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## Complementary and Alternative Medicine Use Among Croatian Health Studies Students – A Single Center Cross-Sectional Study

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### Abstract

**Objective.** The use of complementary and alternative medicine (CAM) among healthy population and in patients with certain health conditions has been investigated in Croatia; however, no studies have been carried out among health studies students and professionals. The aim of the study was to measure the extent of CAM use among health studies students. **Materials and Methods.** An online survey was used to question students enrolled at the Faculty of Health Studies, University of Rijeka, Croatia. The questionnaire entailed several parts, including sociodemographic data, frequency of use of 31 CAM methods, the source of obtaining CAM information, as well as the main reason for using CAM. **Results.** Seven hundred and twenty-three students were invited to take part in the survey, of whom 207 (29%) responded, mostly females (N=172; 83.1%). The median age of the respondents was 22 years. More than half of the respondents (N=113; 54.6%) were employed. The most used CAM methods were natural products, such as vitamins and minerals (93.2%), probiotics (80.7%) and herbs (78.3%). The most used mind and body practices were massages (76.3%), deep breathing (61.4%), and spirituality and prayer (56%). The main source of information on CAM was the Internet (N=151; 72.9%). Maintenance/improvement of health was the most common reason for using CAM (49.3%). **Conclusion.** The findings in this study suggest that the most used CAM methods among students were similar to general population; moreover, information about CAM is mostly derived from the Internet.

**Key Words:** Complementary Therapies ▪ Students ▪ Health Occupations ▪ Usage.

### Introduction

Complementary and alternative medicine (CAM) is not easy to define, as it implements a wide spectrum of therapies and medication (1-6). CAM includes two terms: “complementary medicine”, which refers to the treatment procedures used in addition to conventional medicine, and “alternative medicine”, which refers to treatments used instead of conventional medical treatments (2, 6). The use of CAM is becoming increasingly popular all around the world, both in developed and developing countries (3-6). The National Center

for Complementary and Integrative Health (NCCIH) is the leading agency in the USA for scientific research on the variety of medical and health systems, practices and products that are not part of conventional medicine. According to the NCCIH, the term “alternative health approaches” should be used instead of the term “alternative medicine”, and “complementary health approaches” instead of “complementary medicine”. However, the definition of the two terms remains the same: using unconventional products or practices with, or instead of conventional medicine products or practices (1, 3).

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According to the NCCIH, CAM, or complementary health approaches, are classified into three groups (1, 4): (a) natural products: herbs (also known as botanicals), vitamins and minerals, probiotics, special diets, other nutritional supplements; (b) mind and body practices such as guided imagery, hypnotherapy, meditation, deep breathing exercises, progressive muscle relaxation, acupuncture, Tai Chi, Reiki, Qi Gong, Yoga, chiropractic manipulation, osteopathy, massage, reflexology, movement therapies, etc. and (c) other complementary health approaches: traditional healers, Ayurvedic medicine, traditional Chinese medicine, naturopathy, homeopathy and functional medicine (1, 4).

According to Clarke et al. (7) more than 30% of adults in the USA used some sort of complementary health approach in 2012; furthermore, Kempainen et al. found that 25.9% of the general population in Europe used some sort of CAM methods during a 12-month period (8). Most research on the knowledge, attitude, and the use of CAM among medical and health studies students has been conducted in Asia, Africa, and the USA (3-5, 9-12). The results of these studies showed that the use of herbal medicine/supplements (9-11), meditation/Yoga/relaxation/imagery, massage (10), spirituality and prayer (4, 10) have been found to be very popular. In their study Saha et al. (3) reported that homeopathy was mostly used by pharmacy students. *Kampo* (Japanese traditional medicine) was most practised among Japanese dental students (12). The most common sources of information on CAM among many students are the Internet (3, 10, 11), the media (TV, journals) (4, 9, 10, 11), books (3, 4, 9, 10) along with faculty (9), family and friends (3, 5, 9, 11).

