should be functional and convenient, while 50% advocated the kitchen to be practical and accessible.

When the answers given by the demi chefs (N=5) working in the hotel business are examined, two participants suggested the kitchen to be functional and convenient, two stated that the kitchen should be practical and accessible, and one participant claimed that it should be designed according to the physiological characteristics of the kitchen staff.

Once the answers given by the commis 1 (N=6) working in the hotel business are investigated, two people advocated the kitchen to be practical and functional, two to be functional and convenient, one to be practical and functional, and one to be designed by taking into account the physiological characteristics of the staff.

In line with the answers given by the Commis 2 (7 people) working in the hotel business, two people stated the kitchen to be functional and convenient, two to be practical and functional, two to design the kitchen according to the service type, and one to design the kitchen according to the physiological characteristics of the staff.

When the answers given by the trainees (N=2) working in the hotel business are considered, one person advocated that the kitchen should be designed according to the physiological characteristics of the kitchen staff, and one stated that the kitchen should be functional.

Of the female participants (N=11), 4 advocated the kitchen to be practical and functional, 4 to be functional and convenient, two to design the kitchen taking the physiological characteristics of the kitchen staff into account, and one to be functional.

Of the male participants (N=20), 8 of them argued that the kitchen should be functional and convenient, 5 stated that it should be practical and accessible, 4 expressed that it should be designed according to the type of service, two suggested that it should be designed according to the physiological characteristics of the kitchen staff, and one person argued that the kitchen should be designed in a practical and functional way.

Among the participants who had an undergraduate education (N=9), 4 people argued that the kitchen should be functional and convenient, two to be practical and functional, one to be practical and accessible, one to be designed according to the type of service, and one person to be designed according to the physiological characteristics of the kitchen staff.

Of the undergraduate student participants (N=2), one person advocated that the kitchen should be designed according to the physiological characteristics of the staff while the other argued that it should be functional.

When the answers given by the participants with associate degree degrees (N=7) are examined, two people argued that the kitchen should be designed as practical and functional, two to be functional and convenient, one to be practical and accessible, one to be designed according to the service type, and one to be designed according to the physiological characteristics of the kitchen staff.

Among the high school graduate participants (12 people), 5 stated that the kitchen should be functional and convenient, 3 to be practical and accessible, two to be designed according to the type of service, one to be practical and functional, and one to be designed according to the physiological characteristics of the kitchen staff.

The participant with a primary school education (N=1) advocated that the kitchen should be functional and convenient.

The view of the participant coded P8 is as follows;

"First of all, the kitchen should be designed considering the width of the kitchen and its use. All equipment to be used here should be in the same place. The counters and sinks in the kitchen should be designed according to the capacity of the kitchen, according to its quality, and according to the customer type. If your restaurant is small, you

need to create a small kitchen, if it is large, you need to design a large kitchen. Most importantly, it should be convenient."

The view of the participant coded P2 is as follows;

"First of all, kitchens should be useful and convenient."

The view of the participant coded P23 is as follows;

"The priority in the kitchen is that it should be functional and suitable for the work to be done. Considering our priorities, a spacious and comfortable environment should be prepared in the kitchen. Because, unless our physical characteristics are taken into account in the kitchen design, the productivity of the staff will be adversely affected."

As understood from these statements, P2, P8, P23 state that the priority in the design of the kitchen should be given to its functionality and convenience. P23 suggested that the kitchen should be useful and designed according to the physiological characteristics of the staff. He emphasized that if these factors are not taken into account, the productivity of the kitchen workers may decrease.

The view of the participant coded P31 is as follows;

"When designing a kitchen, the priority is functionality. I think it's a matter of how much efficiency we can get from there and how much we can optimize it. While doing this, of course, factors such as comfort need to be considered. I think the most basic element is to ensure the most efficiency we can get from the space we have."

Along with these statements, P31 emphasizes that functionality should be the priority when designing the kitchen. Considering the functionality and comfort features in the kitchen design, the may increase the efficiency by making the best use of the existing space.

Participants' Knowledge Levels About Ergonomics

The extent to which the participants knew the concept of ergonomics and what the concept of ergonomics meant according to the participants were determined and given in the following table.

