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Research on students' traditional knowledge about medicinal plants: Case study of high schools in Izmir, Turkey

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ABSTRACT

Documentation of the traditional knowledge is important for the conservation and utilization of biological resources and should be carried out before such rich heritages are lost due to various anthropogenic and other natural causes. In this reason, the aim of this study is to determine students' current knowledge level and their conceptualisation of medicinal plants used in their surrounding social environment. The research was carried out in two stages. First, semi-structured-tape-recorded interviews were administered to 156 students to gather their information about medicinal plants used in Izmir. Second, students' traditional knowledge about medicinal plants were evaluated conceptually, by asking them the sources and their ideas about the usefulness of such knowledge. According to data obtained from high school students in Izmir, 23 taxa of medicinal plants are used for phytotherapies by the community. However, it was seen that the knowledge and conceptual understanding about medicinal plants is not sufficient for continuity of traditional knowledge.

Keywords: Phytopreparations, Local Knowledge, Students, Ethnobotany.

INTRODUCTION

Nowadays, researchers increasingly recognize the value of so-called traditional (ecological or ethno botanical) knowledge, which is defined as "a cumulative body of knowledge, practice and belief evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (Berkes et al., 2000: 1252). However, the concept of traditional knowledge is also defined from a more widely perspective by Grenier (1998) as "the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular area." Dahlberg and Trygger (2009) claimed that this quote calls for two clarifying comments. First, children and youth should naturally be included, since their experience of social and environmental change is vital to the evolution, transmission and transformation of knowledge. Second, it illustrates the proliferation of terms used. Indigenous, local, traditional and cultural are all frequently used terms and differentiations within these terms are not specified. Irrespective of the term used these knowledge systems are dynamic, and represent generations of experiences and experiments, where new knowledge is continually added and irrelevant knowledge is lost (Grenier, 1998; Berkes and Turner, 2006; Dahlberg and Trygger, 2009). Modern age socio-economic conditions affect the way of people's lives and therefore it can be said that the future of so-called traditional knowledge systems are in danger.

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Many researchers, in the related literature, have reported that “traditional knowledge systems are rapidly fading away” (Cox, 2000). Especially after adapting the modern city life, new generations do not carry traditional knowledge inherited from their families. As a result, they may have some idea about the knowledge, but not in detail, since they do not have experience related to the knowledge. They may confuse the knowledge. For example, they know that *Salvia* sp. is very beneficial against cold and flu, but they don't know how to use it. They don't know that it should not be used children under the age 2, and sometimes serious results can be happened (Sarici et al., 2004).

Many researchers claimed that one of the major strategies for conservation of the traditional knowledge is to increase education in science, conservation, and/or the custom-framed specifics of the culture's traditional knowledge (Berkes et al., 2000; Karr and Thomas, 1996; Reyes-García et al., 2005). They also reported that there is a strong, positive correlation between age and ethnobotanical knowledge (Reyes-García et al., 2005; Redford and Stearman, 1993; Jackson, 1995). Moreover, Reyes-García et al. (2005) stated that their findings support using the educational system to propagate folk knowledge, citing a positive correlation between years in school and degree of traditional knowledge. This idea is supported the traditional knowledge studies in which students learn from others in working groups.

Geographical position of Turkey, Anatolia, known as the cradle of cultures/civilisations, gave Turkey a multi-cultural society, thus, traditional knowledge point of view Turkey has a rich diversity. However, the common world wide problem of difficulty of conservation of the traditional knowledge and transmission of them to the future generations is seen Turkey, as well. Moreover, studies on this issue, in Turkey, are far away from being satisfactory.

The aim of this study is to determine students' current knowledge level and their conceptualisation of medicinal plants used in their surrounding social environment. Through this study we can lead a way to find educational approaches on conservation of traditional knowledge and transmission of them to the next generations.