Croatia's health care insurance is mandatory for all employed citizens. Retired and people with low income are also insured. Most of CAM practices are not covered by in the standard insurance. However, acupuncture treatment and biofeedback are covered by the Croatian basic health insurance and may only be performed by licensed physicians (13). According to the WHO, 103 member states have authorised acupuncture treatment, out of which 18 of them have included it in their health care insurance system (14).

The use of CAM in healthy population and in patients with certain health conditions has been investigated in Croatia (15-17). The attitudes of 325 Croatian health workers were investigated and physicians had a more negative attitude towards CAM than nurses, technicians, and physical therapists (18). However, to our knowledge, the use of CAM has not been conducted with health studies students and practitioners.

The aim of this study was to examine the use of CAM among students at the Faculty of Health Studies. We investigated the frequency of use of various CAM methods, the main reasons for using CAM, and sources of information concerning CAM.

## Materials and Methods

### *Study Design and Setting*

A cross-sectional study was conducted with students from the Faculty of Health Studies (FZSRI) at the University of Rijeka, Croatia. Participation in the survey was voluntary and anonymous. All research participants were informed about the research purpose, voluntary consent, confidentiality of the data insurance, as well as the protection of the participants' identity and information use. Informed consent was given by the participants.

### *Participants*

A total of 723 students from the Faculty of Health Studies in Rijeka, Croatia were included (academic year 2018/2019). Undergraduate physiotherapy, nursing, midwifery and radiology technology students, along with graduate physiotherapy, nursing - health management and mental health promotion, clinical nutrition and physiotherapy bridging programme students were included.

### *Complementary and Alternative Medicine Use Questionnaire (CAMUQ)*

A questionnaire entitled "Complementary and Alternative Medicine Use Questionnaire" (CAMUQ) was designed, which included questions on sociodemographic data, frequency and reasons for CAM use, and sources of information on CAM.

The first part of the questionnaire (8 questions) related to participants' sociodemographic data, including gender and age of the respondents, year of study at FZSRI, employment and workplace. The second part (3 questions) examined the frequency in which 31 CAM methods had been used in the past year on a scale ranging from never (0), rarely (1-2x/year), periodically (3-4x/year), often (1-2x/month) to very often (1 or more times/week). CAM methods were divided into 3 large groups: natural products (5 methods), mind-body practices (21 methods) and other complementary approaches (5 methods). Finally, the last part of the CAMUQ examined the sources of information on CAM and the main reasons for using CAM (closed-ended questions - YES / NO).

### Procedure

The CAMUQ was distributed through the free Google Form application. The invitation to participate in the study and link to the questionnaire was distributed online via e-mail and the social network *Facebook*. Data were collected on three occasions over a period of two months (from the 28<sup>th</sup> November, 2018 until the 27<sup>th</sup> January, 2019).

### Ethics Statement

This research was conducted in accordance with the fundamental ethical and bioethical principles and in accordance with the most recent revision of the Declaration of Helsinki and was approved by the Ethical Committee at the University of Rijeka, Faculty of Health Studies (Number of approval: Class: 602-01/18-01/55; Registration number: 2170-15-18-1).

### Statistical Analysis

Categorical data is presented with frequency (N) and relative frequency (%) (19). Difference in proportions was calculated with a test of proportions ("N-1" Chi-squared test). Quantitative data is presented with appropriate mean and variability measures depending on the type of distribution (tested with the Kolmogorov-Smirnov test). All findings with a  $P < 0.05$  level were considered statistically

significant. The collected data was exported from Google Form application, recorded in spreadsheets formatted in MS Excel (Microsoft Corporation, USA), and statistically processed in MedCalc 19.17.7 (MedCalc Software, Ostend, Belgium).

## Results

### Response Rate

A total of 207 students participated in this research, which represents an average response rate of 29% (Supplement 1). The highest response rates were recorded from physiotherapy graduate students (44.1%) and undergraduate midwifery students (37.5%). The lowest response was observed among nursing - health management graduate students (12.7%).

