Cordyceps (Cordyceps militaris)
Cordyceps (Cordyceps militaris) has a long history of therapeutic use in Traditional Chinese Medicine (TCM), where it is commonly called “Dong Chong Xia Cao” which translates to “worm in winter and grass in summer”. This insect parasitising fungus lives on a wide range of host insects and is chiefly valued as a tonic herb in TCM. Cordyceps is used to treat a wide range of disorders including respiratory, kidney, liver, and cardiovascular diseases, low libido and impotence, and hyperlipidaemia, as well as being used as a tonic to promote energy, reduce fatigue, and strengthen the body after illness. Promising research has also been published surrounding its use in cancer treatment and in chronic kidney disease.

Horny Goat Weed (Epimedium sagittatum)
The Epimedium genus consists of approximately 52 species and more than 15 of these species, including Horny Goat Weed (Epimedium sagittatum), have a long history of use in Traditional Chinese Medicine (TCM). According to TCM theory, Horny Goat Weed is believed to nourish the kidney and reinforce the yang and is subsequently employed in the treatment of deficient kidney yang patterns with symptoms such as impotence, spermatorrhoea, frequent urination, forgetfulness, withdrawal, and cold lower back and knee pain. In modern times, this herbal extract is often used in the treatment of sexual dysfunction, benign prostatic hyperplasia, osteoporosis, cardiovascular disease, menstrual irregularity, asthma, chronic nephritis, and as an immunoregulator.

Japanese Knotweed (Polygonum cuspidatum)
Japanese Knotweed (Polygonum cuspidatum) is another Traditional Chinese Medicine (TCM) herb that has a history of use spanning more than 2,000 years. From the perspective of TCM theory, this plant was used to remove jaundice and clear heat-toxin thereby promoting blood circulation, dispelling stasis, expelling wind and dampness, dissipating phlegm, and suppressing cough. In the West, this plant has recently become popular with researchers and practitioners alike due to its content of the polyphenol, resveratrol. Japanese Knotweed, primarily due to its potent antioxidant, anti-inflammatory and immunomodulation activities, is useful in the treatment of many disorders of the cardiovascular, endocrine, nervous and immune systems.

Kudzu (Pueraria lobata)
The medical use of Kudzu (Pueraria lobata) dates back over 2,000 years to China’s first medicinal work, the Shen Nong Ben Cao Jing, where it is stated as a plant that nourishes constitutional types. In Traditional Chinese Medicine (TCM) it was recommended to relieve “wasting and thirsting symptoms” (or diabetic symptoms), fever, vomiting, and non-specific intoxication, among other complaints. Kudzu has been used as an anti-intoxication agent to treat alcohol related problems as early as 600 A.D. In modern times, it continues to be used in alcohol addiction, as well as in the treatment of cardiovascular disease, benign prostatic hyperplasia, diabetes, osteoporosis, and as a neuroprotective agent. Research has also identified the phytoestrogenic properties of Kudzu accomplished by the plant’s isoflavone constituents, puerarin, daidzin and daidzein.

For further information on these herbal medicine please contact Optimal Rx to request a tech sheet.

Contact OptimalRx OR Your Distributors NOW

<table>
<thead>
<tr>
<th>Optimal Rx</th>
<th>Oborne Health Supplies</th>
<th>Natural Remedies Group</th>
<th>Rener Health Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>P 1300 889 483</td>
<td>P 1300 887 188</td>
<td>P 1300 138 815</td>
<td>P 1300 883 716</td>
</tr>
</tbody>
</table>
NEW Rhodiola & Schisandra
For the challenges of everyday life

Being challenged in life is inevitable. Being defeated is optional.

Rhodiola & Schisandra combines therapeutic doses of these herbs that meet MediHerb’s stringent quality standards so you can be confident in giving your patients the best support to meet the challenges of everyday life.

- Help enhance cognitive performance
- Help relieve stress
- Help boost physical performance
- Support vitality

Dosage
Adults: Take 1 tablet, 2-4 times daily.
Children 6-12 years: Give 1 tablet, 1-2 times daily.

MHRHS60 60 Tablets $16.83 ex GST

Try it in your clinic today!

NOTE: For Practitioner Dispensing Only.
The Australian Journal of Herbal Medicine is a quarterly publication of the NHAA. The Journal publishes material on all aspects of western herbal medicine and is a peer reviewed journal with an Editorial Board.

Members of the Editorial Board are:

Jane Frawley PhD MClinSc BHSc GradCertAppSc
Katoomba NSW Australia

Erica McIntyre BSocSc(Psych)(Hons) BHSc DipBM
Blackheath NSW Australia

Andrew Pengelly PhD BA DBM ND
Laurel Maryland United States of America

Amie Steel PhD, MPH, GradCertEd, ND
Brisbane Queensland Australia

Janelle Wheat PhD MMedRadSc(Nuclear Medicine) MHSc(herbal medicine) BAppSci(Radiography)
Wagga Wagga NSW Australia

Dawn Whitten BNat
Hobart Tasmania Australia

Hans Wohlmuth PhD BSc
Ballaarat NSW Australia

Sue Evans PhD
Melbourne Victoria, Australia

Matthew Leach PhD, BN (Hons), ND, Dip Clin Nutr, RN
Adelaide South Australia, Australia

Susan Arenz BHSc(Hons), ND
Sydney NSW, Australia

Janet Schloss Post Grad Cert Clin Nutr, Adv Dip Health Science (Nut), Dip Nut, Dip HM, BARM
Brisbane Queensland, Australia

The Editorial Board advises on content, structure and standards for the Journal, keeping it relevant to the profession of herbal medicine. Peer reviewers will come from the Editorial Board as well as being sourced globally for their expertise in specific areas. Contributions are invited to the journal.

The NHAA was founded in 1920 and is Australia’s oldest professional association of complementary therapists. The NHAA is a non-profit, member based association run by a voluntary board of directors and assisted by interested members. Representing Western herbalists and naturopaths, the NHAA is the only national professional association specifically concerned with the practice and education of Western herbal medicine (WHM) in Australia. Our mission is to serve and support our membership and promote and protect the profession and practice of Western herbal medicine and naturopathy.

**Aim & scope**
The Australian Journal of Herbal Medicine (AJHM) is Australia’s leading herbal publication. A thoroughly modern, peer reviewed and clinically relevant journal, the AJHM can trace its origins back to publications issued by the Association as long ago as the 1930s. Issued quarterly, the AJHM publishes material on all aspects of herbal medicine including philosophy, phytochemistry, pharmacology and the clinical application of medicinal plants.

**Editorial policy**
- Subject material must relate to herbal medicine.
- Accepted articles become the property of the NHAA.
- Contributions are subject to peer review and editing.
- Contributions to the Australian Journal of Herbal Medicine must not be submitted elsewhere.

**Advertising**
For advertising enquiries please contact the NHAA office on telephone (02) 9797 2244, fax (02) 8765 0091 email nhaa@nhaa.org.au or visit www.nhaa.org.au / Publications and Products / AJHM
# CONTENTS

**Editorial:** ................................................................. 89  
*Jane Frawley*

**Letters to the Editor:** .................................................. 91

**Commentary**

*Is this working? The importance of outcome measures in herbal & naturopathic practice*

... ................................................................. 93  
*Ian Breakspear*

*Could herbal medicine alternatives reduce overuse of benzodiazepines in older adults? Thoughts on the EMPOWER trial*

... ................................................................. 97  
*Nicole Evangelidis*

*The importance of the PRACI project for grass roots complementary medicine practice: A call for practitioner involvement*

... ................................................................. 101  
*Rebecca Reid and Amie Steel*

**Article**

*Use of omega-3 for improving behavioural outcomes in autism spectrum disorder in children: A review of the literature*

... ................................................................. 105  
*Cheryl le Roux*

**Medplant**

*Echinacea for prevention of recurrent respiratory tract infection* ........................................ 111  
*Rhodiola compared to sertraline in depression.* ........................................ 112  
*Herbal medicine use during pregnancy in Australian women.* ........................................ 112  
*Pelargonium extract in animal models of cough and acute bronchitis.* ........................................ 113  
*Mechanisms of effect of Iberogast in functional dyspepsia.* ........................................ 114  
*Zanthoxylum capense enhances antibiotic activity.* ........................................ 115  
*Garlic for hypertension.* ........................................ 116

**Medjourn**

*Vitamin E’s role in head and neck cancer* ........................................ 117  
*Expanding waist circumference and diet soda intake.* ........................................ 117  
*No link between MMR vaccine and autism.* ........................................ 118  
*Salt reduction through a school based intervention.* ........................................ 119  
*Physical activity for smoking cessation in pregnancy.* ........................................ 120  
*Menopausal hormone use and ovarian cancer risk.* ........................................ 120  
*Acupuncture and anaesthesia.* ........................................ 121

*AJHM based CPE questionnaire* ........................................ 123
Editorial: The pluralistic nature of contemporary maternity care in Australia

Jane Frawley
Editor, Australian Journal of Herbal Medicine
PO Box 696 Ashfield 1800
teditorahm@nhaa.org.au

The use of complementary and alternative medicine (CAM), including herbal medicine, is widespread and many women are choosing to use CAM products and services alongside conventional maternity services during pregnancy. Recent research has demonstrated that women are more likely to consult a CAM practitioner during pregnancy if they suffer from back pain and/or neck pain, are experiencing fatigue or wish to prepare for labour. Further to this, emerging research characterising the types of CAM products pregnant women use, and the determinants of this use, illustrates that women who use herbal medicine are more likely to have certain health concerns, namely anxiety, sleeping problems and fatigue. Women also commonly use CAM products and practices whilst not pregnant, but CAM use during pregnancy needs to be closely considered in the context of safety, perhaps more urgently than non-pregnant CAM utilisation.

To further highlight the pluralistic nature of maternity care in Australia, it is important to emphasize that many women access supplementary birth services during the antenatal period, in preparation for the perinatal period. Examples include alternative birthing classes such as HypnoBirthing®, Calmbirth®, Lamaze classes, doula services and numerous other natural birth options. All of these services are part of the maternity care landscape in Australia, and many women integrate these classes with their standard obstetric care, and also CAM use, to suit their individual ideology and health care needs. It has been proposed that women attend these classes in order to feel more prepared for any eventuality during birth and thus more in control. Further to this, studies have shown that women who take personal responsibility to prepare for any birth experience feel more confident and less anxious.

Research indicates that many women desire the least intrusive medical solution for health complaints during pregnancy. These women want medicine that is safe, side-effect free, and natural. Additionally, research demonstrates that women who use CAM during pregnancy believe it is safer and more natural when compared to conventional pharmaceutical medications. There are, however, direct and indirect risks associated with the use of CAM products and services during gestation that need to be considered. Direct risk includes risk from the medications themselves, including both medicines that are teratogens, causing birth defects, and medicines that are abortifacient, which may increase the likelihood of miscarriage. Naturopaths and herbalists understand these safety concerns and prescribe accordingly, but trained practitioners are often not involved in these treatment decisions as many women who use herbal medicine during pregnancy self-prescribe these products. There is also concern in some countries over the prevalence of adulterated or contaminated complementary medicines. Indirect risk includes risk associated with poor diagnosis and ineffectual, delayed or incorrect treatment. These risks are of serious concern as delayed and/or unsuccessful treatment of a common pregnancy health concern may escalate the health problem and in some cases could affect the health of the baby.

