



Use and Awareness of Medicinal Plant and Phytotherapy among Undergraduate Students at School of Pharmacy - University of Chieti, Italy

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Authors' contributions

This work was carried out in collaboration between all authors. Authors LM, MCDF and LL designed the study, collected the data, performed the statistical analysis, wrote the protocol, carried out the literature searches and wrote the first draft of the manuscript. Author AV managed the analyses of the study, revised the manuscript and made the figures. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/EJMP/2015/16164

Editor(s):

(1) Marcello Iriti, Department of Agricultural and Environmental Sciences, Milan State University, Italy.

Reviewers:

(1) Irlan de Almeida Freires, Department of Physiological Sciences, University of Campinas, Brazil.

(2) Anonymous, Brazil.

Complete Peer review History: <http://www.sciencedomain.org/review-history.php?iid=1019&id=13&aid=8376>

Original Research Article

Received 13th January 2015
Accepted 5th February 2015
Published 8th March 2015

ABSTRACT

Aims: To investigate the awareness and the use of herbal products among undergraduate students of the School of Pharmacy in Chieti.

Study Design: From October 2013 to December 2013, students of the School of Pharmacy at University "G. d'Annunzio" in Chieti were invited by e-mail to respond to an online questionnaire about their knowledge and their personal experience in the use of herbal products. The filling of the questionnaire was possible through a specific Italian website. Anonymity and autonomy of the answers were fully guaranteed. The multi tasks online questionnaire was articulated in three main parts: demographic information, awareness of phytotherapy, and personal experience in the use of herbal products.

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Results: A total of 548 questionnaires were collected. The age range of the students was between 18 and 31 years and they were mainly women (74.5%), which were also the typical herbal users (occasional use of complex herbal remedies to treat different diseases). Most herb usage was self-prescribed and undisclosed to physician, but under professional suggestion of pharmacist or herbalist.

Conclusion: Although some misconceptions about definition of phytotherapy and herb-based products were detected, undergraduate students result informed about perspective of use of herbal remedies. The use is wide distributed and the perception of usefulness is positive, as confirmed by strong interest in the continuous use. The use of herbal products without medical prescription could be consider as a potential health risk, but taking into account the health indications, the occasional use, and the strong influence of healthcare professionals suggestions, the use of phytotherapy could be considered as quite safe in the population studied. This study highlights the importance for the “pharmacists of the future” to have a good professional training in the field of medicinal plants (and phytotherapy) during the degree course in Pharmacy.

Keywords: Undergraduate students; medicinal plants; phytotherapy; herbal products; survey.

1. INTRODUCTION

All over the world the definition of alternative medicine is used to indicate those medical practices that are recognized as not conforming to conventional practice of medicine. The common definition is often unclear, without a clear distinction between practices without any rational/scientific basis and the use of natural products as complementary and integrative medicine [1]. Therefore, the term “alternative/complementary medicine” (CAM) is commonly used to indicate a wide range of phenomena, such as herbal medicine (for its correct definition, please visit <http://www.who.int/medicines/areas/traditional/definitions/en/>), acupuncture, homeopathy, reflexology, aromatherapy and others. Their use can be extremely different across countries in term of tradition and marketing authorization. The unclear definition of each alternative/complementary therapy raises problems and generates misunderstandings in the interpretation of data about their uses and effects. The term of Phytotherapy means (at least in Italy) the use of recognized medicinal plants as drugs, on the basis of the same rational use of chemicals used in the conventional medicine [2]. However, herbal based products are often available on the market in different forms, such as food supplements, nutraceuticals, natural cosmetics and others, as well as herbal drugs. All these factors could contribute to increase the confusion about herbal products and the risks possibly associated with their use.

It is known that the use of herbal products in the United States, Canada, Europe and Australia is always increasing, with data confirming an upward trend of sales [3-5]. The use of

complementary medicines in Italy was well described in a National Research Project on “Unconventional Therapies”, which was founded in 1999 by the Italian Ministry of Health and coordinated by the National Institute of Health. The sample for the study was extremely representative as it consisted of 60,000 families (approximately 180,000 subjects). The study confirm that in Italy the number of users of alternative medicines is increasing and the use was higher among females (33-44 years old), with medium-high level of education. Herbal medicine results one of the third most used alternative medicine, after homeopathy and manipulative treatment [6].

