The Effects of Complementary and Alternative Medicine on Physiological Systems: Perceptions of Health Sciences and Medical Students

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Aim: There are limited number of studies regarding complementary and alternative medicine (CAM) and the knowledge level of the society. We aimed to evaluate the relationship between these methods and physiological systems.

Material and Method: This descriptive type of study was conducted along with 1st Grade and 2nd Grade university students attending the departments of health care field (n = 710). A questionnaire form prepared along with the support of scientific resources was used as the data collection tool. Results: In our study, it was ascertained that 36.1% of the students had used CAM methods and that 69% of them had requested that educational programs involving CAM methods be organized and/or this subject be included in their curriculums. When the answers given by the students as to the relationship between CAM methods and physiological systems were evaluated, it was determined that they thought massage was effective on the musculoskeletal system (53.8%), herbal remedy was effective on the cardiovascular system (20.9%), special diets were effective on the digestive system (35.2%), herbal remedy was effective on blood-immune system (22.1%), herbal remedy was effective on the urinary system (17.4%), herbal remedy was effective on the endocrine and reproduction system (17.4%), hypnosis was effective on the nervous system (38.9%), and yoga was effective on the respiratory system (21.5%).

Conclusions: It was ascertained that the students were interested in complementary and alternative methods of medicine, yet, their knowledge as to the targeted organs and systems affected by these methods was inadequate. Creating resources of scientific data about CAM in order to utilize them in health training including complementary and alternative treatment methods in the educational process of the other departments that provide medical education and train health personnel will help those who will apply CAM methods acquire accurate and reliable information.

Keywords: physiological systems, CAMs, education

Introduction

Complementary and alternative medicine practices (CAM) are defined as healthcare systems, practices and products that are performed outside the conventional methods of medicine (Mahan, Mao, & Brinkley, 2013; Goker, Yıldız, Karabacak, & Dogan, 2015; Riccard, & Skelton, 2008; Amanak, Karaoz, & Sevil, 2013). Such
practices are often methods formed as the result of conventions, which are not based on a certain physiopathological explanation and the effectiveness of which has not yet been proven by scientific methods. It is reported that the rates of applying CAM practices in the western countries have been on the increase in all the adult groups as well as the elderly in recent years, and that these rates have reached 42% of the society in general (Moquin & Blackman, 2009; Bilgic & Ak, 2011). Even though there is limited evidence as to the efficiency of most of the CAM practices, it has been applied for centuries, and their application has been on the increase on a considerable level throughout the world and in our country, as well (Goker et al., 2015; Dundar, 2011; Ergin, Hatipoğlu, Bozkurt, & Mirza, 2011; Akbulut & Cakır, 2015; Heather, Z., Heather, S., Susan, Mitch, et al., 2014; Araz, Tasdemir, & Kılıç, 2012).

One of the reasons of this increase is the belief that natural products are good and reliable. It is clear that ignoring such medical practices that have found a place in the lives of the majority of people will lead to risking community health care rather than protecting it. In particular, ignoring a field which lacks standardization and has no infrastructure in terms of legislation, and which is unchecked and open to exploitation will mean leaving it in a more adrift position (Tokac, 2013).

In some countries, CAM practices are subjected to official health policies and are tried to be brought under scientific control. There are also several sub-categories regarding this subject that have not been recognized much in our country. The National Center for Complementary and Alternative Medicine (NCCAM), a department of the National Institute of Health (NIH) in the USA, defines CAM as a group of various medical care systems, practices and products which have not been identified as a part of conventional medicine, yet. NCCAM also separates CAM into the following sub-categories: alternative medical systems (acupuncture, Ayurveda, homeopathy, and naturopathy), biologically-based therapies (chelation, conventional treatments, natural products containing no vitamin/mineral, diet-based treatments, megavitamin therapies), manipulative and body-based therapies (chiropractic care, massage) and mind-body therapies (biofeedback, relaxation techniques, hypnosis, yoga, “Tai Chi”, Qi Gong, healing rituals, energy healing or Reiki) (Doğan, Abuaf, & Karabacak, 2012).