In sharp contrast to the past, women in contemporary society are more likely to make decisions related to their own health. Unbridled access to multiple sources of information regarding health, including the internet, make it very easy for women to navigate various health care options and determine their own health care needs. This extends to pregnancy where women have access to an enormous amount of information regarding pregnancy health care and birthing. In present-day society, an increasing number of women feel confident to search for information themselves and many feel entitled to make informed decisions about their own health care needs. To this, studies have shown that women who take personal responsibility to prepare for any birth experience feel more confident and less anxious.

Whilst in the past the medical wisdom of the day and follow the guidance of their general practitioner or specialist unfailingly. Women may have been less inclined to question medicine, including medical science and medical professionals, believing that they had no grounds to do so. Further to this, modern ideas about health acknowledge that the determinants of health and illness are highly individual, constructed through a kaleidoscope of physical, social, cultural and economic factors. Whilst in the past the care that women received during the antenatal period was relatively standardised, and thus similar for most women, modern maternity care offers a suite of options for both contemporary care and more unconventional care. Women choose their preferred model of maternity care based on medical need, location, ideology and personal
preference, and in addition many women are choosing various CAM therapies and products to enhance and complement maternity care. There are undoubtedly a variety of reasons for this but it does not appear to be due to dissatisfaction with conventional medical care.20

Many women believe it is optimal to increase general health and wellbeing during pregnancy, and this conviction may be encouraging women to pursue CAM products and services.11,12,21 It may also be that women feel the health of the baby can be influenced by the increased “wellness” or “wellbeing” of the mother. Wellness embodies the belief that healthy people can further improve their health in order to achieve greater health benefits and reduce their chance of poor health outcomes.22,23 In the modern Western world context of high-quality health care and low rates of maternal and infant morbidity and mortality, the notion of wellness may have become even more significant for women as they do not need to worry about more serious maternal and/or infant outcomes.18 Further to this, many midwives focus on promoting wellness during pregnancy in an attempt to deflect from an emphasis on fear and to decrease antenatal anxiety.19

In a recent study, women associated self-management techniques, specifically taking control and working towards a desired outcome (life satisfaction, increased energy, peace, happiness), with the notion of wellbeing.24 This concept of wellbeing and the desire to be as healthy as possible during pregnancy, to provide your child with the best start in life, may underpin the use of self-management techniques such as CAM for some women.

The wish to increase health and wellbeing is associated with CAM use in general with a review highlighting that CAM users are more likely to hold post-modern views and value non-toxic, holistic approaches to health.25 Recent studies demonstrate that these beliefs extend to women who use CAM during pregnancy.11,12,21 Warriner et al (2014) explains this phenomenon as: “the notion of well-being encapsulates a demand for being recognised as an active, empowered and knowledgeable agent on the part of those using alternative and complementary medicines. Certainly for [pregnant] women interviewed in this study, CAM provided a way of investing in their bodies, not just to prevent ill health but as a way of fulfilling and optimising potential.”12

Commentators have also raised the recently overt construct of the “good mother”, which in contemporary society is intertwined with the concept of “intense mothering” — the notion that women must mother their children intensively in order to be considered a “good mother”.27,28 This incorporates the belief that women have an explicit responsibility to do everything possible to produce “perfect offspring”.26 In the modern context of promoting self-responsibility for health and wellbeing, this idea has gained momentum, and many women aspire to have a perfect pregnancy (including the avoidance of any risk such as medicines and environmental toxins) in order to attain a perfect child.20 The conviction of some women that CAM products are safer than orthodox medications during pregnancy may be one reason CAM is commonly utilised during this time.11,12

Therefore there appear to be a myriad of reasons that women choose to use CAM during pregnancy. For the most part this use is not harmful, but it is vital to initiate a conversation about self-prescribed CAM, including herbal medicine, with pregnant women in your care to ensure there are no direct or indirect risks associated with this use.

References


References continued on page 122
Letters to the Editor

The Editorial in the last edition – Aust J Herb Med 27(2) – sparked a few thought-provoking letters to the Editor. All letters positively re-enforced the editorial’s main message that there is an education need for naturopaths and herbalists in relation to the risks and benefits of vaccination. It was also interesting to me that all of the letters detail how vaccinations align with naturopathic principles and practice. All letters to the Editor received on this topic were published.

Dr Jane Frawley
Editor, Australian Journal Herbal Medicine
editorajhm@nhaa.org.au

To the Editor,

Naturopathy has no default pre-determined opinion on vaccination

I read with interest the recent editorial on vaccination. This is indeed a debate the profession needs to have, but I fear that the emotion that often surrounds this sensitive issue may impact the ability to have a constructive and respectful discussion. I have already seen and heard in various circles outrage by some practitioners that supporting vaccination is somehow ‘anti-naturopathic’. However, not only is this untrue, it is also offensive in a profession that prides itself on the autonomy and individualised approach afforded to practitioners. In the inevitable controversy that will surround, but hopefully not consume, this discussion, I would urge practitioners to understand that there is no ‘true’ comprehensive and infallible naturopathic opinion on this topic, and to participate in this conversation in an open and respectful manner.

Some practitioners, for example, may falsely believe that vaccination is incongruent with naturopathic principles and philosophy. However, vaccinations are low dose, preventive and work by gently encouraging the body’s own innate immune response to act rather than pharmacologically overwhelming a condition with medication. By this definition they could very well be defined as a naturopathic treatment that aligns completely with naturopathic principles and philosophy. The argument that “the principle of vaccination, according to the naturopathic principle of unity of disease, evades the primary factors responsible, which are usually environmental and nutritional” is irrelevant to contemporary naturopathic practice, or at least it is if practitioners wish to continue to use or refer to other ‘evasive’ treatments such as homeopathy, herbal medicine, physical therapies or acupuncture. It should be remembered that the use of digestive therapies, now commonplace in modern naturopathic practice, were once considered equally offensive to the traditional nature cure adherents that began the naturopathic profession. Lindlahr also posited that naturopaths opposed vaccination because “naturopathy holds that germs, bacteria and parasites are products of disease rather than its cause” arguing that “germs of themselves cannot create disease – if they could, humanity would soon be extinct”. Whilst certainly supporting the argument that vaccinations should not be perceived as a panacea by modern naturopaths (they are not), this statement is clearly no longer relevant to modern naturopaths who do accept germ theory, though also appreciate the importance of supporting other factors that support health.

Nor is vaccination incongruent with the naturopathic profession. In fact early Australian naturopaths were not always against vaccination as a principle, but were more opposed to the medical community’s monopoly on vaccination. Some even tried to claim credit for it – with one early naturopathic journal stating that “[a]lthough vaccination is indissolubly linked with the name of Jenner, there is ample evidence that it was practiced by farmers and others in the rural districts of England well before his day. It was common knowledge amongst folk healers”. When opposition did exist, it was primarily focused on smallpox vaccination, which in the early 19th century was both crude with a relative high risk of infection (though, as history shows, was also undoubtedly effective). However, transferring opposition to these previous vaccines to the significantly different modern vaccines, or opposing vaccination as a homogenous entity rather than assessing vaccines individually, is analogous to opposing all herbal medicines because Withering’s original recommendations of Digitalis extract in dropsy were so unpredictably risky (though also decidedly effective, so much so that standardised alternatives are still used in conventional medicine). Informed public debate about the pros and cons of vaccination is an unqualified public good. It is also a personal choice. Many naturopaths would class themselves as ‘pro-choice’ in relation to their views on vaccination. Such a view necessitates that both cases, supporting and not supporting vaccination, be presented as potential choices. Those practitioners who are uncomfortable with this reality need to reassess their use of this term, and ethically need to more accurately refer to their pro- or anti- positions, rather than obfuscate their true opinion behind a more palatable term. Some individuals
may choose, based on their own interpretation of the risks and benefits, to avoid or advise against vaccination. This may be a valid choice for them to make, but it is not ‘the only’ naturopathic choice. Vaccination can align with naturopathic principles just as much as vaccine skepticism can, and supporting vaccination makes one no less of a practitioner than not supporting it. This is a debate the profession needs to have, but it needs to be respectful, and we need to acknowledge that having different viewpoints within a profession is okay.

Dr Jon Wardle
Faculty of Health, University of Technology Sydney
Building 10, Jones Street, Ultimo, NSW, Australia

5. Withering, W (1785). An Account of the Foxglove and some of its Medical Uses With Practical Remarks on Dropsy and Other Diseases London: GJ and J Robinson

To the Editor,

I wish to extend my congratulations for a well-written and interesting perspective in your editorial piece last issue (27:3) regarding attitudes towards vaccination within the profession.

It concerns me that a number of naturopaths and herbalists align themselves with the view that anti-vaccination is a fundamental naturopathic belief/principle or conversely, that vaccination goes against naturopathic principles. Furthermore, and of greater concern, I have seen this sentiment in some students and early graduates, who perhaps have not been educated otherwise. Quite simply, an anti-vaccination stance is not a naturopathic principle. On the contrary, one could argue that vaccination indeed aligns with three of the six fundamental naturopathic principles:

• Primere non nocere
• Docere
• Preventir

Intended to lower the risk of serious infectious disease in the community, the introduction of vaccines has led to a significant reduction in many preventable diseases. Undoubtedly, there is a risk of side effects with vaccinations, as there is with all interventions. The risks, particularly when managed effectively, are outweighed by the benefits of modern vaccines; aligning with the naturopathic principles of “first do not harm” and preventative healthcare. Ongoing research, monitoring, and surveillance of the effect and safety of vaccines ensure knowledge and understanding of these medications is current, relevant and accurate.

As complementary health care practitioners we have the potential to play an important role in the education of patients’ understanding of vaccines, in line with the principle of teacher. We are responsible for the advice and guidance that we provide and this should be based on facts and current best practice rather than opinion.

Some excellent resources available online to learn more about immunisation and the current vaccination schedule include the Melbourne Vaccine Education Centre www.mvec..vic.edu.au and the Australian Academy of Science https://www.science.org.au/immunisation

Jodie Tester
University of New South Wales
Sydney NSW 2052

To the Editor,

Thank you for such a great editorial in the latest AJHM that points out the importance of education in vaccination. I’m a qualified naturopath from Southern School of Natural Therapies (SSNT) and also a clinical nurse specialist and qualified immunisation nurse. I agree that this whole debate on whether to vaccinate or not has gained so much craziness and momentum in the last few years.

