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PREFACE

Dear Reader

Public health is a branch of science that contributes to social well-being, defines the determinants of health, offers suggestions for improving health, identifies the risks and threats faced by the society related to health, makes the necessary analyzes and offers the necessary solutions, and also sees the health of individuals as their responsibility from the moment they fall into the mother's womb until their death.

Public health, which is a multifaceted, interdisciplinary field, consists of many elements and different applications. These disciplines include epidemiology, biostatistics, social sciences and health services, infectious diseases, chronic diseases, environmental health, mental health, disasters, public policy, health economics, health management, maternal and child health, pregnancy follow-up, disability, occupational safety, health policies, sexual and reproductive health and gender issues in health.

In our book, we aimed to address the current problems that pose a threat to public health. This book has been brought to the literature by making the necessary arrangements within the scope of the original language book project initiated by Bidge Publications. In addition, I hope that our book will be useful for the benefit of the whole society, especially health professionals, educators and students, and I would like to thank all our contributing authors and the editor-in-chief of the publishing house Zeynel KARACAGİL and his team for their great efforts in the publication of the book.

Editor
Asist.Prof. Dr. Mehmet Ali ŞEN

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CHAPTER I

Risk Factors Exposed By Hospital Workers And An Example Risk Assessment

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Introduction

Healthcare institutions are characterized as high-risk places where professionals with different qualifications and quantities, complex business processes and intensive use of technology are located. In addition, the health sector is defined as one of the riskiest business areas both in our national legislation and in the relevant

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literature because the nature of the service exposes employees to risks and dangers while providing health services (Devebakan, 2007).

People who are sick; He can regain his health thanks to health institutions, health services and health workers. Provision of health services depends on the physical, psychological and social well-being of service providers and a safe working environment.

Employee safety is the most important requirement for employee health. Employee health is very important for the quality of optimal healthcare. In order to ensure and protect the safety of hospital employees and patients, the Ministry of Health has enacted many laws such as "Regulations for Ensuring the Safety of Patients and Employees" and "Employee Safety Circular".

Healthcare Quality Standards are also used to guide the adoption and implementation of these regulations as a safety culture in hospitals. Fundamentally, these regulations impose multiple responsibilities on hospital management, employee safety committees, and employees to ensure the safety of our hospital employees. Therefore, hospital management, employee safety committee and employees' obligations will ensure the safety of hospital employees.

In the healthcare sector, which is a high-risk business line, healthcare workers working in hospitals in high-risk locations must first adopt and implement employee safety practices to ensure their own safety, and then take patient safety as a legal obligation and cultural change (Hakeri, 2010).

Changes and sanctions in Occupational Health and Safety (OHS) and healthcare legislation in our country have led to major changes in employee safety practices. Hospital, which has been considered one of the most heavy and dangerous work categories since 2013, makes the necessary changes in accordance with the law and is regularly reviewed by inspectors of the Ministry of Health and the Ministry of Labor and Social Affairs (MoLSS). OHS activities

are carried out by all employees working in the health institution; It is based on the principle of taking protective measures by explaining the risks that may arise from the work area and the work carried out and that may harm their health and safety, and requires scientific and systematic study. Basic steps;

- Assessment of risks
- Detecting hazards
- Determining the necessary measures to be taken
- Implementation of my measures
- Performing checks
- Performing measurement, surveillance and follow-up operations

In these studies, a comprehensive risk analysis of employees in the healthcare system was conducted to prevent possible occupational accidents.

Nowadays, healthcare workers who deal with different professions and responsibilities while providing healthcare services face some risks and dangers in terms of health and safety. According to the United States Bureau of Labor Statistics (BLS), the rate of occupational accidents and occupational diseases suffered by healthcare workers in the United States is equal to or higher than the rate of occupational accidents and diseases in heavy industry. In the United States, 8.8 out of every 100 full-time healthcare professionals working in hospitals and 13.5 out of every 100 nurses working in home care services suffer from a work accident/occupational disease and are away from their jobs.

Considering that the above rate is 4 per 100 employees in the mining sector, 7.9 per 100 employees in the construction sector, and 8.1 per 100 employees in the production sector (industry); People will better understand the importance of work accidents and illnesses for healthcare workers (Evanoff, 2003).

Although the variables affecting the OHS of healthcare workers vary from one healthcare institution to another, it is generally seen that workers in this sector face biological, chemical, physical, psychological or environmental risks (Waterman, 1995). Health and safety management in healthcare services adopts an approach aimed at patients/patients' relatives and healthcare professionals. Mcdiarmid believes that the patient-focused part of healthcare safety management is the patient care environment, and the employee-focused part is the work environment (Mcdiarmid, 2006).

Health services is a high-risk sector in terms of occupational accidents (Yeşildağ, 2005). Since medical institutions employ many professional groups, the working environment of the employees is also different. Differences in the working environment may cause healthcare professionals to encounter different risks and dangers.

Workers in the health sector face not only biological damage, but also many risk factors, from various physical factors and chemicals to violent behavior, long working hours and low wages (Ergör, 2002). Work accidents and occupational diseases suffered by healthcare workers can cause work restrictions, which are a factor that reduces working days and reduces productivity. Healthcare workers experience job dissatisfaction due to increasing work pressure and the quality of their work in an environment of privatization and competition (Demiral, 2006).

The place where this study was conducted is a hospital operating in the center of Diyarbakır. Hospital; It was established on an area of 4,000 m² and consists of Cardiology, Oncology, Children's Hospital, Polyclinics and Administrative departments.

At hospital; Hazards and hazards observed from a total of 416 employees, including 1 hospital chief physician, 3 hospital deputy chief physicians, 1 chief nurse, 2 assistant chief nurses, 70 doctors, 130 nurses, 2 managers, 4 assistant managers, 1 class A occupational safety expert, 2 engineers, 200 support workers. As a result of the

risks, opinions and suggestions were received to carry out the risk assessment study.

In order to evaluate chest tuberculosis, intensive care unit, neurology clinic and physical therapy clinics in terms of OHS risk factors, all clinical units (outpatient clinic, inpatient, laboratory, dressing room, doctor's room, etc.) were directly visited and examined with a previously prepared checklist. Sources of danger and the risks they will cause are noted in detail.

In this study, standard risk factors are listed in order to apply the Matrix and Fine-Kinnney method; Which of these hospital employees may encounter was determined by a preliminary examination in the hospital. For preliminary examination, hospital units, rooms and outbuildings were visited; An analysis was made from the perspective of an analyst based on previously acquired information about risk factors, and notes were taken. Information was obtained about the hazardous situation, behavior and environmental conditions by interviewing the employees in the units. Later, a checklist (list of risks) was created and the risks were evaluated by visiting and observing the units again. In this context, a risk scoring procedure was followed by applying the Matrix and Fine-Kinney methodology.

Figure 1. Risk Factors Observed in the Hospital Within the Scope of COVID-19

Dangerous situations and dangerous movements occurring in the chest tuberculosis intensive care unit, neurology clinic and physical therapy clinic departments of a hospital operating in Diyarbakır Center were examined. Many hazards and risks have been identified regarding infection, hazardous waste accidents, radiation, communication problems, electricity, noise, traffic, ergonomics, emergency escape, fire and COVID-19.

Considering the risk factors seen as a result of on-site interviews and field observations in outpatient clinics, radiology and blood collection units within the scope of the COVID-19 pandemic; There are uncontrolled entrances of patients and their relatives at the main entrance of the hospital polyclinic and temperature measurements are not taken, patients and their relatives applying to the polyclinics walk around the hospital without masks, masks are not distributed to patients and their relatives at the entrance of the polyclinic, hand disinfectants are not available at the entrances of the polyclinic, there is no general patient registration admission. It warns and informs that the employees in the unit and other polyclinics do not have face shields, that there is a queue in the area where the blood collection registration and blood collection process is carried out without complying with the social distance rule, that there are more than one patient inside although there is only one employee in rotation, and that the social distance rule must be followed in the polyclinic and other areas. Situations such as absence of signs have been detected.

Figure 2. COVID Precautions Taken During the Procedure for the Patient

Oncology outpatient clinic; The pharmacy unit consists of work area, drug storage and drug preparation areas. Considering the thermal comfort conditions for the employees and the storage conditions of the drugs, it has been observed that natural ventilation is insufficient and there are no forced ventilation and air conditioning systems.

Figure 3. Risky Medicine Stacking in the Pharmacy Unit

The current situation is that drugs containing chemicals with serious mutagenic effects will pose a serious risk to employee health. There are no fire extinguishing cabinets and fire extinguishing systems (fire extinguishers, etc.) against possible fire in the oncology hospital oncology pharmacy unit working area. It has been observed that there is no fire/smoke detection system against fire.

Figure 4. Stacking in a Risky Ventilation Environment in the Pharmacy Unit

During the field observation carried out to determine the non-conformity of hazardous waste in the hospital chemotherapy unit; Antineoplastic drugs administered to patients in the chemotherapy unit of the oncology hospital have cytotoxic, mutagenic and teratogenic effects, and antineoplastic drug wastes resulting from treatment are placed in inappropriate waste bins. There is a high risk of contamination, waste collection in the chemotherapy unit working area is carried out by employees without taking the necessary protective measures, the collection, transportation and disposal processes of antinepoplastic drug waste generated after chemotherapy treatment are not carried out in accordance with the standards, etc. risk factors have been identified.