Although modern medicine is the basis in the field of health care in our country, the use of CAM methods is still on the increase in accordance with the tendency seen throughout the world (Araz, Tasdemir, & Kılıç, 2012). Despite this increase, the studies relative to the knowledge and application levels of the society in Turkey with regard to complementary and alternative practices of medicine are rather limited, except for cancer patients (Sarı & Kipay, 2008).

In Turkey, the Code of Conventional and Complementary Medical Practices was published in the Official Gazette, dated October 27, 2014 and numbered 29158, and was put into effect later on (Official Newspaper, 2014).

In this guideline, certified members of health profession were authorized in these practices under the supervision of a physician or a certified physician who were certificated for 15 methods/practices, such as cupping therapy (with cupping glasses), acupuncture, apitherapy, phytotherapy, hypnosis, leech therapy, homeopathy, chiropractic care, maggot (larva) therapy, mesotherapy, ozone therapy, prolotherapy, reflexology, osteopathy and music therapy (Gonen, 2015). The fact that health professionals engaged in complementary alternative practices have been on the increase plays a major role in the increasing number of patients who utilize such treatment methods (Araz, Tasdemir, & Kılıç, 2012). Due to the increase in the application of CAM methods, health personnel in particular need to upgrade their knowledge about the effects and reliability of these methods.
Many patients wish to acquire information from their physicians about the use of these methods. For this reason, physicians should have adequate knowledge over CAM methods so as to be able to guide their patients to apply these methods in an accurate way. Although there have been various studies conducted in the developed countries, there is limited amount of information among the physicians in our country as to the general approaches towards CAM methods (Ozcakır, Sadıkoğlu, Bayram, et al., 2007). For example; what these methods are, how often they are applied, for what purpose they are applied, and also the views and knowledge of health personnel and health personnel candidates about CAM practices. Thus, this study was planned and conducted descriptively in cross-sectional design for the purpose of determining the knowledge levels of the students attending different fields of health sciences with regard to CAM methods and the systems they have an effect on as well as ascertaining whether or not the complementary treatment methods students prefer or tend to are applied accurately.

Material and Method

Participants

This study was conducted among 1st Grade and 2nd Grade students attending the Faculty of Medicine and the Vocational School of Health Services of Sakarya and Ataturk Universities in December, 2015. A total of 710 students participated in the study. The study protocol was approved by the Local Ethical Committees, and written informed consent forms were received from the participants.

Assessment of Perceptions About CAM Methods by Using a Questionnaire

All the data were collected by using a questionnaire form consisting of two sections. In the first section of the questionnaire, the demographic and descriptive data were collected, while in the second section, the students’ views regarding CAM as well as the relationship of CAM methods with physiological systems were questioned. As CAM methods; acupressure, acupuncture, aromatherapy, Ayurveda, herbal treatment, biofeedback, chiropractic, spirituality, fengshui, cupping, hydrotherapy/spa, hypnosis, homeopathy, shark cartilage, massage, meditation, osteopathy, ozone therapy, special diet, reflexology, reiki, relaxation techniques, colors therapy, picture/music/art therapy, leech, therapeutic touching, vitamins and yoga were questioned. The questionnaire forms were handed out to the students who volunteered to participate after they had been provided with information about the research, and afterwards, they were asked to fill out the forms themselves.

Statistical Analysis

All the analyses were performed by using a commercial software program (IBM SPSS Statistics, Version 22.0; IBM Corp., New York, USA). All the continuous data were given in percentages and mean ± standard deviation, and all the categorical data were expressed in numbers and percentages.

Results

General Characteristics of Participants

Seven hundred ten participants were enrolled in the study. 409 (57.6%) of them were female (mean age; 19.35 ± 1.70), whereas 301 (42.4%) of them were male (mean age; 19.88 ± 2.82). 371 (52.3%) of the students were attending the Faculty of Medicine, and 339 (47.7%) of them were attending the departments of health sciences, whereas 403 (56.8%) of them were attending 1st Grade, and 307 (43.2%) of them were attending 2nd Grade. Other characteristics were summarized in Table 1.
Table 1

