Evidence-Based Pharmacy Practice

Editorial

There is increasing awareness of the need for healthcare professionals to adopt an evidence-based approach to their daily practice. What this means is that there needs to be scientific evidence exhibiting the effectiveness of a particular practice. This concept is at times criticised as being unattainable since not enough evidence exists on which to base daily practice. This may be true, but a considerable amount of evidence does exist and this should be employed. Where evidence is found to be lacking, research should be encouraged.

Pharmacy is the profession which is responsible for the provision of safe, effective and economic drug therapy. There is ample evidence both nationally and internationally to support this statement. However, are we making full use of our capabilities? It seems that we are not. A much cited quote by Harding and Taylor infers that pharmacists' inertia will result in their downfall. The way to prevent this is by practising professionally based on the best evidence available and making the evidence of our practice available for policy makers.

Practicing pharmacy in an evidence-based manner will enhance professional satisfaction and increase the pharmacist's capability to do what is best for the patient. This concept must be engrained in pharmacists at an undergraduate level. Students need to be taught how to link science with professionalism.

Pharmacists must embrace the concept of lifelong learning professional development. Practising pharmacy in an evidence-based manner necessitates the ability to access relevant current literature, reading, understanding, assimilating and, if necessary, challenging the information presented. The next step would be for pharmacists to incorporate the knowledge obtained into their daily practice.

In order to ensure standards of practice, pharmacists must be willing to assess their knowledge and audit their practice to determine the effectiveness of their interventions.

Many feel that this is an unnecessary exercise; however research has shown that the outcomes of certain interventions and practices are not as desirable as had been imagined.

Pharmacists need to measure and monitor their contribution to health care for the ultimate benefit of the patient.

The MCPP endeavours to address the educational needs of the profession. While the service provided by the college is by no means exhaustive, we try to direct pharmacists to areas of current interest and encourage them to be better informed about particular topics.

Our latest service in encouraging evidence-based pharmacy practice is an electronic review of the latest research relevant to the profession (see pg 20). We would appreciate your feedback regarding our first step in on-line CE. ✶

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How Safe are Herbal Products?

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Key words: herbal, toxicity, adverse reactions, interactions

In the search for cures for his ailments, man discovered many healing and toxic properties of plants. Some were found to cure certain diseases while others were found to exert dramatic effects on the body[1]. Consequently, most natural products used today as medicines are derived from plants.

In recent decades, the growing awareness of the possible toxicity of modern medicinal products has contributed to a rise in interest, on the part of the general public, in alternative medicinal therapies. This phenomenon is also evident in Malta, as demonstrated by the increasing availability of herbal remedies from pharmacies. Unfortunately, there exists a remarkably common belief among suppliers and users of herbal remedies that the products are harmless because they are derived from a natural source. However there is a substantial body of evidence to rebut this view[2].

The pharmacological activity and toxicity of conventional medicines can be attributed to a drug substance or combination of substances, or to the metabolic products that are generated in the body. Herbal medicines exert their activity and effects in very much the same way but little is known about the kinetic behaviour of the bioactive compounds in the plants. However complex the composition of a herbal medicine may be, the active principles are chemical entities that possess pharmacodynamic properties and must obey the same pharmacokinetic rules as conventional medicines[2].

Toxicity of Herbal Ingredients

Plants have evolved defence mechanisms against predation by animals and pests. These include chemicals that make the plants unpalatable or that poison or kill the predators, and may therefore be the cause of toxicity in humans. Thus the coexistence of beneficial and adverse effects is as much a reality for plant products as it is for conventional medicines[3].

The toxic effects of phytochemical substances are varied when consumed by mammals. The main target organs appear to be the liver and the kidneys, probably because of their role in the metabolism and elimination of xenobiotics. Plant substances may also possess carcinogenic, teratogenic, mutagenic, or genotoxic properties that increase their toxic effects.

The safety of herbal remedies is of particular importance since the majority of these products are self-prescribed and are used to treat minor and often chronic conditions. The long-term traditional use of a plant, even for many hundreds of years, does not necessarily establish its safety. The more subtle and chronic forms of toxicity, such as carcinogenicity, mutagenicity and hepatotoxicity, may well have been overlooked by previous generations but are of concern nowadays when assessing product safety[9].

Herbal products are often the target of criticism because of their unique status when compared with other medicines. Conventional medicinal products must undergo extensive preclinical testing in laboratory animals for the evaluation of organ toxicity and death, tests for mutagenic and carcinogenic activity, and reproductive toxicity before they are administered to human beings in clinical trials. However, it is ironic to note that much of the knowledge on the toxicity of herbal products that has been accumulated over the years stems from observed poisonous and lethal effects in man[3].

The difficulty with which the herbal active principles may sometimes be isolated or identified means that the source of toxicity may at times be unknown. Furthermore, errors in the identification of the species of plant or plant parts and difficulty in the standardisation of the content of active principles may lead to toxicity especially in self-medication.

Adverse Reactions

The inherent toxic properties of herbal ingredients may be the cause of adverse effects arising from the ingestion or topical application of herbal products. This is even more so when the products do not contain adulterants or substituted ingredients that however may in themselves be the cause of adverse reactions[8]. Some herbal ingredients that may potentially give rise to adverse events as reported in the literature are summarised in Table I.

Herbal products have traditionally been used to treat both adults and children. Although herbal remedies may offer a milder alternative to some conventional medicines, they must be used with caution in children and medical advice should be sought if in doubt. Babies may be at a higher risk of toxic effects because they may be given higher doses than adults per kilogram of body weight, they lack certain drug metabolising and detoxifying enzymes, and they may receive herbal ingredients from the mother during lactation[10]. Chamomile, a popular remedy for teething pains in babies, is known to contain allergenic sesquiterpene lactones and should be used with caution. The administration of herbal teas to children is generally unwise unless used according to

professional advice[9].

The chemistry and pharmacology of a number of herbs are poorly documented and their use in pregnancy should be avoided. In addition to the herbs indicated in Table I, other herbs that should be used with caution in pregnancy include Avens, Burdock, Calendula, Devil's Claw, Euphorbia, Fenugreek, Gentian, Hawthorn, Black Horehound, Meadowsweet, Myrrh, Passionflower, Poplar, Northern Prickly Ash, Raspberry, Uva-Ursi, Vervian, and Willow. Some of the herbs are reputed to be abortifacient or to affect the menstrual cycle although no recent clinical or experimental data exists. Others are oxytocic, demonstrate uterine activity or are uterine stimulants, demonstrate hormonal activity, or are inherently toxic[9].