Figure 5. Risk Factors Created by Chemotherapy Hazardous Wastes

When we examine what the risk factors may be caused by water flowing from the attic where the heart hospital angiography unit and KVC intensive care center air conditioning systems are installed; After the central air conditioning systems of the heart hospital were put into cooling mode and approximately 2.5 bar of water was pumped in two days, the circulation system in one of the two units called hygienic package air conditioning, located on the attic above the angiography unit, feeding the angiography operation rooms, worked. As a result of the cracking and rotting of some of the copper pipes in the senpantin part containing copper pipes, the pumped water leaked through the copper pipes and flowed into the unit.

The water overflowing from the unit and collected in a certain area of the attic floor over time during the day flowed to the angiography unit located just below it and, due to the slope, to the KVC intensive care unit. At the same time, the water reaching the

edges of the walls also flowed from the edges to certain areas of the polyclinic floor.

Interviews were held with the relevant people and employees in the same area, and some of the discharge pipes drawn from the angiography unit, KVC intensive care unit, the attic where the central air conditioning systems above the angiography unit are installed, and the polyclinic, and the hygienic package air conditioning unit on the attic, were used to evacuate the water flowing from the units without coming into contact with the ground. It has been determined that the risk factors are that it does not have a sufficient slope to carry the water to the final discharge point, the gaps (dilatation) in the concrete floor that are bordering each other are not closed, the concrete floor is left in a cast state, it does not have sufficient insulation, and the plasterboards in certain areas of the ceiling on the polyclinic floor are exposed to water.

Figure 6. Risk Factors Created by Chemotherapy Hazardous Wastes

When the risk factors created by inappropriate electrical cables are examined in the field observation made in the hospital parking area; lighting installed at various times in the parking lot around the hospital, children's playground and its surroundings, parking entrance and exit barriers, etc. During the works, the cables of the power line that need to be underground by taking the necessary insulation measures are left exposed, the control boxes of the power line located in various parts of the parking area are not locked in an unsafe manner, and there is no risk of possible electrical hazards and shocks in the parking lot, children's playground and surrounding areas. It was determined that there was no warning sign.

Figure 7. Inappropriate electrical wiring in the parking area

Conclusion

In a hospital operating in Diyarbakır Center: As can be seen from the findings of the risk assessment study conducted with Matrix

and Fine-Kinney methods, a total of 90 hazards and risks were evaluated and the relevant findings were included. The process of identifying hazards and risks was done by dividing the employees into two different groups.

Table 1. Comparison of matrix and fine-kinney risk assessment

Activity: Hospital Risk Management		**Matrix Current Status**		**Situation After Matrix CPA**		**Fine-Kinney Current Status**		**Situation After Fine-Kinney CPA**	
Danger	**Risk**	**Doctors**	**Other healthcare personnel**	**Doctors**	**Other healthcare personnel**	**Doctors**	**Other healthcare personnel**	**Doctors**	**Other healthcare personnel**
Development of latex allergy due to glove use	Allergy	6	6	3	3	240	20	8	8
Skin allergy caused by hand antiseptics	Allergy	6	6	3	3	240	240	8	8
Allergy development due to exposure to device disinformation	Allergy	6	6	3	3	100	90	40	6
Allergic skin diseases caused by the use of surface disinformation	Allergy	6	6	3	3	240	80	16	16
Risk of drug reaction due to exposure to drug splashes	Allergy	6	6	3	3	240	20	16	8

Physical violence (assault, battery, etc.)	Violence	6	6	3	3	240	240	16	16
Verbal violence (insults, threats, etc.)	Violence	12	9	6	3	240	240	16	8
Sexual harassment (verbal or physical)	Violence	6	6	3	3	45	240	6	8
Transmission through skin contact with blood and body fluids	Infection	8	12	4	8	240	240	40	16
Transmission through eye contact with blood and body fluids	Infection	8	12	4	8	100	240	40	8
Risk of contamination due to physical environment	Infection	4	8	4	4	240	130	16	40
Injury with a cutting tool	Infection	12	8	4	4	240	240	8	8
Disorders due to inadequate sink ventilation	Infection	12	12	4	4	100	90	40	6

- According to the results obtained from the study, recommendations for similar studies on the hospital to be conducted in the future and to the stakeholders of the sector are given below.
- In intensive care units, instructions should be created and used for practices such as patient transportation, lifting and pulling. Training on occupational safety and relevant legal regulations, such as ergonomics, exercise, and coping with stress, should be provided to all hospital employees.
- In order to obtain clearer results when evaluating ergonomic risk factors in the hospital, methods such as Ovako Working Posture Analyzing System (OWAS), Rapid Whole Body Assessment (REBA) and Rapid Upper Body Assessment (RULA), which are among the ergonomic risk assessment methods, should be preferred.
- Preventive and protective practices regarding occupational health and safety in hospitals should be constantly improved and periodic inspections should be carried out on time without being neglected.
- It should be ensured that healthcare workers undergo health checks at regular intervals, records of personal health information are kept, an ergonomic working environment, safe tools, equipment and devices are provided, and protective measures are taken by checking the devices at regular intervals.
- Depending on the nature of the job, employees should be ensured to use PPE.
- It is of great importance to hold on-the-job talks (toolboxes) periodically in hospitals in order to raise awareness and, as a result, to create a culture of occupational safety.
- As a result of the risk analysis and literature review conducted in the study, it has been revealed that the most important factor

in preventing work accidents and occupational diseases is that employees should be trained at regular intervals.

- It is seen that the basic trainings, which should be given periodically for 8, 12 and 16 hours according to the workplace hazard class, are given in very short periods of time such as 1-2 hours, using the intensity of the work as an excuse. It is of great importance to provide these trainings fully in order to reduce the safety culture and occupational accidents. In addition, it should be ensured that the training that must be given upon return to work after a work accident is not neglected.
- In hospitals, after a work accident, a detailed root cause analysis should be carried out and precautions should be taken according to the results, and if necessary, the employee's department should be changed or assigned to a lighter job.
- One of the ways to prevent work accidents and occupational diseases in hospitals is to ensure that risk analyzes are shared with employees. In addition, annual training plans should be prepared for experts on risk analysis and periodic training should be provided to each employee.
- Awareness should be created that documentation work carried out in the workplace and labor inspections should be done by informing the employees, not on paper, in order to avoid penalties.

As a result, informing employees about the work on occupational safety through training will eliminate or minimize work accidents and occupational diseases. Otherwise, perfect documentation work done in the digital environment will not be of any importance in eliminating work accidents and occupational diseases unless employees are informed through training.

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CHAPTER II

Hazards and Risks Caused by Chemicals To Which Workers Are Exposed in the Hospital Environment

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Ahmet CİHAN[2]
Şahin YILDIZ[3]

Introduction

Health services, which include health care services, are a branch of service that is constantly evolving and adds economic value to our country. Health services comprise 20% of all employment areas in European Union member countries. It is carried out in public and private organizations that produce all or part of the

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work and service areas such as hospitals, dental clinics, clinical mobile emergency medical care departments, which indirectly or directly contribute to the realization of rehabilitation, diagnosis, treatment and protection studies in the field of health (OSHA-EU, 20136:1). Health professionals face serious dangers and risks, sometimes directly and sometimes indirectly, as a result of the relationships between their work areas or their relationships with the patient. Risks arising from the working environment in the field of healthcare include chemical (disinfectants, drugs, radioactive substances, cleaning agents, anesthetic gases, etc.), physical (vibration, noise, low and high temperatures, ionizing and non-ionizing radiation, etc.), psychosocial (heavy workload, night time). shifts, relations with patients and relatives, etc.), ergonomics (carrying, working for long periods, standing, heavy lifting, etc.). If hazards cannot be prevented or working personnel are not protected from them in current hospital conditions, safety and health risks will occur. According to the 2015 data of the social security institution (SGK), 575 work accidents and 6 occupational diseases were detected in hospitals in our country, and 5 healthcare professionals were permanently disabled due to work accidents. A healthcare professional also died due to an occupational disease.

Chemical Substances Used İn Health İnstitutions And Risk Situations

A wide variety and increasing number of chemical substances are used in healthcare institutions. Some of these pose serious risks to safety and health when used without taking necessary precautions. In this part of the study, hazardous chemicals are classified according to their intended use in hospitals, such as disinfectants and antiseptics, anesthetic gases, chemicals used for cleaning, anthenoplastic drugs, etc. Other existing chemical drugs were examined under the headings of laboratory chemicals and other existing chemicals (latex, surgical smoke, mercury, methyl, methacrylate, etc.).

Antiseptics And Disinfectants

Disinfectants and antiseptics are formulas that combine cleaning and additives with a filler by neutralizing microbial substances. Since antiseptics are administered from the external surface, there are substances that neutralize viruses or kill microorganisms in living tissues (mucosa, healthy skin and wounds). Disinfectants and antiseptics are substances that neutralize microorganisms and viruses in fixed materials temporarily located in hospitals or in fluids and tissues removed from the human body. Disinfectants, which are caustic and toxic enough to be applied to most living tissues, are widely used in hospitals as antiseptics (Kayaalp 2011: 324; Cerpy, 2002, 83).