General Characteristics of Participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n = 710</th>
<th>%</th>
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<tbody>
<tr>
<td>Gender</td>
<td></td>
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<tr>
<td>Female</td>
<td>409</td>
<td>57.6</td>
</tr>
<tr>
<td>Male</td>
<td>301</td>
<td>42.4</td>
</tr>
<tr>
<td>Class</td>
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<tr>
<td>1st Grade</td>
<td>403</td>
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<td>2nd Grade</td>
<td>307</td>
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<td>Mother’s education status</td>
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<td>Literacy</td>
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<td>High school</td>
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<td>University degree</td>
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<td>Literacy</td>
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<tr>
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<td>High school</td>
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<td>Father’s occupational status</td>
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<tr>
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<td>Province</td>
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<tr>
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<tr>
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<td>206</td>
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</tr>
<tr>
<td>≥ 3</td>
<td>263</td>
<td>37.0</td>
</tr>
</tbody>
</table>

When the status of the participants regarding whether or not they had received any training/courses on CAM methods was questioned, 590 (83.1%) of them stated that they had received no training before, while 120 (16.9%) of them were determined to have received training/courses in this subject. While 490 (69%) of the
students requested that training programs on CAM methods be organized and/or that this subject be included in their curriculums, 174 (24.5%) of them stated that they were indecisive, and 46 (6.5%) of them were reluctant about this subject (Figure 1). Separately, 411 (57.9%) of the students thought that some of the practitioners of CAM methods took advantage of the desperation of the patients through the use of these methods and used this situation as their source of income, whereas 215 (30.3%) of them were indecisive about this, and 84 (12.6%) of them thought the practitioners would not use it as a source of income.

![Figure 1. The students’ views on arranging training programs on CAM methods and/or including this subject in their curriculums.](image)

**CAM Method: Evaluation of the Informational Status as Well as Its Relationship With the Systems**

In our study, it was determined that 36.1% of the students had experienced CAM methods. When the knowledge levels of the students as to which one of the CAM methods would be effective on what physiological system at most were evaluated, it was determined respectively that massage (53.8%), hydrotherapy/hot spring bath practices (31.4%) and acupuncture (26.2%) would do good. Colors therapy (2.1%), special diet (3.2%) and reiki (3.7%) were respectively determined as the most ineffective methods than others.

As for the problems in the cardiovascular system; 22.1% of the students think that yoga and herbal therapy will be one of the CAM methods to be used in this matter, while 21.5% of them think cupping therapy will be beneficial. Osteopathy (1.8%), shark cartilage (2.5%) and reflexology (3.2%) were respectively determined as the most ineffective methods than others.

When the views of the students as to the CAM methods likely to have an effect on the problems of the gastrointestinal system are reviewed, 36.5% of them stated that herbal therapy would be good, 34.2% of them said special diets would be beneficial, whereas 26.3% of them stated that vitamins would be useful. Osteopathy (2.3%), therapeutic touching (2.8%) and cupping (3.9%) were respectively determined as the most ineffective methods than others.

As for the problems of the blood-immune system, 23.9% of them thought vitamins could be effective, while 20.8% of them said herbal therapy would be good, 15.4% of them said religious methods/prayers would
do good. Acupressure (1.1%), ozone therapy (1.5%), and yoga (2%) were respectively determined as the most ineffective methods than others.

As for the problems of the urinary system, 33.8% of the students thought vitamins could be effective, 24.8% of them said herbal therapy would be good, whereas 21.5% of them thought cupping therapy would do good. Osteopathy (2.3%), relaxation techniques (2.4%), and acupressure (3.4%) were respectively determined as the most ineffective methods than others.

As for the methods to be used for the problems of endocrine and reproduction system, 19.3% of the participants stated that herbal therapies would be effective, while 16.2% of them said religious practices/prayers would be good, and 14.6% of them stated that vitamins could be effective in this matter. Acupressure (1%), shark cartilage (1.5%), and osteopathy (2%) were respectively determined as the most ineffective methods than others.

As for the problems of the nervous system, 37.3% of the participants said hypnosis would be good, 36.2% of them stated that religious methods/prayers would be effective, while 32.7% of them were in favor of acupuncture. Shark cartilage (1.3%), homoeopathy, and osteopathy (2.4%) were respectively determined as the most ineffective methods than others.

