Mushroom Consumption Despite Its Risks; Habits and Beliefs of the People in Central Anatolia

Risklerine Karşın Mantar Tüketimi; Orta Anadolu’da İnsanların Aşkı ve İnanışları

ABSTRACT

Aim: We aimed to learn about the mushroom consumption habits of the people and the effects of informing the public about poisonous mushrooms on solving the mushroom poisoning.

Methods: This descriptive study was done at Central Anatolia in April and May 2005. A questionnaire was applied including questions about their habits and beliefs while consuming mushroom. Then, the participants were given education about poisonous mushrooms and what to do after poisoning. We observed the effect of education by estimating differences in emergency ward admissions between three years before and after the education.

Results: In the study; 788 participants attended and 698 participants (88.6%) stated that they regularly consumed mushrooms, and 396 participants (50.3%) told that they knew people around poisoned due to consumption. The number of patients admissions diagnosed with mushroom poisoning at the emergency ward decreased after the education given in the year 2005 from Mihalıççık.

Conclusion: We conclude that in Central Anatolia, mushroom poisoning is an important problem and the education can be effective for solving this problem.

Keywords: mushrooms, mushroom poisoning, education

ÖZET

Amaç: İnsanların mantar tüketme alışkanlıklarını ve bilgilendirmenin mantar zehirlenmeleri etkisine öğrenmek amacıyla.


Bulgular: Çalışmaya 788 kişi katıldı. 698 katılımcı (%88,6) düzenli mantar tükettiğini, 396 katılımcı (%50,3) zehirli mantarlar hakkında bilgi almayı tercih ettiğini belirtti. 2005 yılında verilen eğitim sonrasında Mihalıççık’tan acil servise gelen şahısların sayısı azaldı.

Sonuç: Orta Anadolu’da mantar zehirlenmeleri önemli bir problemdir ve insanlara mantar tüketimi ve zehirli mantarlara karşı eğitimi vermek için etkili bir çözümü bulunmaktadır.

Anahtar kelimeler: mantarlar, mantar zehirlenmesi, eğitim
Introduction

Until now, nearly a hundred thousand species of mushroom have been defined in the world and only 2-3% of these species cause poisoning (1). While Amanita is the most poisonous genus, poisoning cases caused by the genus Cortinarius also attract attention in Europe (2). The American Association of Poison Control Centers (AAPCC) states in its 2008 Annual Report that 6034 applications were made with regard to mushroom poisoning (3). Although the exact number of mushroom poisoning cases in Turkey is unknown, the studies reveal that the number of deaths caused by mushroom poisoning is really high in Central Anatolia (4).

Wild mushroom poisoning can result in clinical findings varying from gastrointestinal complaints and neurological problems to liver and renal failure (5). Clinical spectrum and toxicity show changes depending on the consumption pattern, geographical region and immunity of the person concerned (6). The effects of wild mushrooms on the body are influenced by factors such as the age of the mushrooms ingested, how much and in what way they were ingested, characteristics of the region and season (7).

People know very little about wild mushroom poisoning effects and the belief that processing the wild mushroom will alter its toxicity is really common. The people have wrong beliefs that when the mushroom is picked if the inside color immediately turns blue it is poisonous; when the mushroom is cooked or boiled with a silver spoon or coin, the silver turns black if the mushroom is poisonous; the mushrooms that snails and insects eat and the ones grow in the pastures and on trees are nonpoisonous; boiling the mushroom in water with salt or vinegar removes the poison; snakes give their poison to mushrooms; the poison is taken off when the mushrooms are dried or cooked, and eating the mushroom with yoghurt or after having kept it in buttermilk prevents the poison (8).

There are many studies about wild mushroom poisoning cases in the Central Anatolia (4,9). In Unluoglu et al. studies around Eskisehir between the years 1996 and 2004, they, draw the attention to the fact that the number of poisoning cases is really high in districts of Eskisehir (9). The aim of the study concerned was to learn about the frequency of wild mushroom consumption, and habits and beliefs of consumption, which characteristics of the mushrooms are considered while consuming, what the people do in case of mushroom poisoning in Mihalçaçık district of Eskisehir and its villages where poisoning cases are frequently seen. We wanted to give education the people about poisonous mushrooms and what to do in case of poisoning.

