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## MEDICAL AND LEGAL DIMENSION WITH PATHOGENIC MICROORGANISMS IN WATER-BORNE POISONINGS IN TURKEY

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## ABSTRACT

### Introduction

One of the most important public health problem is pathogenic microorganisms in water-borne poisoning which can result in disability or even death, creates a significant workload in hospitalizations, common in the world and our country.

### Aim of the Study

In this study, it was aimed to share information and examine the medical and legal dimensions of health professionals and other public officials who obliged to be notified in the case of toxicities caused by pathogenic microorganisms in the water.

### Materials and Methods

The scope of the research determined by searching the current domestic and foreign literature then the information has been collected from the relevant people about the subject. The compiled information was presented systematically and the solution proposals were given about the problems that have emerged.

### Results

Water-borne pathogenic microorganism poisoning is in the forensic event like all the other poisoning events, and notification is mandatory under article 280 of Turkish Penal Code. Not to notice imposes certain sanctions like including a prison sentence to healthcare profession.

## Conclusions

One can say it is the most essential key factor to report water-borne poisoning cases to the judicial authorities and determine the reasons correctly in order to avoid recurrence such incidents.

**Key words:** Drinking water, Law and regulations, Pathogenic microorganisms, Poisoning, Water regulations, Basic Health Statistic Module.

## INTRODUCTION

Water pollution is a big global problem and also seen the cause of the events like many death and pestilence (1). Approximately 200 million people per year in the world to catch a water-related illness and more than 2 million of them die because of polluted water diseases. Nearly half of all diseases on earth are believed to be associated with the water directly or indirectly. Water-borne infection induced diarrhea is 2<sup>nd</sup> place all over the world among the cause of death (2). The World Health Organization (WHO) reported those approximately 470 thousand, *Campylobacter*, *Vibrio cholerae*, *E. coli*, *Giardia*, *Legionella*, *Shigella*, Hepatitis A infections and typhoid fever, amebiasis case by the member states in Centralized Information System for Infectious Diseases in the European Region in 2010 (3). According to the same data, almost 14 deaths have been reported per day because of the limited water, sanitation services and hygiene-associated diarrhea. This rate is below the world average. While 1,5 million children who died because of the diarrhea-related diseases in the world in 1990, this number has been reduced to 622 thousand in 2012. It is thought to be a significant part of this cases source of drinking water. According to the data of Turkish Statistical Institute, diarrhea is in the first place in the most common diseases cases in children age group of 0-6, in 2012, and second place in 2014 (4). In recent years, although increased the taking precaution, pathogenic microorganisms-borne in drinking water poisoning still emerges as an important health issue in our country and in many parts of the world. Whereas medical authorities specify that diarrheal disease at level of 25-35% and the other water-related diseases can be significantly reduced with sanitation services and hygiene interventions (3). It may have thought the reported water-borne poisoning numbers in Turkey do not reflect reality. However, notification about water-borne poisoning to forensic authority and accurate determination of the cause of poisoning to paramount importance in terms of prevent the recurrence of these poisoning incidents and taking the necessary precaution by relevant authorities. In this study, we aimed to health professionals in the notification obligation in forensic cases, sharing information to other public officials and examination of the medical and legal aspects of the subject in pathogenic microorganisms borne occur/caused poisoning in water.

## MATERIALS AND METHODS

The scopes of the research, the current domestic and foreign literature were searched and the information has been collected from the relevant people about the subject. The compiled information was systematized and presented then the solution proposals were given about the problems that have emerged. When researching the study, Google search engine and PubMed database scanned and examined with key words such as "poisoning", "water epidemics", "forensic case report", "basic health statistics module", and "water legislation".