MATERIALS AND METHODS

Study area

Izmir Province, which is located (26° 15' - 28° 20' E and 37° 45' - 39° 15' N) in the Aegean subdivision (one of seven subdivisions of Turkey), is comprised of 28 districts. Turkey's third largest city of Izmir's population is 3.868.308 persons and has the country's largest port after Istanbul. Izmir city has approximately 11.973 km² space located in the West Anatolian part of Turkey. The city is surrounded by Aegean Sea in the West, Balıkesir in the North, Manisa in the East and Aydın in the South.

Participants

In order to determine the participants of this study, a pre-interview has been done with students from three different high schools in the city of Izmir, in Turkey, in 2011. After the interview,

156 male and female students who declared to have (more or less) knowledge about medicinal plants and who claimed at least once to use phytopreparation were selected as the participants of this study. The numbers of male and female high school students participated in this study were 72 and 84, respectively. The age of students ranged from 15 to 18 years (M = 16.8 years, SD = 1.29).

Research method

The research was carried out in two stages. First, semi-structured-tape-recorded interviews were administered to 156 students to gather their information about medicinal plants used in Izmir. The information including the various data such as local names, ailments and diseases treated, parts of plants used and methods of preparation were obtained from students through individual and face-to-face interviews. Second, students' traditional knowledge about medicinal plants were evaluated conceptually, by asking them the sources and their ideas about the usefulness of such knowledge. At the end of the semi-structured interviews, all the information given by the students were transcribed.

By using local names of the plants, the medicinal plants mentioned by the participants were determined and collected by authors and taxonomically identified according to 'Flora of Turkey and the East Aegean Islands' (Davis, 1965–1985; Davis et al., 1988; Guner et al., 2001).

Their information about medicinal plants and their usages, the sources of such knowledge and their ideas about the usefulness was carefully analysed and summarised in tables.

RESULTS AND DISCUSSION

Students' traditional knowledge about medicinal plants

According to data obtained from high school students in Izmir, 23 taxa of medicinal plants are used for phytotherapies by the community. These medicinal plants belong to 16 families. The plants used for medicinal purposes are presented in Table 1 arranged in alphabetical order of their botanical names, with the relevant information such as family, vernacular name, plants parts used etc.

Further analysis on the families has shown that family *Lamiaceae* is represented by highest number of species (5 species). This is followed by *Liliaceae*, *Moraceae* and *Rosaceae*, each represented by two species. The rest of the families are represented by one species each (12 families).

In the related literature there are some other studies carried out related to usages of medicinal plants, in Turkey. When we compare the results of this study with them, it was seen that plants belonging to the families of *Lamiaceae*, *Asteraceae*, *Fabaceae* in Izmir (Ugulu et al., 2009), *Asteraceae*, *Fabaceae*, *Lamiaceae* in Catalca (Genc and Ozhatay, 2006), *Rosaceae*, *Asteraceae*, *Lamiaceae* in Merzifon (Ezer and Arisan, 2006) are used commonly by the people of the regions. The results of this study and other mentioned studies imply that especially plant species belong to *Lamiaceae* family is better known by students. The reason of better known of the members of *Lamiaceae* family

Table 1: Traditional knowledge about medicinal plants obtained from students.