According to the chemical grouping in the structure of antiseptics and disinfectants; They can be listed as chlorinated halogens, aldehydes (Glutaraldehyde, Formaldehyde), iodized halogens, mercury types, phenolite and its derivatives, oxidizing compounds, strong bases and acids. Health professionals perform disinfection and cleaning with different meticulousness and frequency than other sectors, and they are continuous and widely applied activities that are not intended to be separate from each other. Doctors, medical personnel and nurses perform these activities as part of treatment (skin, instrument and surface infection, hand, etc.), and hospital cleaners perform these activities as a requirement of healthcare. Exposure of hospital staff during disinfection; It varies depending on the method, environmental characteristics (volume of the space, humidity, temperature, ventilation), active ingredient and work organization (time and frequency of the employee, etc.).

Disinfectants and antiseptics contain many different substances that neutralize microorganisms and affect the safety and health of hospital employees. Therefore, most of these substances are marked with one or more danger symbols. Keeping these chemicals containing alcohol in the warehouse may also cause fire.

Chemicals Used In Cleaning

It is very important to protect from infection and provide a cleaner environment in hospitals. Many different types of cleaning chemicals are used for adequate and effective hygiene. Dirty substances are removed from the environment by wiping, mopping and scrubbing with chemicals (Herc, 2016). The chemicals used in hospitals affect not only cleaners but all healthcare professionals.

Anesthetic Gases

Anesthesia is an activity performed to prevent the patient from feeling pain during the operation. As an anesthetic agent in this activity; Substances containing halogen gases in their structure such as tehalotene, isoflurane, sevoflurane, nitrous oxide, methoxyflurane and enflurane are used (NIOSH, 2007; OSHA, 2014). Anesthetic gases are administered to the patient through inhalation. The existing gases reach the anesthetic devices through a pipe from the gas cylinder or central gas plant located at the back of the device. The flow in the gas remains in balance with the flow meter and pressure regulator. In the breathing circuit, anesthetic gases mix with the final gas mixture by evaporation and are delivered to the breathing circuit connected to the respiratory tract of the patient. With this circuit, the gas mixture transferred to the patient is used by the patient, and then the waste is removed through the muscular system by the patient exhaling.

Anesthetics negatively affect the health of those around them. If intense exposure to anesthetic gas occurs for a short period of time, dizziness, headache, fatigue, difficulty in reasoning, and tension occur. Kidney and liver diseases may occur. Although some scientists claim that long-term exposure to low-intensity anesthetic gases does not affect health, some scientific studies have linked low-exposure anesthetic gases to cancer or genetic disorders.

Antineoplastic Drugs And Other Dangerous Drugs

Drugs refer to a biologically active natural chemical substance used in medicine and other health fields, or its equivalent natural mixture containing a certain amount of active substance of animal or plant origin. The distinction between poison and medicine is relative. Consuming all drugs found in nature and chemical environments above a certain amount can have a poisonous effect. Even if the medication is taken at the desired dose, it may not only give the desired effect, but may also cause side effects, that is, undesirable situations.

Laboratory Chemicals

In the field of healthcare, substances such as reagents, dyes, buffer liquids, compressed gases and media in laboratories are dangerous for both the environment and occupational health and safety. These chemicals, which enter the human body by being absorbed by the mucosa and skin, swallowed or inhaled, may pose serious health hazards to those working in laboratories such as biologists, physicians and laboratory workers.

Latex

The most well-known cause of this allergy is healthcare professionals' direct contact with latex, a natural compound used in the formation of disposable gloves and other materials. Some healthcare professionals are more sensitive to this chemical. Sudden and localized skin damage and irritation can cause reactions that pose serious injury risks. To reduce exposure to latex, gloves should be powder-free, and to eliminate this risk, gloves that do not contain latex should be preferred.

This research we have conducted is to identify possible chemical risks and hazards that may affect hospital employees and to make recommendations to hospitals by making a risk assessment example that will contribute to the protection of employees from these chemical substances. The application location of the research

is a hospital operating in Diyarbakır Center. The hospital is built on an area of 6,000 square meters with 1300 beds and consists of a blood bank, in vitro fertilization center, emergency hospital, operating rooms, clinical units, administrative and outpatient services.

Method

In order to achieve the goal of our research, "5 x 5 L type Matrix risk assessment method" and risk assessment for chemicals were applied. For risk assessment studies, a risk assessment team was formed in the hospital in accordance with the "Occupational Health and Safety Law No. 6331" and the related "Occupational Health and Safety Risk Assessment Regulation". Risk assessment was carried out in 5 stages. It includes identifying hazards, evaluating hazards, rating risks, implementing control measures, and audit monitoring and review.

The 5 x 5 matrix (L type Matrix) diagram is often used to evaluate cause and effect connections. (Akpınar and Çakmak Kaya, 2014:277). Since its structure is simple and easy to use, this method can be implemented by a single analyst without establishing a team. In this method, especially the dangers that require urgent precautions are identified. The probability of any event occurring and the likely consequences of that event occurring can be rated and measured.

When evaluated for hospital employees; Cleaning chemicals, hand antiseptics, surface disinfectants and mercury are chemicals that are exposed to all hospital units. Works that cause employees to be exposed to chemicals include cleaning all surfaces, ensuring hand hygiene, transferring chemicals to containers, and using materials containing mercury. According to the health screening plan, periodic examinations are performed for all hospital employees every year, and additional examinations are performed for some professional groups (bronchial provocation tests, liver and thyroid function tests, etc.). If a hospital employee is suspected of having an occupational disease, they are directed to the outpatient clinic; If there is latex

allergy, personnel are monitored based on exposure history and occupational history. According to the risk assessment results we made, the missing situations I observed in the hospital are as follows:

- Artificial and natural air exchange is not sufficient.
- Chemicals used in cleaning were placed in corridors, although they should normally be in special protection areas.
- The hospital environment prevents easy cleaning of surfaces.
- Safety data sheets for chemicals in the hospital are not available.
- There is no automatic system to detect the malfunction of the air exchange system and report it to the center.
- Chemicals in the hospital were stored where they were used. However, they should be stored in a separate place.
- Dirt and sediment from the air exchange system are not cleaned regularly.
- The scope and duration of work in the hospital are not listed in a way that would diminish its status.

Chemicals exposed to in the surgical environment are high-level instrument disinfectants, surgical smoke, radiation, anesthetic gases (N2O sevoflura), metal methacrylate (bone cement), surface disinfectants, latex and hand antiseptics. These chemicals are exposed to patients in procedures such as anesthesia, surgical interventions, preparation for operations, use of materials from sterilization and cleaning of the operating room. Operating room personnel were provided with masks, aprons, gloves and glasses, but most of these personal protective equipment are not effective in reducing chemical exposure or in terms of usage. According to the risk assessment results, the deficiencies commonly seen in the hospital are as follows:

- Chemical waste collection containers are without lids.

- Chemical substances do not have a safety data sheet.
- Dirt and sediment are not cleaned periodically in the air exchange system.
- There is no automatic warning system that indicates ventilation system failure.
- Anesthetic gas density is not measured.
- Collection systems for waste anesthetic gas are not available
- It is not checked whether the breathing circuit and the anesthesia machine circuit operate without leaks or leaks.

Ethylene oxide; They are dangerous chemicals used in surface disinfectants and high-level tool disinfectants. Sterilizing machines in hospital departments; The area sterilized with ethylene oxide, the unit where chemicals are stored and the rest areas are different from each other. However, the rest area is not separated from other units by a door. The doors of the area where chemicals and machinery are located are left open during work. The protective equipment provided to hospital staff includes chemical-resistant aprons, overalls, gloves, ethylene oxide goggles and a gas mask. According to the risk assessment results, the missing conditions observed in the hospital are as follows;

- Ventilation systems are not at the required level.
- Chemical substances do not have a safety data sheet.
- The methods to be applied in case of contamination with chemical substances have not been determined.
- The method of preventing chemical substances from meeting has not been fully determined.
- There is no warning system in case of ventilation failure.
- Dirt and solution from the air exchange system are not cleaned regularly.

Conclusion

Different chemicals are used in hospitals, which are known to be harmful and require precautions to protect personnel. All work groups can be affected by these chemical substances, which are exposed by ingestion, inhalation or contact with the skin, as teamwork is carried out as a requirement of healthcare.

For chemical substances that cannot immediately prevent risks and dangers, a risk assessment study should be carried out in advance.

The widespread use of various types of hazardous chemicals in hospitals, the ways they enter the body, the organs and systems they affect, their health effects and consequences, and ways of preservation, and the fact that people from various professions working as a team in hospital services are exposed to these hazardous chemicals under various conditions but together are constantly exposed to dangerous chemicals. It must be performed in an on-site and systematic working environment.

The study we have conducted should be carried out in all hospitals, its results should be evaluated and updated accordingly.

For the healthy functioning of our work, first of all, all chemical substances in hospitals should be identified, risky and dangerous substances should be separated, the risks and dangers of the separated chemical substances should be detected immediately, and work should be initiated immediately for areas that can be prevented by taking actionable measures and conclusions should be drawn.

It was determined that a large number of hazardous chemicals were used in the hospital investigated and that these chemicals affected many personnel from various work groups at various levels due to the reasons listed below.

Despite the existing problems, an appropriate risk assessment has not been made in the health institution and an action plan has not

been prepared. There was no list of chemicals used in the healthcare facility and no safety data sheets.

Naturally, it has been determined that hospital staff do not have sufficient knowledge about the hazardous chemicals they use, their risks and dangers, and how to protect themselves from them. Training on this subject has not been adequately provided.