As is the case with conventional medicines, the serious and lethal adverse effects of some herbal ingredients may arise as a result of misuse or abuse of preparations or due to a lack of knowledge regarding the substances. The abuse of herbal products as alternatives to street drugs is an area of concern. This is evidenced by the use of *Ephedra* as an alternative to 4-methyl-2-dimethoxyamphetamine (MDMA, 'Ecstasy') because of its euphoric effect[6]. In fact, the United Kingdom (UK), United States of America (USA) and Canada have issued warnings against the use or supply of *Ephedra*-containing herbal food supplements[4,5]. The Food and Drug Administration of the USA has also ordered the removal from the market of preparations containing *Ephedra*, alone or in combination with St John's Wort, that were promoted as herbal alternatives to fenfluramine and

Table I: Potential Adverse Effects of Herbal Ingredients (adapted from Newall *et al.*, 1996)

Herb	Adverse Effect
Agnus Castus[2]	Allergic reactions
Alfalfa	Systemic lupus erythematosus syndrome
Aloes[2]	Purgative, irritant to GIT
Angelica	Phototoxic dermatitis
Aniseed	Contact dermatitis
Apricot[1,2]	Cyanide poisoning (seed)
Arnica[1]	Dermatitis, irritant to GIT
Artichoke	Allergenic, dermatitis
Asafoetida[2]	Dermatitis, irritant
Bayberry	Carcinogenic to rats
Blue Flag[2]	Nausea, vomiting, irritant to GIT and eyes (fresh root)
Bogbean[2]	Purgative, vomiting (in large doses)
Boldo[2]	Toxicity, irritant
Boneset[2]	Dermatitis, cytotoxic
Borage[1,2]	Genotoxic, carcinogenic, hepatotoxic
Broom[2]	Cardiac depressant
Buchu[2]	Irritant to GIT, kidney
Calamus[1]	Carcinogenic, nephrotoxic, convulsions
Capsicum	Irritant
Cascara[2]	Purgative, irritant to GIT
Cassia	Allergenic, irritant
Celery	Phototoxic, dermatitis
Cereus	Irritant to GIT (fresh juice)
Chamomile[2]	Allergic reactions
Chaparral[2]	Dermatitis, hepatotoxic
Cinnamon	Allergenic, irritant
Clove	Irritant
Cohosh, Black[2]	Nausea, vomiting (high doses)
Cohosh, Blue[2]	Irritant to GIT (seeds)
Cola[2]	Sleeplessness, anxiety, tremor
Coltsfoot[1,2]	Genotoxic, carcinogenic, hepatotoxic
Comfrey[1,2]	Genotoxic, carcinogenic, hepatotoxic
Corn Silk[2]	Allergenic, dermatitis
Cowslip	Allergenic
Damiana[2]	Convulsions (one report with high dose)
Dandelion	Allergenic, dermatitis
Echinacea	Allergenic, irritant
Elecampane	Allergenic, irritant
Eucalyptus[2]	Nausea, vomiting
Evening Primrose Oil	Mild indigestion, increased risk of epilepsy (in schizophrenics on phenothiazines)
Eyebright	Mental confusion, raised intraocular pressure (tincture)
Feverfew[2]	Allergenic, dermatitis
Frangula[2]	Purgative, irritant to GIT
Fucus[2]	Hyperthyroidism
Garlic	Irritant to GIT, dermatitis

Herb	Adverse Effect
Ginkgo	Gastric upset, headache
Ginseng[2]	Mastalgia, vaginal bleeding, insomnia
Golden Seal[2]	Gastric upset
Gravel Root[1]	Genotoxic, carcinogenic, hepatotoxic
Ground Ivy[2]	Irritant to GIT, kidneys
Guaiacum	Allergenic, dermatitis
Hops[2]	Allergenic, dermatitis
Horehound, White[2]	Dermatitis, irritant (plant juice)
Horse-chestnut	Nephrotoxic
Horseradish[2]	Allergenic, irritant
Hydrangea	Dermatitis, irritant to GIT
Hydrocotyle[2]	Phototoxic, dermatitis
Ispaghula	Oesophageal obstruction, flatulence (if swallowed dry)
Jamaica Dogwood[2]	Irritant, numbness, tremors (high doses)
Juniper[2]	Irritant, abortifacient
Lady's Slipper	Allergenic, dermatitis, hallucinations
Liferoot[1,2]	Genotoxic, carcinogenic, hepatotoxic
Liquorice[2]	Hyperaldosteronism (excessive ingestion)
Lobelia[2]	Nausea, vomiting, diarrhoea
Maté[2]	Sleeplessness, anxiety, tremor
Mistletoe[2]	Hepatitis, hypotension, poisonous
Motherwort[2]	Phototoxic dermatitis
Nettle[2]	Irritant
Parsley	Irritant, hepatitis, phototoxic, abortifacient (excessive ingestion)
Pennyroyal[2]	Irritant, nephrotoxic, hepatotoxic
Pilewort[1]	Irritant
Plantain[2]	Allergenic, dermatitis, irritant
Pleurisy Root[2]	Dermatitis, irritant, cardiac activity
Pokeroot[2]	Mitogenic, toxic, nausea, vomiting, cramp
Prickly Ash, Southern[2]	Toxic to animals
Pulsatilla[1,2]	Allergenic, irritant
Queen's Delight[1,2]	Irritant to GIT
Red Clover[2]	Oestrogenic
Rhubarb[2]	Purgative, irritant to GIT
Rosemary	Convulsions
Sage	Toxic, convulsant
Sassafras[1,2]	Carcinogenic, genotoxic
Scullcap[2]	Hepatotoxicity
Senega	Irritant to GIT
Senna[2]	Purgative, irritant to GIT
Shepherd's Purse[2]	Irritant
Skunk Cabbage[2]	Itch, inflammation
Squill[2]	Irritant, cardioactive
St John's Wort[2]	Phototoxic
Tansy[1,2]	Severe gastritis, convulsions
Thyme	Irritant to GIT
Wild Carrot[2]	Phototoxic, dermatitis
Yarrow[2]	Allergenic, dermatitis
Yellow Dock[2]	Purgative, irritant to GIT

GIT - Gastrointestinal tract [1] Not recommended for internal use [2] Herbal ingredients best avoided or used with caution during pregnancy.

fentermine[7]. Furthermore, warnings against abuse of products containing Khat and Yohimbe as alternatives to street drugs were issued in the UK[4].

Drug-Herb Interactions

A recent circular from the Maltese Health Division highlighted the interactions between herbal remedies containing *Hypericum perforatum* (St John's Wort) and conventional medicines[11]. However, very few drug-herb interactions have been reported in the medical literature when compared with reports of interactions between conventional drugs. The low incidence of reporting of interactions with herbs, in itself, neither confirms their safety in use nor suggests that the incidence is indeed low. Most of the interactions are not recognised by patients who self-medicate and are not reported to a medical practitioner or a pharmacist[12].

The mechanism of a drug-herb interaction may be difficult to identify when there is insufficient knowledge of the pharmacological activity of the herbal product. However, it is possible to predict potential interactions on the basis of known herbal constituents and their reported pharmacological action and documented side effects[9]. Examples of known or potential drug-herb interactions are summarised in Table II. It should be emphasised that many drug interactions are harmless and many of those that are potentially harmful occur only in a small proportion of patients and may then vary in severity from patient to patient[6].

Table 2: Summary of Drug-Herb Interactions of Commonly Used Drugs (adapted from Miller, 1998)