Botanical Name	Local Name	Family	Parts Used	Preparation	Uses
<i>Allium cepa</i> L.	Mutfak Soğanı	Liliaceae	Bulbus	Crushed + salt	Ext. Sprain, Edema, Bruise
<i>Allium sativum</i> L.	Sarmısak	Liliaceae	Bulbus	Crushed	Ext. Bee bite
<i>Althaea officinalis</i> L.	Hatmi	Malvaceae	Leaves Flowers	Infusion Decoction/ Infusion	Ext. Mouth Diseases O. Cold, Cough, Expectorant
<i>Ecballium elaterium</i> (L.) A. Rich.	Eşek hıyarı	Cucurbitaceae	Fruits' Juice + Water	Snuffing	Ext. Sinusitis
<i>Ficus carica</i> ssp. <i>carica</i> L.	İncir	Moraceae	Latex	Fresh	Ext. Warts
<i>Hypericum perforatum</i> L.	Kantaron	Clusiaceae	Leaves Leaves	Keeped in olive oil Decoction	Ext. Wounds O. Gastric Ulcer, Stomachic
<i>Juglans regia</i> L.	Ceviz	Juglandaceae	Leaves	Infusion	Ext. Eczema, Herpes, Pimples
<i>Laurus nobilis</i> L.	Defne	Lauraceae	Fruits	Crushed	Ext. Antiseptic
<i>Lavandula stoechas</i> L.	Karabaş otu	Lamiaceae	Leaves	Infusion	O. Expectorant, Pharyngitis
<i>Matricaria chamomilla</i> L.	Papatya	Asteraceae	Flowers	Decoction/ Infusion	O. Flu, Cough, Sore Throat, Pharyngitis
<i>Mentha piperita</i> L.	Nane	Lamiaceae	Leaves	Decoction/ Infusion	O. Cough, Flu, Cold, Pharyngitis
<i>Morus nigra</i> L.	Karadut	Moraceae	Fruit Juice	Crushed	O. Ext. Mouth Diseases
<i>Ocimum basilicum</i> L.	Fesleğen	Lamiaceae	Leaves	Infusion	O. Cough, Expectorant, Pharyngitis
<i>Orchis sp.</i> L.	Salep	Orchidaceae	Tubers	Decoction	O. Cough, Bronchitis, Pharyngitis
<i>Origanum onites</i> L.	Izmir kekiği	Lamiaceae	Leaves	Decoction/ Infusion	O. Flu
<i>Pinus pinea</i> L.	Fıstık Çamı	Pinaceae	Gum	Decoction	Ext. Wounds
<i>Platanus orientalis</i> L.	Çınar	Platanaceae	Leaves	Decoction	Ext. Edema
<i>Rosa damascena</i> L.	Gül	Rosaceae	Petals	Juice	Ext. Skin Care
<i>Rubus canescens</i> DC.	Böğürtlen	Rosaceae	Leaves	Decoction	Ext. Wounds, Burns
<i>Salvia officinalis</i> L.	Adaçayı	Lamiaceae	Leaves	Decoction/ Infusion	O. Flu, Cough, Sore Throat, Pharyngitis
<i>Tilia rubra</i> DC.	Ihlamur	Tiliaceae	Flowers	Decoction/ Infusion	O. Flu, Cough, Sore Throat, Pharyngitis
<i>Urtica dioica</i> L.	Isırgan	Urticaceae	Leaves	Decoction	Ext. Skin Diseases
<i>Viola tricolor</i> L.	Menekşe	Violaceae	Aerial Parts	Infusion	Ext. Eczema, Acne, Expectorant

O. Oral administration, Ext. External usage

by the students may be because, members of this family, especially *Mentha piperita*, *Ocimum basilicum* and *Salvia officinalis*, are commonly used among Turkish people against frequent illness like cold and flu.

Students indicated that different parts of various plant species are used in the traditional medication of different diseases, however, the most frequently used parts are leaves. The utilization and administration of the medicinal plants vary depending on the type of diseases. Sometimes, local people also used other ingredients, such as salt, olive oil to prepare the remedies.

The most frequently used way of applying the phytotherapies is decoction and infusion of the usable parts of the medicinal plants. When other studies concerning nearby areas were evaluated, it was seen that decoction and infusion are the methods mostly used for the preparation of the folk medicine (Tuzlacı and Tolon, 2000; Kargiöglu et al., 2008; Ugulu et al., 2009). Participants of this study declared both decoction and infusion for many phytopreparations. This result implies that students participated in this study have difficulty in differentiate decoction from infusion.