Table 1. Participants' Characteristics

Variable	N (%)
<b>Gender</b>	
Females	172 (83.1)
Males	34 (16.4)
Missing	1 (0.5)
Total	207 (100)
<b>Year of study</b>	
1 <sup>st</sup> year of Undergraduate Study	63 (30.4)
2 <sup>nd</sup> year of Undergraduate Study	38 (18.4)
3 <sup>rd</sup> year of Undergraduate Study	42 (20.3)
1 <sup>st</sup> year of Graduate Study	31 (15.0)
2 <sup>nd</sup> year of Graduate Study	25 (12.1)
Bridging programme	8 (3.9)
Total	207(100)
<b>Working place</b>	
Primary health care	12 (10.6)
General / County Hospital	8 (7.1)
Special hospital	13 (11.5)
Clinical Hospital Centre	34 (30.1)
Private practice	13 (11.5)
Other	33 (29.2)
Total	113 (100)

### Participants' Characteristics

Out of 207 respondents, 172 were female (83.1%), 34 were male (16.4%), while one participant failed to complete this category (0.5%). The average

mean age of the respondents was 22 years (ranging from 18-58 years of age). Most of the respondents (N=63, 30.4%) were first year students of an undergraduate study programme, and the smallest number of respondents (N=8; 3.9%) attended the bridging programme (Supplement 1).

More than half (N=113; 54.6%) of the respondents were employed (Table 1). Of those employed, 100 (88.5%) of them worked in their field of expertise. Most of them were employed in clinical hospital centers (N=34; 30.1%); the fewest number worked in general/county hospitals.

### Complementary and Alternative Medicine Use

The results of the use of natural products are presented in Table 2. The most used natural products were vitamins and minerals (N=48; 23.2%). More than half of the respondents (N=128; 61.8%) had never used special diet methods. Herbs were occasionally used by a quarter of the respondents (N=54; 26.1%).

Concerning mind and body practices, 5 (2.4%) respondents stated that they had used the Qi Gong method. Furthermore, 35 (16.9%) respondents revealed that they used spirituality and prayer very often, 26 (12.6%) did deep breathing exercises very often, and 39 of them (18.8%) often got massages (Table 3).

Table 2. Frequency of Use of Natural Products

Natural products	Frequency of use N (%)				
	Never	Rarely*	Periodically <sup>†</sup>	Often <sup>‡</sup>	Very often <sup>§</sup>
Herbs	45 (21.7)	63 (30.4)	54 (26.1)	28 (13.5)	17 (8.2)
Vitamins and minerals	14 (6.8)	64 (30.9)	43 (20.8)	38 (18.4)	48 (23.2)
Probiotics	40 (19.3)	67 (32.4)	49 (23.7)	33 (15.9)	18 (8.7)
Other nutritional supplements	62 (30)	70 (33.8)	37 (17.9)	16 (7.7)	22 (10.6)
Special diets	128 (61.8)	53 (25.6)	13 (6.3)	4 (1.9)	9 (4.3)

\*1-2x/year; <sup>†</sup>3-4x/year; <sup>‡</sup>1-2x/month; <sup>§</sup>1 or more times/week.

