Pre-Service Teachers' Opinions and Perceptions of Ethnobotany and Medicinal Plants

Öğretmen Adaylarının Etnobotanik ve Tıbbi Bitkiler ile İlgili Görüş ve Algıları

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Abstract: Ethnobotanics is the science of human interaction with plants. The aim of this research is to determine the opinions and perceptions of prospective teachers towards ethnobotanical and medicinal plants. Research was conducted in 2014-15 academic year, the education faculties in Turkey. The data were obtained from 96 (61 women, 30 men) pre-service primary class teachers and science teacher. In the research carried out using the descriptive method, the data were collected in two stages. In the first step, a questionnaire consisting of 7 open-ended questions was prepared by the researchers and given to prospective teachers. In the second step, semi-structured interviews were held with 10 pre-service teachers in order to examine their views and perceptions in this regard in more detail. The data were analyzed by content analysis. The information about the prospective teachers' ethnobotanical, medicinal plants and their usage, sources of such information are analyzed and summarized in the findings section. According to the findings of the study, preservice teachers knew that ethnobotany was a science, but they could not define it correctly. In addition, information sources have often been their families. In their daily lives, they used the plants for various purposes (such as food, furniture, toys). In the case of disease, they stated that the plants consumed every part of the plant in the form of tea for drug purposes. It is a remarkable finding that the audiovisual media have an important place in terms of giving information about the medicinal plants and explaining their usage. In addition, pre-service teachers are aware that they should be careful when using such plants. In order to transfer ethnobotanical science to future generations and to attract students' attention, it is considered necessary and recommended to enter this subject in the curriculum.

Structured Abstract: Introduction

Since the existence of humanity, there has always been a relationship between plants and people. The Turkish people used the plants for different purposes such as food, medicine, cosmetics, cleaning and dyestuff. The ethnobotanical concept emerged at this point. The ethnobotanical concept was first used in 1896 by botanist John W. Harsberger in his book "The Purposes of Ethnobotany" (Afyon, 1994). Ethnobotany's has an

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effective and cumulative information system because the experiences and experiments obtained are transferred from generation to generation to make progress; unused information is lost and new information is added and refreshed (Grenier, 1998; Berkes and Turner, 2006; Dahlberg and Trygger, 2009). Information on traditional plant use is important for the future of biological resources. (Uğulu and Aydın, 2011). Today's modern youth do not carry traditional plant use information inherited from their families due to their socio-economic status (Sarıcı et al., 2004).

From the past years people have benefited from plants in various areas such as health, nutrition. This plant usage information, which people acquire through trial and error, has continued to be used even though it has undergone changes over time and each area have specific plants and usage of plants (Ecevit Genç, 2003). Especially in Anatolia, utilization of plants has become a culture and has been going on for centuries (Demirci, 2010).). For this reason, within the framework of the ethnobotanical concept, it is necessary to give awareness of the areas of plant use to our future generations and to prevent this culture from disappearing.

Based on all this information, this study aimed to reveal the opinions and perceptions of pre-service teachers about ethnobotanical and medical plants. According to the literature review, a study for this purpose has not been encountered before. The research is considered to be original and important in these aspects.

Method

The research was carried out with the descriptive research method. The research was performed in an education faculty in Turkey. The data were gathered from 96 (66 female, 30 male) pre-service teachers. The pre-service teachers were attending the third class of primary science education department (45–30 female, 10 male) and primary education department (51–31 female, 20 male). Semi-structured interviews were carried out with 10 (5 female, 5 male) students. The students interviewed were randomly selected from those who used the plants for health. The data were collected in two steps in the school year 2014–15. In the first step, a measuring instrument that consisted of 7 open-ended questions was prepared by the researcher and given to the students. In the second step, semi-structured interviews were held with 10 prospective teachers in order to examine students' views and perceptions in this regard in more detail. The data were analyzed with content analysis. The data obtained from the instrument and interviews were categorized and arranged by considering the alternative opinions of the pre-service teachers. The opinions of the pre-service teachers who gave the same type of answers and pre-service teachers who gave different types of answers were categorized and specified.