Unfortunately, whilst doing my immunisation certificate at Latrobe University, I witnessed many nurse immunisers bad mouthing naturopaths, assuming they all have anti-vaccination attitudes, when this isn’t at all true. There are however some naturopaths and other complementary practitioners who focus only on the risks (often uneducated immunisation based opinions) of vaccination rather than the benefits. While obviously all naturopaths can’t and probably don’t want to become a nurse immuniser I strongly agree with you that there is a lack of correct information/education sought by naturopaths on this topic and it is time we talked about immunisation. I have recently had the pleasure of starting work at SSNT as a teaching assistant in the naturopathic clinic and do my best to correctly inform students when asked about immunisation from both my experience and my education. This really can be an area for an integrative approach and I think that all naturopaths/herbalists etc. would benefit from reading your editorial as much as I have. I am about to commence a Masters in Public Heath at Melbourne University through the global health stream and look forward to learning more about this topic and being able to provide an integrated opinion that continues to support both naturopathic and main stream medicine practices.

Natasha Culver
Integrated Naturopathic Medicine
19A Boyd St Altona, Victoria, Australia
natasha@naturopathiclifestyle.com.au
Is this working? The importance of outcome measures in herbal & naturopathic practice

Ian Breakspear¹, ²
¹ WholMed Consultancy www.wholmed.com.au
² King St Clinic. Suite 202, 147 King Street Sydney, NSW, 2000
Contact: ianbreakspear@icloud.com

Abstract
An acknowledged strength of herbal and naturopathic medicine is its patient-centred focus, yet critics often state that these disciplines lack evidence of efficacy. Assessing efficacy of the individualised care practices of herbalists and naturopaths is not always an easy process, for clinicians or for researchers. The incorporation of outcome measures, especially patient-reported outcome measures (PROMs) in clinical practice has the potential to improve the assessment of efficacy at the individual patient level. Additionally, increased use of outcome measures in published case studies may assist in evidence generation which is consistent with the individualised care philosophies inherent to naturopathic and herbal medicine. This commentary piece will introduce the reader to the concept of outcome measures, discuss their nature, and point out some of the benefits as well as barriers to their widespread use.

Introduction
The American Institute of Medicine, in 1990, defined quality in health care as “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.” Few would argue that this is a useful definition, especially with its focus on the patient. However, with debate around the quantity, quality, relevance and utility of some research in herbal and naturopathic medicine, how does a clinician know whether or not they are providing quality care? The answer may lay in the use of outcome measures.

The nature of outcome measures
Outcome measures can take many forms, such as blood tests, patient questionnaires, or physical examination methods such as blood pressure monitoring or joint mobility tests. Haemoglobin A1c, blood inflammatory markers, or cardiac output, are classic examples of objective and disease specific measures, which often come to mind when considering how to measure the efficacy of treatment in diabetics, patients with lupus, or heart disease patients respectively. All are useful and valid tools; however, their limitations must also be recognised. A test’s sensitivity and specificity must be understood for effective clinical interpretation. Additionally, the relevance of results to the patient and their perception of their own health status must also be considered, especially in complex and chronic conditions.

For example, using positive changes in HbA1c results in a diabetic patient as an indicator of treatment efficacy, whilst valuable and important, may not provide the total picture of the patient’s health. Perhaps the positive result is due to regular hypoglycaemic episodes every week. It also ignores the impact that dietary restriction or hypoglycaemic treatment may be having on the physical, psychological and social wellbeing of the patient.

In recognition of these limitations, broader and sometimes more subjective measures have increasingly been used in research. These broader measures often take the form of quality of life questionnaires such as the well known 36-item Short Form Health Survey (SF-36; mostly a research tool) and the more clinically useful, but somewhat similar, 20-item Short Form Health Survey (SF-20). These tools can assist clinicians and researchers in evaluating the broader wellbeing of an individual or group of individuals, but again have their limitations. They are not disease specific, and are often designed from the perspective of population-level research. Thus on their own, these measures may lack individual relevance in the one-on-one clinical care situations found most commonly in naturopathic and herbal practice.

Patient reported outcome measures (PROMs)
In a number of areas of health care, a new paradigm for measuring patient outcomes is emerging. This paradigm acknowledges that there is a need for patient-centred tools for evaluating disease severity and the progress (if any) obtained from treatment. Such measures should require patient interaction and reflection to be deemed clinically relevant and patient-centred. These newer measures (Table 1) are being collectively referred to as Patient Reported Outcome Measures (PROMs).

PROMs are, by their very nature, subjective. This, in fact, is the strength and value of PROMs – they represent the patient’s perception and experience of health and disease, unencumbered by the clinician’s opinion, or...
highly technical but sometimes alienating pathology reports. Thus, they are truly patient-centred methods of evaluating efficacy of treatment. Generally speaking, PROMs tend to examine one of six different constructs:\(^2\)
- health status
- quality of life (QoL)
- health-related quality of life (HRQoL)
- wellbeing (often psychological)
- treatment satisfaction
- symptoms and functioning

It is important to remember that health status is not the same as quality of life. Indicators of health status can be measures such as the ability of a patient with chronic joint disease to climb four flights of stairs. Quality of life is a broader measure encompassing the patient’s subjective evaluation of the quality of their physical, psychological and social aspects of their life. Both types of measures have their value in practice. Health-related quality of life becomes more specific and evaluates the degree to which the disease, and any associated treatment, impacts on the patient’s quality of life.\(^2\)

### Relevance of outcome measures in clinical practice

In the publication *Crossing the Quality Chasm: A New Health System for the 21st Century*, the Committee on Quality of Health Care in America in 2001 stated: “The health care delivery system is in need of fundamental change. Many patients, doctors, nurses, and health care leaders are concerned that the care delivered is not, essentially, the care we should receive. The frustration levels of both patients and clinicians have probably never been higher. Yet the problems remain. Health care today harms too frequently and routinely fails to deliver its potential benefits.”\(^4\)

In response to this realisation, they detail six aims for quality health care:\(^5\)
- Safe
- Effective
- Patient-centred
- Timely
- Efficient
- Equitable

The use of outcome measures, especially PROMs, can directly help clinicians achieve three of these six aims – specifically safe, effective and patient-centred care. Outcome measures give us a way of measuring effectiveness, and a way of being alerted to issues around safety. PROMs in particular, due to the fact that they are examining the patient’s perception of their illness and treatment, help encourage a strong patient-centred focus in the delivery of our care.

### Barriers to the use of outcome measures

Despite the potential value of employing outcome measures in practice, research in allied health indicates only about 20-30% of clinicians routinely measure outcomes in practice.\(^6\) Of course this raises the question as to why.

A number of publications have outlined some key barriers to the routine usage of outcome measures. Some of these barriers include:
- Lack of time\(^6,7\)
- Fear of adding to workload\(^3,7\)
- Belief that the clinician understands the patient’s problems and doesn’t need additional information\(^3\)
- Fear of change\(^7\)
- Concerns around being assessed and criticised\(^7\)
- Lack of knowledge, skill and training\(^6,7\)
- Lack of support from health care management\(^6\)
- Tools being burdensome\(^7\)
- Cost constraints\(^7\)

### Overcoming barriers to the use of outcome measures

A study of Australian occupational therapists (OTs) published in 2006 demonstrates ways that some of these barriers can be overcome, resulting in increased use of outcome measures. This study employed an educational intervention consisting of a one-day workshop, with an accompanying information package, which included nine outcome measurement tools for use with chronic pain patients. Whilst the number of OTs enrolled in this study was low (n=36), 65.7% of OTs in the study

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Application</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Health Profile (DHP-18)</td>
<td>HRQoL</td>
<td>Monitoring impact of diabetes on patient’s life</td>
<td>License required (but free for clinical use). Useful in clinical practice.</td>
</tr>
<tr>
<td>Headache Impact Test™ (HIT™)</td>
<td>Symptoms and functioning</td>
<td>Headache severity and impact of treatment evaluation</td>
<td>License required. Useful in clinical practice.</td>
</tr>
<tr>
<td>Measure Yourself Medical Outcome Profile (MYMOP-2)</td>
<td>Symptoms and functioning</td>
<td>Any condition involving symptoms</td>
<td>Public domain access. Useful in clinical practice.</td>
</tr>
<tr>
<td>Patient Health Questionnaire-9 (PHQ-9)</td>
<td>Wellbeing (psychological)</td>
<td>Severity of depression</td>
<td>Public domain access. Useful in clinical practice and research settings.</td>
</tr>
</tbody>
</table>
reported using outcome measures prior to the workshop intervention, which increased to 91.4% four months after the workshop. Furthermore, this study gathered data from participants around the factors which they perceived as helping to affect change, revealing that 86% rated the workshop presentations as important, 89% rated the workshop discussion as important, 74% rated the workshop practical sessions as important, and 86% rated the resource package as important.6

However, an important question to consider is whether the implementation of outcome measures in naturopathic and herbal practice is possible, and if so, is it valuable? To date there is very little evidence available to answer this question. However, Secor et al in 2004 showed that not only is it possible, but that there is perceived benefit.8 This study, conducted in a complementary and alternative medicine outpatient clinic in Connecticut, utilised the SF-12v2® Health Survey with 94 patients with pain of various causes, who were receiving acupuncture, chiropractic or naturopathic treatment. The study demonstrated positive changes in physical health scores within the SF-12v2® from baseline, with the authors stating that the data collection system was well received by staff and patients within the clinic.8

Traps to avoid

Nelson and colleagues discuss the fact that patients generally welcome the routine use of PROMs, but that they “must be used well and not misdirect the focus of the clinical encounter, burden patients, or focus only on factors that have value to clinicians.”3

Additionally, reliability and validity of the outcome measure is essential for it to be successfully incorporated into patient management.5,8 This is particularly important in naturopathic medicine, where in recent years there has been an explosion in the use of alternative testing procedures. For example, the zinc taste test (ZTT) has been used diagnostically to evaluate zinc status (due to zinc deficiency being linked to diminished taste acuity in humans and animals), as well as a way of evaluating the effectiveness of supplementation. However, an Australian review focusing on the correlation between ZTT and zinc status published in the Journal of Alternative & Complementary Medicine in 2012, found only three studies that could be included in the review. Two of these showed some degree of correlation between zinc status and ZTT result but suffered from serious methodological flaws, and the largest of the three studies showed no correlation between three different measures of zinc status and the ZTT result.8 Thus, it is imperative that herbal and naturopathic clinicians consider the validity and reliability of any outcome measure tool before implementing it in their practice.

Conclusion

The use of outcome measures, especially Patient Reported Outcome Measures (PROMs) has the potential to provide greater insight to herbal and naturopathic clinicians regarding the nature and severity of the patient’s health complaint, and the impact of treatment. However, evidence from medical and allied health research indicates relatively low usage of outcome measures and identifies a number of legitimate barriers to implementation. Tailored educational interventions may assist in overcoming some of these barriers and increasing the utilisation of outcome measures in practice.

Additionally, the potential for evidence-generation offered by the routine use of outcome measures should not be ignored. It is important to note that evidence-based medicine is more than treating patients based on research evidence alone. According to Straus et al, “evidence-based medicine (EBM) requires integration of the best research evidence with our clinical expertise and our patient’s unique values and circumstances.”10

By incorporating PROMs into practice, and subsequently publishing case studies and case series, we can all contribute to the growing evidence-base of naturopathic and herbal medicine. At the same time we continue to adhere to our patient-centred philosophy and bypass some of the methodological criticisms of more controlled research designs such as the randomised controlled trial.