Drug	Herb	Interaction
Alprazolam	Kava	Excessive sedation may result with concomitant use.
Corticosteroids, Cyclosporin	Echinacea, Astragalus, Liquorice, Alfalfa Sprouts	Immunostimulating effects of the herbs may offset immunosuppressive effects of the drugs.
Digoxin		Additive effects possible with herbs containing cardiac glycosides.
	Hawthorn	Hawthorn purportedly potentiates digoxin.
	Liquorice	Liquorice may cause hypokalaemia, hence predisposing the patient to toxic effects of digoxin.
	Foxglove	Plantain may be adulterated with Foxglove, hence elevating blood levels of digoxin.
	Siberian Ginseng, Kyushin	The herbs may interfere with digoxin assays.
	Uzara root	Uzara root may exert additive digoxin-type cardiac effects.
Diuretics (e.g. hydrochloro-thiazide, furosemide)	Sodium-sparing herbal aquaretics (e.g. Dandelion, Uva-Ursi)	The herbs may offset antihypertensive effects of the drugs.
	Gossypol	Gossypol may exacerbate hypokalaemia secondary to the drugs.
Hypoglycaemics (e.g. sulphonylureas)	Karela	Karela has been shown to decrease dosage requirements for chlorpropamide.
Iron	Tannin-containing herbs (e.g. Chamomile, Feverfew, St John's Wort)	The herbs may interact with iron, hence inhibiting iron absorption.
Levothyroxine	Horseradish, Kelp	The herbs may suppress thyroid function, complicating thyroid function.
Nonsteroidal anti-inflammatory drugs	Herbs irritant to GIT (e.g. Gossypol, Uva-Ursi)	Additive GIT irritation may be encountered with concomitant use.
Phenelzine (and other MAO inhibitors)	Ginseng, Yohimbine, Ephedra	Concomitant use with the herbs may result in insomnia, headache and tremulousness.
	St John's Wort, Liquorice	The herbs may have MAO inhibitor activity and should not be used concomitantly with known MAO inhibitors.
Phenobarbitone	Thujone-containing herbs (e.g. Wormwood, Sage)	The herbs may lower seizure threshold, hence increasing anticonvulsant dosage requirements.
	Gamolenic acid-containing herbs (e.g. Evening Primrose Oil, Borage)	The herbs lower seizure thresholds and may increase anticonvulsant dosage requirements.
Phenytoin		Same as for phenobarbitone.
	Shankhapulshpi	Shankhapulshpi may shorten the half-life and diminish effectiveness of phenytoin.
Spironolactone	Liquorice	Liquorice may offset the effects of spironolactone.
Warfarin	Garlic, Ginger, Ginkgo, Feverfew	The herbs may augment the anticoagulant effect of warfarin.
	Ginseng	Ginseng may decrease the effectiveness of warfarin.

GIT - Gastrointestinal tract MAO - Monoamine oxidase

Conclusion

The ultimate benefit that the consumer will derive from the use of herbals depends on the correct use of products of acceptable quality. This may be achieved if there is adequate control of the manufacture of herbal products to ensure that the correct standardised botanical ingredients are used and to minimise the problem of toxicity associated with adulteration, substitution, misidentification and contamination of products[13].

Different standards of regulatory control of herbal products exist in various countries. When preparations are sold without appropriate or complete labelling and product information, or when they are freely available as unlicensed dietary supplements, it becomes increasingly difficult to enforce quality and safety requirements or to ensure that all incriminated products are withdrawn after a drug alert[8].

The examples of herbal toxicity that were presented in this brief discussion are not intended to undermine the role of herbal medicines in pharmacotherapy but, rather, to demonstrate that natural products are composed of chemical substances that possess properties that can be therapeutic as well as toxic. Herbal medicines should be allowed to find a niche in pharmacotherapy, not solely as an alternative form of therapy but also to complement conventional drugs. ✶

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Out of the Shadows:

Services for Persons with Epilepsy in Malta

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Epilepsy is the most common neurological disorder in clinical practice and it is a generic term used to define a variety of seizure disorders. A seizure is a disturbance in the electrical activity of the brain. There are more than 20 different epilepsies and syndromes, according to recent international reclassification of symptoms by the International League Against Epilepsy. These seizures affect awareness, produce brief loss of muscle control and may involve sensory distortions. Early diagnosis is crucial. Children and adults with undiagnosed seizures risk developing a more severe, more difficult to treat condition with consequent poor prognosis and increased medical costs.

Twenty percent of cases develop before the age of five and 50 % develop before the age of 25. It is also increasingly associated with the elderly. In about 70% of cases there is no known cause. Of the remaining 30%, the most frequent causes include head trauma, brain tumour and stroke, poisoning, alcoholism and following infections such as meningitis or viral encephalitis. All people inherit varying degrees of susceptibility to seizures. The genetic factor is assumed to be greater when no specific cause can be identified. Modern treatment with drugs can achieve full or partial control of seizures in about 85% of cases. Yet social, educational and employment stigmas persist world-wide, even here in Malta.

The World Health Organisation estimates there are 40 to 50 million people with epilepsy throughout the world and, in many countries, remains a stigmatising condition surrounded by mystical beliefs and social taboos. In addition, there are a number of social and economic factors which will influence the outcome of seizure control in persons with epilepsy and lack of data relating to the number of persons with this disability will hinder progress in allocating medical, support, educational and employment resources for persons with epilepsy and their careers.

Local associations

Over the last three years the Epilepsy Society of Malta and Malta Caritas Epilepsy Association have been

set up to serve as local chapters of the International League Against Epilepsy (ILAE) and International Bureau for Epilepsy (IBE). These are respectively the associations for health care professionals involved in the care of people with epilepsy and the group for patients and their families. These two groups are working together, with the Departments of Clinical Pharmacology and Therapeutics, Medicine and Paediatrics at the University of Malta and St Luke's Hospital as well as Kummissjoni Persuni b'Dizabilità to promote professional and lay knowledge of epilepsy in Malta especially since it is estimated that there are more than 2000 people suffering from epilepsy in Malta.

Out of the Shadows

These two groups are also working to propagate the initiative of the International League Against Epilepsy / International Bureau Against Epilepsy and World Health Organisation ILAE/ IBE/WHO global campaign in epilepsy, "Out of the Shadows", which aims to seek to enlighten society about epilepsy as a medical and social problem and disability that can be treated. In this respect, the Epilepsy Society of Malta and Malta Caritas Epilepsy Associations are, respectively, affiliated members of the two organisations, and are participating actively in this campaign. Over the last three years they have mounted promotional and educational campaigns, in line with WHO recommendations and using expertise from American Epilepsy Foundation and the National Epilepsy Association of Australia. These campaigns were held on local TV, radio and print media in order to make Maltese society more aware of the true condition, signs and symptoms of epilepsy and of the rights and duties of people with epilepsy and their families. These two groups also address issues such as developmental, educational and employment questions as well as legal matters. These discussions are held against a background of obviously increased medical needs e.g. seizure type, availability of treatment, investigations, prognosis and ability to have a family. In addition to providing support services, as a team of health professionals working in the field, i.e. neurologists, paediatricians, nurses, pharmacologists and pharmacists, they are promoting professional knowledge of epilepsy in Malta by undertaking coordinated scientific research in this area.

Epilepsy Diaries

The two groups have also issued several educational publications in Maltese such as identity cards and information about epilepsy in children. Recently, diaries were launched by the Hon. Minister of Health, Dr Louis Deguara. One of the key factors in epilepsy is the accurate recording in a diary of when the seizures occur and what form they take. The completed diary pages will then help physicians to plan their treatment to achieve the best possible control of the epilepsy. These diaries help one to keep track of the date and time of seizures, type of seizures and any possible triggering factors that may have caused the seizures, such as missed medication, stress, tiredness and any other items that affect mood or health, as well as space to record hospital or doctor appointments. The information thus recorded will help the persons with epilepsy to obtain some type of control on the factors that may induce the seizures, and thus may help remove some of the problems for daily life associated with the unpredictability of epilepsy.

These diaries were kindly sponsored in Malta by Janssen-Cilag, a subsidiary of Johnson and Johnson, represented in Malta by AM Mangion Ltd. These diaries may be obtained from Neurology Outpatients' Clinics and Paediatric Clinics, St Luke s Hospital or by contacting the Caritas Malta Epilepsy Association on 233933 or 32902845.

Month *January*

Date	Awake	Asleep	Time	Triggers	Notes
1					
2					
3	*2A*				*Very tired, grumpy*
4					
5					
6					
7	*2B*			*Period*	*Took paracetamol 2x500mg x 3*
8					

The Achilles Project

Prevalence of Tinea Pedis and Onychomycosis in Malta

The Maltese Dermatological Association

Keywords: Achilles project, onychomycosis, Tinea pedis, fungal foot infections.