Table 3. The connotations of the concept of ergonomics in the participants

P1	I heard. Improvement of workplaces.	P 17	I heard. It is a design in which working environments are safe and practical.
P2	I heard. Creating a physical and psychological working environment	P 18	I heard. Design that considers the safety and health of staff
P3	I heard. Optimal design and placement of a product	P 19	I heard. Regular and systematic working environments.
P4	I heard. Creating working environments according to physical characteristics.	P 20	I heard. Creating a working environment according to physical characteristics
P5	I heard. Improvement of workplaces.	P 21	I heard. Creating a physical and psychological working environment
P6	I did not hear.	P 22	I heard. It is the working comfort of the staff.
P7	I heard. The floor plan made for the comfortable and efficient work of the staff.	P 23	I heard. Creating a working environment according to physical characteristics
P8	I heard. Improvement of workplaces.	P 24	I heard. It is a design in which working environments are safe and practical.
P9	I heard. Regular and systematic working environments.	P 25	I heard. Creating a working environment according to physical characteristics
P10	I heard. Improvement of workplaces.	P 26	I heard. It is the working comfort of the staff.
P 11	I heard. Improvement of workplaces.	P 27	I heard. Improvement of workplaces.

Table 3. The connotations of the concept of ergonomics in the participants (Continuation)

P 12	I heard. Improvement of workplaces.	P 28	I did not hear.
P 13	I did not hear.	P 29	I heard. Improvement of workplaces.
P 14	I heard. Creating a physical and psychological working environment	P 30	I heard. Improvement of workplaces.
P 15	I heard. Improvement of workplaces.	P 31	I heard. Design that considers the safety and health of staff
P 16	I heard. Regular and systematic working environments.		

While 90.33% of the 31 participants working in the hotel business said that they heard ergonomics before, 9.67% said that they did not hear ergonomics before.

Considering the answers given by executive and sous chefs (N=7) working in the hotel business, 6 said that they heard ergonomics before, while one person said that they did not hear ergonomics before.

All of the chef de partie working in the hotel business heard ergonomics before.

When the answers given by the demi chefs (5 people) working in the hotel business are examined, 4 people said that they heard ergonomics before, while one said that he did not hear ergonomics before.

All of the commis 1 working in the hotel business heard ergonomics before.

According to the answers given by the commis 2 (N=7) working in the hotel business, 6 people said that they hear ergonomics before, while one person said that he did not hear it before.

All of the trainees working in the hotel business said that they heard ergonomics before.

All of the female participants (N=11) heard ergonomics before.

While 17 of the male participants (N=20) said that they heard ergonomics before, 3 people said that they did not hear it before.

All of the participants with an undergraduate degree (N=9) heard ergonomics before.

All of the undergraduate student participants (N=2) heard ergonomics before.

Six of the participants (N=7) with an associate degree said that they heard ergonomics before, whereas one said that they did not hear it before.

While 10 of the high school graduate participants (N=12) said that they heard ergonomics before, two people said that they did not hear it before.

The primary school graduate participant (N=1) said that he heard ergonomics before.

The view of the participant coded P17 is as follows;

"Yes, I heard it before while studying at MSA. It means designing the kitchen for the safety of the working environments, the fast and safe exit of the products."

The view of the participant coded P18 is as follows;

"Ergonomics; yes, I heard it before. Ergonomics is the design of work environments for the staff, taking into account occupational safety and occupational health."

The view of the participant coded P31 is as follows;

"I've heard of ergonomics before. I think it is a branch of science that is based on people. I think that the health, safety, or performance of the person is maintained in the foreground and while these are considered, the kitchen and tools are prepared according to these factors."

From these expressions, it is understood that P17, P18, P31 have heard of ergonomics before and see ergonomics as a science that takes into account the occupational health and safety of the personnel in their working environments.

The view of the participant coded P2 is as follows;

"I heard ergonomics before. We can say that ergonomics is the conditions that can be applied to increase work efficiency in physically suitable conditions in working life. We can say that creating a convenient working environment both physically and psychologically."