References

Patient-Reported Outcome Measures (PROM’s)

How to improve patient satisfaction & practice success

Expanding upon his acclaimed presentation at the NHAA 9th International Conference, in this workshop Ian will take you through the minefield of PROM’s, including:

- How PROM’s can improve patient satisfaction and practice success.
- Step-by-step method of applying & integrating PROM’s into your practice.
- A resource package of PROM’s you can immediately apply in practice.

Register your interest by 31 October 2015 for 10% off your first module + FREE GIFT

First workshop in Sydney due in November 2015, other states to follow.

www.wholmed.com.au

Ian Breakspear
MHerbMed (USYD) ND DBM
CertPhyto
Fellow of the NHAA

A naturopath, herbalist and educator with more than 22 years of experience, Ian delivers dynamic, unbiased CPE you can immediately apply in your work.

INTEGRIA HEALTHCARE SYMPOSIUM 2015
Clinical Pearls + Practitioner Perspectives
An Experience-Based Approach to Patient Care
24-25 OCTOBER
MELBOURNE

Clinical Pearl:
(ˈklɪntɪkl ˈpɜːrl)
1. A straightforward and meaningful piece of clinical advice.
2. Clinically relevant information based on experience.

Join us for the inaugural Integria Healthcare Symposium at the Sofitel Melbourne on Collins.

Over the course of this two day event, our presenters will share with you the knowledge embedded in their own clinical practice, along with cutting edge scientific updates on the pathophysiology and holistic management of commonly encountered clinical conditions.

Their skill and expertise in integrating research with clinical reality will provide you with truly balanced recommendations and ‘clinical pearls’ that can be easily adapted to your own clinical practice.

Our Presenters
Professor Kerry Bone
Angela Hywood
Nicole Bijlsma
Dr Ronda Nelson
Dr Elizabeth Steels
Dr Bradley McEwen
Lee Carroll

Don’t miss this unique and inspirational opportunity to gain genuine clinical insights from experienced practitioners!

For more information, or to register, go to www.bit.ly/integriasymposium2015

Inspiring people to live better lives through natural healthcare
Could herbal medicine alternatives reduce overuse of benzodiazepines in older adults? Thoughts on the EMPOWER trial

Nicole Evangelidis
The University of Sydney, NSW, Australia 2006
Contact: neva4580@uni.sydney.edu.au

Abstract
Inappropriate prescribing of benzodiazepines is very common, despite known risks. This is a significant problem in older adults with further pressure being placed on health care services as this population increases. This presents an opportunity for herbal medicine to offer safe and effective alternatives. Anxiety and insomnia are the main conditions treated with benzodiazepines. Traditional and modern evidence supports the use of herbal medicine for the treatment of these conditions. In particular, Passiflora incarnata has shown strong potential as a substitute for benzodiazepines with minimal or no side effects. The challenge is in how to create awareness about these alternatives to provide patients with a choice. A patient-centred approach using a shared decision making model (EMPOWER trial) has been effective in benzodiazepine withdrawal for older adults. Including herbal medicine in the discussion would provide patients with further options for safe and simple alternatives.

Keywords: Inappropriate prescribing, benzodiazepines, herbal medicine, Passiflora incarnata, passionflower, ageing population, patient-centred, shared decision making

Introduction
Inappropriate prescribing of medication – when potential risks outweigh potential benefits, and safer therapeutic alternatives exist that have similar or superior efficacy – has been identified as a major health issue worldwide. Risks of side effects and adverse drug reactions are increased, which can lead to serious injury, hospitalisation and even death. The elderly population are particularly vulnerable due to their decreased physical functioning, age-related illnesses and high incidence of polypharmacy. They are the most likely age group to be taking inappropriate medication.

The use of benzodiazepines is common in older populations, ranging from 5% to 32% in community-dwelling older adults, with incidence being much higher in aged care facilities. Benzodiazepines are a class of drugs with sedative, hypnotic and anxiolytic actions and are mainly used to treat insomnia and anxiety disorders. Use of these drugs in older people has been shown to elicit cognitive deficit leading to increased falls, hip fractures, car accidents and hospitalisations. Hip fractures are serious incidents in the elderly, commonly leading to disability and death. Psychological dependence and addiction is a major issue with benzodiazepines, highlighting the importance of early intervention.

Anxiety and insomnia in older adults
Benzodiazepines are prescribed to older adults primarily to treat anxiety and insomnia. These conditions occur at a higher rate in older adults for a number of reasons such as social isolation and lack of family support. The current treatment and management of anxiety in Australia has been identified as suboptimal due to under-diagnosis and treatment not being specific to the type of anxiety condition. The current treatment options that are most commonly recommended are pharmacotherapy and psychological therapy (mainly cognitive behavioural therapy).

Similarly, it has been well-established that insomnia is under-diagnosed and inadequately in Australia. Re-Awakening Australia, a national report commissioned by the Sleep Foundation in 2011, identified insomnia as having a significant economic impact for the Australian healthcare system. Insomnia occurs at a higher rate in older adults, and for women, there is a sharp increase after age 54. It often precedes depression in older adults.

In an Australian report using nationally representative data, it was found that treatment seeking for insomnia is low as it is often not perceived as a medical problem by both the public and clinicians. There is a general lack of awareness about treatment options, particularly those provided by complementary and alternative medicine (CAM). This is supported by a population survey in the United States indicating that only 4.5% of people with insomnia report using CAM for sleep. A small proportion of herbal therapy users in Australia cite insomnia as a reason for use. This points to a significant opportunity for increasing awareness of CAM therapies for treating insomnia.
A patient centred approach to benzodiazepine withdrawal: the EMPOWER trial

The EMPOWER (Eliminating Medications through Patient Ownership of End Results) trial has tackled the issue of inappropriate prescribing of benzodiazepines using a patient-centred approach. The study was designed to examine the effect of a direct-to-consumer educational intervention on benzodiazepine therapy discontinuation in community-dwelling older adults. Adults living in aged care facilities were not included, which is a limitation of this study considering the high risk of inappropriate prescribing in these facilities.

The intervention consisted of an eight-page booklet mailed to participants. The booklet was customised according to the type of benzodiazepine the patient was using and presented information about benzodiazepine-induced harms. It included a range of features designed to promote cognitive dissonance in the participant, aiming to initiate a discussion between patient and physician. The authors of the study hoped to imitate the success of individually targeted anti-smoking campaigns by empowering chronic users with knowledge about risks.

The objective of the education tool was to move away from a ‘top-down’, didactic approach frequently used in patient care, and rather present information with the intention of promoting a dialogue between patient and physician. Constructivist learning theory and self-efficacy theory informed this active learning approach. These theories maintain that users create new knowledge in order to make sense out of the information presented to them and ultimately foster their own selecting and organising of the material.

The primary outcome of the EMPOWER trial was to evaluate the effectiveness of the educational intervention by measuring the rate of benzodiazepine discontinuation at 6 months. This was measured by pharmacy renewal profiles supplied by the patient’s pharmacist along with patient reported outcomes in phone interviews. The final results showed a significant outcome. At 6 months, 27% of intervention group had discontinued benzodiazepine use compared with 5% of the control group. The effect of the intervention was robust across age, indication, dose and duration of benzodiazepine use. However, a limitation of this evaluation was the short 6-month time frame for outcome reporting as relapse may occur after 6 months and is more common among high dose users.

Interestingly, a qualitative study on the prevention of relapse for high-dose benzodiazepine users found that patients’ perception of treatment approaches played a major role in preventing relapse. This highlights the potential of benzodiazepine users calling upon a range of health modalities with different treatment approaches to suit their individual needs.

Alternative herbal therapy

The Herbal Approach

The EMPOWER trial offers some insight into a shared decision making model for discontinuing benzodiazepines. The purpose of the educational intervention was to prompt a discussion between patient and physician. However, once this dialogue takes place, what kind of information can a physician offer as alternative treatment?

There are a range of herbal medicines that are highly effective in treating anxiety and insomnia. In particular, the following herbs are frequently prescribed for these conditions: Piper methysticum, Passiflora incarnata, Valeriana officinalis, Melissa officinalis, Scutellaria lateriflora, Matricaria recutita and Eschscholzia californica. Specific combinations of herbs have also been used to treat insomnia such as Valeriana officinalis and Humulus lupus; however, one of these herbs – Passiflora incarnata – may be particularly useful as an alternative to benzodiazepine medication.

Passiflora incarnata

Passiflora incarnata (passionflower) has great potential to assist older adults in managing their anxiety and insomnia. There is an emerging body of research that supports the efficacy of passionflower for the treatment of anxiety and insomnia. Passionflower’s unique combination as an anxiolytic, hypnotic and sedative is relevant to this group of older adults suffering from anxiety and insomnia. It has been tested specifically for drug withdrawal with benzodiazepines and also opiate drugs in clinical trials. Passionflower has an excellent safety profile, making it highly suitable for older adults who are predisposed to polypharmacy.

Traditional use and history

Passiflora incarnata is a member of the Passifloraceae family, which is native to North, Central and South America. It has been used for many years in the Americas and Europe as a remedy for sleep and anxiety disorders, and was introduced to Europe by the Spanish conquistadors in the fifteenth century. The flower of the plant is unusually beautiful and was given the name ‘Passion Flower’ due to its resemblance to the crown of thorns placed on Christ’s head and symbolic relevance to the crucifixion or ‘Passion of the Christ’. Traditionally, the aerial parts are used for medicinal use; however, recently the leaves in particular have been identified as having the strongest anxiolytic action.

Modern evidence

More recently, clinical trials have investigated the efficacy and safety of passionflower as a treatment for general anxiety, preoperative anxiety, sleep quality and opiate withdrawal symptoms. The most frequently discussed trial compared the effectiveness of passionflower to the benzodiazepine oxazepam. This
was a randomised, double blind, controlled trial where participants took a dose of 45 drops of a passionflower extract daily. Further details about the extract were not provided which is a limitation of this particular study. It involved 32 subjects diagnosed with generalised anxiety disorder (GAD), aged between 18 and 47 years of age. The results of the trial showed that passionflower was as effective as oxazepam in treating GAD. Furthermore, the herbal treatment had a lower incidence of job impairment side effects compared to oxazepam. This shows significant potential and raises the question as to whether a larger trial could be conducted targeting an older population who are more likely to be taking benzodiazepines.

In relation to sleep disorders, a double blind, placebo controlled trial was conducted by Monash University in Australia to test the efficacy of a passionflower tea on sleep quality in 41 participants.25 The trial found significant improvement in sleep quality for those taking the passionflower tea as compared to placebo. The infusion was based on 2g of dried passionflower aerial parts, infused in 250ml of boiling water for 10 minutes and taken one hour before bed. This trial, however, was based on healthy adults and excluded those with extreme sleep difficulties. It may therefore not be generalisable to those suffering from insomnia; nevertheless, the significant results are promising and warrant further larger trials specifically for insomnia sufferers.