A large amount of data is also available on opinion and approach to use of CAM, or more specifically herbal medicine, among the general public or among specific groups, such as healthcare professionals [7-9], medical students [10-13], or pharmacy students [14-19]. However, these data are almost lacking in Italy.

The survey has been developed to investigate the level of awareness and the use of medicinal plants among undergraduate students of Pharmacy at Chieti University (Italy), considering the economic relevance of herbal products, the common identification of phytotherapy as safe medicine and taking into account the easy access to most of herbal product as non-prescription medications.

2. METHODOLOGY

All student of the Faculty of Pharmacy (5 years curriculum) at University “G. d’Annunzio” of Chieti (Italy) were contacted by mailing-list and invited, in accordance with ethical requirements,

to participate anonymously and on a purely voluntary basis to the study by filling an online questionnaire (please, for the link to the online questionnaire see the Appendix). The e-mail message included a link to the web page with the survey, where they were also informed about the scope of this research. Responders were not offered any incentive for study participation. The questionnaires were collected online from October to December 2013 and processed by Microsoft Office Excel™ software.

Students' opinion and their personal experience in the use of medicinal plant and herbal related-products for phyto-therapeutic purpose were investigated. Structure of survey, questions and validation are based on previous published studies [13,14]. The questionnaire consists of 30 questions on demographic characteristics (age, gender and place of living), personal awareness (e.g. definition and opinion about safety and effectiveness of phytotherapy) and on the use of herbal products (e.g. frequency of use, satisfaction). Mandatory fields included demographic characteristics, previous work experiences related to medicinal plants sale and health status of the respondents. Further questions were on characteristics of specific herbal remedies (ingredients, pharmaceutical form, choice criteria, treatment indications, etc). The final part of the questionnaire focused on source of information on the use of herbal products, experience of side effects and the disclosure to physician of the use of herbal remedies.

Data are expressed as percentage and frequency. Categorical variables were analyzed among ages or sex by χ -squared test. Differences are considered significant for P values less than 0.05. Statistical analysis was performed using GraphPad Prism version 5.00 (GraphPad Software, San Diego, California, USA).

Limitations of the study: the sample of students is homogeneous and may not reflect the entire student populations at University. Moreover, the questionnaire was self-administered and therefore the reliability of answers cannot be verified.

3. RESULTS AND DISCUSSION

A total of 548 surveys were completed. Responders were in an age range of 18-31 years (mean age 20.2) and were mainly women (74%). No significant gender differences were found in

all tests parameters, except for the number of students that full fill the questionnaire: 407 females (F) and 141 males (M).

Students were generally from small town of 5000-60000 inhabitants (49%, n=271) or village <5000 inhabitants (35%, n=191), with no previous work experience (n=521), except for 3 students who have had experience of training in pharmacy or retail outlets of herbal supplements. Most of the responders (69%, n=378; 289 F, 89 M) confirm to know phytotherapy (yes versus no, p=0.015), in particular female students of 18-19 years old (n=131; p<0.0001). The most quoted definition for "phytotherapy" (taking into account the possibility of multiple answers) was the "therapy exclusively with medicinal plants or herbal based product" (n=412). Other meaning (some of which wrong) were the following: "alternative medicine" (n=136), "therapy with natural product" (n=113), "something to be used in association with pharmaceutical products" (n=71), "treatment with homeopathic products" (n=48), and placebo (n=10).

Phytotherapy was considered "highly safe" by 3% of responders (n=15) and "safe" by 71% (n=351). On the other hand, 25% of students (n=121) considered phytotherapy as "not so safe" or "dangerous" (1%, n=5). Others report a conditioned answer, specifying that safety is strictly dependent by the users health status, phytocomplex quality and mode of use.

In the rating scale to define the efficacy, ranging from 1 (ineffective) to 5 (very efficacious), students considered phytotherapy as shown in Fig. 1. In 8% of cases (n=19) the perception of the efficacy of phytotherapy was not reported.