The view of the participant coded P14 is as follows;

"Yes, I heard it at the restaurant. If you are going to place a product, you pay attention to its harmony with the environment. We can say that it is a system that does not tire people in their work, motivates them psychologically, provides convenience, and helps people.

The view of the participant coded P21 is as follows;

"Yes, I heard the word ergonomics. I know it as a branch of science that prepares a public space that provides physical and psychological comfort to kitchen staff."

As understood from these statements, P2, P14, P21 state that they heard it before and see ergonomics as a science that it is a physically and psychologically motivating in working environments.

The effects of ergonomic design in the kitchen on hygiene

Although the knowledge of the participants were at different levels, the answers they gave were in the same direction. The answers are presented in the table below.

Table 4. What are the effects of ergonomic design in the kitchen on hygiene?

P1	It helps to provide hygiene more easily.	P 17	It helps to provide hygiene more easily.
P2	It helps to provide hygiene more easily.	P 18	It helps to provide hygiene more easily.
P3	It helps to provide hygiene more easily.	P 19	It helps to provide hygiene more easily.
P4	It helps to provide hygiene more easily.	P 20	It helps to provide hygiene more easily.
P5	It helps to provide hygiene more easily.	P 21	It helps to provide hygiene more easily.
P6	It helps to provide hygiene more easily.	P 22	It helps to provide hygiene more easily.
P7	It helps to provide hygiene more easily.	P 23	It helps to provide hygiene more easily.
P8	It helps to provide hygiene more easily.	P 24	It helps to provide hygiene more easily.
P9	It helps to provide hygiene more easily.	P 25	It helps to provide hygiene more easily.
P10	It helps to provide hygiene more easily.	P 26	It helps to provide hygiene more easily.
P 11	It helps to provide hygiene more easily.	P 27	It helps to provide hygiene more easily.
P 12	It helps to provide hygiene more easily.	P 28	It helps to provide hygiene more easily.
P 13	It helps to provide hygiene more easily.	P 29	It helps to provide hygiene more easily.
P 14	It helps to provide hygiene more easily.	P 30	It helps to provide hygiene more easily.
P 15	It helps to provide hygiene more easily.	P 31	It helps to provide hygiene more easily.
P 16	It helps to provide hygiene more easily.		

All hotel staff argued that the ergonomic design in the kitchen will help ensure hygiene more easily.

All of the executive chefs and sous chefs (N=7) working in the hotel business stated that the ergonomic design in the kitchen help ensure hygiene more easily.

All of the chef de parties (N=4) working in the hotel business argued that the ergonomic design in the kitchen help ensure hygiene more easily.

All of the demi chefs (N=5) working in the hotel business stated that the ergonomic design in the kitchen help ensure hygiene more easily.

All of the Commis 1 (N=6) working in the hotel business advocated that the ergonomic design in the kitchen help ensure hygiene more easily.

All of the Commis 2 (N=7) working in the hotel business argued that the ergonomic design in the kitchen help ensure hygiene more easily.

All of the trainees (N=2) working in the hotel business stated that the ergonomic design in the kitchen help ensure hygiene more easily.

All of the female participants (N=11) argued that the ergonomic design in the kitchen help provide hygiene more easily.

All of the male participants (N=20) suggested that the ergonomic design in the kitchen help ensure hygiene more easily.

All of the participants who have an undergraduate degree (N=9) advocated that the ergonomic design in the kitchen help ensure hygiene more easily.

All of the undergraduate student participants (N=2) stated that the ergonomic design in the kitchen help provide hygiene more easily.

All of the participants with an associate degree (N=7) argued that the ergonomic design in the kitchen help provide hygiene more easily.

All of the high school graduates (N=12) explained that the ergonomic design in the kitchen help ensure hygiene more easily.

The primary school graduate participant argued that the ergonomic design in the kitchen help ensure hygiene more easily.

The view of the participant coded P1 is as follows;

"It has so many effects. For example, if the sink is high and the person is washing his/her hand, water may splash as it is not ergonomically designed, which will have a negative impact on hygiene. For example, if the shelves on the counter where the clean plates are placed are very high, you can take the products directly from there and serve the product without seeing whether it is dirty or not."