It has been observed that periodic examinations and employment examinations carried out within the scope of personal protection are completed completely.

It has been observed that some of the hospital staff participated in occupational health and safety activities, but they were insufficient to be fit for purpose.

To solve the problems mentioned in these articles:

Chemical substances used in hospitals should be identified separately and a complete list of hazardous chemicals should be prepared.

For this purpose, safety data sheets (MSDS) of chemical substances should be obtained from the manufacturer.

Precautions to be taken for very dangerous chemical substances and those that can be prevented should be set aside, the precautions and precautions to be applied should be determined and implemented, and the dangers in this way should be eliminated from the beginning.

For other hazardous chemical substances, a risk assessment and appropriate action plan should be prepared and implemented throughout the health care facility and within departments, and the results should be evaluated.

Personal protective equipment should be selected according to the target and should be viewed as an additional and temporary measure. Personnel should be trained on how and why to use personal protective equipment, how to maintain it, what kind of

problems they will encounter when they do not use it, and personal protective equipment inspections should be carried out constantly.

A systematic study should be followed in training activities, from the most dangerous unit to the least dangerous unit.

Training plans should be prepared, implemented and repeated based on the risk assessment results.

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CHAPTER III

A Case of Dissociative Identity Disorder Presenting with Bilateral Pseudocortical Blindness, Left Pseudohemiparesis and Speech Impairment and Therapy

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Introduction

The first cases that started to be scientifically examined in psychiatry were dissociative states (Putnam 1991).Dissociative disorders are defined as the loss of motor and/or sensory functions in a way that suggests a neurological or other organic disease due to psychological conflict or need (American Psychiatric Association 2000). It is also considered a physical symptom of psychological distress. Symptoms such as dizziness, balance disorder, fainting, loss of consciousness, non-epileptic seizures, dysphagia, aphonia, anosmia, loss of vision, double vision, paresthesia, anesthesia,

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paralysis, motor and sensory loss can be seen (Sar et al. 2009, Hsieh et al. 2010). Dissociative amnesia, depersonalization, derealization, identity confusion and identity change are the main features of dissociative psychopathology. Multiple personality disorder (dissociative identity disorder) is a psychiatric disorder that has been defined since the 1800s, attracts the most attention among dissociative disorders, and leads to memory and identity disorders (Kaplan et al. 1994). Although the prevalence of dissociative identity disorder (DID) is not known exactly, it is believed that it is not as rare as previously thought (Golf 1990). DID is an ongoing dissociative disorder and is diagnosed by the presence of one or more subpersonalities in an individual (Golf 1990, Putnam et al. 1986).

The first emergence of the second personality or other subpersonalities may be spontaneous or through events that accelerate this situation (hypnosis, drug-assisted interview) (World Health Organization 1992).Headaches are known to be quite common among dissociative identity disorder patients (Putnam et al. 1986,9). Headaches may be a sign of transition from one personality to another (Ghadirian et al. 1985). Although almost all dissociative disorders, which are thought to occur mostly in relation to trauma, start in childhood, diagnosis is delayed (Kluft 1996).

In this case report, we present a 20-year-old patient with dissociative identity disorder that developed after severe headache and fainting, with pseudocortical visual loss in both eyes, pseudohemiparesis on the left and speech impairment.

Case

Mr. T, 20 years old, single, second of 6 siblings, high school graduate, preparing for university entrance exam, male patient. He was admitted to the psychiatry outpatient clinic with his relatives with complaints of total vision loss in both eyes, difficulty in speaking, loss of strength on the left side of the body and inability to walk.

Clinical History: According to the anamnesis, the patient's complaints started as a severe headache 30 hours ago while he was in the classroom. While being taken to the hospital by his friends due to severe headache, he suddenly fainted in the car. The patient was taken to the emergency department of the district state hospital and after coming to, he started to complain of total loss of vision in both eyes, difficulty in speaking, loss of strength and sensation on the left side of the body and inability to walk. Biochemistry, hemogram and blood gas tests were performed in the emergency department of the district state hospital. Cranial brain tomography was performed. The patient was examined by neurology and internal medicine doctors and was told that no organic pathology was detected and was advised to apply to a medical faculty hospital. When the patient was brought to the emergency room of our hospital, his complaints were the same. Routine examinations were performed at our hospital. The patient was evaluated by neurology and ophthalmology doctors.

Neurological examination findings: Bilateral pseudocortical blindness, left hemihypoesthesia (subjective), left pseudohemiparesis and babinski negative. Brain MRI and EEG were performed and no pathology was detected. As a result of all investigations, no organic pathology was considered and the patient was referred to psychiatry outpatient clinic.

E***ye examination findings:*** Light reflex was positive in both eyes, but suspicious on the right side. Both eye movements were normal. Intraocular pressure was 15 mmHg in the right eye and 17 mmHg in the left eye. The anterior segment was observed as normal. Fundus examination revealed that the optic disc, macula and peripheral retina were normal. As a result of all examinations, no organic pathology was considered and the patient was referred to psychiatry outpatient clinic.

Psychiatric examination and follow-up: Mr. T, a tall, dark-skinned, thin, elderly male patient, presented to our psychiatric outpatient clinic with complaints of total visual loss in both eyes, difficulty in speaking and limping in the left leg while walking. The

patient was conscious, oriented and cooperative. Since the patient had difficulty in speaking, he tried to express himself with sign language and a few stuttered words. When the anamnesis obtained from the patient and his relatives was deepened, it was learned that he had a problem with his friend 3 days ago and his mood had decreased because of this. He stated that his sleep and appetite were normal. No delusions and hallucinations were described. It was learned that she had been doing her self-care with the help of her family since the onset of her complaints, that is, for the last 30 hours. The patient was presenting to the psychiatry outpatient clinic for the first time and no psychiatric history or use of psychotropic drugs was described.

After anamnesis and emergency, neurologic and ophthalmologic examinations, organic etiology was excluded. After a detailed mental status examination, it was concluded that the patient might be dissociated. In order to confirm this and to raise the patient's awareness, information about dissociative identity disorder was given. It was explained that as a result of a psychological trauma, additional alter identities or identities may form as a defense mechanism in addition to the host identity. The patient was asked whether we guessed that she was a newly formed alter identity and whether this was true. The patient confirmed that our guess was correct and that she was an alter identity. And thus the diagnosis of dissociative identity disorder was confirmed.

The patient underwent a dissociative hypnotherapy lasting about 1 hour. During the therapy, the dialog with the alter identity was continued and a good atmosphere of trust was created between the physician and the patient by explaining to him that we physicians are friends and that we strive for his recovery. It was emphasized that she, the alter identity, was actually a self-sacrificing person who went out to protect the host identity, that she sacrificed herself to T, the host identity, but that this was not right and that she was definitely harming both herself and T. Because they are currently unable to perform the functions of their bodies that should be normal, for example, they cannot walk, they have difficulty in speaking, they

have no vision at all, and they suffer the most from this. They were told that if they stayed like this and did not recover, they would soon fail the university entrance exams, which were very important for them, and it was emphasized that their current situation was not normal and that they needed to integrate their identities as soon as possible so that they could recover. It was explained that it was inevitably necessary for them to help us, their therapist, during the therapy. In order to do this, it was emphasized that all the traumatic events should be fully explained and thus the unwanted distressing, negative emotions experienced inside them should be transferred out of the head.

The story of the alter ego (second T): 1 month ago he and his 2 cousins rented a car but they did not have a driver's license. Mr. T. was driving the car. They had an accident with material damage and T. took all the responsibility and expenses. He told his family and because of this situation, because he was a financial burden on his family, his mood, joy and morale were very bad. Approximately 1 month ago, due to this incident, an alter identity named 2.T. was formed. With the thought of "I'm going to the classroom, I'm dealing with the stress of debt while the exam is approaching", he entered into an intense distress. For 1 week, he had been experiencing headaches and short-term vision loss. And most recently, he fainted after a severe headache, loss of vision in both eyes, slurred speech, numbness on the left side of his body, loss of strength and inability to walk. She said that the second T., the alter identity, had done all this.

The second T. was asked if she wanted to recover. She replied that she wanted to get better. We explained that we, as her therapist, would help her in this regard, but that she should also contribute by supporting us during the therapy and that we would actually direct them (the host personality and the second T) like an orchestra conductor.

The second T. agreed to all this. She was asked to close both eyes and concentrate completely inside her head. Hypnotherapy was

started using the method of imagery. She was told to open a large window from the closest part of her head. She was asked to completely throw out all the traumatic processes, troubles and unhappiness she had experienced through the window. The second T. said that he threw out all traumatic processes, distress and unhappiness in a short time. She was asked the question "how do you feel now?". He replied that he felt quite relaxed. He was told to throw his worn out, heavily troubled body out of the window, provided that his soul remained in the head, so that he would feel light like a soul. And he said that he did this action. An agreement was made with him that from now on he would not harm himself or the environment. The second T. was asked to dig a well at least 100 meters from wherever the head came out. He said that he had done so. The second T. was told that the inside of the well and the inside of the host T.'s head should be all tea and that he should be sugar. He said he did as he was told. Then he was told to throw the sugar into the well, stir it well and dissolve it so that it would become completely one with T., the host. He said he did exactly as he was told. After a short while, T., the host personality, who was in full control of the body, stepped in. T. did not recognize us at first. He was looking around in a daze, asking questions such as "who are you, where am I, where is this place?" which showed that he was in a daze. The patient's loss of vision in his eyes had completely recovered, his speech was normal and fluent, and he could walk. In other words, all his complaints were gone. He remembered that the last time he had a severe headache was in the classroom and he and his friends had gotten into the car to go to the hospital. He said that he did not remember any of the events that had happened since then and was looking around, unaware of what was happening. The patient described complete amnesia for about 30 hours, including the hypnotherapy we did. He could not remember anything that was said during the hypnotherapy. The patient was explained in detail that this was a hospital and as a result of the trauma he experienced, how the alter identity 2.T. was formed and that 2.T. prevented him from seeing, speaking and walking, and his awareness was created.