Tinea pedis (athlete's foot) is a common fungal infection of the feet with the major causative organisms being *Trichophyton rubrum*, *Trichophyton mentagrophytes* and *Epidermophyton floccosum*[1]. It occurs worldwide, with a greater frequency and severity during the warmer months of the year. The condition is most prevalent in adult men, especially in the presence of excessive perspiration and occlusive footwear[2]. Transmission may be direct, from person to person, or indirect via infected skin scales on towels, shoes, socks, and floors, particularly in communal showers[2]. These conditions tend to favour recurrence of the infection.

The symptoms generally commence in the fourth toe cleft and may include itching between the toes and the development of small blisters that may rupture and ooze a thin fluid. The horny skin layers eventually become macerated and peel, resulting in cracks which are prone to secondary bacterial infection. Chronic fungal infection leads to a scaly and cracked skin appearance, and, if the condition persists further, may involve the rest of the foot including the nails, where onychomycosis (also known as Tinea unguium) can develop. When this happens, the nail may become discoloured, thickened, or even distorted[1,2].

The Achilles project was set up because of the general poor awareness of foot disease, especially of fungal foot infections. Foot diseases are often not viewed as a real problem and there is limited knowledge of them. Most previous studies have involved small and specific population groups, such as school children, subjects visiting swimming baths, populations with specific occupations, or patients with underlying diseases like diabetes. Moreover, patients often had to diagnose the condition themselves. The results of these self-assessments was an underestimation of the prevalence of foot infections[3,4].

The Achilles project is the largest epidemiological study ever to be carried out on foot health in Europe. Started in 1998, the aim of the project is to gain a better understanding and awareness of the medical problems of diseases affecting the feet or related to the part of the body below the Achilles heel (e.g. foot, toes, toenails) and of their prevalence amongst different patient groups. The project will also allow an insight to be gained into the predisposing factors and quality of life in a large population. In the longer term, a key objective is to improve the diagnosis and treatment of foot conditions and to generate clinical data from a sample of the population. The data will serve as the basis for epidemiological studies, allowing both medical professionals and patients to benefit from this knowledge. The ultimate goal is therefore to increase the chance for timely diagnosis and treatment of foot disorders.

Several European countries, including Austria, Belgium, the Czech Republic, Germany, Greece, Hungary, Italy, Luxembourg, the Netherlands, Portugal, Poland, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom (UK), have thus far participated in this foot-screening project, which was endorsed by the European Academy of Dermatology and Venerology (EADV) and the European Nail Society. Following the example of these countries, in the fall of 1999 many efforts were deployed to implement the Achilles project in Malta, Jordan and Cyprus.

Design and Methodology

The study was designed to give patients visiting the dermatologist, a clinical evaluation of the feet. The patients had initially presented with a condition other than fungal infection. Patients were included in the study irrespective of their age, sex, or medical complaints. Participating dermatologists examined patients' feet for seven working days during the last week of October 1999. Assessments were also carried out for demography, predisposing factors, diagnosis of foot disease, skin and nail examination, and quality of life measurements. The project investigated the effect of gender, age and several clinical factors, including diabetes, obesity, antibiotics, corticosteroids, immunodepression, vascular disease, trauma, osteoarticular pathology, and sports activity, on the prevalence of foot disease.

Four patient age groups were defined as follows: child, 0-17 years; adult, 18-39 years; medium aged, 40-64 years; elderly, 65 years and older. In

Table 1: Comparison of Achilles project results
(adapted from Haneke, 1999)

	Patients	Fungal foot infections	Tinea pedis	Onychomycosis
Europe	13,695	35.0%	22.0%	23.0%
Malta	186	23.7%	16.1%	19.1%
Cyprus	1506	41.2%	28.2%	21.7%
Jordan	1287	27.3%	20.5%	11.5%

assessing the nature of the foot disease, Tinea pedis was defined as a fungal infection involving the plantar and/or interdigital side of the foot while onychomycosis was defined as a fungal infection of the nail. The prevalence was calculated as the number of cases divided by the number of subjects in the corresponding population. The results were subjected to statistical analysis using logistic regression, a *p* value of 0.05 being chosen as the delimiting statistic between statistical significance and nonsignificance.

Results

Fungal foot infections

186 patients were screened, and 60% of the dermatologists practising in Malta took part in this project. The percentage incidence of fungal foot infection was 23.7%, with an expected higher prevalence in males (28.4%) than females (18.7%). The risk increased by 1.65 times for males relative to females, and with each additional year of age by 1.28 times for both males and females. Practicing sports was observed to be a predisposing factor for foot diseases, mainly in children and adults.

Tinea Pedis

Tinea pedis was reported for 16.1% of individuals, with prevalence being higher in males (20.0%) than females (12.1%). In all groups with predisposing factors, except antibiotics and immunodepressants, the prevalence of Tinea pedis was higher, although not statistically significant. Tinea pedis incidence increased with age up to the age of 56.

Onychomycosis

Onychomycosis was reported in 19.1% of individuals, with the prevalence being approximately the same for males (10.5%) and females (7.7%). The risk of onychomycosis for males was approximately 1.30 times higher than the risk for females, and increased with each additional year of age by 1.02 times for both sexes. The prevalence of onychomycosis was higher among persons with diabetes, obesity, vascular disease, trauma, and those practicing sports, and lower among those using antibiotics or corticosteroids, and with immunodepression or osteoarticular pathology. However, apart from the increase in the risk of onychomycosis associated with trauma, the effects of all other factors on the risk of onychomycosis were not statistically significant.

Discussion

Table 1 compares the results for fungal foot infections, Tinea pedis and onychomycosis in Europe (1998 survey) and in Malta, Cyprus and Jordan (1999 survey). In Europe, 13,695 patients were included in the survey. In Malta 186 patients were screened (population 376,000), compared to 1506 in Cyprus (population 751,500) and 1287 in Jordan (population 936,300). Cyprus screened the largest percentage of their population, while Europe screened the least. However, it can be seen from the table that the incidence of all fungal foot infections, Tinea pedis, and onychomycosis is comparable for all regions[5]. However, compared to other epidemiological studies[3,4] the prevalence of fungal foot infections as found in the Achilles project is much higher[5]. The sex dependency of onychomycosis remains a topic of discussion. The Achilles project data for Europe parallels the results obtained in Malta and firmly establishes the higher prevalence of clinically diagnosed fungal foot infections in the males of the total screened population[5].

Based on the above results, it would appear that physicians have to take a more active approach to foot health, since many foot conditions are never diagnosed, and hence treated. Furthermore, because of their ignorance of foot problems, patients do not seek treatment in time and the condition often becomes very serious, affecting quality of life (itching, pain, discomfort in walking, embarrassment, limitations in work and other activities). This makes the disease more difficult to treat, and longer treatment duration is needed. People should be educated that foot problems are not due to poor personal hygiene, but that underlying causes may be related to a variety of predisposing factors which mean that some people are more likely to contract a foot problem like a fungal infection. Moreover, both physicians and patients should be aware of effective systemic therapy[5].

Acknowledgements

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Pharmacy and the EU

The Impact of European Union Membership on the Pharmacy Profession in Malta

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Key words: pharmacy profession, European Union, Malta Chamber of Pharmacists

The Malta Chamber of Pharmacists, as the National Pharmaceutical Association, monitors the developments in local, European and international pharmacy. With the current national developments, the Chamber's primary focus is the impact of EU membership on pharmacists, pharmacy and medicines. The Chamber has in fact been studying the impact of European Union (EU) membership intensively since 1990, at the time when the then Administration had first formally applied for full membership in the EU[1].