The view of the participant coded P2 is as follows;

"It has a direct link. You can wash your hands without touching the surroundings by pressing your leg or pressing the pedal in professional handwashing sinks. Now, after the pandemic, we have sensored instruments that give soap and disinfectant without hand contact. These are used to prevent contact. To avoid contact, you need to reduce the distance between them. When there is such a system, our working areas in the kitchen will be clean. For example, if someone else comes into contact with the upright cabinet before you, there will be no negative situations because this system applies. This has something to do with ergonomics. You have to touch more surfaces in an inconvenient kitchen. Of course, you touch many points while transferring your products. For this reason, if your hand washing and vegetable washing sink are not within easy reach at the place where you work, it means that everything is not suitable in this kitchen. For example, you first bought your vegetables with pallets and go down three floors and wash your vegetables. Then you put your clean vegetables in the car, walk for 15 minutes, get on the elevator, touch many points in the elevator and come to the kitchen. After that, you extend the vegetables to the counter. All of these will appear as both a loss of workforce and an unhygienic situation. The fewer these processes are, the more efficiency and hygiene will increase. By reducing the number of processes, you can prevent contact."

The view of the participant coded P3 is as follows;

"We can provide hygiene more easily with products that can be cleaned more easily, moved and placed. If you have a restaurant with a capacity of 30 people, and if you are trying to do this with an oven that can cook for 500 people, it will be difficult to clean and move the products once. Therefore, an ergonomic arrangement provides serious convenience in terms of keeping the kitchen clean and hygienic. These contribute positively to hygiene. In the kitchen, the products should be made of washable, cleanable materials and equipment that can be easily disinfected. There are some materials that do not contain bacteria and do not keep them on, they are very hygienic."

The view of the participant coded P4 is as follows;

"In a well-designed kitchen, you can provide hygiene more comfortably and easily."

The view of the participant coded P5 is as follows;

"I think it has a lot of influence. Because without ergonomics, there is no hygiene. It would be a problem to expect hygiene in a non-ergonomic kitchen. It will be more difficult to maintain hygiene."

The view of the participant coded P7 is as follows;

"It will be easier to clean in a properly planned kitchen. Because there won't be any places you can't reach."

The view of the participant coded P8 is as follows;

"Hygiene is prioritized in ergonomically designed equipment. Cleaning such equipment will also be easy. Easy to pull cabinets, mobile benches, etc. In this case, the quality increases."

The view of the participant coded P17 is as follows;

"It helps to be more organized in the kitchen. It helps to ensure hygiene in the production in the kitchen so that it can be easier. It helps and facilitates everything from the color of cutting boards to countering the risk of cross-contamination."

The view of the participant coded P18 is as follows;

"It has great implications for hygiene. For example, an ergonomically designed kitchen has a vegetable and fruit washing and drying area and a separate hand wash sink. For this reason, there will not be any hygiene-related problems in the products made."

Conclusion and Recommendations

Although the ergonomics and hygiene rules applied in businesses have varied from past to present, progress has been made by adhering to the original concept. The location of Istanbul and its being a metropolitan city made it important to carry out this study there. Ergonomics and hygiene practices in an international hotel in Istanbul were examined and the interaction between them was tried to be revealed.

The answers given to the questions vary according to the workplace and experience. In the answers given to the priority in kitchen design, the participants mostly stated that the kitchen should be functional and convenient, practical and accessible, practical and functional, and some said that it should be designed according to the type of service. According to the answers given, it is seen within the rules of ergonomics that a kitchen is practical and functional. It is understood that there is no difficulty in fulfilling the hygiene rules in such kitchens.

It is said that maintaining the hygiene of ergonomically designed kitchens is easier than the kitchens without ergonomic design. For instance, moving the kitchen cabinets forward, backward and to the side make cleaning easier. In addition, participants stated that a kitchen cabinet that cannot be moved is difficult to clean.

While designing the kitchen, it is necessary to seek help should from chefs and architects who have a good grasp of how the design will be. Wrongly designed kitchens cause the staff to get tired and wear out.

Planning the working environments in a way that will ensure the safety and efficiency of the staff will maximize the efficiency to be obtained from that business. The performance of the staff will be positively affected in the ergonomically designed kitchens.