Methods

Participants and Procedures:

Mihalçaçık is situated in a forestland at an altitude of 1330 meters, 90 km away from Eskisehir. The population of Mihalçaçık and its’ villages is 12000 approximately. The study, was done in the center of Mihalçaçık and its’ 10 villages, the people of which presented most to the district state hospital with the complaint of wild mushroom poisoning. We calculated the representative sample confidence interval of 90% with a standard deviation of 5% consisting of 650 participants aged 18 years and older in this study.

Before the study; we got the permission from the local government. In this study; the data were collected using anonymous questionnaires.

Selected villages were informed about the survey by a phone call to the headmen and wanted them make announcement about the study to the villages and made to schedulate the survey date. Ten villages headmen agreed to participate the study. Completion of the survey took one day in one village. Data were collected between April and May in 2005.

Study Design and Data acquisition:

We aimed to learn about the mushroom consumption habits of the people and the effects of education the public about poisonous mushrooms on solving the mushroom poisoning.

In this survey; we performed two studies; the first one was about learning habits and beliefs and knowledge of people about mushroom consumption and than we gave education abut poisonous mushrooms and what to do in the case of the poisoning. And then we observed the emergency ward admissions with mushroom poisoning from the
Mihalıççık. Firstly; the participants, included in the study on a volunteer basis, were questioned face to face with a questionnaire composed of 18 multiple-choice and open-ended questions and their socio-demographic features were noted by the researchers. Verbal and written instructions reminded participants of the importance of giving honest answers, not writing their names on the questionnaire to maintain confidentiality.

Instrument:

The questions were about their methods of obtaining wild mushrooms, ways of consumption, whether there were special methods performed to make the mushroom not poisonous, whether they or the people around had been poisoned before or anyone they knew had died, the symptoms of poisoning they knew and what they did in the case of poisoning. Following this questionnaire, the participants were gathered together and given education by researchers about the poisonous mushrooms, symptoms of poisoning and things to do.

After this education, the number of patients, diagnosed with mushroom poisoning, followed up in the reference hospital, Eskisehir Osmangazi University Faculty of Medicine Hospital Emergency Department, situated in the western part of the Central Anatolia, before and after three years from Mihalıççık. So we may mention about the effect of the education by estimating differences in emergency ward admissions between 2002-2004 and 2005-2008.

Statistical evaluation

Statistical analysis for descriptive statistics was performed using SPSS software (version 16.0; SPSS Inc., Chicago, IL, USA).

Results

Sociodemographic features:

A total of 788 participants were included in the study. Of these participants, 248 (31.5%) were female between the ages 18-86 and 540 (68.5%) were male between the ages 17-96. 118 participants (15.0%) were illiterate and 32 (4.1%) were only literate. 446 (56.4%) participants were farmers and 54 (6.8%) were civil servants.

Habits and beliefs and knowledge of people:

In the study, 698 participants (88.6%) stated that they consumed wild mushrooms. 76.8% of the participants consuming wild mushrooms stated that they themselves or their families gathered wild mushrooms, 6.1% stated that their neighbors gave them and 5.7% bought them from the bazaar.

It was found that while consuming wild mushrooms, the people trusted the appearance of the mushroom most ($x^2=157,397, p<0.05$). Besides, there were 294 people (37.3%) believing that the location and 104 participants (13.2%) believing the experiences of the person who gathered it were important. There were 388 participants (49.4%) believing that cooking the mushroom takes out the poison. The wild mushroom consumers did not obtain which the way of cooking was more effective. There were 62 participants (7.9%) believing that the poison of the wild mushroom takes out the poison with eating soil.

There were 396 participants (50.3%) around whom there were people poisoned from wild mushroom, and 12 persons (1.5%) around whom mushroom poisoning ended in death.

466 participants (59.1%) stated that the most frequent symptoms of mushroom poisoning were nausea and vomiting.

In the case of poisoning, 526 (66.8%) participants declared that eating yoghurt and 62 (7.9%) participants eating soil, 304 (38.6%) participants declared that admitting immediately to a hospital and 96 (12.2%) participants declared that they did not know what to do. (Participants marked multiple options.)

It was found that 44 participants (5.6%) declared that they still consume the wild mushroom although got poisoned before. A statistically significant relationship was found between the participants who themselves got poisoned before and the ones presenting to a health care facility in the case of poisoning ($x^2=12,897, p<0.05$).