In 1998, the Maltese Government reactivated its application for full membership in the EU. Immediately, the Chamber, given that a plethora of EU Commission Directives address the free movement of pharmacists, their right of establishment and the mutual recognition of qualifications in pharmacy and the free movement of medicines in the European Economic Area (EEA), intensified its endeavours in the field, to be in a "pole"position to:

- consolidate its European activities, in the light of the roles played by the Pharmaceutical Group of the European Union (PGEU) and EuroPharm Forum (WHO/Euro) at European level, and the Chamber at European and national levels;
- advise the Government and other relevant institutions and Authorities, the members of the pharmacy profession and the public, on these matters;
- make recommendations to the Government and other relevant institutions and authorities, and the members of the pharmacy profession, on the implementation of the changes to the relevant legislation and practice;
- prepare the profession and the country for full membership through pro-active participation in the updating of the legislation, structures and standards pertaining to pharmacists, pharmacy, medicines and health;
- empower the active participation of the Chamber in all the processes leading to the official negotiations with the EU on matters concerning pharmacists, pharmacy, medicines and health;
- enable Chamber participation in Brussels, the hub of activity, and in other EU countries, on affairs pertaining to pharmacists, pharmacy, medicines and health;
- engage identified European experts with the remit to advise the Chamber Executive Council and to visit Malta to hold intensive meetings with the Chamber Executive Council and workshops/ seminars for members.

The Pharmaceutical Group of the European Union

After the signature of the Treaty of Rome, on the 25th March 1957, which incepted the European Economic Community (EEC) and the European Community of Atomic Energy (Euroatom), few were those professionals who were quick to realise the significant implications and challenges brought about by the "Four Freedoms" (Freedom of movement of capital, services, persons and goods).

European pharmacists were amongst the first to do so, and, in 1957, the "Groupement", the Pharmaceutical

Group of the European Community at that time, was founded, engrouping the then six members of the EEC. This has now evolved into the Pharmaceutical Group of the European Union (PGEU), which is the strong lobby group on pharmaceutical matters based in Brussels, Belgium. It consists of the delegations of the National Pharmaceutical Associations of 15 members (country delegations) together with a number of observers mostly from applicant countries for EU membership and other international and European Pharmaceutical institutions.

The pharmaceutical profession, through the PGEU, maintains relations with the European Commission, the European Parliament, the Economic and Social Council and other European and international organizations of Health Care professionals and stakeholders. Through its founder membership of the EuroPharm Forum (WHO/Euro) in 1992, the Chamber has since established a fruitful collaborative relationship with the PGEU.

The Pharmacy Sectorial Directives

The pharmaceutical profession is mainly regulated by three Directives in the EU.

Directives 85/432/EEC[2] and 85/433/EEC[3] concern the free movement of pharmacists and the right of establishment and the mutual recognition of qualifications in Pharmacy. Directive 85/434/EEC[4] provides for the setting up by the EU Commission of the Advisory Committee on Pharmaceutical Training. Moreover, in May 1994 this latter Committee issued the document entitled "Report And Recommendations On Pharmaceutical Education Undergone At Higher-Education Institutions", the contents of which have been implemented by several member states, albeit it is not a directive[5].

Article 1 of Directive 85/432/EEC lays down in paragraph 1.1 that "Member States shall ensure that holders of a diploma, certificate or other University equivalent qualification in pharmacy which meets the conditions laid down in Article 2 shall be entitled at least to access to the activities mentioned in paragraph 1.2 and to pursue such activities, subject where appropriate to the requirement of additional professional experience."

The activities referred to in this paragraph are outlined in paragraph 1.2 and include:

- the preparation of the pharmaceutical form of medicinal products;
- the manufacture and testing of medicinal products;
- the testing of medicinal products in a laboratory;
- the storage preservation and distribution of medicinal products at the wholesale stage;
- the preparation, testing, storage and supply of medicinal products in pharmacies open to the public;
- the provision of information and advice on medicinal products.

Article 2 of Directive 85/432/EEC specifies that training leading to the formal qualification shall ensure adequate knowledge:

- of medicines and the substances used in the manufacture of medicines;
- of pharmaceutical technology and the physical, chemical, biological and microbiological testing of medicinal products;
- of the metabolism and the effects of medicinal products and of the action of toxic substances and of the use of medicinal products;
- to evaluate scientific data concerning medicines in order to be able to supply appropriate information on the basis of this knowledge;
- of the legal, ethical and other requirements associated with the practice of pharmacy.

Briefly, therefore, any person who holds a qualification listed in Article 4 of Directive 85/433/EEC, gained by successful completion of a course of study complying with Article 2 of Directive 85/432/EEC, or who meets the criteria for established rights in Article 6 of Directive 85/433/EEC (Table 1) is entitled to access in any country of the EEA to any activity in Article 2 of Directive 85/433/EEC.

Having taken into consideration all of the above, the Chamber has made the following strong recommendations to the Government.

Mutual Recognition of Qualifications

The Government must ensure that Maltese pharmacists who qualified before the implementation of Directive 85/433/EEC benefit from the "established rights" provisions of Directive 85/432/EEC, and that the "cut off point" should be the date of EU accession.

Established Rights and Regulated Areas of Practice - The Case of Pharmacist Medical Representatives

With further reference to the established rights provision in Directive 85/433/EEC, suitable safeguards must be in place for those pharmacists who do not comply with Directive 85/432/EEC nor with the acquired rights provisions of Directive 85/433/EEC because they are not practising in a regulated area of practice.

A case in point is that of pharmacist medical representatives. It is vital that medical representation is immediately designated by the Government as a regulated area of practice and that a register of pharmacist medical representatives is held by the Pharmacy Board.

Moreover, the necessary structures for the keeping of registers for existing specific areas of practice, including the managing pharmacists of community pharmacies, pharmacists in hospital practice, administrative pharmacists, pharmacists practising in laboratories, the qualified persons (pharmacists) designated as responsible pharmacists of the pharmaceutical activities of wholesale dealers of medicines, and the qualified persons in the manufacturing of medicines, should be set up without delay.

In-Service or Pre-Registration Training - The Case of the B.Pharm. (Hons.) Class Of 2000

Besides the specifications on the adequate knowledge required in the training leading to the formal qualification mentioned above, Article 2 of Directive 85/432/EEC imposes a further minimum period of six months in-service training in a hospital or a community pharmacy towards the end of the University course leading to the qualification in pharmacy[6]. In 1993, the Advisory Committee[7] laid down the principles according to which the monitoring, evaluation and content of in-service training were to be determined. The Chamber has studied the documents of the Advisory Committee on Pharmaceutical Training of the EU and other recommendations of European advisors and has strongly recommended to the Government and the University that Malta should immediately develop the appropriate supervising and training infrastructure with appropriate pharmacist mentors in both hospital and community pharmacy. However, this is a short term priority, since there is no provision for in-service training as yet . Thus, students in the course at present and who will graduate this year, are not in line with Article 2 of Directive 85/432/EEC[3] and on accession, these will not have freedom of movement unless provisions in this regard are immediately taken.

Accession to Activities in Pharmacy by a National of a Member State

The Chamber has strongly recommended that the Licensing Authority request proof of qualification (University degree), pre-registration training, licence to practice (warrant), proof of actual practice experience, and certificate of good conduct (civil and professional conduct and repute, perhaps reflected in a current licence to practice and "history" thereof), from the member state. This is an example of practice in various member states.

Linguistic Knowledge

It is an ethical requirement that there is good communication and understanding between the pharmacist, indeed any health care professional, and the patient. Moreover. the Chamber insists that nationals of Member states applying for registration in Malta should be requested to have a good working knowledge (spoken and written) of the Maltese Language since this is the national language of the Maltese population[8].