When the CAM methods thought to have an effect on the respiratory system are examined, 22.4% of the students thought yoga would be an effective practice, 20.1% of them were in favor of painting/music/artistic activities, 18.3% of them said herbal therapy could do good. Shark cartilage (0.4%), homoeopathy (1.3%) and acupressure (1.5%) were respectively determined as the most ineffective methods than others (Figures 1 and 2).

Figure 2. The most effective CAM methods on physiological systems.

Notes. MSS: Musculoskeletal system; CVS: Cardiovascular system; GIS: Gastrointestinal system; BIS: Blood and immune system; US: Urinary system; ERS: Endocrine and reproductive system; NS: Nervous system; RS: Respiratory system.
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### Discussion

The studies in the literature suggest that the use of complementary and alternative treatment is on the increase day by day throughout the world and across our country. There are various studies that research into the application rate of CAM methods according to age and occupational groups (Hajbagherya, & Hoseinian, 2014; Dekeyse, Cohen, & Wagner, 2001; Holroyd, Zhang, Suen, & Xue, 2008). In a study conducted in the USA between the period 2007-2012 for the purpose of determining the frequency of the application of CAM methods to the children aged between 4-17 (National Health Interview Survey, 2007-2012); it was reported that the application rate of CAM methods was 11.1% (Black, Clarke, & Barnes, 2015). In a study conducted in Turkey, 70% of the adults aged over 18 were determined to have used at least one of the alternative therapy methods (Uzun & Tan, 2004). In a study conducted on the students of the Faculty of Health Sciences, 40.6% of the students reported that they applied these methods at least once, while 20.6% of them stated that they used different CAM methods more than once (Official Newspaper, 2014). The reason why the results of the studies in the literature regarding CAM prove to be different is that the CAM methods used are different, there are differences between study groups, and the regions where the practices are performed are also different (Topaloglu, Yildirim, Tekin, Uludag, & Ozgen, 2013).

In our study, most of the participants stated that they received no training/courses on CAM methods, and requested that training programs on CAM methods be organized and/or that this subject be included within their curricula. The studies regarding the inclusion of CAM methods in the curriculums support our study, as
well. In a study conducted on the students of the Faculty of Medicine, 62.5% of the participants stated that they would like to receive training on herbal therapy, while 61.2% of them said that they would like to receive training on hypnosis (Adams & Jewell, 2007). The fact that students want CAM methods to be included in their curriculums suggests that they are quite interested in this subject.

It is of great importance to maintain the trust, treatment, and care between health personnel and patients in a healthy way. The conducted studies have shown that 74.2% of the patients share their general concerns about CAM methods with the health personnel that provide service in the clinics or polyclinics (Altan & Rahman, 2014). Therefore, health personnel need to have adequate knowledge of CAM methods in order to guide the patients to use CAM accurately and to eliminate their concerns in this matter, as well.

In our study, most of the students stated that some of the practitioners of CAM methods took advantage of the helplessness of their patients by applying these methods and used this situation as their source of income. In order to eliminate the concerns about this subject and to prevent these practices from being used negligently by anyone, the Code of Conventional and Complementary Medical Practices pertaining to the Ministry of Health was published in the Official Gazette, dated October 27, 2014 and numbered 2,9158, and was put into effect in our country (Official Newspaper, 2014). In this guideline, the certified members of health profession were authorized under the supervision of a physician or a certified physician who were certificated in these methods/practices (Gonen, 2015). When the pros and cons of the practices in question are also taken into consideration, the fact that these practices have been brought under regulation by the Ministry of Health through the guideline in question can be evaluated as something positive in terms of being an attempt to be performed by trained and controllable people or institutions by also standardizing these practices (Ozcelik & Toprak, 2015).

The most important characteristic of our study is that no similar study that investigates the relationship between CAM methods and physiological systems has been found in the literature. With this aspect, our study is the first study in literature. According to whole literature, CAM methods are used mostly by the patients/the individuals who have musculoskeletal problems, such as rheumatoid arthritis, and chronic back and neck pain (Mahan, Mao, & Brinkley, 2013; Karahancı, Oztoprak, & Ersoy, 2015). In one of the studies, it was reported that almost half of the rheumatic patients has used at least one of the CAM methods (Mbizo, Okafor, Sutton, Burkhart, & Stone, 2016), while in another study, it was reported that the CAM methods most commonly applied by the patients with rheumatoid arthritis and ankylosing spondylitis were herbal products and hydrotherapy/hot springs (Ulusoy, Gucer, Aksu, et al., 2012). The studies suggesting that hydrotherapy reduces muscular pains support the students’ knowledge over this method (Solak, Ulaşlı, Cevik, et al., 2015). The frequency of applying CAM methods and the CAM methods used may vary according to the culture, habits, economic costs, and accessibility of the public.