Table 3. Frequency of Use of Mind and Body Practices

Mind and body practices	Frequency of use N (%)				
	Never	Rarely*	Periodically <sup>†</sup>	Often <sup>‡</sup>	Very often <sup>§</sup>
Biofeedback	169 (81.6)	22 (10.6)	8 (3.9)	4 (1.9)	4 (1.9)
Guided imagery	179 (86.5)	14 (6.8)	8 (3.9)	1 (0.5)	5 (2.4)
Hypnotherapy	200 (96.6)	5 (2.4)	2 (1.0)	0	0
Meditation	140 (67.6)	32 (15.5)	15 (7.2)	11 (5.3)	9 (4.3)
Deep breathing exercises	80 (38.6)	53 (25.6)	36 (17.4)	12 (5.8)	26 (12.6)
Spirituality and prayer	91 (44)	43 (20.8)	14 (6.8)	24 (11.6)	35 (16.9)
Expressive art therapies	174 (84.1)	21 (10.1)	6 (2.9)	4 (1.9)	2 (1)
Progressive muscle relaxation	144 (69.6)	29 (14)	20 (9.7)	10 (4.8)	4 (1.9)
Yoga	148 (71.5)	29 (14)	9 (4.3)	11 (5.3)	10 (4.8)
Tai-chi	192 (92.8)	12 (5.8)	2 (1)	1 (0.5)	0 (0)
Chiropractic	174 (84.1)	20 (9.7)	9 (4.3)	3 (1.4)	1 (0.5)
Osteopathy	192 (92.8)	7 (3.4)	3 (1.4)	2 (1)	3 (1.4)
Massage	49 (23.7)	73 (35.3)	33 (15.9)	39 (18.8)	13 (6.3)
Movement Therapies	153 (73.9)	21 (10.1)	13 (6.3)	7 (3.4)	13 (6.3)
Needle acupuncture	186 (89.9)	12 (5.8)	5 (2.4)	2 (1)	2 (1)
Reflexology	179 (86.5)	19 (9.2)	4 (1.9)	3 (1.4)	2 (1)
Reiki	199 (96.1)	6 (2.9)	1 (0.5)	0 (0)	1 (0.5)
Qi Gong	202 (97.6)	4 (1.9)	0 (0)	0 (0)	1 (0.5)
Touch healing	197 (95.2)	6 (2.9)	2 (1)	1 (0.5)	1 (0.5)
Electromagnetic therapy	175 (84.5)	21 (10.1)	6 (2.9)	2 (1)	3 (1.4)
Aromatherapy	130 (62.8)	44 (21.3)	20 (9.7)	6 (2.9)	7 (3.4)

\*1-2x/year; <sup>†</sup>3-4x/year; <sup>‡</sup>1-2x/month; <sup>§</sup>1 or more times/week.



Other complementary health approaches were generally rarely used by respondents (Supplement 2). Out of 207 respondents, 201 (97.1%) had never used traditional healers' services. Furthermore, traditional Chinese medicine and homeopathy were used very often by only two respondents (1.0%).

### Sources of Information and Reasons for Using CAM

Most of the respondents received information on CAM via the Internet (N=151; 72.9%), and a smaller proportion of respondents (N=12; 5.8%) through formal education. All differences were significant for individual sources ( $P < 0.001$ ) (Table 4).

The most common reason for using CAM (Table 5) for most participants was maintaining/improving health (N=102; 49.3%), while the least common reason (N=6; 2.9%) was relief of symp-

toms caused by allergies. Forty-six respondents (22.2%) stated that they had not used CAM.

### Discussion

The results of this study are new for the South European region and give an insight in the most used CAM methods among health sciences students. Our participants used natural products, massages, deep breathing exercises, and spirituality and prayer the most. Regarding the type of natural products used, the majority of respondents (93.2%) used vitamins and minerals, 80.7% used probiotics, while herbs were consumed by 78.3% of the respondents. In the study carried out by Ameade et al. (9), 117 (57.6%) out of 203 medical students in Ghana used CAM, and most of them used herbal medicines. Furthermore, James and Bah (4) showed that among 90 undergraduate pharmacy students from University of Sierra Leone, herbals/botanicals/supplements were the most frequently used CAM modalities (N=63; 70%). Research related to the mind and body practices varies depending on the practice itself. According to the results of National Health Survey conducted in the USA in 2012 (7), the most popular CAM methods used by adults included deep breathing exercises, Yoga, Tai Chi and Qi Gong, chiropractic or osteopathic manipulation, as well as meditation. Kemppainen et al.'s (8) study showed that the most frequently used CAM treatments among the general population in Europe were massages, homeopathy, osteopathy, herbal treatments, acupuncture, chiropractic, reflexology and spiritual healing. Kemppainen et al.'s findings indicated that CAM is commonly used for health-related problems; moreover, it was typically used in a complementary way.