Noteworthy is that herbal products are usually marketed without appropriate clinical trials to demonstrate either efficacy or safety. Despite this, responder's attitude is to continue to use natural products for any circumstances (sleep and eating disorders, anxiety, constipation, burns, respiratory tract diseases, urinary tract infections, inflammations, etc.). These findings among Italian students are similar to those reported for Australian and Pakistani students [20].

The interviewed considered as phytotherapeutic agents: any naturally derived products (n=473), herbal food supplements (n=193), homeopathic remedies (n=139), cosmetics (n=87), nutraceuticals (n=38), or functional food (n=20).

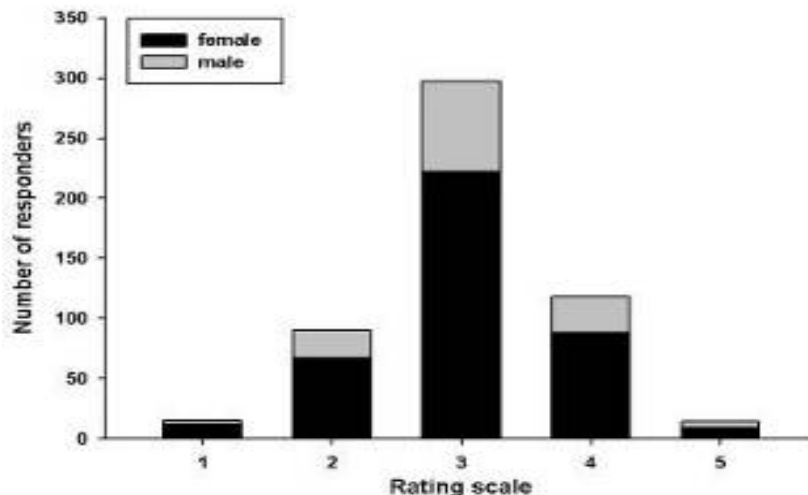


Fig. 1. Level of satisfaction in the use of phytotherapy among Italian undergraduate students

Legend: 1 = ineffective (n=15); 2 = not much effective (n=87); 3 = suitable for various conditions (n=297); 4 = effective (n=118), and 5 = very efficacious (n=14)

However, the knowledge of the classification of herbal agents is frequently unclear, as students often confused homeopathic drugs, food supplements, cosmetics, nutraceuticals and/or functional food. This could be due also to the National (e.g. D.L.vo 169/2004) [21], and International Law (e.g. Dir. 2002/46/EC, 2004/24/CE, CE 258/97) [22-24] where the demarcation boundary between different categories is, in some cases, barely outlined. Nowadays, for example, homeopathic medicines and phytotherapeutic products are under the responsibility of the Italian Medicines Agency for their marketing authorization. These products can be used to treat or prevent diseases, or for restoring, correcting or modifying physiological function, only if they observed specific requirements of safety and efficacy, obtained by preclinical data and clinical trials. These kind of testing are not required for food/herbal supplements, cosmetics, or functional food, because of they can claim only nutritional and/or physiological effects. Moreover, food/herbal supplements and cosmetics are under the control of the Italian Ministry of Health and they need only a notification for their marketing. Other different regulations are provided for cosmetics [25], novel foods [24], whereas no rules exist for nutraceuticals or cosmeceuticals products [26], at least in Italy. Therefore, in a so confused system, it is easy to guess the effort of consumers to discriminated the classification of any natural product.

As regards to the favorite places to buy herbal products, responders indicate the herbalist's shop (n=466) as the most preferred along with pharmacy (n=391), and other specialized shops (n=130). Internet websites have been indicated by students (n=75) as secondary choice in buying natural products, even if the use of Internet is increasing dramatically worldwide [27], it is of particular interest that only few real consumers believed Website as a good source of herbal preparations. This situation is important in the limiting the purchase of counterfeit phytherapeutic agents, that are very common in the international internet trade [28]. These data were basically confirmed also in our survey among users of phytotherapy, where the favorite place to purchase herbal products were pharmacies (n=127) and herbalist's shops (n=112), followed by supermarkets (n=26), other specialized shops (n=16), and internet websites (n=3).