Results

For the first question; most of the students mentioned that ethnobotany is a *science* (n=35). 16 of the students wrote what botany is. Some of them mentioned that ethnobotany is a science which is interested in *ethnic + botany*. For the second question, 12 of them mentioned that ethnobotany is interested with traditional plant usage. Those who answered "*science*" to the first question were unable to respond to the ethnobotany area of interest in the second question. Most of them of the participants did not know about the interest of ethnobotany. For the third question, most mentioned code was food (n=83). Health, dye, cosmetic, toy, furniture were also mentioned by the students. For the factors that affect them to plant consumption family is most mentioned code (n=79). People around me (n=29), audiovisual media (n=68), advertisement (n=42), print media (newspaper, magazine etc.) (n=12), doctor (n=11), herbal shop (n=38) are also mentioned. For the fifth question; flu is the most mentioned code (n=96) and skin disease is mentioned secondly (n=26). Diabetes, cholesterol disease, kidney disease are also mentioned for this question. For the sixth question tea is the most mentioned code (n=96) and swallowing seeds is mentioned less (n=2). For the seventh question *All parts* is the most mentioned code (n=65). Leaf (n=53), seed (n=28), root (n=10) and flower (n=8) are also mentioned for using plant parts.

Second interview questions; Not all the pre-service teachers consider the use of plants for therapeutic purposes inconvenient. They stated that they could use herbal cures they heard from the television program or the people around them for the purpose of treatment. All of the students who participated in the interview emphasized that chemical drugs are more objectionable than plants. And all of the students emphasized that they will pay attention to the recommended preparation and use instructions while using the plants. They stated that they would prefer herbal shops or pharmacies for plant supply.

Conclusion

In this study, where the thoughts and perceptions of pre-service teachers towards ethnobotanical and medicinal plants were determined, various results were revealed for ethnobotanical field in line with the questions directed to pre-service teachers. In the first question, pre-service teachers were asked a question about what ethnobotany is. While some students expressed this concept as a science, they stated that they had no idea what it was like. In this case, it can be interpreted that pre-service teachers are not provided with sufficient training on ethnobotanical. In the second question directed to the pre-service teachers, their opinions about the interests of ethnobotany were asked. The vast majority of the participants stated that they had no idea about this issue. Ethnobotanics has been a science that has been reflected to the present day as a result of the bond they have established with plants since the existence of humanity. In the third question of the study, pre-service teachers were asked what purpose they used the plants and students mostly answered "food". Some of the participants replied "for health purposes". In the studies of Uğulu and Aydın (2011), it was seen that students benefit from plants in case of cold and flu. In the fourth question of the research, what factors led them to plant consumption was asked. Pre-service teachers mostly gave answers to family, audiovisual media and advertisements. In the fifth question, in which diseases pre-service teachers used medicinal plants were asked. A large part of them answered as flu. Thanks to the studies carried out, the information learned from the public can be used in public health and it can be easily determined which plants can be used in which region (Kendir and Güvenç, 2010). In the sixth question, how they consume plants as medicines was asked. In the results revealed in the study, it is seen that pre-service teachers use the plants mostly as food and drink both for therapeutic purposes and use. The seventh question asked which parts of the plants they used as medicines and they gave the answer "leaf" to the question of which part of the plants they use the most after the "all parts" answer. In their study, Uğulu and Aydın (2011) received the answer of "leaf". In addition, it was observed that pre-service teachers did not know about the recognition, collection and storage of plants. For this reason, it becomes important to know and teach the correct use of plants.

Keywords: Ethnobotany, medicinal plants, pre-service teacher, science education.