For cardio-vascular disorders, it was reported that the patients had used alternative therapies of herbal origin as well as supplementary nutritional products quite commonly (Vaile, Halson, Gill, & Dawson, 2008). In another study conducted, it was determined that one-third of cardiac patients had used complementary treatment methods, that herbal therapy was the method preferred at most, and that other CAM methods applied were prayers and breathing therapy techniques (Ipek, Guray, Demirkan, et al., 2013).

Owing to the quest for different treatment methods on the part of the individuals with diseases that affect the quality of life negatively, such as chronic diseases and chronic pain, the part of the cancer patients who have no hope for recovery is seen to increase (Erdogan, Oguz, & Erol, 2012). CAM has more places in our live
with each passing day. As a one of the popular CAM methods, herbal products are generally used by the patients with chronic diseases, such as cancer, liver diseases, HIV, asthma, and rheumatic diseases (Bent & Ko, 2004). It was reported that the majority of the patients who applied CAM methods in the case of severe treatments like chemotherapy in which the immune system is suppressed had said that they used herbal mixtures and herbal teas, while more than half of the patients stated that they used these methods in order to overcome the disease, while 26.6% of them stated that they applied these methods to feel physically better (Bagci, 2011). It was determined that seeking support for the treatment, preventing cancer from recurring, increasing the quality of life, reinforcing the immune system and elevating the state of well-being were among the reasons why cancer patients applied CAM methods (Toruner, Soykan, & Ozden, 2002). In a study conducted for investigating how the patients with allergic diseases in Turkey used CAM methods, it was reported that mostly the patients with asthma, allergic rhinitis and chronic urticaria had applied CAM methods and that they used herbal treatment methods at most (Ugurluel, Karhan, Edirne, & Sahin, 2007).

In some of the conducted studies, it was reported that herbal therapy was effective on reducing the symptoms of gastrointestinal system (Ovayolu, O., & Ovayolu, N., 2013). In a study that was conducted on this subject, the application rate of CAM in the patients aged over 40 who had inflammatory bowel syndrome was 47.4% (Kurt, Bavbek, Pasaoglu, Abadoglu, & Misirligil, 2004). It was shown that CAM methods were used by the children with functional gastrointestinal problems on quite a substantial level, and that those CAM methods used most frequently consisted of nutritional supplements and herbal products. When the literature is reviewed, it is seen that many people use alternative therapies, particularly special diets and herbs, in order to lose weight and that the belief that these methods of treatment are harmless is quite dominant, as well. Whereas, the researches carried out so far highlight that the individuals seeking ways for solving the problems of obesity and similar diseases suffer from serious side-effects of these herbal products due to unconscious use of such products.

The patients with chronic renal failure (CRF) were reported to have preferred CAM methods by 25.2% to 57%. It is seen that CRF patients also refer to the CAM methods, such as acupressure, acupuncture, homeopathy, aromatherapy, yoga and reflexology, in addition to the herbal therapies so as to be able to cope with/minimize the symptoms of their diseases and to increase their quality of life (Erdogan, Atik, & Cinar, 2014).

The complaints caused by the hormonal changes during the menopausal period could be treated through the use of alternative methods of treatment and that 80% of the women aged between 45-60 used alternative therapies in coping with menopausal complaints. CAM practices usually preferred by the patients with the problems of reproduction system are acupuncture, vitamins and minerals, herbal products, homeopathy, mind-body-energy medicine, yoga, aromatherapy, and psychotherapy (Ozcan & Beji, 2016). The women with the complaints of dysmenorrhea were reported to have used CAM methods, such as body therapies, mind-body techniques, vitamin-mineral supplements, and herbal therapy (Ozcan & Beji, 2016).