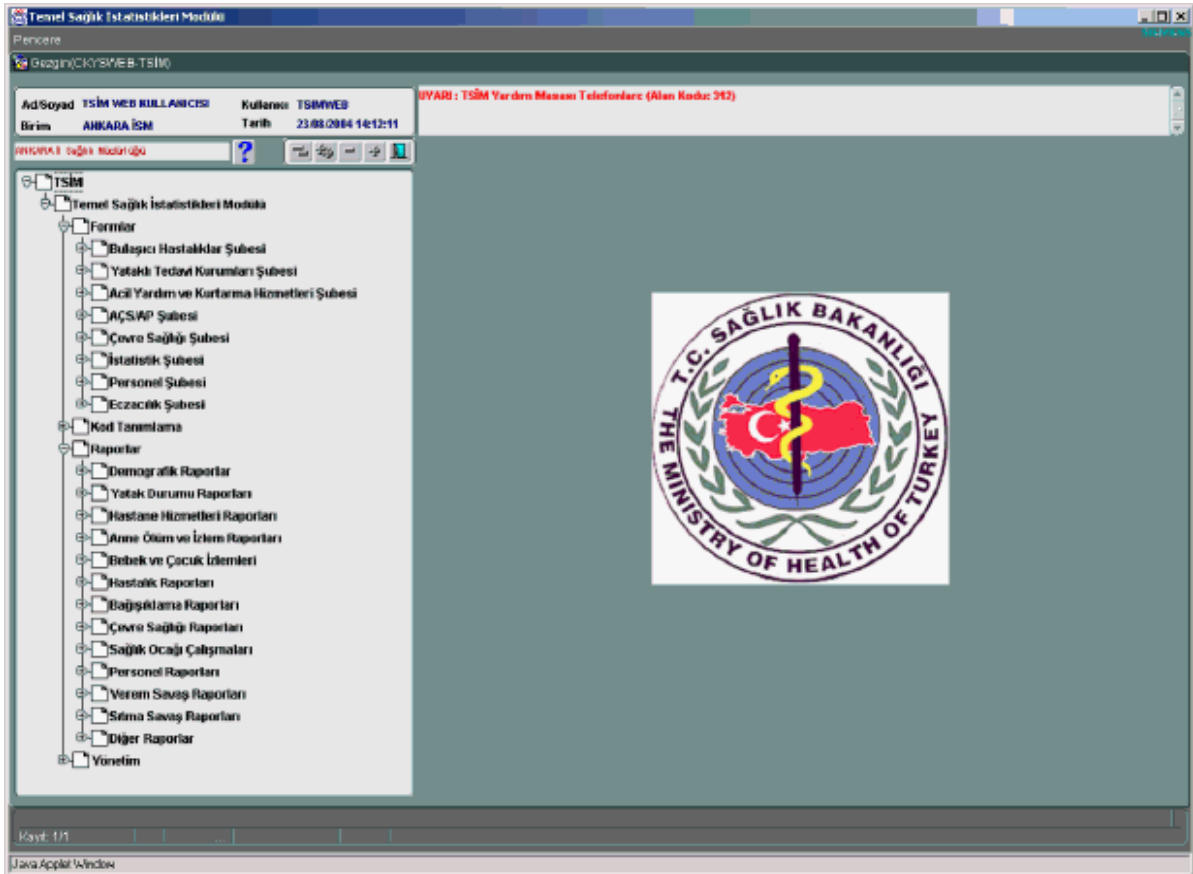
## RESULTS

Pathogenic microorganisms-borne poisoning in water is in the forensic case like the other poisoning events. Article 280 of Turkish Penal Code says “Any member of the medical profession who fails to report of an offence, or delays in reporting such offence, to the relevant authority after becoming aware, in the course of his duty, of any evidence demonstrating that a crime may have been committed shall be sentenced to a penalty of imprisonment for a term up to one year” (5, 6) (Table 1).

**Table 1. Notification obligation of forensic cases for public and healthcare professionals.**

Article	Context
TPC 279	(1) Any health personnel who notices commission of an offense while performing his/her duty, but neglects to notify this to the authorized bodies, is punished with imprisonment up to one year.
TPC 280	(1) Any person who destroys, deletes, conceals, changes or corrupts the evidences produced to prove commission of offense in order to hide the truth is punished with imprisonment from six months to five years. A person may not be punished according to the provisions of this article due to an offense personally committed or involved in its commission.

And article 279 of Turkish Penal Code, apply the same sanction to the other public employees. Therefore, primarily making the forensic case statement in pathogenic microorganisms-borne poisoning in water is a legal obligation to all public and health employees, including doctors. Basic health statistics module (BHSM) is initialized in 1997 as a “Basic Health Statistics Module Project” for to be used in the field of health statistics. The system redesigned and developed in a central web-based pattern in 2005. Since August 2011, this system service continues as Hospital Information Forms. It is aimed to provide up to date and reliable information on healthcare and health risks, throughout the country to guide to programs and resources of Ministry’s central and provincial organization, thus health policies. Data quality is very important to have a complete and accurate BHSM database in order to conform the national and international standards to be able to produce the health statistics to correct, valid information. Two fields which “Hospital Information Form” and “Oral and Dental Health Information Form” are used in BHSM about hospital services (Figure 1).