Thus, with Hypnotherapy, the patient's real identity was integrated with the alter identity that was formed 1 month ago.

After the hypnotherapy, his father and relatives waiting outside were called and there were emotional moments when they saw T. fully recovered.

After the treatment, the patient was recommended outpatient visits from time to time. Since he did not have any physical, anxious, depressive or psychotic symptoms, it was decided to follow the patient without medication. At the second outpatient clinic visit about two weeks later, the presence of the alter identity was again felt. But she had very mild symptoms compared to before. And with a short hypnotherapy she completely recovered.

Mr. T also talked about other negative things that the alter identity did in his life. Regarding this, it was learned that during the preparation for the university exam, while solving the questions in the mock exams, while thinking of marking the correct answer, the alter identity directed the patient towards a wrong answer, misleading the patient, and about 20 questions in a 160-question mock exam were answered incorrectly in this way. And after the integration, it was stated that there were no such mistakes and there was a significant increase in the number of correct answers. At the 3rd interview two weeks later, the patient, who had no alter identity and therefore no symptoms, was talking about a significant increase in success in the mock exam results. Approximately 1 month later, when she presented to our outpatient clinic with the complaint of headache, the presence of a second alter identity, 3.T., was detected. It was understood that the new alter identity was formed after the accident about two months ago. Since awareness was created due to previous psychiatric interviews and therapies, the 3rd T. was easily integrated with hypnotherapy and the patient's headache disappeared and she had no complaints. Fluoxetine 20 mg/day was started as supportive pharmacotherapy. The patient continues to be followed up in our outpatient clinic.

Discussion

Although the prevalence of DID is not known exactly, there is no consensus on this issue. Researchers at one extreme believe that DID is very rare, while researchers at the other extreme believe that it is less recognized than it is (Ross 1989, Simpson 1989, Ghadirian et al. 1985). In well-organized studies, it was reported that 0.5-2% of adult patients admitted to psychiatric clinics in North America met the diagnostic criteria for DID (Kaplan et al. 1994). In some studies conducted in North America, this rate was found to be between 5-10% and it was concluded that DID is quite common among psychiatric disorders (Ross et al. 1991a, Ross 1991b).

Although it is a common disorder, DID patients may present to the clinician in many different ways. It has been reported that patients with DID received an average of three different psychiatric diagnoses, excluding DID, before receiving this diagnosis. In studies, this number varies between 2.3-3.6. The most common diagnoses include major depression, personality disorder (especially borderline personality disorder), schizophrenia and other psychotic disorders, other dissociative disorders, anxiety, somatization and eating disorders and substance abuse (Ross 1989, Goff 1990, Putnam et al. 1986,Coons et al. 1988,Boon et al. 1993, Ross et al. 1989). Putnam suggested that DID should be considered as a meta-diagnosis and that it should be treated first because of the findings related to a wide range of disorders in those diagnosed with DID (Putnam et al. 1984).

DID, which is a chronic and polysymptomatic disease, may generally present to the physician in the form of different symptoms. Among these symptoms, chronic and severe headache is one of the most common (Kluft 1991, Putnam 1989). In these patients, headache usually occurs during transitions between identities, and the patient himself/herself is often unable to realize this connection due to the amnesia disability.

DID is one of the most well-known psychiatric disorders with a well-known etiology. Etiologically, it is a chronic post-traumatic

stress disorder due to childhood traumatic experiences (Spiegel 1986). Treatment is only psychotherapy and prognosis is good with appropriate psychotherapy (Kluft 1991, Putnam 1989, Spiegel 1986, Kluft 1988). However, despite all these, under-recognition of the diagnosis of dissociative identity disorder by clinicians and failure to apply the appropriate psychotherapy method may cause many patients to receive unnecessary medication, to live with chronic symptoms and unfortunately to become a patient resistant to DID therapy.

CONCLUSIONS

Patients with dissociative identity disorder may present with very different symptoms. In our case, the patient was under the influence of the alter identity and presented to our psychiatry outpatient clinic with pseudo-vision loss in both eyes, pseudohemiparesis on the left, left hemihypoesthesia (subjective) and speech disorder. Our patient developed identity fragmentation as a result of a trauma she experienced about 1 month ago.

According to DSM-V diagnostic criteria, the main feature of Dissociative Identity Disorder is that two or more separate identities or personality structures are seen in the same person and the transition between identities is self-reported or observed by others (Indicator A). There are recurrent gaps in recall of everyday events, personal information and/or traumatizing events that cannot be explained by ordinary forgetfulness (Indicator B).

In this case report, the transition between identities was clearly observed in our patient during hypnotherapy. The patient describes an amnesia of approximately 30 hours which meets the DSM-V criteria. As a result of hypnotherapy, the patient's complaints completely resolved without the need for medication.

It should be taken into consideration that dissociative identity disorder can be confused with many other psychiatric disorders and that patients may remain untreated for a long time if not given enough importance. It is thought to be important for therapists

working in this field to receive training in the field of psychotherapy for dissociative disorders.

Although dissociative identity disorder is a common disorder among psychiatric disorders, it is thought that it is a frequently overlooked condition. With this case, which recovered in a short time with hypnotherapy without the need for pharmacological treatment, we wanted to emphasize the diagnosis and treatment method of dissociative identity disorder.

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CHAPTER IV

Microplastics in Terrestrial Ecosystems and Examining the Effects in Soil

Nurhan GÜMRÜKÇÜOĞLU[1]

INTRODUCTION

Today, plastic use is so widespread that it is stated that we live in the “plastic age” (Aslan, 2018), on a “plastic planet” (Kayhan, 2019). Some scientists even predict that the geological layers that will be formed over a long period of time from plastic pieces in the world will be called "plastiglomerate" and the microbial community that uses plastic particles as habitat in aquatic environments is called the "plastisphere" (Roger, Turak & Tegart, 2019).

The global spread of plastic wastes used in various fields and their effects on the ecosystem have become a global problem due to

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events such as being small enough to be transported from one ecosystem to another, incorporating and accumulating by fauna and flora. A total of 6300 million tons (MT) of global plastic waste was generated between 1950 and 2015 (Geyer & et al., 2017). Between 60 and 99 (MT) MPs were produced globally in 2015 and this figure is estimated to triple to 155-265 MT by 2060 (Lebreton & Andrady, 2019). Microplastic pollution has become a growing concern for soils after oceans, freshwater resources and sediments (Helmberger & et al., 2019). The accumulation and effects of these MPs in soil ecosystems are largely unexplored (He & et al., 2018). It is suggested that soils are more exposed to this type of pollution than the oceans, since terrestrial ecosystems are the places where these materials are both produced and used (Horton & et al., 2017). Plastic pollution in water is easily detected due to the transparent structure of the water, while the complex structure of the soil delays the detection of such pollution for a long time. The annual flow of plastic pollution into the oceans is estimated at 4.8-12.7 MT. It has been reported that most of these plastics are of terrestrial origin and are transported to the oceans by rivers or winds (Jambeck & et al., 2015).

Such synthetic materials have been produced to replace many natural raw materials such as rubber and timber. The most important factors in the widespread use of plastic materials and their widespread use are properties such as durability, workability, lightness and low cost. On the other hand, large production volumes, long-term environmental persistence and potential ecological effects of plastics have caused them to become pollutants. The most important problem arising from the use of plastic is that it is extremely slow to decompose in nature. Therefore, it is expected to accumulate in nature and remain in nature for at least the next few centuries (Hale & et al., 2020).

Most MPs are difficult to biodegrade and can only be broken down into smaller particles. It is seen that the enzymes of microorganisms, which are the most important decomposers of nature, are not very effective or very little effective against these artificially obtained materials. Plastic wastes can also be

decomposed by physical and chemical factors (ultraviolet rays, radiation, wind or water erosion, etc.) and broken down into smaller particles.

As a result of the rapid increase in the amount of plastic waste, pollution occurs in both marine and terrestrial ecosystems. The problem is growing day by day as a result of the low degradation rate of plastics and the lack of appropriate plastic waste management. Plastic accumulation in the global ecosystem will increase further if current production, consumption and waste management practices remain unchanged. The change in plastic size from meters to microns, and the wide variety of shapes, physical and chemical properties make it difficult to determine this pollutant group. The degradation and fragmentation processes of plastic particles in ecosystems make it difficult to identify and remove these particles, especially those of very small size. For this reason, it is extremely important for the future to investigate and reveal the effects and fate of MPs that reach soils in various ways on soil properties.