When necessary precautions are not taken in the kitchen and storage areas, possible accidents are caused. As a result, the problem of incapacity and lack of staff arises.

Staff changes occur frequently in kitchens that do not have an ergonomic design. As a result, the quality of the food decreases due to the frequent changes and the adaptation process.

Ergonomically designed kitchens increase the productivity of the staff and the hygiene conditions of the equipment.

Due to the short distance between the purchase and the kitchen in ergonomically designed kitchens, possible physical contamination that may occur will be prevented.

In ergonomic kitchens, personal hygiene will be provided easily as there will be hand washing sinks at each station.

Bacterial factors will be prevented due to the separation of vegetable and fruit washing areas in ergonomically designed kitchens.

In ergonomically designed kitchens, since the trash cans have a pedal system, hand contact is prevented and hygiene is provided at the maximum level.

- In kitchen design; the kitchen chef and architect provide an accurate design. In a properly designed kitchen, the quality of the food can be increased thanks to the training given by the food engineer to the staff on hygiene.

- Reproducing the equipment used in the kitchen can prevent the negative effects of hygiene.

- Wide movement areas can be created to ensure comfortable transitions between stations in the kitchen.

- The stations should have a large area so that two people do not come into contact with each other at the same time.

- Hygiene and sanitation training should be given to kitchen staff at regular intervals. As a result of the training given, an exam may be taken.

- Businesses should have sanctions that indicate that employees should take the necessary precautions regarding hygiene. A scoring system chart should be created by observing the hygiene rules applied by the staff. Promotion may be carried out according to the result of this scoring.

- Each station should have its own counter and work area. Each station should have its own +4,-18 locker. In this way, work speed and efficiency will increase.

-The location of the kitchen and the purchasing unit can be located close to each other. In this way, the hygiene of the product can be ensured.

- The length of the counter can be designed in such a way that it will not prevent the staff from working or cause health problems in the future.

- Mise en place cabinets must have a drawer system. It will make the order faster, and it will also prevent health problems.

- In ergonomically designed kitchens, it can be easier to maintain hygiene in the area due to the fact that mise en place cabinets have a drawer system. Health problems can be prevented as well as enabling us to make the order faster.

- Hygiene can be achieved more easily in ergonomically designed kitchens, since each station has its own hand wash basin and vegetable washing unit.

- In properly designed kitchens, regular cleaning and replacement of the rubbers of the mise en place cabinets can affect hygiene positively.

- Hand hygiene can be provided more easily by introducing a pedal system without hand contact in handwashing sinks.

- Every business can have a stewarding team that knows which chemicals should be used to clean the equipment.

Declaration

All the authors have equally contributed to the article. There is no conflict of interest to be declared by the authors. The ethics committee permission document required for the collection of the data used in this study was obtained from the Balıkesir University Ethics Committee with the date 08.04.2021 and the decision/number 2021/2.

REFERENCES

Barnett, R. L., Glowiak, S.A. & Poczynok, P. J. (2002, Ocak). İnsan kaymasının stokastik teorisi. In *ASME Uluslararası Mekanik Mühendislik Kongresi ve Sergisi* (Vol. 36479, s. 93-99).

Bilici, S., Uyar, M. F., Beyhan, Y. & Sağlam, F. (2008). *Besin güvenliği*. Ankara: T.C. Sağlık Bakanlığı Yayınları.

Blair, A. (2003). *With ergonomics, small steps equal big benefits*. Nation's Restaurant News.

Bostan Sarıoğlan, A. & Deveci B. (2021). Öğretmen Adaylarının Beslenme ile İlgili Bilişsel Yapılarının Kelime İlişkilendirme Testi ile Belirlenmesi, *Journal of Tourism and Gastronomy Studies,* 9(4). 3003-3017.

Bulduk, S. (2007). *Gıda ve personel hijyeni* (1. baskı). Ankara: Detay Yayıncılık.

Bulduk, S. (2009). *Gıda teknolojisi* (5. baskı). Ankara: Detay Yayıncılık.

Çeven, S. & Özer, K. (2013). Büro ergonomisinin çalışma psikolojisi ve iş verimine etkisi. *Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü Dergisi,* (25), 61-70.