Table 1: Established Rights Criteria
Article 6: Directive 85/433/EEC

6.1 Diplomas, certificates and other university or equivalent qualifications in pharmacy which were awarded to nationals of Member States by Member States and which do not satisfy all minimum training requirements laid down in Article 2 of Directive 85/432 EEC shall be treated as diplomas satisfying these requirements if:

- they are evidence of training which was completed before the implementation of the said Directive, or
- they are evidence of training which was completed after but which was commenced before the implementation of the said Directives.

and, in each case, if

- they are accompanied by a certificate stating that their holders have been effectively and lawfully engaged in one of the activities referred to in Article 1 (2) of Directive 85/432/EEC in a Member State for at least three consecutive years during the five years preceding the award of the certificate, provided that this activity is regulated in that State.

Source: Council Directive 85/433/EEC. O.J.No.L 253, 24.9.1985. pp 0037-0043.

Advisory Committee on Pharmaceutical Education and Training

This Committee comprises, from each country, three members and three deputies, representing the competent authorities, academic pharmacy and the practising pharmaceutical profession. It is the Chamber's strong opinion that the Government should consult the Chamber in the appointment of the member and deputy to represent the Maltese practising phamaceutical profession on this Committee.

Specialisation

There is the requirement in the first directive (85/432/EEC) that the Commission must make proposals for specialisation to be undertaken by pharmacists already registered to practise pharmacy in the EU. The EU Advisory Committee on Pharmaceutical Training has issued documents with respect to Specialisation in Community Pharmacy[9] but this has not taken the form of a Directive; the Committee is at present working on Specialisation in Hospital Pharmacy and Specialisation in Clinical or Medical Biology.

In this context, the Chamber has urged for work to start immediately to provide for specialisation of Maltese pharmacists in the various areas of hospital pharmacy including clinical pharmacy, community pharmacy, pharmaceutical industry including marketing of medicines and wholesale distribution, laboratories, and academia. This is so as to safeguard the position of Maltese pharmacists vis a vis EEA citizens who already have a history of specialisation.

The Right of Establishment

The preamble to Directive 85/432/EEC, states that "The geographical distribution of pharmacies and the monopoly of the supply of medicinal products continue to be a matter of the Member States...". This national autonomy is further recognised by paragraph 7 of Directive 85/433/EEC which states that: "Whereas, under their national policies in the sphere of public health, which seek inter alia to ensure the satisfactory dispensing of medicinal products over their entire

territories, certain Member States restrict the number of pharmacies that may be established...".

The EEC Treaty (Treaty of Rome) which aimed at the attainment of absolute freedom of circulation of merchandise (Article 9-11) of the labour force (and hence, professionals including pharmacists) (Article 48-51) and freedom of establishment of workers anywhere in the EU (Article 52-58) freedom of services rendered (Article 59-66) accepts as lawful any restrictions imposed by member states on these matters for reasons of public order, public security and public health (Article 48, par. 3, Article 56, par. 1, Article 68) in which said restrictions are also included any regulations concerning the pharmaceutical profession.

In fact, based on the principle of "subsidiarity", which is an important principle in EU law, all EU countries have restrictions on the opening of pharmacies for reasons of public health. All countries therefore organise the licensing of pharmacies according to their needs (Table 2). There are no grounds whatsoever to believe that this would be challenged by the Commission either in the course of negotiation for entry or on entry itself (PGEU, 2000).

In this context, the Chamber is strongly insisting that the legal provisions that were submitted to the Hon. Minister of Health in 1999 are implemented at law, ensuring that there are no loopholes in the system. Suitable safeguards must also be addressed such as the definition of a new pharmacy and the practice by some States to bar non-nationals from acquiring and opening a pharmacy. This report also relaxes the existent criteria whilst keeping to the principles of geodemographic organisation. The report fully liberalises the transfer of

Table 2: State of the Art of Pharmacy Organisation in the European Union

1. In the majority of member states of the EU, including Denmark, France, Greece, Italy, Portugal, Spain, Luxembourg, Finland and Austria, community pharmacy organisation is based on geographical/demographic considerations; and legislation provides for pharmacist ownership only.
2. The UK, Ireland and Belgium allow non-pharmacists to own a pharmacy, but the allocation of dispensing contracts under the NHS, in the first two countries amounts to distribution control, whilst Belgium has distribution controls. The Dutch government has recently legislated to allow the ownership of pharmacies by non-pharmacists.
3. In Germany, only pharmacists can own a pharmacy but there are no distribution regulations.
4. The Swedish system is totally alien to any of the above situations and to current thinking and practices in the EU (and locally.)

Reference

PGEU, letter from the President, Prof. Dieter Ahlgrimm, to the President of the Malta Chamber of Pharmacists, April 1996; PGEU, letter from the Vice-President, Mr. Aidan O'Shea, to the President of the Malta Chamber of Pharmacists, March 2000 and from Mr. John Ferguson, (UK) April 2000.

licence. However, the Chamber is urging the Government to provide the necessary safeguards, with urgency, in the incumbent accession negotiations on free movement of persons and the right of establishment, so that no non-Maltese citizen will open a pharmacy in Malta - and that Parliament should legislate in favour of planned distribution of pharmacies, without any loopholes. This is because under other circumstances, that is, in the absence of geodemographic regulation, citizens of member states and others who are not allowed to open pharmacies in their country by their own Government would be tempted to open in Malta.

The Drafting of a Pharmacy Act

The changes and challenges faced by the Pharmaceutical Profession during the last century and the Government's thrust towards EU membership in the last decade have brought about the urgent need to draft a Pharmacy Profession Act to govern pharmacists in all areas of practice.

The Chamber made detailed submissions regarding this issue in April 2000 (10) at the invitation of the Director General of Health, since the Ministry of Health had embarked on the redrafting of Chapter 31 of the Medical and Kindred Professions Ordinance. In the context of EU membership, it is relevant to highlight the Chamber's stance on the following principles:

- that there should be a Pharmacy Professions Act regulating pharmacists practising in the following areas: community and hospital pharmacy, pharmaceutical industry including manufacturing, importation and wholesale distribution, advertising and marketing (medical representation) of medicinal products without distinction of whether pharmacists practise in the private or public sector;
- that in transposing the EU directives into the main body of the legislation, there will be no loopholes with regard to the recognition of all pharmacists on the register on the date of accession to the EU, so that all may benefit from the established rights provision of Directive 85/433/EEC, even those who do not comply with the provisions of either Directive 85/432/EEC or Directive 85/433/EEC;
- that special areas of practice are immediately designated and that provisions for the establishment and keeping of registers by the Pharmacy Board for different existent areas of practice are immediately implemented, i.e., for the Qualified Person (QP) pharmacist in pharmaceutical manufacturing; the Responsible Pharmacist (RP) in pharmaceutical wholesale activities, (termed QP by the DH circular bringing the requirement into force); pharmacist medical representatives practicing pharmaceutical marketing, and of course, managing pharmacists in community and hospital practice;
- that the necessary legal provisions are implemented to ensure that medical representation is a regulated area of practice, prior to the EU accession date;
- that the requirement on wholesale distribution of medicines should be transposed into the law to state that the "Responsible Person" is a pharmacist;
- that the law should clearly state that the "qualified person" responsible for the manufacture of medicinal products and for the release of same is a pharmacist. In this respect the provisions in MKPO CAP 31; Part X Section 96; subsection [2] for persons with "competency in chemistry" should be appropriately amended;
- that the recommendations mentioned above on the Licensing of Pharmacies are transposed into the law, without loopholes, in the interest of public health and in the light of the provisions of the EEC Rome Treaty and the preamble to Directive 85/432/EEC to introduce safeguards on the right of establishment of pharmacists;
- that the existing Pharmacy Board is replaced with a Pharmacy Council, in view of the need for the true self-governance of the Pharmacy Profession, based on the principles of self regulation, autonomy (financial and administrative), and transparency of judicial review and other decisions. The new Pharmacy Council will have a new composition which reflects professional autonomy and self-regulation, new structures and resources reflecting the evolution of practice and new ethical needs; the new roles, such as mutual recognition of qualifications and specialisation, monitoring of the undergraduate pharmacy curriculum, setting up the provisions and the monitoring of in-service training, the Pharmacy Inspectorate and other activities in the light of EU accession. Thus the restructuring and review of the raison d'étre of the Pharmacy Board is not only of significance to the Maltese Pharmaceutical Profession and the public but also to the European pharmacists who will be approaching it as the Authority to evaluate their eligibility to practice and to discipline them. The Chamber has also made strong and consistent representations with the Minister of Health to this effect.