A great proportion of students (n=239) declared the use of herbal-based products, even if they had no experience and/or knowledge in this field (Fig. 2), and girl students (n=197) used herbal products more than the male counterpart (n=42). The remaining responders (n=308) declared that they do not used natural products (209 F, 99 M) and so this sample was excluded for further question that are focused only on personal experience in using phytotherapy.

Among users, the frequency of taking of herbal products was occasional (up to 5 times in the past year) in 47% of cases (n=113; 34 F, 19 M), whereas 17% (n=40; 40 F, 7 M) of responders were regular consumers (range 5-10 times year) and 21% (n=49; 37 F, 12 M) of students were frequent consumers (over 10 times/year). In all other cases (15%; n=37) the frequency of use was not reported.

Natural products most commonly used by consumers containing chamomile (n=49), aloe (n=38), fennel (n=29), valerian (n=26), propolis (n=19), ginseng (n=12), lemon balm (n=12), dandelion (n=12), eucalyptus (n=11), ginkgo (n=11), liquorice (n=11), blueberry (n=11), tea (n=11), and other medicinal plants (n=52) including mallow, mint, thyme, amica, hawthorn, echinacea, and grape. Regarding the type of herbal product most utilized, a lot of students (n=120; 128 F/ 32 M) preferred previous medicinal plants in products containing multiple herbal ingredients, whereas only 36 responders indicating a single plant (30 F, 6 M). Eleven students specified a commercial brand of natural products, probably indicating that the users understand that it is a plant-based products, but they ignore their ingredients. The products used are based on multiple (n=95; 78 F, 17 M) or single natural ingredient (n=90; 73 F, 17 M), while only a minority of responders used both (n=19; 15 F, 4 M). Regarding the pharmaceutical preparation, the most used were the following: infusion (n=133), tablets (n=86) or drops (n=57),

followed by others, like syrup (n=39), capsules (n=31), hydroalcoholic extracts (n=26), powder (n=16), eyewash (n=1), and ointment (n=1). These dosage forms were often used singly (44%) or in combination with another one (34%), while the use of three (13%) or more than three (9%) different herbal formulations were less common. In the case of choice in using herbal products, the consumers were strongly influenced by suggestion of various people (n=146) and easily conditioned by quality (n=60) and product composition (n=58). As regards the hints, the most important advise was coming from the following sources: pharmacist (n=82), physician (n=59), herbalist (n=63), family members (n=57), and friends (n=32), while source of information as television, newspapers or internet advertising (n= 18) were less trusted. Moreover, the pharmaceutical form (n=25), source (12), price (8), safety (6), and the brand name (1) had no influence in the choice of a specific herbal product.

The students declared to use herbal-derived products as useful tools for large number of unhealthy circumstances that are summarized in Table 1. The perception of efficacy of natural products in the ailments reported in Table 1 was mainly positive, and 95% of responders have confirmed their intention to continue using phytotherapy also for other indications. The rating scale of perceived efficacy is reported Table 2.

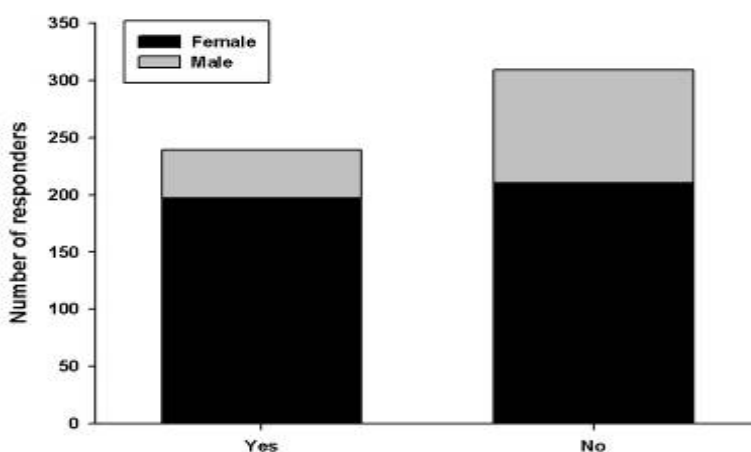


Fig. 2. Precedent experiences in the use of phytotherapy among Italian undergraduate students