Öz: Etnobotanik, insanların bitkilerle etkileşimi bilimidir. Bu araştırmanın amacı öğretmen adaylarının etnobotanik ve tıbbi bitkilere yönelik görüş ve algılarını belirlemektir. Araştırma 2014-15 öğretim yılında Türkiye'deki bir eğitim fakültesinde gerçekleştirilmiştir. Veriler 96 (61 kadın, 30 erkek) sınıf öğretmeni ve fen bilgisi öğretmeni adaylarından elde edilmiştir. Betimsel yöntem kullanılarak gerçekleştirilen araştırmada veriler iki aşamada toplanmıştır. İlk adımda 7 açık uçlu sorudan oluşan bir anket araştırmacılar tarafından hazırlanmış ve öğretmen adaylarına verilmiştir. İkinci adımda, 10 öğretmen adayı ile onların bu konudaki görüş ve algılarını daha ayrıntılı incelemek amacıyla yarı yapılandırılmış görüşmeler yapılmıştır. Verilerin tümü içerik analizi ile analizi ile değerlendirilmiştir. Öğretmen adaylarının etnobotanik, tıbbi bitkiler ve kullanımları hakkındaki bilgileri, bu tür bilgilerin kaynakları bulgular bölümünde analiz edilmiş ve özetlenmiştir. Araştırmanın bulgularına göre, öğretmen adayları etnobotanik bir bilim olduğunu bilmişler fakat doğru olarak tanımlayamamışlardır. Ayrıca bilgi kaynakları genellikle aileleri olmuştur. Günlük hayatlarında bitkileri çeşitli amaçlarla (yemek, mobilya, oyuncak gibi) kullanmışlardır. Hastalık durumunda ise bitkileri ilaç niyetine çay formunda ve bitkinin her bölümünü tükettiklerini ifade etmişlerdir. Öğretmen adaylarına göre görsel-işitsel medyanın tıbbi bitkiler hakkında bilgi vermesi, kullanımını açıklaması bakımından önemli bir yere sahip olduğu dikkat çekici bir bulgudur. Ayrıca öğretmen adayları bu tür bitkiler kullanırken dikkatli olmaları gerektiğinin de farkındadırlar. Gelecek nesillere etnobotanik biliminin aktarılması ve öğrencilerin dikkatinin çekilmesi için bu konunun öğretim müfredatlarına girmesi gerekli görülmekte ve önerilmektedir.

Anahtar Kelimeler: Etnobotanik, tıbbi bitkiler, öğretmen adayları, fen eğitimi.

Introduction

Since the existence of humanity, there has always been a relationship between plants and people. The Turkish people used the plants for different purposes such as food, medicine, cosmetics, cleaning and dyestuff. The ethnobotanical concept emerged at this point. The ethnobotanical concept was first used in 1896 by botanist John W. Harsberger in his book "The Purposes of Ethnobotany" (Afyon, 1994). By definition, ethnobotanical; people benefit from the plants in their immediate

vicinity to meet their various needs and effects on plants. (Altay and Çelik, 2011). Turner (1995) defined ethnobotany as “the science of people’s interaction with plants.”

Ethnobotany’s has an effective and cumulative information system because the experiences and experiments obtained are transferred from generation to generation to make progress; unused information is lost and new information is added and refreshed (Grenier, 1998; Berkes and Turner, 2006; Dahlberg and Trygger, 2009). Information on traditional plant use is important for the future of biological resources. (Uğulu and Aydın, 2011). Today's modern youth do not carry traditional plant use information inherited from their families due to their socio-economic status (Sarıcı et al., 2004).

From the past years people have benefited from plants in various areas such as health, nutrition. This plant usage information, which people acquire through trial and error, has continued to be used even though it has undergone changes over time and each area have specific plants and usage of plants (Ecevit Genç, 2003). Especially in Anatolia, utilization of plants has become a culture and has been going on for centuries (Demirci, 2010). Each culture has used plants according to themselves; a plant which is used as medicine can be used only as food in another culture. Turkey has a rich culture in terms of benefiting from plants. With the development of medicine and pharmacology, locally used plants have begun not to be preferred. Thus, with the death of old people who have this information, this information which has been obtained through long experience has begun to disappear. Our plant species should be preserved for the next generations, and this information should be transferred to the next generations in a healthier way (Kızıllarslan, 2008). For this reason, within the framework of the ethnobotanical concept, it is necessary to give awareness of the areas of plant use to our future generations and to prevent this culture from disappearing.