This study revealed that respondents were either not familiar with, or rarely practiced most of the suggested mind and body practices. The most used practices included massages, which were used by 76.3% of the subjects, followed by deep breathing exercises (61.4%), and spirituality and prayer (56%). A study by Kanadiya et al. (10) examined the attitudes and use of CAM among

Table 4. Information Sources on Complementary and Alternative Medicine (N=207)

Sources of information about CAM	Yes; N (%)	No; N (%)	P*
The Internet	151 (72.9)	56 (27.1)	<0.001
The media (TV, radio, journals)	64 (30.9)	143 (69.1)	<0.001
Professional literature	50 (24.2)	157 (75.8)	<0.001
Health professionals	61 (29.5)	146 (70.5)	<0.001
Faculty	55 (26.6)	152 (73.4)	<0.001
Formal education beyond study	195 (94.2)	12 (5.8)	<0.001
Family/friends	73 (35.3)	134 (64.7)	<0.001
Other	34 (16.4)	173 (83.6)	<0.001

\*"N-1" Chi-squared test.

Table 5. Reasons for Using Complementary and Alternative Medicine.

Main reason for using CAM	N (%)
I do not use CAM methods	46 (22.2)
Maintaining/improving health	102 (49.3)
Mitigating psychological problems	13 (6.3)
Mitigating the side effects of conventional medicine	8 (3.9)
Other	18 (8.7)
To relieve symptoms caused by allergies	6 (2.9)
Treatment of chronic pain	14 (6.8)
Total	207 (100)

635 osteopathic medical students. The most used CAM methods were meditation/Yoga/relaxation/imagery, massages, and spirituality/prayer (10). Moreover, spirituality/prayer followed by massage therapy were often used by pharmacy students in a study by James and Bah (4).

Other complementary health approaches, such as the preference for traditional healers, traditional Chinese medicine and naturopathy were never used by most of the respondents in this study. Homeopathy was used by 14.5% of respondents, while Ayurveda by 8.2%. This result can be explained by the increasing influence of Eastern practices, methods and philosophies, along with other complementary methods among the Western society, all with the purpose of maintaining or improving mental and physical health. In a cross-sectional study by Saha et al. (3) on the knowledge, attitude, perception and use of CAM among Bangladesh pharmacy undergraduate students (N=250), researchers found that homeopathy (59%), Ayurveda (30%) and meditation were commonly practiced (29%). Given that the research by Saha et al. was conducted in a South Asian country, where these approaches are part of the culture and civilization, the difference with our European sample was expected. Homeopathy seems to be a popular complementary approach in Europe as well. Specifically, 5.7% of the respondents confirmed using this method (8).

Internet was the main source of information on CAM for the majority of our respondents (73%), while only 6% received information through formal education on CAM outside their studies. Furthermore, 73% of respondents stated that they had not received information on CAM during their studies, and among 71% of respondents, information on CAM was not provided by the healthcare professionals. These results could suggest a potential need for CAM implementation in health studies curricula. In other studies, students reported the Internet (10), media (4, 9) and family and friends (3, 5, 9, 11) as the main source of information on CAM. Certain CAM methods are part of Asian culture; however they are not widely implemented in the standard curriculum. Arai, Nakada and Izumi (20) investigated the use of and

the involvement of traditional Japanese medicine (Kampo) during and after medical residency in Japan. One fifth of the hospitals they investigated taught Kampo medicine, and this mostly referred to hospitals with 50 or more residents. Great majority of the residents (96%, N=93) believed that traditional Japanese medicine has its' place in hospitals and 73% of them considered that it should be introduced into the curricula (20). India has 57 traditional medicine universities and a number of research councils, where traditional medicine is studied and practiced (21). Then as well, the South Korea has established 12 universities, and a number of research councils in which traditional Korean medicine is studied and CAM treatment sponsored by the government (21). Along with the traditional Chinese medicine taught and practiced in medical institutions in China, western medicine and CAM are gaining more and more attention in their education curricula (14).

Maintaining or improving health was the main reason for using CAM according to nearly half (49%) of our respondents. The reasons for using CAM in other studies are diverse. For example, health care was the main reason for using CAM among osteopathy students in the study carried out by Kanadiya et al. (10), while Iranian medical students specified neuromuscular disorders and back pain as the main reason for CAM use (11). In the study conducted by Saha et al., respondents mostly used CAM to relieve cases of the common cold and flu (3).