A recent systematic review made a strong argument for further rigorous research to be conducted on passionflower.31 Analysing all clinical trials to 2010, it identified important details being excluded such as insufficient information about drug extract ratio and unclear placebo definitions. This points to the larger issue facing the integration of traditional herbal medicine with modern science, whereby the dosages used in clinical trials do not always match doses prescribed in clinical practice.32 This is becoming more important as clinical interest in herbal medicine increases worldwide.

A public health campaign educating both the public and clinicians about alternatives to benzodiazepines in the treatment of anxiety and insomnia would be beneficial. An analysis of a campaign in Europe that aimed to decrease benzodiazepine use found that the campaign was only effective when an alternative therapy was offered to replace the benzodiazepine.33 Information about herbal alternatives to benzodiazepines could be a valuable addition to an intervention that aims to decrease benzodiazepine use in older adults. Further information about the variety of health modalities and therapies offering alternative treatments would be ideal as lack of awareness has been highlighted.

Safety and polypharmacy

Providing herbal medicines to older adults who are predisposed to polypharmacy is problematic. The risk of herb-drug interactions is increased due to the large number of medications taken by this group. Passionflower has a good safety profile with no reports of interactions between other drugs to date.32 Products implicated in case reports have rarely been tested, and adverse effects may be due to adulterants, rather than to passionflower itself.34 The theoretical additive effect of passionflower with benzodiazepines and other sedatives needs to be considered when prescribing.

Potential issues of herb drug interactions can be managed through open communication with the patient about current medications as well as pharmacists, physicians and psychiatrists. An appropriate tapering protocol, monitored by a medical professional, is necessary for those wishing to discontinue benzodiazepines. A patient centred approach based on shared decision-making is an effective way to educate benzodiazepine users about associated risks and tapering protocols.3

Conclusion

There is a wide range of herbs that have been effective in the treatment of nervous system conditions for thousands of years and clinical evidence is emerging to support this. This report has outlined great promise in the use of Passiflora incarnata for the treatment of anxiety and insomnia in older adults. With awareness increasing about the detrimental effects of benzodiazepines, this is an important opportunity for herbal medicine to offer a safe alternative. Indeed, it is necessary at a time when the health of older adults is a global priority. With the ageing population increasing, significant demand is placed on health care services to provide suitable care. Reduction in the incidence of benzodiazepine-induced harm will make a significant impact on the health and wellbeing of older adults and lessen the burden on health care services. A patient centred approach can empower patients through discussion of multiple treatment options from a range of health modalities. Herbal medicine and passionflower in particular, is a valuable addition to discussions about alternative treatment therapies.

References

Benzodiazepine and z-hypnotic use by an elderly population. Sleep Med 13(7):893-897.
Commentary

The importance of the PRACI project for grass roots complementary medicine practice: A call for practitioner involvement

Rebecca Reid1
Amie Steel1,2
1 Office of Research, Endeavour College of Natural Health, Brisbane, Australia
2 Australian Research Centre in Complementary and Integrative Medicine, Faculty of Health, University of Technology Sydney, Australia

Abstract

The Australian complementary medicine (CM) community needs advancement in clinical knowledge that can be implemented into grass roots practice, yet there is still an ongoing gap between academic researchers and clinical practitioners. A practice-based research network (PBRN) is a feasible research model that can be of great value to clinical practitioners by developing new knowledge and by providing a bridge between researchers and practitioners. With the emergence of PBRNs in a variety of health care professions, the Australian CM community has recently become involved with the establishment of the Practitioner Research and Collaboration Initiative (PRACI). PRACI will provide 14 CM professions with the essential research infrastructure to establish new ground breaking research drawn directly from grass roots practice. However, in order for PRACI to fulfill its highest potential, CM practitioners need to be involved. PRACI will facilitate research projects that are clinically relevant to the professions involved and will have the potential to be utilised as a platform for future CM research that is meaningful and relevant to contemporary clinical CM practice.

Introduction

CM research capacity in Australia

Complementary medicine (CM) is faced with many challenges associated with the evidence based medicine (EBM) movement, including potential conflict with the implementation of EBM into CM approaches to care,1 risk of a decreased importance being placed on CM practitioners’ experience and intuition,2 and fears from CM practitioners that the EBM model may diminish the holistic patient centred care that is a hallmark of CM.1 However, EBM is defined as the “conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients”.3 This statement clearly states that the concept behind EBM is to ensure that the clinical decisions being made by the practitioner is done so with the most up to date reliable evidence currently available.1 In recent years, the perception of randomised placebo-controlled trials as the gold-standard research design to inform clinical decisions has been replaced somewhat with an acknowledgement that more pragmatic research designs, which are embedded in the realities of grass-roots clinical practice, provides a more meaningful answer as to the clinical effectiveness of specific treatments and interventions. This is particularly the case for complex systems of care such is seen in complementary medicine.

The need for research that explores and examines CM practice continues to grow, and whilst the methodologies that are supported within EBM become more aligned with CM practice approaches, the quantity of CM research still lags behind other fields of healthcare. The reasons that are driving this situation vary. One such reason is restricted access to research funding devoted to the advancement of CM research.4 This funding inadequacy has limited the development of research infrastructure needed for further CM research. Another reason is insufficient engagement in CM research by individuals with a strong understanding of CM clinical practice and with high level research skills.5

The solution to both of these challenges lies squarely with the CM community to take responsibility for building research capacity within the CM professions.1 This can be achieved through practitioners either developing their own research projects to examine real-life clinical questions, or alternatively being involved in CM projects being conducted by skilled researchers. Whilst it is perhaps more reasonable and feasible to develop this latter solution first, this requires a bridge to be built between CM practitioners and researchers. Once achieved, practitioners will have the opportunity to lend the experience and knowledge to researchers and collaborate in the design and implementation of clinically-relevant research projects. The key element that can address these issues is the development of a practice-based research network (PBRN) for the CM professions.
What is a PBRN?

A practice based research network (PBRN) is defined as a group of practices that collaborate together for the sole purpose of conducting and developing research by drawing on data collected from practitioners and their patients in grass roots practice. PBRNs are well situated for truly clinically-relevant research studies as they allow for research questions to be generated, answered and further executed into real world clinical settings. Research questions employed using the PBRN infrastructure can target a wide range of clinical topics, including but not limited to comparative effectiveness, clinical effectiveness, safety, and efficacy of interventions, all of which aim at improving patient outcomes.

The key advantage to implementing a PBRN into CM practice is the ability to develop new clinical knowledge that can be implemented into clinical practice and in turn improve the quality of patient care and outcomes. Importantly, this is achieved by enabling clinical practitioners to be involved, collaborate and create new knowledge or advancements in their profession without requiring that they have personal skills or experience in research (see Figure 1).

However, in order to ensure the effectiveness of the PBRN and further clinical research development, a PBRN requires a highly collaborative approach between researchers, PBRN infrastructure teams and clinical practitioners. Without these 3 main factors, a PBRN cannot work to its full potential and enhance the quality and quantity of research being conducted.

**Figure 1: The advantages of practitioner involvement in a practice-based research network (PBRN)**

**CM professions in Australia**

In Australia there is a vast diversity of CM professions. According to the Australian Bureau of Statistics (ABS) in 2006, the main primary health care providers in CM included chiropractors, naturopaths, acupuncturists, osteopaths, traditional Chinese medicine practitioners, homeopaths, and massage therapists. From the ABS data there is approximately 19,401 practitioners in the CM workforce. However, currently this figure is only an estimate as it only identifies the practitioners listed as primary health care provider as recognized by the ABS and there are a number of other professions within CM not included in this list. Although Australia has a diverse range CM professions as primary health care providers, there is still limited evidence of effectiveness, utilisation and safety associated with care from practitioners in some of these professions. In order to address these significant issues, CM practitioners and academic researchers have developed the Practitioner Research and Collaboration Initiative (PRACI) project, a diverse research network that is committed to enhance and facilitate CM research in Australia.

**What is PRACI and its significance?**

The PRACI (Practitioner Research And Collaborative Initiative) project is a multi-modality PBRN for CM professions, which harnesses the diversity of CM in Australia by housing 14 modalities including acupuncturists, aromatherapists, Ayurveda practitioners, Bowen therapists, Chinese herbalists, homeopaths, kinesiologists, massage therapists, musculoskeletal therapists, myotherapists, naturopaths, nutritionists (non-dietetic), reflexologists, Western herbalists, and yoga practitioners. PRACI will undergo a number of stages in order to develop it to its full potential. Initially PRACI will undertake a workforce survey and recruitment of interested practitioners to the PBRN. Following this PRACI PBRN members will be invited to complete a more detailed survey of their profession and practice. By gathering data from practitioner members from the PBRN, PRACI researchers will be able to network with these practitioners and begin facilitating the implementation of new and exciting research projects.

As PRACI provides the infrastructure for several CM modalities, it provides the opportunity to advance CM practice and knowledge by establishing research in grassroots clinical practice and allows for effective relationship building between clinical CM practitioners and researchers. Firstly, researchers can utilise PRACI to recruit practitioner assistance with new research projects in the field. This can either be through inviting practitioner input on the design and implementation of interventions for studies, or simply seeking the assistance of practitioners to recruit participants or participate as practitioner-researchers in exciting initiatives such as multi-centre clinical trials. Secondly, CM practitioners...
will also have the opportunity to drive research from the ground by developing research questions or establish researching projects with the support of researchers, regardless of their research skills and abilities. This allows for practitioners to take an active part in the development of new knowledge and to enhance research capacity in their profession (see Figure 2).

Figure 2: The bi-directional collaborations between practitioners and researchers available through the Practitioner Research and Collaboration Initiative (PRACI)

The projects developed as a result of these practitioner-researcher collaborations can be more readily implemented into clinical practice drawing on real-life CM practitioner patients. As a result, the findings from these projects will display more accurate results of the benefits and effectiveness of care from a qualified CM practitioner – a notable contrast to existing studies which are primarily conducted in a laboratory setting and without the advice and expertise of a trained CM practitioner. Through PRACI a link between researchers and practitioners will exist and as such the research developed and implemented through PRACI will be truly reflective of the realities of the high quality clinical care delivered by CM practitioners. Of equal importance is that by establishing a PBRN in CM practice, it provides further advancement of CM knowledge and more importantly gives the ability to improve the quality of care provided to patients from CM practitioners.

Formation of Research questions within PRACI

With PRACI’s sub-study infrastructure, a broad range of research questions and designs can be implemented. PRACI will be able to house research designs such as experimental, observational and qualitative research methods to answer vital questions in contemporary clinical practice. Each research proposal will be reviewed by the PRACI steering committee to ensure it meets the core values of PRACI and will provide new insight into CM grass roots practice. As PRACI houses 14 CM modalities, the types of research proposals and research questions will be vast and can include a range of topics, including safety of treatment or intervention, comparative effectiveness, clinical efficacy or cost effectiveness studies. For example the following could be potential research questions developed within PRACI:

- Is naturopathy a cost effective intervention for allergic disorders?
- What is the clinical effectiveness of naturopathic care in the treatment of patients with cardiovascular disease?
- What are the experiences of patients consulting with a naturopath?
- What are the outcomes of patients receiving individualised herbal medicine treatments compared with 'off the shelf' products for anxiety and depression?