Conclusion

Irrespective of the EU accession exercise which is currently underway, the changes to legislation governing Pharmacy and the moving toward the attainment, in particular, of structured in-service training and specialisation have long been felt. There should also be a joint effort to attain harmonisation in education and training. In Europe it is being advocated, particularly by the EuroPharm Forum[11] and the European Association of Pharmacy Faculties, that this may be best achieved through partnership of Faculties of Pharmacy and National Pharmaceutical Associations i.e., by academics and practitioners. This objective is fully supported by the PGEU and EPSA[12]. It is of course a moot point that such an initiative is fully and proactively nurtured by the Malta Chamber of Pharmacists[13]. ✶

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Malta Chamber of Pharmacists

The Chamber's EU Task Force is headed by Mary Ann Sant Fournier and includes Mary Anne Ciappara and David Camilleri. Further information may be obtained by visiting the Chamber's Website at http://www.synapse.net.mt/mcp/ or by contacting the Chamber's EU desk on Tel no 312888, Fax no 343002/or e-mail: mfpb@malta net.net or spizjar@synapse.net.mt

Coelic Association Malta

Carole Pace Balzan

Chairperson, Coclic Association Malta

Coeliac Association Malta is a voluntary organisation for people with Coeliac Disease or Dermatitis Herpetiformis. It is a non-profitable support group founded in 1989 by coeliacs themselves in order to promote the welfare of coeliacs in Malta. Membership is open to those persons who have been medically diagnosed with coeliac Condition or Dermatitis Herpetiformis.

The Association offers help, support and advice, and provides useful information about the Condition and the gluten-free diet to newly diagnosed coeliacs. This makes it easier for the coeliac to overcome the initial shock of having to change eating habits and to adapt to a new lifestyle. The Association also offers on-going support and advice to members and their families and provides dietary guidelines, thus improving the quality of life for the coeliac.

Get-togethers are held regularly to give members the opportunity to meet and also to discuss any problems they might have. For these activities members are encouraged to bake gluten-free products which are shared over coffee. This is also an occasion to exchange recipes. Speakers are sometimes invited to give talks to members on various issues including medical, dietetic and nutritional concerns. Occasionally, bread-making demonstrations are held and social functions for members and their families are organised.

The Coeliac Association of Malta is a member of The Association of European Coeliac Societies (AOECS) and has contacts with Coeliac Societies worldwide. Important information and research material regarding Coeliac Disease and the gluten-free diet, received from Coeliac Societies in other

countries, is from time to time distributed to members of the Association, as well as to the Medical Profession. Every year two delegates from the Coeliac Association of Malta attend the annual AOECS conference, thus acquiring important information on recent developments. This yearly event is also an excellent opportunity to meet delegates from other countries and discuss matters of common concern.

Yearly contacts with local manufacturers are kept in order to investigate the presence of gluten in their products. A list of locally manufactured products certified to be gluten-free is then issued and distributed to all members.

One aspect where it is difficult for the Association to advise members concerns medicines. Some medicines may contain hidden sources of gluten and it is proving to be rather difficult for the Coeliac patient to know whether a specific medicine contains gluten. It would therefore be of great help if the pharmacist could advise coeliac patients when dispensing medicines.

The Association moreover endeavours to create a greater awareness about Coeliac Disease both with the general public as well as amongst medical and health care professionals.

Over the years the number of diagnosed coeliacs has been increasing, such that the incidence in Malta is now estimated to be 1 in 1000. The prevalence of diagnosed coeliacs in other countries varies considerably, however it is now anticipated that true figures may in actual fact be much higher in every country, with many patients remaining undiagnosed.

The number of members of the Association at present is 200. This number would be much higher if all past members would renew their membership annually. ✶

The members of the Committee for the year 2000/2001 are:

Carole Pace Balzan	Chairperson
Connie Debattista	Secretary
MaryRose Caruana	Treasurer, PRO & Overseas Contact Person
Helen Gatt	Activities Co-ordinator
Marion Tanti	Member

For further information, you may contact:

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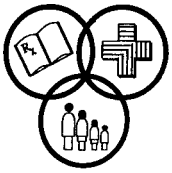
Connie Debattista	Tel. 675400 (3:00pm - 8:00pm)

PHARMA SCAN

The Malta College of Pharmacy Practice, in cooperation with TheSYNAPSE, is pleased to announce the launching of the Pharma Scan, a new internet-based service where abstracts of the latest advances in pharmacology, pharmaceutical care and pharmaceutical sciences published in leading peer-reviewed journals such as The Lancet, The New England Journal of Medicine, JAMA, Pharmaceutical Journal and many others are available to members of the TheSYNAPSE.

The service also highlights presentations from the latest scientific meetings and important press releases by pharmaceutical companies and pharmaceutical regulatory agencies on both sides of the Atlantic. The abstracts are also linked to the full-text versions of the articles where these are freely available on the internet. Membership to TheSYNAPSE is free and is open to all health and medicine professionals and students.

Membership application forms are available online at http://www.thesynapse.net/infodesk/membershipform.asp



The Malta College of Pharmacy Practice

is proud to announce the launching of its website at

http://www.geocities.com/mcpharmp/

The website features 'The ScanneRx', a periodical scan of the leading peer-reviewed on-line journals, as on-line version of the 'Chronic*ill', the College's annual review journal, up-to-date information regarding the College's continuing education program and other features of interest to pharmacists.

For further information, we invite you to visit our site, or to contact us by email at: mcpharmp@yahoo.com

Dietary Supplements: Sorting Fact from Fiction

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Keywords: dietary supplementation, vitamins, minerals, recommended intakes, antioxidants.

Early scientific research into food and nutrition was directed towards identifying the essential nutrients[1]. Indeed, several of the Nobel prizes in Physiology and Medicine at the beginning of the last decade were awarded for work on discoveries related to vitamins and the recognition of their ability to cure deficiency diseases. The public and medical enthusiasm which resulted is reflected even today in the 'magic bullet' image of nutrition. It is also reflected in the consumption of 'vitamin products' in the belief that these provide essential or desirable supplementation even to a healthy diet.

A vast number of dietary supplements have been marketed either to supplement the diet or to meet special therapeutic needs. The sales of such dietary supplements are in a number of countries substantial and even on the increase[2,3]. Dietary supplements were traditionally considered to be composed only of essential nutrients, such as vitamins and minerals, and proteins. Through the U.S. Dietary Supplement Health and Education Act[4] the meaning of the term 'dietary supplements' was expanded to include other substances. Thus, dietary supplements fall into several categories including vitamins and minerals, 'unofficial' vitamins and minerals (e.g. inositol, choline and silicon), natural oils (e.g. fish oils, evening primrose oil), natural substances (e.g. ginseng, garlic), and enzymes (e.g. superoxide dismutase).