However, observing the undesirable side effects of artificial drugs used in the treatment of diseases recently brought up the use of herbs in the field of health. The plants, called “green medicine” and which we use for the treatment, are widely used all over the world, especially in Europe and America (Saya et al., 2001). In Turkey, nearly 600 plant species used for treatment are grown (Öztürk and Özçelik, 1991). However, many people who use plants for health in our country buy these plants from transplant and prepare them in line with what they hear from the media in their own kitchen.

In general, people do not consult a doctor or a specialist, and they think that the natural is always safe. However, not using herbal products at the appropriate dosage and time can cause serious illnesses and even death (Başaran, 2015). For this reason, the public should be knowledgeable about the correct and timely use of plants. This information can be made both through media and education. It may be important to give this education especially in schools in Anatolia.

Based on all this information, this study aimed to reveal the opinions and perceptions of pre-service teachers about ethnobotanical and medical plants. According to the literature review, a study for this purpose has not been encountered before. The research is considered to be original and important in these aspects.

Method

Design of the research

The types of research conducted in general can be classified as descriptive, relational and intervening research. (Fraenkel & Wallen, 2006). Descriptive studies describe a given situation as thoroughly and carefully as possible (Büyüköztürk et al., 2011). In this study, a descriptive research was carried out to determine the opinions and perceptions of prospective teachers towards ethnobotanical and medicinal plants.

Sampling

The research was performed in an education faculty in Turkey. The data were gathered from 96 (66 female, 30 male) pre-service teachers. The pre-service teachers were attending the third class of primary science education department (45–30 female, 10 male) and primary education department (51–31 female, 20 male). Primary science pre-service teachers study general biology lessons (112 hours), biology laboratory lessons (56 h) and science laboratory lessons (56 h) in which they performed activities with live plant materials. The students from the primary education department had general biology lessons (28 h) and science laboratory lessons (56 h). The Master's degree students were attending the first class of the primary science education department. They are all graduates from the department of primary science education and four of them were active primary-school teachers. The sample was selected because one of the researcher is a member of staff at this faculty. The pre-service teachers averaged 20 years of age, and the Master's students averaged 21 years. They were all Turkish students.

Semi-structured interviews were carried out with 10 (5 female, 5 male) students. The students interviewed were randomly selected from those who used the plants for health. In the interviews, it was aimed to learn in depth what the students using the herbs for treatment are paying attention to.

Instrumentation

The data were collected in two steps in the school year 2014–15. In the first step, a measuring instrument that consisted of 7 open-ended questions was prepared by the researcher and given to the students. During the preparation of the open-ended questions, the literature has been surveyed and the experts' opinions have been taken (3 science educators). In this instrument the students were asked about ethnobotany and plants used for needs in Istanbul.

In the second step, semi-structured interviews were held with 10 prospective teachers in order to examine students' views and perceptions in this regard in more detail. During the interviews, different questions were asked from time to time in parallel with the survey questions in order to go deep. Students were given time to express their ideas freely without interrupting their sentences. The researcher used different questions for those who were reluctant to speak or were misunderstood. The students were asked about the information about traditional medicinal plants, the usefulness of such information, and the sources of information; It was evaluated conceptually. Each student's interview took about 30 minutes. At the end of the semi-structured interviews, all the information given by the students was coded. Information containing various data such as local names, ailments and diseases treated, parts of plants used and preparation methods were obtained from open-ended questions and interviews. We did not give the students any species name because it was not important for our research.

Data analysis

The data were analyzed with content analysis. Content analysis organizes and interprets similar data within the framework of certain concepts and themes in a way the reader can understand (Yıldırım and Şimşek, 2016). The interviews were semi-structured. The data obtained from the instrument and interviews were categorized and arranged by considering the alternative opinions of the pre-service teachers. The opinions of the pre-service teachers who gave the same type of answers and pre-service teachers who gave different types of answers were categorized and specified. The total responses are more than the sample size because some pre-service teachers mentioned more than one category. Some of the student statements that were different and interesting are also included as displayed quotes in the results section. Pre-service teachers' opinions and perceptions about ethnobotany, medicinal plants and their usages, the sources of such knowledge was carefully analyzed and summarized in tables.