Effect of the education given in 2005:

Between the years 2002-2004, a total of 161 persons admitted to the Emergency Department due to mushroom poisoning, and 18 (29.5%) out of these 161 patients were from Mihalıççık. In the year 2005, no one presented from Mihalıççık whereas between the years 2006 and 2008 a total of 135 persons of
whom 4 (3.0%) were from Mihalıcçık admitted to the emergency ward. When we compared the differences in emergency ward admissions between three years before and after the education, there was reduction in the number of mushroom poisoning cases. For the hypothesis, “is education effective factor for wild mushroom consuming?”, we compared the admission the emergency department for mushroom poisoning from the area of Mihalıcçık. It was compared with power analysed and was found as a result that education, given on mushroom poisoning in 2005, was found as a protective factor (p=0.011<0.05, OR=0.266 (0.07-0.762)).

**Discussion**

Mushroom poisoning is an important health problem both in Turkey and in the world (4,10,11). Thus, the Ministry of Health in Turkey prohibits the sale of wild mushrooms in public places. In Switzerland, 5638 patients had been reported because of mushroom poisoning by Toxicology Center between January 1995 and December 2009 (12).

It is not always possible to clearly determine which type of mushroom is poisonous. Furthermore, geographical features such as the region, the season, experience of the gathering people and the type of consumption are also important. The appearance of the mushroom was the most important point for the participants in our study, and then the experience of the person gathering the mushrooms. In the study in England, it has been found that one out of every three adults consumed cultivated and/or wild mushrooms and they reported that mushroom consumption per person was 0.12 kg annually (11).

In studies conducted in Turkey, it has been found that mushroom poisoning is mostly seen in June and December, while in Switzerland in June, September and October and it is mostly seen in Ireland in May to October (4,9,12,13).

Except for the genus Amanita, the poisoning effects of mushrooms which are more toxic when eaten raw are partially reduced by cooking (14,15). In this regard, children are of great risk. The mushrooms which seem attractive to children because of their shapes are digested raw and lead to increase in cases of poisoning. In the study of Unluoglu et al., 223 cases of children were discussed and 5 children died of mushroom poisoning (16). In the 2002 Annual Report of AAPCC, it is stated that children under the age of 6 were the most affected group and that 90% of the poisoning cases consisted of people under the age of 19 (17).

In mushroom poisoning cases, gastrointestinal symptoms appear within the first 6 hours of mushroom ingestion and then symptoms progressing to renal and liver failure are observed. In our study; most of the participants stated that nausea and vomiting can be seen.

While the mortality rate in Turkey due to mushroom poisoning was found to be %1.02 in Sivas % 2.8 in the study in Eskisehir and, it was found %17.9 in Istanbul (4,16,18). In the Toxicology Report (2009) of the North American Mycological Association (NAMA), it is stated that 4 patients who had undergone liver transplantation died after mushroom ingestion (19). In the review of Jander et al. (15), the mortality rate was between 4.8 to 34.5%. In our study, while 12 participants knew persons around who died of mushroom poisoning, 44 participants have been poisoned themselves. The fact that; people continue consuming wild mushrooms although they have been poisoned before. It may depend that there are cheap and delicious mushrooms in the region they live. However, edible and poisonous mushrooms might be growing side by side and thereby cause poisoning. The finding in the study of İşloğlu et al. (8), there are 14 types of poisonous mushrooms including Amanita phalloides were found alongside with 10 types of edible mushrooms in the same area supports this view. Besides, fungal spores spread around by variables such as wind, heat and moisture and thereby poisonous and nonpoisonous mushroom types are mixed together (8).

**Limitations:**

The rate of wild mushroom consumption was higher. We think this data is important because of reflection the situation about consuming wild mushroom in rural area.

We analyzed the effect of the education by using the data from emergency ward admissions at only reference hospital so we had overlooked the admissions to other hospitals.
Conclusion

Mushroom poisoning is a rare event compared to poisoning with other toxicants and has lower mortality rate. As in this paper; in Europa, America and far east in the world, there are many mushroom poisoning people. Due to importance from a population point of view, healthcare professionals should be aware of the possibility mushroom consumption may lead to fatal poisoning. We found that the rate of mushroom consumption was extremely high in rural areas and people had wrong beliefs. We conclude that informing the public the about poisonous mushrooms and mushroom poisoning in regions is of great importance for public health.

References

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