In this review, the effects of MPs, which are included in the soil ecosystem by any means, on the physical, chemical and biological properties of the soil are emphasized. Today, soil ecosystems are exposed to various physical, chemical and biological stress factors directly or indirectly caused by human origin (anthropogenic) activities. There is a balance between abiotic and biotic factors in the soil ecosystem. When any external effect is made on the system in this balance, soil functions such as nutrient cycle and carbon cycle are also disrupted. Activities such as mining, agriculture, forestry and waste disposal adversely affect the structure of the soil ecosystem, soil functions and services. With this review, it is aimed to reveal the effects of MPs on soil ecosystem by considering the positive / negative aspects of the results of the study showing the effects of MP presence in soil ecosystems. It is thought that the findings will be useful in the development of new strategies to improve the negative effects of MPs and will help in reducing their ecological footprints.

MATERIALS AND METHODS

Microplastics

Microplastics, which are defined differently by many researchers, are defined as plastic particles with a size range of less than 5 mm. According to the definition of the European Commission in the Strategy Framework Directive, it is appropriate to accept particles smaller than 5 mm as microplastics. The structure of microplastics mainly includes polyethylene [PE], polypropylene [PP], polyamide [PA], polyvinyl chloride [PVC], polystyrene [PS], polyurethane [PUR] and polyethylene terephthalate [PET] (Alimi & et al., 2018). To classify microplastics, their shape, colour, structure, welds and wear status can be examined. Considering the size range, it was observed that they were divided into groups such as micro, meso and nano plastics.

As given in Table 1, in most of the studies conducted, those with a size of less than 5 mm were accepted as microplastic, those between 5-25 mm as mesoplastic and those larger than 25 mm as macroplastic. The sizes of microplastics, which are widely seen in the environment, vary as a result of different transformation processes such as biodegradation and decomposition that change their physicochemical properties (Ahmed & et al., 2022).

According to their shape, microplastics are commonly classified as (a) granüle, (b) fragment (small plastic), (c) pellet (round plastic), (d) fiber (fibrous plastic), (e) film (thin layer plastic), and (f) foam (foam plastic) (Figure 1).

Table 1. *Sizing of microplastics*

Microplastic Type	**Dimensions**	**Resources**
Microplastic	0,1 µm-5 mm	Yu & et al., 2020
Mesoplastic	5-25 mm	
Macroplastic	>25 mm	
Nanoplastic	<100 nm	
Microplastic	<5 mm	Battulga & et al., 2020
Mesoplastic	5-20 mm	
Macroplastic	20-100 mm	
Microplastic	<5 mm	Huang & et al., 2020
Macroplastic	>5 mm	
Microplastic	<5 mm	Egessa & et al.., 2020
Mesoplastic	5-25 mm	
Macroplastic	>25 mm	

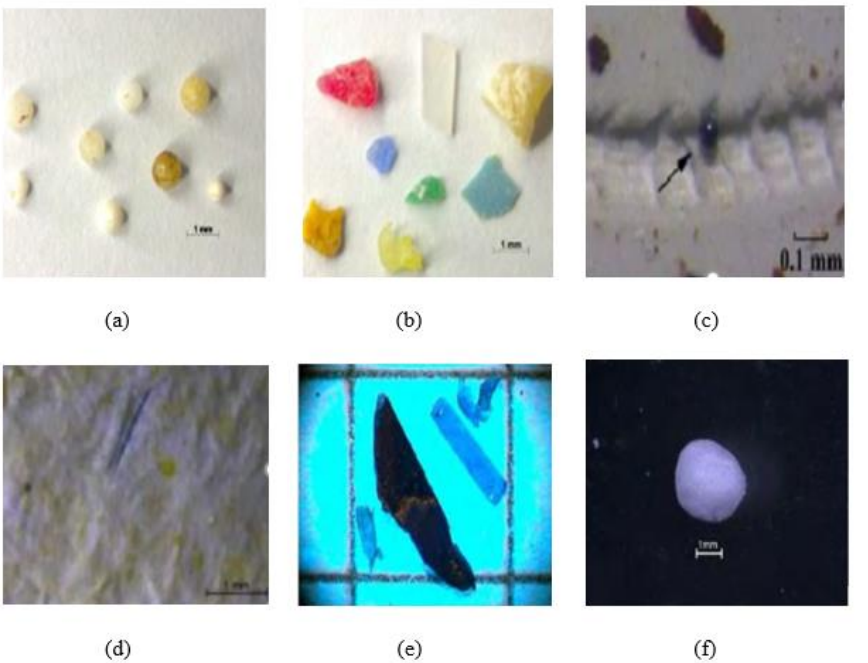

Figure 1. *Types of microplastics according to their shapes (a, b: Virsek & et al., 2016; c: Huang & et al., 2019; d: Zhang & et al., 2017; e: siyakti & et al., 2018; f: Tunçer & et al., 2018)*

Microplastics are divided into two as primary and secondary sources according to their formation sources. Its primary sources are plastic particles in cosmetics and personal care products (Jiang & et al., 2020). Plastics applied in cosmetics include two main categories of plastics derived from petroleum carbon sources.

Polymers are classified as thermoplastic, thermoset and elastomers according to their behavior under temperature. Among thermosets, plastics are polyester, etc. while thermoplastics include polypropylene (PP), polystyrene (PS), polyethylene (PE), polymethyl methacrylate and polytetrafluoroethylene (Teflon). Important sources of primary microplastics include plastic resin pellets and plastic powder or lint. Secondary resources are obtained

as a result of the breakdown of large plastic products with biological, chemical and physical degradation (Jiang & et al., 2020).

Sources of microplastics in soils

Considering the soils, urban and rural: MP pollution sources in the urban area are many materials using plastic such as particles from car tires, garbage, industrial wastes. MP has been detected in amounts ranging from 0.3–67.5 g kg^{-1} in urban areas. The MP quantities and properties determined in different country territories are given in Table 2.

Table 2. *Presence and properties of microplastics in different soil types (He & et al., 2018)*

Soil type	*Guantity*	*Size Range*	*Shape*	*Composition*	*Place*
Soils in industrial areas	300-67.500 mg kg^{-1}	-	-	PVC (>80%), PE, PS	Australia
Beach soil	317 matter $500g^{-1}$ (average)	1.56 mm	piece, granule fiber, film	-	China
Beach soil	1.3-14.712 matter kg^{-1}	< 1 mm (% 60)	foam, pellet, piece, fiber, film, sponge	PE, PS, PP	China
Floodplain soil	55.5 mg kg^{-1} or 593 matter kg^{-1}	125-500 (% 88)	-	PE, PS, PVC	Switzerland
Agricultural soil	0.54mg kg^{-1}	>100 µm	-	PE	China
Forest soil	7100-42.960 matter kg^{-1}	10-0.05 mm	piece, fiber, film	-	China
Agricultural soil	78.0-62.5 matter kg^{-1}	0.03-16 mm	piece, film	PE (%50.51), PS (%6.06), PP (%43.43)	China

PVC: Polyvinylchloride, PE: Polyethylene, PP: Polypropylene, PES: Polyethersulfone

The most common types of plastics appear to be Polyethylene (PE) and Polystyrene (PS). The use of MP resources in agricultural areas for agricultural irrigation, the use of wastewater treatment sludge (Corradini & et al., 2019) greenhouse nylons, plastic

mulching materials, irrigation pipes, fertilizer capsules (Akça & Sözü Doğru Ok, 2021) (Figures 2-4).

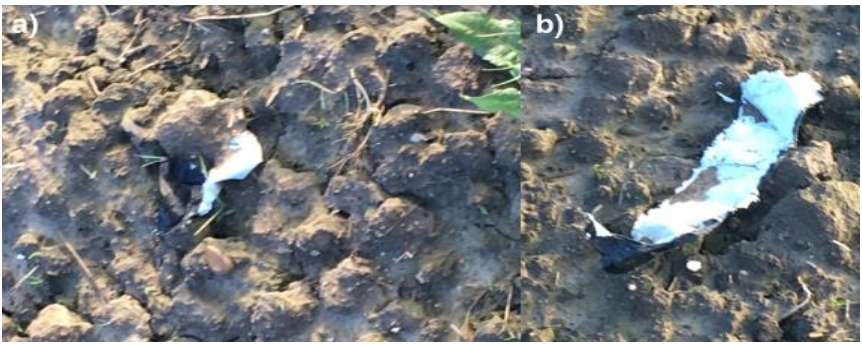

Figure 2. *a + b: Residues of plastic film found in an agriculture field after plastic mulching was conducted to grow cucumber (Bläsing & Amelung, 2018)*

Figure 3. *Plastic originating from atmospheric input or littering found in agricultural fields (a-c) and near trails in a protected landscape near Bonn, Germany (d-f) (Bläsing & Amelung, 2018)*

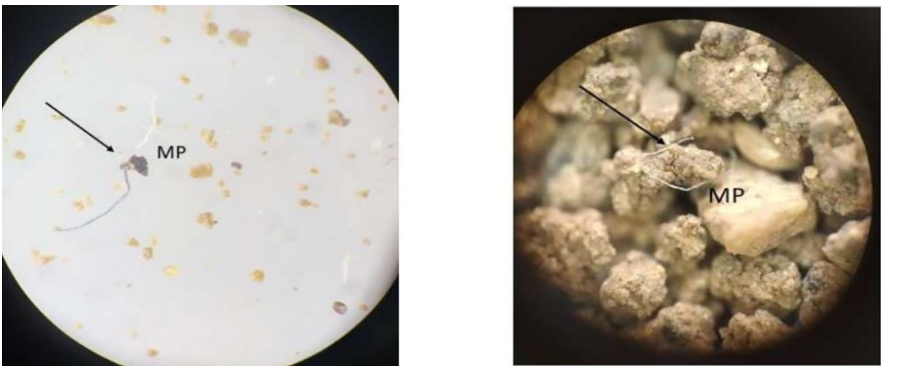

Figure 4. *Image of microplastic residues in binocular stereomicroscope in mulched soil (Leica S8AP0/1.0-8.0 X Zoom) (A), Microplastic residue image in soil binocular stereomicroscope (Leica S8AP0/1.0-8.0 X Zoom) (B) (Akça & Sözü Doğru Ok, 2021)*

Movement and transport of microplastics in soil

MPs, which are included in the soil in any way, can move horizontally or vertically in the soil. Agricultural practices such as cracks, pores, ploughing, harvesting, elongation of plant roots, soil fauna, especially earthworms, and the digging behavior of other soil animals provide the deep transport of MPs in the soil (Gabet & et al., 2003) (Figure 5).