PRACI has the potential to answer an infinite number of research questions that are clinically relevant to their modality and can provide the advancement of CM research in Australia.

A need for practitioner involvement

The key to PRACI’s success is support and involvement from the Australian CM practitioner community. As part of effective clinical practice, practitioners are required to enhance their knowledge through continuing professional education and this often means engaging with CM research that does not report the outcomes of practices and methods as they are really used in clinical practice. This is particularly the case where evidence is presented that reports a lack of efficacy for a poorly administered intervention or technique. This error can be quite frustrating for CM practitioners as they rely on the progression of clinical knowledge from researchers who may not be CM practitioners or understand the philosophy, methods and techniques used in clinical practice. The outcomes of studies such as this can also cause substantial damage to the profession when outsiders use such research as broad scale evidence of the ineffectiveness of CM.

These potentially devastating outcomes can be avoided through practitioner consultation and involvement in CM research. Practitioners would be able to provide advice on dosage forms, prescription requirements, practice techniques and other vital factors that enhance the validity of their interventions and thus increase the likelihood of identifying improved patient outcomes. Further to this, practitioners who want to see more research develop in a particular area of their profession can network and collaborate with academics researchers to fill this gap in their profession.

Keeping practitioners in the driver's seat

As a PBRN, PRACI is a very practitioner-centric model of research infrastructure. It supports research in practice, about practice, with practitioners. This commitment to practitioner-centricity permeates all
levels of PRACI activity, including empowering its practitioner-members to have complete control over their level of involvement and participation in research projects that utilise the PRACI database. Joining PRACI simply means electing to be on the database and to be open to receiving invitations from the PRACI steering committee about upcoming research projects. Each practitioner can decide on their involvement in specific research projects on a case-by-case basis.

As PRACI continues to be well established within CM research infrastructure, it will be a vital time for CM practitioners to enhance not only their own professional knowledge in their chosen profession but to support the research being developed for their profession across the country. PRACI members will be actively contributing to sustaining their profession by advancing new knowledge of CM clinical practice in Australia.

Conclusion
In order to enhance the available and ongoing CM research, practitioners need to take ownership of their responsibilities to their profession and the development of further research in their field. PRACI is a new and exciting initiative which will allow practitioners to join with active researchers and contribute to the growth and sustainability of their profession in a direct and meaningful way. PRACI has the potential to develop clinically relevant research that can be implemented directly into grass roots practice and will be the key driving force to enhancing and sustaining the viability of the CM professions in Australia. However, this will only be achieved with the support and involvement of CM practitioners across the country.

References
Use of omega-3 for improving behavioural outcomes in autism spectrum disorder in children: A review of the literature

Cheryl le Roux
Endeavour College of Natural Health
Level 2, 269 Wickham St, Fortitude Valley, Brisbane, QLD 4006.
Contact: cheryl.leroux@gmail.com

Abstract

Purpose: The global rate of diagnosis of autism spectrum disorder (ASD) is increasing and many parents are turning to complementary and alternative medicine (CAM) to help with the wide range of symptoms, including behavioural abnormalities. The aim of this review is to examine the efficacy of omega-3 supplementation, a popular CAM therapy for behavioural problems in children with ASD.

Methods: The peer-reviewed literature published in the English language between 2007 and April 2015 was systematically searched using www.clinicaltrials.gov (US National Institute of Health database), CINAHL, Google scholar, PubMed (US National Library of Medicine) and Cochrane library databases, using a combination of the search terms Autism, ASD, Omega-3, fish oil, PUFA, EFA, EPA, DHA. Clinical studies examining the effects of omega-3 in ASD were considered.

Results: Six studies were found to be relevant to this review (N = 168, ages 2 – 17). Two of these were open-label studies and four were randomised control trials.

Conclusion: There is limited evidence supporting the use of omega-3 supplementation in clinical practice for the treatment of behavioural symptoms in children with ASD. However, some studies do show potential for this treatment option in a limited range of behavioural outcomes. Further studies are required.

Keywords: Inappropriate prescribing, benzodiazepines, herbal medicine, Passiflora incarnata, passionflower, ageing population, patient-centred, shared decision making

Introduction

Autism Spectrum Disorder (ASD) is an umbrella term encompassing a range of neurodevelopmental disorders characterised by impairment or delay of functions related to the central nervous system. The condition usually begins in infancy or childhood, and symptoms usually become apparent before the child is 3 years old.1 ASD is characterised by a variety of symptoms including impaired capacity for reciprocal socio-communicative interactions; repetitive, stereotyped patterns of behaviours; and restricted interests and activities.1,2 Other aspects, such as atypical eating, are also common but are not required for diagnosis.1 The resultant impairment in social interaction, communication and unusual way of perceiving and processing information can impede the individual’s daily functioning, social interactions and educational opportunities. Some children suffering from ASD require life-long care and support, while others manage to lead independent and productive adult lives.2

The rate of ASD diagnosis is rising steadily. In the United States the reported rate was 1 in 150 children in 2000, and 1 in 68 children in 2010.3 Global prevalence has been reported as 1 in 160 children,2 and Australian rates are estimated at 1 in 100.4 Improved awareness, better diagnostic tools and an expansion of the diagnostic criteria contribute to the rise in incidence in the last 2 decades.5

The aetiology of ASD is still not known, but evidence supports a genetic component.6 Epidemiological studies indicate that environmental effects such as air pollutant exposure, prenatal infections, and dietary composition changes might also be risk factors for ASD.7 Abnormalities of brain structure and function are found in sufferers, including enlarged ventricles and abnormalities of brain stem nuclei.1 ASD alters the way in which nerve cells and their synapses connect and organise information processing in the brain,1 but again, it is not known exactly how or why this occurs.

Current medical treatment includes the use of antidepressant medication such as Selective Serotonin Reuptake Inhibitors (SSRIs) and antipsychotics such as risperidone, in conjunction with applied behaviour analysis therapy (ABA) and/or occupational therapy, physical therapy or speech-language therapy.8 Problems exist with the efficacy of medications in young children with ASD, and the chances of developing intolerable side effects from the medications is also higher in this
population. Many families may find that good quality behavioural and educational interventions are financially and/or geographically out of reach.

Omega-3 fatty acids have been shown to play a vital role in the functioning of the brain and the central nervous system. They make up structural and functional components of cell membranes and are important in neuronal membrane fluidity and function, and in controlling neuronal growth factors. They are essential for synapse and memory formation, brain growth and development, and cognitive function development. A lack of omega-3 fatty acids or an imbalance between omega-3 and omega-6 fatty acids is associated with a number of neurological and psychiatric disorders, as well as behavioural abnormalities in both adults and children.

Various studies have demonstrated that children with ASD have lower long-chain polyunsaturated fatty acids levels in erythrocyte membranes and plasma, and that supplementation with omega-3 increases erythrocyte membrane DHA and the membrane ratio of omega-3 to omega-6. It is therefore possible that omega-3 supplementation might be beneficial in the treatment of ASD in terms of behavioural and cognitive development.

A Cochrane review of the available literature relating to the use of omega-3 supplementation to improve core features of ASD was conducted in 2010 (published in 2011). Based on limited trial data available, it concluded that there was no current evidence to support the use of omega-3 fatty acid supplementation in ASD treatment. At the time of the review there were trials underway with larger sample sizes than those available in the Cochrane review, and covering a wider range of ages and ASD functioning individuals. Since 2011, two new randomised controlled trials have been published relating to this topic.

Method

Peer-reviewed literature published in the English language between 2007 and April 2015 were systematically searched using www.clinicaltrials.gov (US National Institute of Health database), CINAHL, Google scholar, PubMed (US National Library of Medicine) and Cochrane library databases, using a combination of the search terms autism, ASD, Omega-3, fish oil, PUFA, EFA (essential fatty acid), EPA (eicosapentaenoic acid), DHA (docosahexaenoic acid). Only peer-reviewed journal articles were considered.

Results

Six research publications (four randomised controlled trials and two open trials) were identified which fulfilled the search criteria (after completing standard steps of identification, selection, analysis, synthesis and compilation). These studies are summarised in Table 1. The trials covered subjects ranging in age from 2 to 17 years, and sample sizes ranged from 10 to 57. Most of the trial participants were male, although in the open-label trials gender breakdown was not given. Outcome measures also varied greatly between the trials, most studies using one or more of the following: Autism Treatment Evaluation Checklist (ATEC), Clinical Global Impressions-Improvement (CGI-I), Pervasive Development Disorder Behaviour Inventory (PDDBI), Aberrant Behaviour Checklist (ABC), Children’s Psychiatric Rating Scale (CPRS), Behaviour Assessment System for Children (BASC-2) and Childhood Autism Rating Scale (CARS). One of the studies also included direct behaviour observation as an outcome. Some studies included laboratory testing for measuring changes in omega-3 levels in serum or erythrocyte membranes. Trial periods ranged from 6 weeks to 3 months.

A randomised double-blind placebo-controlled study showed a non-significant trend ($p = 0.1$) in decreased hyperactivity and stereotypical behaviour in ABC scores in children with ASD; however, no statistical significance was reached in treatment vs. placebo groups for any of the 5 ABC subclass outcomes (see Table 2). Thirteen children aged between 5 and 17 were randomly assigned to the treatment group [$n = 7$, mean age ($\pm$ SD) 10.5 ($\pm$ 3.2) years] or the control group [$n = 6$, mean age ($\pm$ SD) 12.1 ($\pm$ 2.7) years]. The treatment group received 1.5g of omega-3 (840mg EPA and 700mg DHA) over 6 weeks, while the control group received placebo. The main limitations of this study are its small sample size, and short intervention period. In addition, all the participants were male and exclusion criteria did not take into account prior omega-3 supplementation.

In 2009 Meiri, Bichovsky and Belmaker undertook a 12 week open-label study which showed general improvement in all of the measured autism symptoms after supplementation with 1g omega-3 (380mg EPA and 180mg DHA) in children with DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition) diagnosed ASD. The primary outcome measured was ATEC scores and results showed that of the 9 participants who completed the study, there was a 33% improvement on the ATEC. Again, this was a very small study ($N = 10$) of children aged 4-7 years old (gender not noted). While this was not a rigorous randomised controlled trial, results were promising and may have prompted some of the later trials.