Çivril, H., Aruğaslan, E. & Yakut, G. (2013). Uzaktan eğitim ders içeriklerinde bilişsel ergonomi ve kullanılabilirlik. *Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 1, 233-246.

Demirdiler, S. & Üçdoğruk, Ş. (1995). *İş kazaları ve ergonomi*. İstanbul: Milli Prodüktivite Yayınları.

Denizer, D. (2005). *Konaklama işletmelerinde yiyecek ve içecek yönetimi*. Ankara: Detay Yayıncılık.

Dul, J., Bruder, R., Buckle, P., Carayon, P., Falzon, P., Marras, W. S., ... & Van der Doelen, B. (2012). A strategy for human factors/ergonomics: developing the discipline and profession. *Ergonomics*, *55*(4), 377-395.

Dul, J., Weerdmeester, B. A., Yavuz, M., Kahraman, N. & Ceylan, C. (2007). *Ergonomi: Ne, neden, nasıl?*. Ankara: Seçkin Yayıncılık.

El-Gammal, M. I., İbrahim, M.S., Badr, E. A., Asker, S. A. & El-Galad, N. M. (2011). Health risk assessment of marble dust at marble workshops. *Nat Sci,* 9(11), 144-154.

Erdal, G. (2013). Ambalajın dili ve psikolojik etkisi. *Akademik Bakış Dergisi*, 35, 1-10.

Erkan, N. (2003). *Ergonomi*. Ankara: Milli Prodüktivite Merkezi Yayınları.

Ersin, M. & Beyhan, Y. (2015). Toplu beslenme sistemlerinde hijyen sanitasyonu sağlama önerileri. *Mesleki Sağlık ve Güvenlik Dergisi (MSG)*, 2(8), 19-26.

Ertopcu, İ., Avcıkurt, A. & Çetinkaya, T. (2019). Aşçılık programı öğrencilerinin hijyen bilgi düzeyleri üzerine bir araştırma. *Journal of Tourism and Gastronomy Studies*, 7 (3), 2187-2203.

Feyen, R., Liu, Y., Chaffin, D., Jimmerson, G. & Joseph, B. (2000). Computer-aided ergonomics, s. a case study of incorporating ergonomics analyses into workplace design. Applied Ergonomics, 31(3), 291-300.

Fişek, A. G. (1995). Çok bilimli eksende işçi sağlığı iş güvenliği. *Ankara Üniversitesi SBF Dergisi*, 50 (3), 167-172.

Frable, J. F. (1996). Enhance operational efficiencies with improved ergonomics. *Nation's Restaurant News,* 30(32), 92-93.

Gökdemir, A. & Sökmen, A. (2005). *Mutfak hizmetleri yönetimi*. Ankara: Detay Yayıncılık.

Güler, Ç. (1997). *Ergonomiye giriş.* Ankara: Çevre Sağlığı Temel Kaynak Dizisi: 45.

Güler, S. (1998). *Otel işletmelerinde mutfak planlaması ve bir anket uygulaması*. Yayımlanmamış Yüksek Lisans Tezi. Eskişehir: Anadolu Üniversitesi, Sosyal Bilimler Enstitüsü.

Güneş, E. & Koçyiğit, T. (2018). Turizm işletmelerinde hijyen ve sanitasyona dair işbaşı eğitimin önemi: Konya örneği. *Ulusal Çevre Bilimleri Araştırma Dergisi,* 1(2), 73-86.

Jones, R. A. & Kapple, W. H. (1975). *Kitchen planning principles: Equipment, appliances*. Urbana-Champaign: Small Homes Council-University of Illinois.

Joshi, S. (2016). To study the relationship between ergonomics and efficiency of the housekeeping employees at workplace. *Atithya, S. Journal of Hospitality,* 2(1), 37-42.

Karsh, B. T., Waterson, P. & Holden, R. J. (2014). Crossing levels in systems ergonomics, s. a framework to support 'mesoergonomic'inquiry. *Applied Ergonomics*, 45(1), 45-54.