Findings

Open-ended questions findings

The findings are separately examined in tables for each question.

First question's aim is to learn pre-service teachers' knowledge about ethnobotany. The frequencies of students' codes responding to this dilemma are presented in Table 1.

Table 1: Pre-Service Teachers' Ideas About Ethnobotany

Codes	f
Science	35
No respond	33
Botany	16
Ethnic+botany	12

The majority of students participating in the research mentioned that ethnobotany is a *science* (n=35). 16 of the students wrote what botany is. Some of them mentioned that ethnobotany is a science which is interested in *ethnic + botany*.

Second question is "What is the ethnobotany area of interest?". The frequencies of students' responding to this dilemma are presented in Table 2.

Table 2: Pre-Service Teachers' Ideas About Interested of Ethnobotany

Codes	f
No respond	68
Plants	16
Traditional plant usage	12

12 of them mentioned that ethnobotany is interested with traditional plant usage. Those who answered "*science*" to the first question were unable to respond to the ethnobotany area of interest in the second question. Most of them of the participants did not know about the interest of ethnobotany.

Three of the pre-service teacher's statements given below (Numbers in the paranthesis used instead of student's name):

- "*I think ethnobotany is interested in local plants and how people use it.*" (T₁₂)
- "*Ethnobotany examines the traditional uses of plants.*" (T₄)
- "*I think it is the science that studies how ethonobotanical plants are used by local people in daily life.*" (T₁₉)

Third question is "For what purposes do you use plants?". The frequencies of students' responding to this dilemma are presented in Table 3.

Table 3: Pre-service teachers' ideas about for what purposes they you use plants

Codes	f
Food	83
Furniture	48
Toy	42
Health	29
Cosmetics	18
Dye	12
Others	7

Most mentioned code was *food* (n=83). Health, dye, cosmetic, toy, furniture were also mentioned by the students.

Table 4: Pre-service teachers' approaches about the factors that affect to consumpt plants

Codes	f
Family	79
Audiovisual media	68
Advertisement	42
Herbal shop	38
People around me	29
Print media	12
Doctor	11

Some of the pre-service teachers' statements given below:

- *"I am vegetarian. I always eat plants." (T₁₃)*
- *"My mom makes dyes from various plants. We collect flowers and sometimes roots of the plants. She knits lots of things such as rugs." (T₃₄)*
- *"I care for my hair by boiling some herbs. It works!" (T₈₈)*

Fourth question is "What are the factors that affect you in plant consumption?" The frequencies of students' responding to this dilemma are presented in Table 4.

Family is most mentioned code (n=79). People around me (n=29), audiovisual media (n=68), advertisement (n=42), print media (newspaper, magazine etc.) (n=12), doctor (n=11), herbal shop (n=38) are also mentioned.

Some of pre-service teachers' statements given below:

- *"I heard from TV programme." (T₁₈)*
- *"My mom has a herbal recipe for every occasion. When I am ill, I consult her on which plant to use." (T₄₅)*
- *"There is a professor who does herbal medicine on TV, I watch him from time to time." (T₇₄)*
- *"My roommate is very interested in these issues, and I learned more when I was with her." (T₉₁)*

Fifth question is "For which disease do you use plants?" The frequencies of pre-service teachers' responding to this dilemma are presented in Table 5.

Table 5. Pre-service teachers' ideas about using plants for diseases

Codes	f
Flue	96
Skin disease	26
Diabetes	15
Cholesterol disease	8
Kidney disease	6
Others	5

Flue is the most mentioned code (n=96) and skin disease is mentioned secondly (n=26). Diabetes, cholesterol disease, kidney disease are also mentioned for this question.