Another open-label study failed to find any clinically significant outcomes in any behavioural or development outcomes. The study was a 3-month prospective open label (but randomised) parallel group design study with supplementation of 400mg/day DHA. A total of 23 Preschoolers with a mean age of 3.5 were randomly assigned to the treatment group [$n = 10$, mean age ($\pm$ SD) 44.7 ($\pm$ 7.63) months] or the control group [$n = 13$, mean age ($\pm$ SD) 38.7 ($\pm$ 8.48) months]. Outcomes on the Child Behaviour Checklist - Externalising factor showed improvement in the omega-3 group ($p = 0.03$), but the control group improved more than the omega-3 group on
the Affective factor scoring \((p = 0.02)\). Again, no clinically significant outcomes were found between the groups. The statistically significant differences that were shown were accounted for by differences at baseline between the two groups. Limitations of this study are again the small sample size \((N = 23)\), limited outcome measures, lack of placebo control and low dosage of DHA \((vs\ DHA\ and\ EPA\ of\ other\ studies\ being\ compared)\). It is also worth noting that while all the participants were diagnosed with ASD, not all of them had autism – six of the participants \((n = 4,\ control\ group\ n = 2)\) were diagnosed with Pervasive Developmental Disorder, not Otherwise Specified (PDD, NOS) – another of the conditions under the ASD umbrella. None of the other studies, with the exception of Amminger et al distinguished between disorders within ASD.\(^{18}\)

In a small \((N = 27)\) 12-week pilot study in ASD children aged three to eight, no statistically significant effect was found on hyperactivity in either the ABC \((p = 0.4)\) or the BASC \((p = 0.8)\) measurements.\(^{19}\) Children were assigned randomly to either the treatment group \([n = 14,\ mean\ age\ (\pm SD)\ 70.2 (\pm 22)\ months]\) or the placebo group \([n = 13,\ mean\ age\ (\pm SD)\ 69.8 (\pm 17)\ months]\). The treatment group was given 1.3g of omega-3 \((700mg\ EPA\ and\ 460mg\ DHA)\). Eight participants did not complete the study due to discontinuing the intervention or being lost to follow-up \((treatment\ group\ n = 5,\ control\ group\ n = 3)\) thereby further reducing the final number of participants who were analysed \((N = 25)\). The small sample size presents a limitation in this study. In addition, the inclusion criteria of moderate severity autistic symptoms was not specific enough to include

<table>
<thead>
<tr>
<th>Study</th>
<th>Study type (Country)</th>
<th>N, age, % female</th>
<th>ASD type &amp; DMS Criteria</th>
<th>Control</th>
<th>Intervention dose (Duration)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amminger et al (2007)(^{18})</td>
<td>RCT (Austria)</td>
<td>13, 5-17yo 0%</td>
<td>DSM-IV (AD) ADI-R ADOS</td>
<td>Placebo (7g) coconut oil (+ 7mg) vitamin E (+ 7mg) fish oil for taste)</td>
<td>1500mg omega-3 ((840mg\ EPA + 700mg DHA) + 7mg vitamin E) 6 week trial</td>
<td>Statistically non-significant improvement in hyperactivity and stereotypy in ABC measures</td>
</tr>
<tr>
<td>Bent et al (2011)(^{19})</td>
<td>RCT (USA)</td>
<td>27, 3-8yo, 11%</td>
<td>DSM-IV (ASD), ADOS, SCQ</td>
<td>Placebo (orange) flavoured pudding packets with safflower oil)</td>
<td>Orange-flavoured pudding packets, twice daily, total (1300mg\ omega-3 ((700mg\ EPA + 460mg DHA)) 12 week trial</td>
<td>Statistically non-significant improvement in hyperactivity in treatment group. Increased serum omega-3 levels in treatment group</td>
</tr>
<tr>
<td>Bent et al (2014)(^{20})</td>
<td>RCT (USA)</td>
<td>57, 5-8yo 12%</td>
<td>Diagnosed ASD and SCQ</td>
<td>Placebo (orange) flavoured pudding packets with safflower oil)</td>
<td>Orange-flavoured pudding packets, twice daily, total (1300mg\ omega-3 ((700mg\ EPA + 460mg DHA)) 6 week trial</td>
<td>Statistically non-significant improvement in hyperactivity</td>
</tr>
<tr>
<td>Johnson et al (2010)(^{16})</td>
<td>Prospective open label Randomised (USA)</td>
<td>23 Mean age 3.5yo unknown</td>
<td>DSM-IV (ASD) ADOS</td>
<td>Healthy, low-sugar diet</td>
<td>400mg DHA/day 3 month trial</td>
<td>No clinical gains on behavioural or developmental outcome measures</td>
</tr>
<tr>
<td>Mankad et al (2015)(^{21})</td>
<td>RCT (Canada)</td>
<td>38, 2-5yo, 26%</td>
<td>DSM-IV (TR), ADOS, ADI-R</td>
<td>Placebo (refined) olive oil and medium chain triglycerides)</td>
<td>3.75ml of the liquid formulation of NutraSea HP ((1500mg\ of EPA+DHA), EPA/DHA ratio 3:1. Starting dose is half of this, doubled at week 2 6 month trial</td>
<td>No significant improvements in autism symptom severity</td>
</tr>
<tr>
<td>Meiri, Bichovsky &amp; Belmaker (2009)(^{17})</td>
<td>Open-label study (Israel)</td>
<td>10 4-7yo unknown</td>
<td>DSM-IV (ASD) CARS</td>
<td>None</td>
<td>1g omega-3 ((380mg EPA + 180mg DHA)) 12 week trial</td>
<td>33% improvement on ATEC score</td>
</tr>
</tbody>
</table>

at least moderate severity of hyperactivity at baseline, resulting in the primary outcome measure (hyperactivity) being applied to subjects who displayed relatively mild levels of hyperactivity at baseline. Also it was noted that the hyperactivity results were dependant on free fatty acid levels at baseline.

Bent et al\textsuperscript{20} conducted a novel 6-week internet-based randomised controlled trial investigating the effect of omega-3 treatment on hyperactivity in children diagnosed with autism. This study had a slightly higher number of subjects than previous trials ($N = 57$, ages 5-8) and participants were randomly assigned to either the treatment group [$n = 29$, females = 3, mean age ($\pm$ SD) 88.2 ($\pm$ 12.3) months] or the placebo group [$n = 28$, females = 4, mean age ($\pm$ SD) 85.0 ($\pm$ 13.2) months]. The intervention administered was the same as their 2011 trial\textsuperscript{19}

### Table 2: Inclusion/exclusion criteria and outcome measures of trials related to omega-3 supplementation in ASD

<table>
<thead>
<tr>
<th>Study</th>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
<th>Outcome Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amminger et al (2007)\textsuperscript{18}</td>
<td>Weight greater than 15kg Mental age at least 18 months $&gt; 17$ score on ABC (irritability subscale) No serious medical disorders or other psychiatric disorders requiring medication</td>
<td>Psychotropic drug medication users</td>
<td>ABC - 5 subscales: Irritability, Social Withdrawal, Stereotypy Hyperactivity, Inappropriate Speech Side effects</td>
</tr>
<tr>
<td>Bent et al (2011)\textsuperscript{19}</td>
<td>Non-verbal IQ $&gt; 50$ On stable medical regimen Clinician rating of at least moderate severity of autistic symptoms (GCI score at least 4, range 0-7)</td>
<td>History of fish allergy or nuts; Diabetes; A bleeding or seizure disorder; Cancer; Peri-natal brain injury; Other serious medical illness; Current or prior use of omega-3 fatty acids</td>
<td>ABC – hyperactivity; Safety Biomarkers - serum free fatty acids and cytokines PPVT - communication assessment; EVT - expressive vocabulary; SRS - social interaction BASC; CGI</td>
</tr>
<tr>
<td>Bent et al (2014)\textsuperscript{20}</td>
<td>Some verbal ability SCQ score $&gt; 12$ ABC-Hyperactivity $&gt; 20$</td>
<td>Bleeding disorder, Current use of anticoagulant or anti-platelet therapy, or recent/ planned surgery; Any major medical illness affecting regular school attendance; Current or recent (past six months) use of omega-3 fatty acids; Fish allergy; Siblings with ASD</td>
<td>ABC – hyperactivity ABC – irritability, stereotypy, lethargy, inappropriate speech scores SRS; CGI-I; Adverse events</td>
</tr>
<tr>
<td>Johnson et al (2010)\textsuperscript{16}</td>
<td>None specified beyond diagnosis criteria</td>
<td>Taking prescription medications; Identifiable genetic or metabolic conditions to explain their autistic symptoms; Seizures; History of low platelet count; bleeding disorder</td>
<td>CBCL/1 1/2 – 5 Direct behaviour observation measure Mullen Scales of Early Learning AGS Edition Side effects and adherence</td>
</tr>
<tr>
<td>Mankad et al (2015)\textsuperscript{21}</td>
<td>On stable non-pharmacological treatment during the preceding 3 months prior to screening Normal physical exam and laboratory results Parents with adequate English proficiency</td>
<td>History of prematurity (&lt;35 weeks of gestation), significant neurologic, haematological, endocrine, CV, respiratory, renal hepatic or GIT disease; Primary psychiatric disorder other than ASD; Use of psychoactive medications; Can’t tolerate venepuncture; coagulation deficits; Known genetic syndrome; Allergy to omega-3 fatty acids or placebo components</td>
<td>PDDBI (for autism symptom severity) BASC-2 (for externalising problems score) CGI-I; VABS-I; PLS-4 Safety; Cytokine plasma levels</td>
</tr>
<tr>
<td>Meiri, Bichovsky &amp; Belmaker (2009)\textsuperscript{17}</td>
<td>A minimum moderate rating on CARS at baseline (it is unclear whether this was by design or coincidence)</td>
<td>None specified</td>
<td>ATEC Side effects and safety CARS, CGI, CPRS</td>
</tr>
</tbody>
</table>

Primary outcomes are highlighted in bold, secondary outcomes are listed in italics

Abbreviations: ABC - Aberrant Behaviour Checklist; AD - Autistic Disorder; ADI-R - Autism Diagnostic Interview - Revised; ADOS - Autism Diagnostic Observation Scale; ASD - Autism Spectrum Disorder; ATEC - Autism Treatment Evaluation Checklist; CBCL - Child Behaviour Checklist; EVT - Expressive Vocabulary Test; CGI-I - Clinical Global Impressions – Improvement; DSM-IV - Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; PLS - Preschool Language Scale; SCQ - Social Communication Questionnaire; PPVT - Peabody Picture Vocabulary Test; SRS – Social Responsiveness Scale; VABS – Vineland Adoptive Behaviour Scale
and the study procedures, including screening, informed consent and outcome measurement, were conducted over the internet and collected electronically. The primary outcome measure was changes in the hyperactivity subscale of the ABC, as measured by teacher-rated changes. The treatment group showed a greater reduction in hyperactivity compared to the placebo group, but once again this trend was not statistically significant. While this study had a bigger sample size than previous studies, one possible limitation might be the lack of control over accuracy/conformity of outcome measurements which were conducted by differing individuals over a wide geographic area without supervision.