Table 1. Circumstances treated with phytotherapy by undergraduate students

Circumstances	Gender		Total % (n=341)
	Female % (n=268)	Male % (n=73)	
Anxiety/mood regulation	19 (51)	11 (8)	17 (59)
Cellulitis	11 (30)	0 (0)	9 (30)
Eating disorders	14 (38)	12 (9)	14 (47)
Sleep	19 (51)	19 (14)	19 (65)
Sport supplement	4(10)	11 (8)	5 (18)
Tonic-restorative	17 (46)	29 (21)	20 (67)
Weight control	5 (14)	4 (3)	5 (17)
Others*	11 (28)	14 (10)	11 (38)

P=0.0041

* Other conditions treated with phytotherapy among users include the following: constipation, burns, respiratory tract diseases, urinary tract infections, venous insufficiency, inflammations/pains, ocular and dermatological problems.

Table 2. Self-evaluation of the efficacy of phytotherapeutic treatment used by undergraduate students

Opinion about effectiveness of herbal medicines	Gender		Total % (n=217)
	Female % (n=177)	Male % (n=40)	
1-poor	4 (7)	0 (0)	3 (7)
2-sufficient	12 (21)	7 (3)	11 (24)
3-fairly good	40 (71)	30 (12)	38 (83)
4-good	35 (62)	45 (18)	37 (80)
5-excellent	9 (16)	18 (7)	11 (23)

P=0.192

The last two questions focused on indications and/or warnings received by health practitioners. Out of 228 responders, 164 (F136, 28 M) believe to have received sufficient information on the use of herbal products from purchasing sources. On the other hand, 64 (52 F, 12 M) declare to haven't received information, also because 64% of responders declare that their physician was not informed of the use of phytotherapy.

4. CONCLUSION

This study investigates the use and the awareness of medicinal plants and their derived products among undergraduate students at School of Pharmacy in an Italian University. The article describes some aspects of consumers of herbal products; it is focused in a population of young adults, in the University environment, that can be considered representative of specific consumers or predictive for groups of adults with a medium-high level of education in the Central-Italy.

Findings from the survey were that most of students show awareness of phytotherapy, which is considered the therapy with medicinal plant (herbs or herb based products). The general

perception is that phytotherapy is safe but with only a moderate therapeutic efficacy.

Pharmacy students, even the poor knowledge of the classification of herbal agents, appear adequately informed on herbal products and their traditional use and indication. They don't like internet website as a source in buying natural supplements and this aspect insures, at least partially, the safety of such products (avoiding counterfeit, sophisticated, and adulterated agents).

Between students, the typical consumer was female, which consumes occasionally multi-herbal ingredients formulation, as infusions.

The very important aspect is that pharmacy students considered the safety as an almost irrelevant factor in purchasing natural products raises an important concerns, and highlights the importance of a good educational programs on phytotherapy that should be incorporated into training and continuing health professional courses (e.g. Pharmacy, Chemistry and Pharmaceutical Technologies, Pharmaceutical Applied Sciences, Pharmaceutical Biotechnologies).

Finally, the use of over the counter herbal products can be considered as a potential health risk, but considering the health indications (usually addressed to mild conditions), the occasional use and the strong influence of healthcare professionals suggestions, phytotherapy could be considered quite safe in the population studied. However, potential interaction with concomitant pharmacological treatment, physiological (e.g. pregnancy, breast-feeding, pediatric population) and pathological (allergies, liver and/or kidney failure, etc.) conditions should be always considered before using herbal products.

CONSENT

Consent were not applicable. Before access to online questionnaire every participant were informed that, the participation was based on a purely voluntary basis and information collected were completely anonymous. No personal information were recorded.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

Link to the online questionnaire:

Available: <http://farmacia.unich.it/biologia/ricerca/menghini/quiz/index.htm>

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