Some of the pre-service teachers' statements given below:

- *"When I get flue, my mother first make me tea." (T₃₅)*
- *"When I was ringworm, herbalist gave a mixture, I used it." (T₂₃)*
- *"Since I am diabetic, there is a tea I use to balance my blood sugar." (T₅₆)*

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- *"I'm drinking a tea for my kidney stones." (T₈₁)*

Sixth question is "How do you use plants as a drug?" The frequencies of pre-service teachers' responding to this dilemma are presented in Table 6.

Table 6. Pre-service teachers' ideas about how using plants as a drug

Codes	f
Tea	96
Food	53
Crema	42
Crushing	8
Others	5
Swallowing seeds	2

Tea is the most mentioned code (n=96) and swallowing seeds is mentioned less (n=2).

Some of the pre-service teachers' statements given below:

For Tea;

- *"When I have flu, I get herbal tea mix from herbal tea." (T₅)*
- *"Drinking herbal tea is good for my stomach. I drink regularly." (T₁)*
- *"I have sleep problems and some nights I sleep by making tea with herbal mixtures." (T₄₄)*

For food;

- *"We cook from nettle. At least once a year, this dish is cooked for the purpose of healing at home." (T₂₈)*
- *"We use spices like thyme." (T₁₅)*

For others;

- *"We pass the parsley with the stems through the blender. We brew it by adding lemon juice and water." (T₄₅)*

For Cream;

- *"I use a creamy herbal blend that soothes my reflux disease." (T₂₁)*

For Crushing;

- *"When we were young, we crushed the leaves of some plants to protect them from mosquitoes at night. Then they wouldn't bite us." (T₅₅)*

For swallowing seeds;

- *"I mix the black seed and yogurt in the morning and eat. It gives me vitality and relieves fatigue during the day." (T₆₃)*

Seventh question is "Which part of plant do you use as a drug?" The frequencies of pre-service teachers' responding to this dilemma are presented in Table 7.

Table 7. Pre-service teachers' ideas about which part of plants do they use as a drug

Codes	f
All parts	65
Leaf	53
Seed	28
Root	10
Flower	8

All parts is the most mentioned code (n=65). Leaf (n=53), seed (n=28), root (n=10) and flower(n=8) are also mentioned for using plant parts.

Interview findings

The first question is “What do you think about using the plants you hear from the TV or the people around you for treatment or for health?”

Not all the pre-service teachers consider the use of plants for therapeutic purposes inconvenient. They stated that they could use herbal cures they heard from the television program or the people around them for the purpose of treatment. All of the students who participated in the interview emphasized that chemical drugs are more objectionable than plants.

- *“There are many morning programs on this topic on TV. I love watching these programs. I did not use it, but I know that my family used herbal cures on television for health purposes. For example, my mother had a herbal cure for fatty liver. Feels good. I did not find it objectionable because there are very familiar plants such as parsley and lemon.” (T₄₅)*
- *“It catches my attention when I see such broadcasts on TV. Because when I use a drug, I also read its side effects from the package insert. It has a lot of side effects. They cause new diseases that heal some diseases. That's why I approach the medicinal plants more positively.” (T₃₉)*

Some negative approaches;

- *“Obviously, these herbs don't sound convincing to me because when I drink a painkiller, I immediately see the effect, but I don't know a plant that will soothe my pain in a short time.” (T₈₉)*
- *“I prefer to use drugs produced with modern science instead of traditional ones. It sounds more reliable.” (T₁₇)*

The second question is “What do you pay attention to when using plants for therapeutic purposes?”

All of the students emphasized that they will pay attention to the recommended preparation and use instructions while using the plants. They stated that they would prefer herbal shops or pharmacies for plant supply.

- *“I pay attention to how I should prepare the plants. I also use it for the recommended time.” (T₂₂)*
- *“Maybe I'll use it if a pharmacist recommends it. I use the clock on the clock and with its exact application according to the recommendations.” (T₁₇)*
- *“Care should be taken when using plants. If taken too much, there may be damages. Therefore, it should be applied by considering the usage recommendations.” (T₆₈)*

In addition, during the interviews, it was observed that the students did not have any concerns about the use of plants, the identification of plants, the collection and storage conditions of the plants.