As in our study, among the CAM methods used also in other studies, prayers, herbal therapies, and acupuncture are seen to have a major place (Akay & Akturk, 2010). According to the literature, the most common CAM methods used for post-partum depression are herbal therapies, aromatherapy, massage, acupuncture, prayers and homeopathy (Bilgic, Daglar, Ozkan, & Kadioğlu, 2015). There are various studies investigating the effect of massage therapy on health in the cases in which one suffers from depression, migraine, asthma, chronic fatigue, pain, and stress. It is accepted that massage therapy causes biochemical
changes in several systems in the body through nerve conduction (Field, Hernandez-Reif, Diego, Schanberg, & Kuhn, 2005). In a study in which individuals from different races participated, it was reported that massage therapy had minimized the depressive symptoms in depressive individuals on a considerable level (Hou, Chiang, Hsu, Chiu, & Yen, 2010).

In our study, when the views regarding the CAM methods to be effective on the problems of the respiratory system were reviewed, it was ascertained that 18.3% of the students thought herbal therapy could be effective, while 16.2% of them were in favor of religious methods/prayers and 15.9% of them thought that ozone therapy would be effective in this matter. In the literature, no study regarding whether or not ozone could be used in the diseases of the respiratory system could be found. The fact that students consider ozone therapy to be used in the diseases of the respiratory system can be identified with the fact that ozone is gas and can be taken in through inhalation. Herbal therapies are applied in the case of the diseases, such as COPD (chronic obstructive pulmonary disease), asthma, coughing, sore throat, side pain, lung cancer, and in the cases of giving up smoking. The fact that non-medical alternative practices are also used in the infections of the respiratory tract that is commonly seen has been shown in several studies (Robinson, Blair, Lorenc, Gully, Fox, & Mitchell, 2008). In a study trying to determine the use of alternative treatment practices on the children who underwent a respiratory tract infection, it was determined that the most commonly-used practices in this respect were to provide pure honey to reduce coughing and to have a warm shower to reduce the fever (Topaloglu, Yıldırım, Tekin, Uludag, & Ozgen, 2013).

In our study, students are of the opinion that herbal therapy and religious methods/prayers in particular could be used in all the system problems. No clear indication has been stated as to what indications herbs will be used in. The studies in the literature suggest that the patients with different system problems also use this method frequently, and these results support our study, as well. CAM methods, such as acupuncture, aromatic therapy and vitamins, are also stated to be used along with the herbal therapy (Altan & Rahman, 2014). Although treatment with herbs is applied commonly throughout the world and in our country, this is still an important subject to be focused on carefully due to the fact that these products, contrary to what is known and expected of them, may also lead to many health issues. It should also be kept in mind that herbal products, apart from their several toxic effects reported, interact with medications (Caliskan, 2014).

All around the world, the chronic diseases, such as cancer, inflammatory bowel diseases, diabetes, chronic liver diseases, and cardiovascular diseases, are on the increase, and it is known that those with chronic diseases prefer CAM methods more (Sirois, 2008; Hawk, Ndetan, & Evans, 2012). Also in our country, the use of CAM methods in the above-mentioned chronic diseases has become prominent with each passing day. It is also reported in the studies conducted in our country that the method referred to often by patients involves herbal products and that patients usually prefer these products in order to make additional use of their treatment. Religion life-style, cultural background, having the knowledge of local herbs, and the beliefs that recovery will be achieved through CAM all affect the preference of CAM methods.

Conclusions

This study is the first of all the others in terms of determining the complementary and alternative medical methods as well as the acquired knowledge of the relationship between these methods and the physiological systems that constitute the functional organization of human body. The reason why students mostly think that herbal therapy and religious methods/prayers will be effective on all the system problems and why these
methods are those that are often used by patients could be that these methods of treatment are preferred because they are easily accessible, inexpensive, and they are even obtained free-of-charge most of the time. The reason why students think that acupressure, shark cartilage, osteopathy, etc., will be least effective on all the system problems could be due to these that are expensive and need someone to implement them. It is also clear that socio-cultural structure, geographical means and the accessibility of this method are effective on the preference of CAM methods. Creating scientific data regarding CAM methods for the health personnel and training health personnel and the students of Medicine in CAM methods will be useful in terms of using CAM accurately and providing accurate information for the society.

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