**Figure 1.** The Ministry of Health of the Republic of Turkey, Basic Health Statistics Module.

BHSM is intended to be source of important statistical data in medical service indicators and to get especially administrative service indicators. All hospitals in our country and the health facilities, as the purpose of BHSM's software, enter previous month's snapshot data before the first 10<sup>th</sup> days of each month. For example, the data of April 2016 would be entered between 1<sup>st</sup> and 10<sup>th</sup> of May 2016 by those related parties. In the first 10 days of each month data are entered and approved by hospitals, they approved electronically via BHSM in 11-15<sup>th</sup> days on every month by the relevant branch of the Provincial Health Directorates and Secretariat of Public Hospitals Union. Hospitals data belong to the Institution of Public Hospitals in Turkey confirm by Secretariat of Public Hospitals Union. Data of Private hospitals, university hospitals and integrated district hospitals belong to Institution of Turkey Public Health confirm to relevant branch offices of Provincial Health Directorates. Provincial Health Directorates and Secretariat of Public Hospitals Union has only monitoring and approving accesses which means they do not have entry rights into those forms. When a hospital enters a new set of data to the system and save, users with the sufficient rights of the relevant hospital, Provincial Directorate of Health, Secretariat of Public Hospitals Union, Directorate General of Health Services can see it on their screens with the status of "waiting for approval", on real-time basis. Hospital officers are also able to change the data in a certain time of allowed period, whether it has approved yet or not. Once the entry gets approval, Provincial Directorate of Health and Secretariat of Public Hospitals Union's check button becomes active. . This workflow must be followed for each entry. In our country, 18/C "Food Poisoning Form" which used for only food poisoning removed from the application in 2007. "Poisoning Case Report Form" is created within BHSM for collection of statistics about poisoning and all the poisoning cases (7). According to the Ministry of Health Circular, filling out the form and the statement must be done with the Provincial Health Directorates by all health institutions and organizations within 24 hours. Because of the restructuring of the health system, the notification is made the same day with the Public Health Directorates instead of Provincial Health Directorates. Currently statistical information about

poisoning in units of the Ministry of Health maintained with obtained records relying on Refik Saydam Hygiene Center Presidency Poison Research Directorate's distributed antidotes. While conducting the notification, information about the stuff who made the statement and the institution which engaged the intervention, date of form, patient's identity and address, and poisoning information (reference time, factor that cause the poisoning, place of poisoning, time, complaints, the time to onset of complaints, if death occurred time of death) must be filled in completely and correctly (6, 7, 8).

The water and food that humans consume, when be harmful to health and not suitable for consumption, it's not safe (9, 10). For this purpose, the necessary legal criteria defined in 1930 dated 1593 numbered in the General Healthcare Law article 235-242 (11), the Ministry of Health, 2005 dated and 25730 numbered in the Regulation on Water for Human Consumption (12), the Ministry of Environment and Forestry dated 2004, 25687 numbered the Regulation on Water Pollution Control (13), for ensure the security and insulation of water basins and protection of consumer health (Table 2).

**Table 2. Laws and regulations about pathogenic microorganisms-borne water poisoning.**

Articles 279 and 280 of Turkish Penal Code, No. 5237
Articles 235 and 242 of Public Health, No. 1593
The Ministry of Health, Regulation about Water for Human Consumption, No. 25730
The Ministry of Environment and Forestry, Water Pollution Control Regulation, No. 25687
Articles 185 and 186 of Turkish Penal Code, No. 5237

## DISCUSSION AND CONCLUSIONS

Article 185 of Turkish Penal Code 5237 numbered, 1<sup>st</sup> paragraph: "Any person who endangers the life or health of others by introducing toxic substances to drinking water, food or any other consumable (by eating, drinking or any other method) items or by spoiling such by any means, shall be sentenced to a penalty of imprisonment for a term of two to fifteen years", and 2<sup>nd</sup> paragraph: "Where an offence in the aforementioned paragraph is committed by failing to exercise due care and attention, the offender shall be sentenced to a penalty of imprisonment for a term of three months to one year" (5). The commit that mentioned above can be done in different ways. "Damage" cannot be seen the same with empoison. It is different from adding poison. Poisoned material itself is a poison. However, damaging is to damage the natural pattern of nutrients. This natural pattern can damage with changes that occur in microorganisms, when the necessary storing requirements are not met, and also can be damaged with an ingredient that does not have the nature of the poison and incompatible with the structural feature of food (14). The Court of Appeals accepts that to throw a dog corpse to the drinking water sources is the contaminating action (15). However perishable food can poison people. The actual shape of destruction, the place and time do not impede the formation of the crime. But it may be important in terms of the occurrence of crime. So, the act that made for damaging the nutrient can perform the effect after a certain time. In such cases, crime takes place at the time that corruption occurred. Also according to article 186 of Turkish Penal Code numbered 5237, provides that up to five years imprisonment and criminal fines to person or persons who procure water and food in such a way as to endanger the life and health of people (5).

In our country, microbiology laboratories in universities and state hospitals, Public Health Agency water analysis laboratories, and microbiology analysis laboratories in the municipalities are undertaking unhealthy waters in the analysis of pathogenic microorganisms. Although drinking water-borne caused by reported pathogenic microorganisms intoxications is quite low number, it doesn't mean that such poisoning is not seen much in our country. Because it is believed that the rate of reported water-borne outbreaks less as the only visible part of an iceberg, and the real numbers are much higher. However, notify the judicial authorities of water-borne outbreaks and determinate accurately cause of the poison, prevent the recurrence of

these poisoning incident and the required measures are of great importance (16, 17). Outbreaks causes will be determined by together with public servants who obligation to report and medical personnel in treatment units, forensic investigation to be done after notify such cases urgently, imported results of analysis of water samples with medical records and samples like stool, blood, vomit (6, 8, 18). Therefore, it is quite important that the public officials, especially the health professionals, know and fulfill the duties and responsibilities related to taking, protecting, storing and sending the samples to be analyzed properly.

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