Conclusion and Discussion

In this study, where the thoughts and perceptions of pre-service teachers towards ethnobotanical and medicinal plants were determined, various results were revealed for ethnobotanical field in line with the questions directed to pre-service teachers. In the first question, pre-service teachers were asked a question about what ethnobotany is. While some students expressed this concept as a science, they stated that they had no idea what it was like. In this case, it can be interpreted that pre-service teachers are not provided with sufficient training on ethnobotanical. Because ethnobotanical information, which has been obtained from past to present through trial and error and passed down from generation to generation, is considered valuable and continues to be passed on to the next generations. Vandebroek and Balick (2012) stated the loss of

information about traditional medicine in the young generation as a result of cultural deterioration caused by different factors such as the impact of modern culture and education systems, globalization of trade and access to modern medicines. Losing biodiversity is considered a global problem. Plants are of great importance, especially considering the nutritional needs of the world's population (Avcı, 2008). For this reason, it is important to protect the endangered plant species and transfer them to future generations. At this point, it is necessary to teach our youth about what can be done to realize and protect our biodiversity. Therefore, a learning environment has to be pedagogically designed to develop an understanding of ethnobotany, to enhance conceptual development and to give a holistic view of ethnobotany. According to the results revealed in the research findings, students know that the ethnobotanical concept is a science, but they cannot define it. At this point, ethnobotany is thought to be a subject to be considered in teacher training. In the second question directed to the pre-service teachers, their opinions about the interests of ethnobotany were asked. The vast majority of the participants stated that they had no idea about this issue. Ethnobotanics has been a science that has been reflected to the present day as a result of the bond they have established with plants since the existence of humanity. Especially recently, phytotherapy has become important as western societies turn their faces to natural ones. From this point on, it can be stated that there is a need to implement a curriculum that includes the ethnobotanical subject to pre-service teachers. Thus, the knowledge level of pre-service teachers on this subject will be increased. In the third question of the study, pre-service teachers were asked what purpose they used the plants and students mostly answered "food". Some of the participants replied "for health purposes". In the studies of Uğulu and Aydın (2011), it was seen that students benefit from plants in case of cold and flu. In the fourth question of the research, what factors led them to plant consumption was asked. Pre-service teachers mostly gave answers to family, audiovisual media and advertisements. Uğulu and Aydın (2011) achieved similar results in their studies. In this case, relying solely on the family recommendation represents a lack of knowledge scientifically (Barlin, 2018). Instead of just following friends or family recommendations, products that have sufficient scientific evidence to support their use need to be trusted (Little, 2004).

In the fifth question, in which diseases pre-service teachers used medicinal plants were asked. A large part of them answered as flu. Thanks to the studies carried out, the information learned from the public can be used in public health and it can be easily determined which plants can be used in which region (Kendir and Güvenç, 2010). In the sixth question, how they consume plants as medicines was asked. In the results revealed in the study, it is seen that pre-service teachers use the plants mostly as food and drink both for therapeutic purposes and use. Together with ethnobotanical awareness, we need to give our students the right use of plants. Plants today; It is used in many fields such as food, cosmetics, dye, textile, medicine, agriculture. As with chemical products, herbal products can have side effects and can cause problems as a result of misuse. As Anatolian lands are rich in terms of plant diversity, teachers of the future should first have knowledge themselves, and when they become teachers, they should guide their students towards this issue and raise awareness. The seventh question asked which parts of the plants they used as medicines and they gave the answer "leaf" to the question of which part of the plants they use the most after the "all parts" answer. In their study, Uğulu and Aydın (2011) received the answer of "leaf". In addition, it was observed that pre-service teachers did not know about the recognition, collection and storage of plants. For this reason, it becomes important to know and teach the correct use of plants.

Consequently, in order for ethnobotanical science to be passed on to future generations, they must first have knowledge and awareness. At this point, educators also have some duties. It is thought that it is important for educators to get ethnobotanical education in terms of gaining environmental sensitivity, maintaining the ecological balance, recognizing the ecological features of the region they live in and knowing the alternative treatment methods correctly.

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