Figure 5. *Schematic representation of environmental risks and processes of microplastics in soil (Xu & et al., 2020)*

After entering the soil, microplastics can affect water transmission along the soil profile. In addition, these MPs can reduce plant yields (Boots & et al., 2019), increase the effects of other pollutants in the soil and potentially cause pollutants to leach into groundwater (Yu & et al., 2012). On the other hand, MPs can be dispersed by dust into the air and through the air by the wind. They can be transported to terrestrial and aquatic systems by erosion or runoff (O'Connor & et al., 2019).

Effects of Microplastics on Some Physical Properties of Soil

Soil structure

Soil aggregates are the main component of soil structure and are in balance with soil microorganisms. In addition, soil aggregates have an important role in soil porosity. This situation directly affects the movement of air and water in the soil, as well as microbial activities (Rillig & Lehmann, 2020). In the presence of MP in the soil, the soil bulk weight decreases and this has completely different effects on all soil types. It often causes deterioration in soil structure.

Volume weight

Bulk weight is a well-known soil physical property and is closely related to the risk of soil erosion (Gohlami & et al., 2020). In general, MPs mixed into the soil reduce the bulk weight of the soil. For example, de Souza Machado & et al. (2019) in their study, found that high-density polyethylene (HDPE), polyester (PES), polyethylene (PET), polypropylene (PP) and polymethylmethacrylate (PMMA) particles were applied to the soil in loamy sandy soils. reported a decrease in soil volume weight. These researchers attributed the decrease in soil bulk weight to the low density of MPs. However, Zhang & et al. (2017) stated in their study that polyester microfiber (PMF) application did not significantly affect the volume weight of clay loam soil in field and greenhouse conditions, which was due to the low dose (0.3%) of the MPs used in the study.

In the presence of MP in the soil, the soil bulk weight decreases and this has completely different effects on all soil types. When large amounts of macroplastics are present in the soil, it often causes deterioration in soil structure. Such situations reduce the infiltration of rainwater and irrigation water into the soil, adversely affect the water holding capacity of the soil and can be harmful in terms of creating anoxic conditions. MPs; reported that it reduces aggregate stability, increases the volume of macropores, and decreases the volume of micropores (Mbachu & et al., 2021).

Aggregate stability

The results of greenhouse and field trials showed that MPs added to soils affect soil aggregation depending on the polymer morphology. MPs added to the soil reduce aggregate stability Lehmann & et al., 2019). MPs are bound to soil aggregates to varying degrees.

They are loosely attached in the form of pieces structurally in soil aggregates and more tightly in fiber types (Guo & et al., 2020). MPs affect the biophysical properties of the soil by affecting the

water-resistant aggregates in the soil (de Souza Machado & et al., 2019). Decreased aggregate stability is often associated with soil biological activities, especially; it creates negative effects on changes in air, water and plant nutrients. As the MP content in the soil increases, the forces holding the soil particles together weaken and the aggregation property of the soil decreases (Lehmann & et al., 2019) stated that soil aggregate stability decreased with the addition of microfibers in the presence of soil biota.

Effects of Microplastics on Some Biological Properties of Soil

It is known that MPs added to the soil change the biophysical properties of the soil. Various studies have shown that MPs; revealed that they have negative effects on carbon (C) and nitrogen (N) cycle, soil microbial activity and plant uptake of plant nutrients (Rillig, 2018). The addition of MP to the soil will affect soil enzyme activities and may promote the accumulation of soluble plant nutrients in the soil. To give an example, if 5-25 kg of plastic mulch material is mixed per hectare in 1 year, on average 4-20 kg of C will be given per hectare.

However, it should not be overlooked that this situation is low compared to the organic C loss rates resulting from intensive agricultural activities and therefore it should not be shown as a positive feature. Hodson & et al. (2017) in their study evaluating the effects of MPs on Zn bioavailability, stated that MPs added to the soil increase the contact between worms and Zn, but the potential risks this may create for worms and the mechanisms of these bioavailability are not fully known.

Plastic mulch materials used in agriculture have improved some biological indicators of soil quality, while others have decreased. MP accumulation in soils negatively affects the physicochemical properties of the soil and may lead to environmental pollution. In some studies, it has been revealed that with increasing amount of MP accumulation in soils, the C and N

content of soil microbial biomass decreases significantly (Wang & et al., 2019).

Microbial activity

It was observed that the metabolic rate of the entire microbial community was significantly affected by the addition of MP to the soils (de Souza Machado & et al., 2019). However, the effects of MPs on microbial activity are not very clear. Polyamide (PA) and PE type MPs cause a significant increase on microbial activity, while PMMA and PES type MPs decrease microbial activity. It has been reported that PA, HDPE and PES applied to loamy sandy soils increase soil microbial activity (de Souza Machado & et al., 2019).

However, when the amount of MP applied to the soil is applied at a higher rate from 7% to 28%, soil respiration is significantly reduced. In China, the addition of PP type MP to loess soil at various rates (7% and 28%) increased beta-glucosidase and phosphatase activities in soil and decreased urease activity. It has been reported that urease and catalase activities increase, while invertase activity fluctuates in soil that is contaminated with low-density polyethylene (LDPE) films (0.076 g kg^{-1} soil) and incubated for 90 days (Huang & et al., 2019). It has been stated that polylactic acid (PLA) type MPs added to rice cultivation soil have no effect on beta-glycosidase and urease enzyme activities (Chen & et al., 2020).

Effects of Microplastics on Plant Health and Some Chemical Properties of Soil

Soil organic matter

The fact that MPs are particulates with a lot of carbon (typically 80%) is a potential source of C for the soil. MP carbon is in some cases only a small fraction of the total soil organic matter carbon. MPs cannot be directly included in soil organic matter dynamics. However, MPs applied to the soil can affect the decomposition of soil organic matter by indirectly affecting microbial processes.

PE fiber can reduce the available water content of the soil to which it is applied, thereby creating a better aerated environment around the MP surface (Guo & et al., 2021), which can accelerate the mineralization of soil organic matter. In a study by Liu & et al. (2017), 28% dose of PP accelerated soil respiration, fluorescent diacetate hydrolase activity and soil organic matter mineralization. In contrast, low soil organic matter decomposition in the PE treated medium was associated with degradation of soluble proteins and reduced amount of Proteobacteria (Wei & et al., 2019).

Given the lower persistence and easier degradation of biodegradable MPs added to the soil, it was concluded that bioavailable C sources from biodegradable MPs increase microbial activity and exoenzyme activity, potentially leading to increased mineralization of natural soil organic matter, therefore, MP' It has been stated that the main effect of soil organic matter mineralization on soil organic matter is due to changes in soil properties (Zhou & et al., 2021). Overall, the effect of MPs on soil organic matter mineralization is a new research topic and it is important to conduct detailed studies on carbon dynamics in soils.

Soil fertility

Soil enzymes are closely related to the biochemical processes that occur in the soil. Enzymes serve as an indicator to evaluate soil fertility and also play a very important role in the cycling of plant nutrients such as C, N and P. MPs added to soils in the effectiveness of these macro elements specified in soil fertility.

Soil bulk weight is an important parameter for predicting C storage in soils, and the presence of MPs can lead to an inaccurate estimation of carbon storage in soil. Moreover, since MPs contain high-carbon polymers, MP-C may be disguised as an important anthropogenic component of the soil organic carbon pool (Rillig, 2018). Regardless of their natural properties, if MPs are not removed from the soil matrix by leaching or runoff, they gradually become immobilized and bind with soil minerals or organic compounds through biotic and abiotic processes. These compounds can then

remain in the soil aggregates and be physically protected from microbial decomposition (de Souza Machado & et al., 2019).

In their study, Liu & et al. (2017) in a 30-day incubation experiment, MP added to the soil at a rate of 28% (w/w) increased the accumulation of dissolved organic matter, as well as increased the amount of C, N and P in the soil. However, as the MP content decreased (7% w/w), the dissolved organic matter accumulation slowed down. Effects of added MPs 0-7. It is negligible in days and plant nutrient concentrations are between 14-30. Therefore, the effects of MPs on soil fertility are highly dependent on the residence time in the soil as well as their concentration.