Conceptual structure of students' traditional knowledge

In order to determine conceptual structure of the students' knowledge about medicinal plants, first of all, they were asked the source(s) of their knowledge. The analysis of their responses showed that majority of the participants (82.6%) inherits their knowledge about the medicinal plants from their families.

Over one third of them (36.3%) declared that they learn the knowledge from their friends. These two responses followed by 27.5%, 13.4% and 5.1% from media, from internet and don't remember, respectively (Table 2).

Table 2: Students' Sources of Traditional knowledge about medicinal plants.

Question: "Where did you get your information about Medicinal plants?"	Boys	Girls	Total
	No (%)	No (%)	No (%)
My elders (Mother-father-grandma-grandpa)	56 (77.7%)	73 (86.9%)	129 (82.6%)
My friends	18 (25.0%)	38 (45.2%)	56 (36.3%)
Media (TV, newspapers, magazines, etc)	13 (18.0%)	30 (35.7%)	43 (27.5%)
Internet	9 (12.5%)	12 (14.2%)	21 (13.4%)
Don't remember	6 (8.3%)	2 (2.3%)	8 (5.1%)

Table 3: Students' Ideas about Usefulness of Phytopreparations.

Question: "Do you think use of medicinal plants is useful while you are sick?"	Boys	Girls	Total
	No (%)	No (%)	No (%)
I think useful	46 (63.8%)	61 (72.6%)	107 (68.5%)
I would like to see the doctor first	42 (58.3%)	36 (42.8%)	78 (50.0%)
They are useful in simple illnesses like cold and flu	35 (48.6%)	41 (48.8%)	77 (49.3%)
I don't think they are useful	13 (18.0%)	12 (14.2%)	25 (16.0%)
Don't know	5 (6.9%)	3 (3.5%)	8 (5.1%)

In order to determine the students' ideas about usefulness of phytopreparations, they were asked "Do you think using medicinal plants is useful while you are sick?" Analysis of their responses showed that more than two third of them (68.5%) said "Yes, I think they are useful". Follow up questions clarified that half of the respondents (50%) believe that they prefer to see the doctor first, while the rest (49.3%) believe to use them only in simple illnesses like cold and flu.

Many researches and education programmes related to intergenerational learning typically focus on the many ways parents can be included in students' learning and how this can positively influence young people's knowledge, beliefs and actions (DeFreitas, 1991; White and Matz, 1992; Christenson et al., 1992; Ballantyne et al., 2006). Students in this study responded that primary source of their information about the medicinal plants were their families. Students' knowledge about the information, like cultural knowledge, normally do not given at school, and therefore, we can reach a conclusion that results of this study clearly support the idea that families have an important role in students' education. Reyes-García et al. (2005) stated a positive correlation between years in school and degree of traditional knowledge. Our results support this idea, since students declared that secondary sources of their knowledge about the medicinal plants were their friends. None of the participants mentioned the effect of school knowledge among the sources of their knowledge about medicinal plants.

In constructivist perspective, primary process in student's conceptualisation is to make them aware their needs about the information (Aydin, 2000). Therefore, to conserve the cultural knowledge, teachers are better to make students aware the value of such knowledge. In another word, teachers should be informed about the ethnobotanical importance of such value.

Students learn many things from their families and their friends, and some of them are different from scientifically acceptable ideas (Driver, 1989). From the ethnobotany point of view, families and their offspring who have been adapted to city life for many years may have some misconceptions or at least some confusing ideas about which medicinal plant can be used for an ailment or how to use them. Transmission of such information to the next generations may cause many problems. As a result the valuable knowledge can be eliminated and lost. Therefore, educational systems are better to have ethnobotany courses to correct the ideas about medicinal plants. This way, traditional cultural ethnobotanical knowledge which has been carried through the generations can be scientifically validated and conserved.

This study may lead to raise awareness about the conservation of traditional knowledge, transmission of such knowledge to the next generations and importance of ethnobotanical studies among educational and botanical researchers.

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