Koçak, N. (2010). *Yiyecek içecek işletmelerinde gıda ve personel hijyeni*. Ankara: Detay Yayıncılık.

Lee, H. Y., Chik, W. N. W., Bakar, F. A., Saari, N. & Mahyudin, N. A. (2012). *Sanitation practices among food handlers in a military food service institution.* Malaysia.

Mahami, T. & Odonkor, S. T. (2012). Food safety risks associated with tertiary students in self catering hostels in Accra Ghana. *International Journal of Biology, Pharmacy and Allied Sciences,* 1(4), 537-550.

Matthews, J. & Just, A. (1967). Progress in the application of ergonomics to agricultural engineering. Engineering symposium of the Institute of agricultural engineers agricultural engineering. NCAE: College Silsoe.

Özdamar, K. (1999). *Paket programlar ile istatistiksel veri analizi-1: SPSS-MINITAB*. İstanbul: Kaan Kitabevi.

Patton, M. Q. (2014). *Nitel araştırma ve değerlendirme yöntemleri* (Çev. S. Çelik, F.Ö. Karataş). Ankara: Pegem Akademi.

Sabancı, A. & Sümer, S. K. (2015). *Ergonomi*. Ankara: Nobel Yayın.

Sarıoğlan, M. & Bostan Sarıoğlan, A. (2012). *The Effect of Underwater Fauna Diversity in The Agean Sea on Ayvalık* Region Culinary Culture and Gastronomy Tourism, Underwater Values and Tourism.

Saygı, A. C. (2016). *Seyahat acentalarında ergonomik koşulların işgörenlerin iş doyumuna etkisi*. Yayınlanmamış Yüksek Lisans Tezi. Balıkesir: Balıkesir Üniversitesi, Sosyal Bilimler Enstitüsü.

Shaikh, Rh, Khan, T. & Hussain, I. (2012). Farmasötik bitki sanitasyonu ve temizliği: Kaliteli, güvenli ve etkili ilaçlar için bir adım atın. *Kanada Uygulamalı Bilimler Dergisi*, 2, 246-254.

Songur, C. (2009). *Gıda güvenliği yönetim sisteminin kalite maliyetlerine olan etkisi*. Yayımlanmamış Yüksek Lisans Tezi. İstanbul: Marmara Üniversitesi, Sosyal Bilimler Enstitüsü.

Sökmen, A. (2003). *Ağırlama endüstrisinde yiyecek ve içecek hizmetleri yönetimi*. Ankara: Detay Yayıncılık.

Şimşek, M. (2010). *Örgütsel etkinliğin sağlanmasında iş gören- iş uyumunun ergonomik analizi.* Yayımlanmamış Doktora Tezi. Konya: Selçuk Üniversitesi, Sosyal Bilimler Enstitüsü.

Tutar, H. (2000). *Kriz ve stres ortamında yönetim.* İstanbul: Hayat Yayınları.

Türkan, C. (2000). *Uygulamalı yemek yemek yapma tekniği.* İstanbul: İnkılap Kitap Evi.

Türkmen, F. (2004). Kayseri'de et ve et mamülleri üreten işletmelerde üretimde çalışan personelin hijyen ve sanitasyon konusunda bilgi düzeyleri. *Erciyes Üniversitesi Sağlık Bilimleri Dergisi*, 13(2), 66-75.

Wickens, C. D. (1992). *Engineering psychology and human performance*. New York: Harper Collins.

Yavuzcan, G., Acar, A. İ. & Çolak, A. (1987). İnsanın İş yapabilme yeteneğinin bisiklet ergonomisi yöntemiyle belirlenmesi. *Milli Prodüktivite Merkezi Verimlilik Dergisi*, 4, 57-63.

Yetiz, A. (2009). *Ofis mobilyaları ve ofis mobilyalarının tasarımını etkileyen ergonomi faktörünün incelenmesi: Adana'da bir banka örneği.* Yayımlanmamış Yüksek Lisans Tezi. Adana: Çukurova Üniversitesi, Sosyal Bilimler Enstitüsü.

Yıldırım A. & Şimşek H. (2018). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin Yayıncılık.

Zander, J. (1973). *Principles of ergonomics*. Agricultural University.