RESULTS AND DISCUSSION

The investigation of microplastic pollution in terrestrial ecosystems is a relatively new field of research compared to aquatic environments. Although terrestrial emissions are the predominant source of microplastics, detection, monitoring, fate and impact of microplastic pollution because the soil environment is a very complex structure (Campanale & et al., 2022). Among the sources of microplastics in terrestrial environment, agricultural applications (mulch films), use of treatment sludge in the field, compost applications, use of treated wastewater in agricultural irrigation, belonging to vehicle tires, particles and atmospheric deposition are counted. Microplastics entering the soil can reach groundwater through storage, displacement, erosion, degradation (He & et al., 2018). Compared to the ocean, the terrestrial environment is a more important receptor for microplastics because annual plastics released into the terrestrial environment are estimated to be 4-23 times higher than into the ocean (Horton & et al., 2017).

In case of microplastic accumulation in the soil, the physical properties and fertility of the soil, resident microbial communities, soil quality and nutrient cycling may be adversely affected (Xu & et al., 2020). Sewage sludge and wastewater are the most important sources contributing to microplastic pollution in soils (Li & et al., 2019). Domestic/Urban wastewater treatment plants produce tons of

sewage sludge daily, and in many countries, stabilized treatment sludge is used as soil improver and/or fertilizer in agricultural lands (Corradini & et al., 2019). Although microplastics in very high concentrations in raw wastewater are treated at high removal efficiency rates, microplastics removed from water become concentrated in treatment sludge (Koyuncuoğlu & Erden, 2021). Sewage sludge containing large amounts of microplastics disperses directly into the terrestrial environment when applied to the soil.

In a study conducted in China, it was observed that the number of microplastics in the soil increased with the increase in the rate of application of sewage sludge to the soil environment as the final disposal method. While the microplastic concentrations in the soils where 30 tons/ha and 15 tons/ha treatment sludge are applied annually, were found to be 545.9 and 87.6 MP/kg, respectively. In the untreated soil, the microplastic concentration was found to be 5 MP/kg (Zhang & et al., 2017).

In a different study conducted in Canada, microplastic pollution was investigated in agricultural soils where treatment sludge containing microplastics was applied. In the study, an agricultural area where no mud was applied was also sampled for control purposes. According to the results of the study, a very high amount of microplastics (8.7×103-1.4×104 MP/kg) was found in the treatment sludge application areas compared to the concentrations in the control area. The annual microplastic accumulation was calculated as 4.1×1011–1.3×1012 MP/kg (Crossman & et al., 2020).

Microplastics entering the soil environment, affect the physical and chemical properties of soil (Gao & et al., 2020). Organic carbon dissolved in the soil, organic nitrogen and phosphorus, humus in high concentrations of microplastics and fulvic acid concentrations and affect enzyme activity. Depending on the shapes of microplastics, bacteria in the soil can easily colonize on microplastics. In addition, microplastics can affect the soil-water relationship and the stabilization of soil aggregates (Sarker & et al., 2020). The possible negative effects of microplastics on the soil

ecosystem, their potential to mix with groundwater and their uptake by plants should be examined in detail. Uptake of microplastics by plants creates a way for microplastics to enter the food chain and therefore poses a threat to human health (Koyuncuoğlu & Erden, 2021).

CONCLUSION

Applications such as wastewater, sewage sludge, greenhouse plastics, plastic mulching materials, irrigation pipes, fertilizer capsules, which are mostly used in agricultural areas, constitute the MP pollution seen in soils in the world. China takes the first place among the countries in microplastic pollution on a global basis, due to intensive agricultural production. Although studies on MP are not sufficient in our country, it is thought that one of the biggest advantages of our country is that agricultural waste sludge is not used in agricultural areas. As it is known, the effects of more than one factor together with the accumulation of MPs in agricultural areas can vary in different soil ecosystems. Therefore, studies are needed to determine the effects of MPs on soil properties and how they interact with other components in agro-ecosystems that affect soil and plant health. The basic mechanisms of the effects of microplastics on soil properties should be revealed. While explaining these mechanisms, characteristics such as size, shape and concentration should be taken into account as well as the MP types found in the soil.

As a result, it is seen that MPs are included in soils due to agricultural activities and MPs may remain in soils for a long time without fragmentation in the future. Microplastics, like other pollutants, represent a very important potential that may pose a threat to the nutrition of future generations. Perhaps these studies will accelerate the necessity of replacing such materials used in agriculture with biodegradable materials in soils.

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CHAPTER V

Major Depressive Disorder During Parkinson's Disease: Case Report

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Introduction

Parkinson's disease (PD) is a chronic and progressive neurodegenerative disease characterized by degeneration of dopaminergic neurons (Güleç et al., 2008). It is recognized by the presence of various neurological findings such as rigidity, bradykinesia, postural instability, resting tremor, which usually occurs unilaterally (Lauterbach, 2004). Although Parkinson's Disease is basically a movement disorder, it is defined as a neuropsychiatric disease because it is often accompanied by affective, cognitive and psychotic disorders (Vırıt, Savaş & Özovacı, 2007).

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The frequency of at least one psychiatric finding accompanying Parkinson's Disease (PD), a neuropsychiatric disease, is 61-88%.((Lauterbach, 2004) The frequency of depression is around 30-40%. Depression is the most common psychiatric disorder in Parkinson's disease (Vırıt, Savaş & Özovacı, 2007).

Depression is a mood disorder in which depressed affect, lack of energy and loss of interest or pleasure are core features. Other common symptoms include poor concentration, low self-esteem, feelings of guilt, pessimism, thoughts of self-harm or suicide, disturbed sleep patterns, changes in appetite and decreased libido.

The symptom profiles of depressive symptoms seen in PD with depression and non-PD patients with depression may differ from each other. While anxiety, sleep disturbance, anhedonic symptoms and loss of initiative are frequently seen in clinically depressed patients with PD, symptoms such as guilt, self-condemnation and guilt thoughts are less common, and suicidal thoughts and attempts are rare (Poewe & Seppi, 2001).

In this study, we aimed to emphasize the importance of treating the underlying health problem (Parkinson's Disease) for the treatment of current depressive complaints in a 55-year-old depressed patient with untreated Parkinson's disease.

Case

A 55-year-old patient with Parkinson's disease for 6 years and no active treatment was admitted to our clinic with complaints of reluctance, malaise, loss of pleasure, decreased self-care, insomnia and decreased appetite. She has been complaining for 1-2 years and describes an increase in her complaints for the last 1 month. No active/passive suicidal ideation. On mental status examination, she was conscious, oriented and cooperative with decreased interest and care for herself. His associations were slow, the amount and content of speech decreased. There was no spontaneous response and he gave late and short answers to questions. His mood was depressed. Thought content was depressive themed, thought process was goal-

directed, and there was no perceptual disturbance. He made eye contact. Psychomotor mobility was decreased. His judgment was normal and he had partial insight. Hand tremor, mask face, bardikinesis and parkinsonian gait were present due to concomitant PD. Complete blood count, routine biochemistry, complete urinalysis and thyroid function tests were within normal limits. Cerebral magnetic resonance imaging was within normal limits. Family and patient history did not support dementia. The doses of the medications used irregularly before were adjusted and the current treatment was adjusted as venlafaxine 225mg+150mg/day, mirtazapine 30 mg/day 1*1, alprazolam 0.5 mg 3*1. The patient was consulted to neurology with MRI results and Parkinson's treatment was adjusted as stalevo (l-dopa+carbidopa+entacopan) 200 mg/day and azilect (rasajilin) 1 mg/day.

Discussion

Various factors play a role in the development of depression in old age. Etiological factors include psychosocial reasons, increasing physical illnesses, medications, physiological changes related to old age and neurochemical or neuroendocrine changes that may occur after physical illnesses. Depressions in old age are similar to depressions in young people, but differ in some characteristics; depressed mood is less common, while cognitive symptoms are more frequent (Bayulkem&Torun, 2007) Somatic complaints and preoccupations and anxiety findings are at the forefront.

Depression seen in PD may be considered to have some clinical differences from others. For example, feelings of guilt and grief without self-condemnation and anxiety comorbidity are more frequent. It has been reported that depressives with Parkinson's disease show advanced disability and more frontal lobe-type neuropsychological deficits over time (Poewe & Seppi, 2001). In addition, the frequency of depression may vary according to the clinical features of PD itself. It has been suggested that patients with significant postural instability and gait disturbance have more depression than patients with tremor.

This case report emphasizes that depressive disorder may occur during the course of PD and the importance of careful monitoring and treatment of the patients and treatment of the underlying disease in the treatment of depressive disorder due to another health condition.

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Public Health Issues

Dear Reader

Public health is a branch of science that contributes to social well-being, defines the determinants of health, offers suggestions for improving health, identifies the risks and threats faced by the society related to health, makes the necessary analyzes and offers the necessary solutions, and also sees the health of individuals as their responsibility from the moment they fall into the mother's womb until their death.

Public health, which is a multifaceted, interdisciplinary field, consists of many elements and different applications. These disciplines include epidemiology, biostatistics, social sciences and health services, infectious diseases, chronic diseases, environmental health, mental health, disasters, public policy, health economics, health management, maternal and child health, pregnancy follow-up, disability, occupational safety, health policies, sexual and reproductive health and gender issues in health.

In our book, we aimed to address the current problems that pose a threat to public health. This book has been brought to the literature by making the necessary arrangements within the scope of the original language book project initiated by Bidge Publications. In addition, I hope that our book will be useful for the benefit of the whole society, especially health professionals, educators and students, and I would like to thank all our contributing authors and the editor-in-chief of the publishing house Zeynel KARACAGİL and his team for their great efforts in the publication of the book.

BİDGE