Although a vast amount of information exists about dietary supplements, not all of it is reliable. This can lead to confusion among health professionals as well as the general public. As dietary supplements are not considered to be drugs, pharmacists are often unfamiliar with them and because they are not foods (in the sense of being part of a normal diet) nutritionists are wary of recommending them[5]. Health professionals should recognise that evidence for claims made for dietary supplements is often conflicting and inconclusive and based on uncontrolled clinical trials or anecdotal reports.

What are the Recommended Intakes for Vitamins and Minerals?

The scientific community and governmental authorities have assessed evidence as to requirements for vitamins and minerals in the population and have issued recommendations on the daily intake levels of these substances[6-9]. 'Recommended Dietary Allowances' (RDAs) were established as standards by the U.S. Food and Nutrition Board[10]. The RDA is the standard used on the labels of dietary supplements and is often interpreted as the minimum desirable intake for optimal health. In fact, the RDA covers the needs of most of the population, even those with high requirements, and is in excess of what most individuals require. The UK developed 'Dietary Reference Values' (DRVs) in an attempt to overcome the misuse of RDAs[11]. The term 'recommended' has been replaced by 'reference' to emphasise that the figures are estimates or reference values and not absolute recommendations for intakes by individuals. Also, a single figure, the RDA, has been replaced by several which are based on the assumption that the requirements for nutrients in a population follow a normal distribution curve. The 'Estimated Average

Table 1: Possible indications for dietary supplementation[5]

Groups at risk of deficiency include:

- People in a particular demographic category e.g. infants and children, adolescents, women during pregnancy and lactation and throughout the reproductive period, and the elderly.
- People whose nutritional status may be compromised by lifestyle (enforced or voluntary), e.g. smokers, alcoholics, drug addicts, slimmers, strict vegetarians (i.e. vegans), food faddists, individuals on low incomes and athletes.
- People whose nutritional status may be compromised by surgery and/or disease, e.g. malabsorption syndromes, hepato-biliary disorders, severe burns and wounds and inborn errors of metabolism.
- People whose nutritional status may be compromised by long-term drug administration (e.g. anticonvulsants may increase the requirement for vitamin D).

Requirement' (EAR) is the mean requirement; the 'Reference Nutrient Intake' (RNI) is, like the RDA, set at two standard deviations above the mean, and the 'Lower Reference Nutrient Intake' (LRNI) at two standard deviations below the mean.

Indications for Dietary Supplementation

International scientific bodies agree that there is no justification for the widespread use of most vitamin and mineral products, whether sold as foods or pharmaceuticals[12-15]. It is considered that in a community where a reasonably varied diet is readily available, that diet will provide not only the macronutrients but also all the micronutrients which the body needs[16]. Table 1 gives some possible indications for dietary supplementation.

Antioxidant nutrients and future perspectives

Currently, there is considerable interest in antioxidant nutrients and their potential health-promoting properties[17-19]. Epidemiological evidence is emerging that low plasma levels and low dietary intakes of antioxidant nutrients are related to an increased risk of diseases such as coronary heart disease and cancer[20]. There is also increasing evidence that these diseases can be prevented or delayed to some extent by dietary changes, in particular by increased consumption of fruits and vegetables. This, together with scientific hypotheses about molecular and tissue damage from biological oxidation mechanisms, have increased interest in antioxidant nutrients and the possible benefits of supplemental beta carotene, vitamin C and vitamin E and other minerals and trace elements[21].

Antioxidants are believed to protect against certain diseases by preventing the deleterious effects of free-radical-mediated processes in cell membranes and by reducing the susceptibility of tissues to oxidative stress. Further research is required to assess whether supplementation of adequately nourished subjects with antioxidant nutrients will reduce the incidence of disease. The few intervention trials of antioxidants reported so far have shown little evidence for the value of supplements[21]. Although several epidemiological studies have found lower serum levels of antioxidant nutrients in patients with cardiovascular disease, cancer and cataracts, there is, as yet, little evidence that supplements of antioxidant nutrients prevent disease.

Role of the Health Professional

When asked about supplements, health professionals should emphasise

Table 2: Toxic doses of nutrients[5]

	RNI[1]	Toxic dose/day	Maximum levels[2]
Vitamins			
Vitamin A (as retinol)	700µg (2,310 units)	6mg (19,800 units)	600µg (1,980 units)
Niacin	17mg		50mg
Nicotinic acid		3-9g	
Nicotinamide (s/r[3])		500mg	
Vitamin B_6	1.4mg	50mg	10mg
Vitamin C	40mg	6g	600mg
Vitamin D	-	500µg (20 000 units)	5µg (200 units)
Minerals			
Chromium	-	1-2g	100mg
Cobalt	-	300mg	30mg
Copper	1.2mg	50µg/kg	3mg
Fluorine	-	10mg	1mg
Germanium	-	20mg	
Iron	8.7mg	40mg	4mg
Iodine	140µg	1000µg	1000µg
Molybdenum	-	10-15mg	1mg
Nickel	-	250mg	
Selenium	75µg	1mg	1000µg
Zinc	9.5mg	20mg	2mg

1. RNI for men aged 19-50years
2. Maximum daily doses of vitamins and minerals in dietary supplements recommended by MAFF[13]
3. Sustained release

the importance of consuming a diet based on healthy eating guidelines. This is a diet rich in starchy carbohydrates, including fruit and vegetables, and low in fat, sugar and salt. As a health professional, one should be aware of dietary standards and good food sources of nutrients. One should be able to assess an individual's risk of nutrient deficiency and the need for further referral, by asking questions to detect physical, environmental and social conditions which may predispose to inadequate intakes. There is also a need to be aware of the potential for adverse effects with supplements. Thus, when a client or patient presents with any symptoms, questions should be asked about the use of dietary supplements. Individuals will not always volunteer this information without prompting because they believe that supplements are 'natural' and therefore safe. Health professionals should make their clients aware of the existence of badly worded claims and advertisements, and of the dangers of supplement misuse.

Pharmacists have a particular responsibility when dispensing any supplement with perceived health benefits. Pharmacists must be careful to avoid giving their professional authority to a product which may lack any health or therapeutic benefit or has risk associated with its use. Pharmacists must not give the impression that any supplement is efficacious when there is no evidence for such efficacy. However, providing that a product is not harmful for a particular individual, the freedom to use it should be respected. What is important is that consumers are able to make informed and intelligent choices about the products that they buy.

The pharmacist should advise healthy individuals to obtain adequate nutrient intakes from foods eaten in variety and moderation rather than supplements. All nutrients are potentially toxic when ingested in sufficiently large amounts over prolonged periods of time. Table 2 provides a list of nutrients and their toxic dose.

Conclusion

In the field of dietary supplements, incorrect and unsubstantiated claims have been advanced and there has been much public misunderstanding, often reflecting premature publicity accorded to preliminary and unconfirmed findings. Consumers should be discouraged from using excessive doses of supplements which could be harmful, and from using such products in the place of more orthodox disease treatment, particularly without the knowledge of their doctor.

A varied and balanced diet supplies all the necessary nutrients. Supplements are required only for the treatment of established nutrient deficiency and for the prevention of deficiency in certain 'at risk' groups of the population. Nutrition experts agree that until further conclusive evidence emerges, healthy food choices can best provide the variety and balance of vitamins, minerals and other nutrients needed for good health. ✶

List of Abbreviations

RDA	Recommended Dietary Allowances
IUNS	International Union of Nutritional Sciences
DRV	Dietary Reference Values
EAR	Estimated Average Requirement
RNI	Reference Nutrient Intake
LRNI	Lower Reference Nutrient Intake
DoH	Department of Health
MAFF	Ministry of Agriculture, Food and Fisheries
NIH	National Institutes of Health
NRC	National Research Council
WHO	World Health Organisation

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thechronic✶ill
No 4 Summer 2000

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