A possible limitation of this research is a relatively small response rate. However, given that the survey questionnaire was conducted online, this response rate was expected and appropriate. Our sample was gender skewed as we had more female participants. Also, we did not test the participants' knowledge on CAM, but we believe that their usage presumes some pre-knowledge on the subject. Investigating the Internet sources on CAM should have been tested in more detail. It would be interesting to examine the stance on CAM, as well as the readiness to use it, among practitioners of various other health professions, such as medicine, dental medicine, medical biochemistry and pharmacy.

## Conclusion

Our research showed that Croatian health studies students who participated in this study used a variety of CAM methods, including natural products, massage, deep breathing exercises, and spirituality and prayer. Maintaining and improving health was the main reason for using CAM, while the main source of information on the topic was the Internet. Considering that most of the respondents had not received information on CAM at the faculty or from healthcare professionals, implementation of CAM courses in the study curriculum should be evaluated.

### What Is Already Known on this Topic:

*Complementary and alternative medicine (CAM) includes the term "complementary medicine", which refers to the treatment procedures used in addition to conventional medicine, and the term "alternative medicine", which refers to treatments used instead of conventional medical treatments. The use of CAM among healthy populations and in patients with certain health conditions was investigated extensively; however, to our knowledge, no such research had been conducted with health studies students in Croatia.*

### What this Study Adds:

*The use of 31 complementary and alternative medicine (CAM) methods among health studies students, the source of their information on CAM and the main reason for using CAM was investigated in this study. The results of this study revealed a need for additional education on CAM among health studies students.*

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**Authors' Contributions:** Conception and design: TD, IS and KB; Acquisition, analysis and interpretation of data: TD, IS and KB; Drafting the article: TD, Revising it critically for important intellectual content: TD, IS and KB; Approved final version of the manuscript: TD, IS and KB.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Research Data for this Article:** The data that support the findings of this study are openly available in Mendeley data at <https://data.mendeley.com/datasets/48vx4kt3nm/2>.

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## Supplements

### Supplement 1. Participants' Response Rates at the Faculty of Health Studies in Rijeka

Study programme at the Faculty of Health Studies in Rijeka	Total number of students at FZSRI; N (%)	Participants in the study; N (%)	Response rate; %
Undergraduate Physiotherapy Study	103 (14.3)	34 (16.4)	33.0
Undergraduate Nursing Study	252 (34.6)	65 (31.4)	25.8
Undergraduate Radiology Technology Study	51 (7.1)	19 (9.2)	37.3
Undergraduate Midwifery Study	56 (7.8)	21 (10.1)	37.5
Graduate Physiotherapy Study	93 (12.9)	41 (19.8)	44.1
Graduate Nursing - Mental Health Promotion Study	43 (6)	8 (3.9)	18.6
Graduate Nursing - Health Management Study	79 (11)	10 (4.8)	12.7
Graduate Clinical Nutrition Study	31 (4.3)	5 (2.4)	16.1
Physiotherapy Bridging programme	15 (2.1)	4 (1.9)	26.7
Total	723 (100)	207 (100)	28.6

FZSRI=Faculty of Health Studies in Rijeka.

### Supplement 2. Frequency of Use of Other Complementary Health Approaches

Other complementary health approaches	Never N (%)	Rarely* N (%)	Periodically† N (%)	Often‡ N (%)	Very often§ N (%)
Tradicional healers	201 (97.1)	6 (2.9)	-	-	-
Ayurvedic medicine	190 (91.8)	10 (4.8)	5 (2.4)	2 (1.0)	0
Tradicional Chinese medicine	195 (94.2)	8 (3.9)	-	2 (1.0)	2 (1.0)
Naturopathy	197 (95.2)	8 (3.9)	2 (1)	-	-
Homeopathy	177 (85.5)	20 (9.7)	7 (3.4)	1 (0.5)	2 (1.0)

\*1-2×/year; †3-4×/year; ‡1-2×/month; §1 or more times/week.