Mankad et al\textsuperscript{11} conducted a recent randomised double-blind, placebo-controlled trial of omega-3 supplementation in young children (2 - 5 year olds) with ASD. Omega-3 dosage in the treatment group started at 0.75g, and was doubled after two weeks to 1.5g if well tolerated. The formula had an EPA/DHA ratio of 3:1 which equates to 1125mg EPA and 375mg DHA. Participants were randomly assigned to either the treatment group [n = 18, mean age (± SD) 3.8 (± 1.0) years, females = 4] or the placebo group [n = 19, mean age (± SD) 3.5(± 1.1) years, females = 6]. Results showed a statistically significant improvement in externalising behaviours in the placebo, and worsening results in the treatment group (p = 0.02). The authors comment that this abnormality might be because of the age group of the subjects – omega-3 supplementation at the treatment dose in such young children may have produced externalising behaviours. Another possible explanation is that GI distress, a common side effect of the supplementation, may have been manifesting as externalising behaviour in minimally verbal children. There was no statistically significant improvement in hyperactivity. The sample size was again small (N = 38), possibly affecting the outcomes of the study. Another limitation of this study was the use of the Pervasive Developmental Disorders Behavioural Inventory (PDDBI) for measuring outcomes of core autism symptoms. The validity of this research tool, while showing promise, is still being established.

Discussion

This review included six studies (N = 168) of children with ASD. The main limitation in all the studies is the small sample sizes resulting in a limited power to detect small to moderate effects of the intervention. A wide range of inclusion/exclusion criteria was also found (see Table 2) as well as different outcome measures used across studies, making it difficult to compare the results. A variety of age ranges were covered in the studies, as well as differing formulas and doses of omega-3 and EPA and DHA. Only two studies took into account the various disorders that are grouped together under the Autism Spectrum Disorder umbrella.\textsuperscript{16, 18} It would be interesting to see future studies targeting more specific disorders, such as pathological demand avoidance (PDA).

The two manuscripts authored by Bent et al were the only studies that took into account and excluded participants who had current or recent omega-3 use.\textsuperscript{19} This could be an important confounding factor in the remainder of the studies. None of the studies looked at the current diet of the participants during the trials to factor in other sources of omega-3 in the diet. Table 1 includes the country in which the trials were conducted in order to make a general assessment on the typical national diet and omega-3 intake when comparing results. In order to improve the clinical relevance of future studies, they could include screening of subjects and measuring of outcomes based on erythrocyte long chain fatty acid levels. In addition, measurement of polyunsaturated fatty acid metabolites might indicate abnormal lipid metabolism which can have implications for clinical treatment outcomes.\textsuperscript{11}

Most of the studies had a very low rate of female participants. This is not surprising given that ASD has a strong male bias.\textsuperscript{6} Results were not reported by gender, which may mean that there was no significant difference, but studies with much bigger sample sizes are needed to confirm this.

The promising future trials mentioned in the Cochrane Review of 2011\textsuperscript{15} have not delivered the large-scale trials that were hoped for. There is one randomised double-blind placebo-controlled study trial which is currently underway. This trial will measure the decrease in severity of the autism score on the ABC as well as oxidative stress biomarkers in a 12 week trial of 200mg DHA supplementation on an estimated 132 children of both genders aged 5-17. Study results are expected in 2016.\textsuperscript{22}

Conclusion

There is limited evidence supporting the use of omega-3 fish oils in clinical practice for the treatment of behavioural symptoms in children with ASD. Limitations of the studies in this review include inconsistent outcome measures and underpowered trials using heterogeneous samples and various doses and forms of omega-3. Further research using consistent measures such as the ABC outcome measures and intervention in an accepted standard form may provide more information on the efficacy of omega-3 supplementation. The evidence for pharmaceutical intervention is limited. Studies thus far indicate that hyperactivity is the main outcome that should be targeted in future large rigorous studies. All the studies in this review showed that omega-3 supplementation is a safe and well tolerated treatment, which at the very least will increase levels of omega-3 in plasma and erythrocyte membranes in this subgroup of children who have been shown to be deficient.
References


Echinacea for prevention of recurrent respiratory tract infection


Respiratory tract infections (RTIs) are some of the most commonly occurring illnesses worldwide and demonstrate a high propensity of recurrence. Such infections can be debilitating and immune depleting, with physical damage to the airway increasing risk of infection, subsequent recurrence and risk of complication. With limited therapeutic options available for acute infections, *Echinacea spp* (echinacea) extracts, which have traditionally been used to support the immune system, are of great interest. Previous meta-analyses have assessed the role of echinacea in prevention or treatment of an acute phase infection, but recurrent infection or complications have not been included. The aim of the present study was to review and evaluate existing literature and through a meta-analysis assess the preventative effect of echinacea on recurrent respiratory infection and complications.

A systematic review of ten databases including MEDLINE, MBASE, CAplus and BIOSIS was undertaken by two reviewers searching for clinical trials that studied recurrent respiratory infections and complications on treatment with echinacea in a generally healthy population. There were no restrictions for year or publication status. When different echinacea preparations or doses were used in parallel within a single study, the data from the different treatment arms were pooled. The primary outcome assessed was recurrent infection risk, defined as the total of second, third, fourth and fifth episodes under echinacea or placebo continuous treatment for 2-4 months. Complications and associated antibiotic intake as well as safety of treatment were also assessed. After searching and assessing the appropriateness of studies found, the data from six clinical trials were extracted and pooled for meta-analysis.

Data on recurrent respiratory infections from the six clinical trials included a total of 2458 participants who received a variety of echinacea extracts or placebo for up to 4 months. Different forms of echinacea were used, with four studies employing ethanol/glycerol extractions for *E. purpurea/E. angustifolia* (500-4000mg/day), and two using pressed juice of *E. purpurea* (6200-10,000mg/day). Dosing ranged from once daily to four times daily over a period between 2 and 4 months. Of note, one study included in the meta-analysis employed a herbal preparation containing *E. spp*, propolis and vitamin C in a glycerol extract, while a second study used a combined herbal extract of *E. angustifolia*, eupatorium and baptisia. All trials individually reported a lower incidence for recurrent infection in echinacea-treated versus placebo-treated groups but only two of these reached statistical significance.

When the data was pooled, the meta-analysis revealed a significantly reduced risk of recurrent respiratory infection (relative risk (RR) 0.649) in echinacea-treated versus placebo-treated groups. Further investigations were also undertaken in a number of subgroup analyses. When comparing ethanolic/glycerol echinacea extract to pressed echinacea juice extract, the former treatment appeared to offer greater risk reduction (RR = 0.542). Additionally, preventative benefits were assessed in a subgroup population with reported risk factors to infection such as stress, smoking, poor sleep, and presumed immune weakness, with authors reporting superior protective effects in these groups compared to the overall population. Complications including pneumonia, otitis media/externa, and tonsillitis/pharyngitis were also less frequent in the echinacea-treated groups (RR = 0.503), and associated with a decreased need for antibiotics.

The heterogeneity of the tested preparations is a limitation of the study and is reflective of the variations and challenges in analyzing such data. Differences in species, dosing protocols, extraction techniques and duration of treatment contributed to the heterogeneity. Furthermore, the authors did not comment on the possible influence on the meta-analysis outcomes when other ingredients were used in the trials employing combined herbal treatments. The effects from these trials on lowering RTI risk cannot be assumed to be due to echinacea alone, and may have influenced the overall results of pooled data.

Overall, this study provides further insight and supports the role of echinacea in the RTIs, with data indicating an increased benefit upon long-term echinacea supplementation (2-4 months) as a preventative agent for recurrent infections and complications. The authors note that people at most benefit may be those with a presumed lower immune function and consequently high susceptibility. As meta-analyses allow for the pooling of data when studies are sufficiently similar in design and endpoint, they enable interpretation and observation of...
effect across a greater population. These results provide some clarity through the pooling of data from previous individual studies which have had inconsistent and non-significant findings.

**Rhodiola compared to sertraline in depression**


Depression is a common and debilitating condition, with an estimated lifetime prevalence of about 16%. Whilst conventional antidepressants play an important role in the management of depressive disorders, it is reported that up to 70% of patients have an inadequate response to initial therapy. Additionally, side effects and intolerance may result in premature treatment discontinuation. Accordingly, there is interest in alternative treatments including herbal therapies for management of depression.

*Rhodiola rosea* has traditionally been used to promote work endurance, increase longevity and promote resistance to fatigue and depression. Previous studies have demonstrated stimulatory effects on noradrenalin, serotonin, dopamine, and acetylcholine receptors in brain regions involved in mood and affect. In this randomised, double-blind, single-centre, placebo-controlled, proof of concept study, the safety and efficacy of *R. rosea* was compared to sertraline and placebo in outpatients with mild to moderate depression. Effect was assessed through changes over time in Hamilton Depression Rating (HAM-D), Clinical Global Impression Change (CGI/C) and Beck Depression Inventory (BDI) scores.

The study was conducted through the University of Pennsylvania with patients referred from outpatient clinics and through self-referral. Patients were 18 years or older with a DSM IV Axis I diagnosis of major depressive disorder (MDD), with a rating of mild or moderate. Exclusion criteria included severe MDD, bipolar disorder, psychosis, substance abuse or dependence, primary anxiety disorder, dementia, other treatment for depression, suicidal ideation, concurrent use of herbs, remedies or mineral supplements, use of chemotherapy or other medications known to produce mood changes, and recent use of antidepressant, mood stabilising or antipsychotic drugs. Patients were randomised to receive *R. rosea*, sertraline or placebo for a 12-week period. Pharmaceutical grade *R. rosea* powdered extract 340mg (standardised to rosavin 3.07%/rhodioloside 1.95%), sertraline 50mg HCl, or identical placebo capsules were the initial doses commenced. The study drugs were administered in a dose-escalation manner, with an additional capsule increase available after two weeks for patients with ≤50% reduction in depression rating score, assessed on the 17-item HAM-D score compared to baseline. Maximum dose increase was to 4 capsules for weeks 6 through 12 of therapy. Outcome measures were obtained at baseline and after 2, 4, 6, 8 and 12 weeks of treatment.

Of 271 patients screened, 57 patients were randomised to an intervention: *R. rosea* (n=20), sertraline (n=19), or placebo (n=18). For these groups, 16, 10 and 14 patients completed the interventions respectively. Modest, albeit statistically non-significant improvements were observed for HAM-D, CGI/C and BDI scores in treatment groups, however no significant differences were observed between treatment groups. Clinically meaningful odds ratios of global improvement by week 12 (compared to placebo) were reported for both *R. rosea* and sertraline, with 1.4 times and 1.9 times the odds of improvement respectively, compared to those taking placebo. No treatment-related serious adverse events were reported. Two patients discontinued sertraline prematurely because of adverse events, with no adverse-effect associated discontinuations in the *R. rosea* or placebo arms. The small sample sizes, diminished completion rates and limited power make it difficult to draw conclusions from this study.

This is the first randomised, double-blind, placebo controlled comparison trial of oral *Rhodiola rosea* compared to conventional antidepressant therapy for treatment of mild to moderate depression. As a proof of concept trial, the study was not sufficiently powered to detect small statistically significant differences between groups. Nevertheless, the study authors reported finding clinically meaningful reductions in HAM-D scores for both sertraline and *R. rosea* groups. This study represents early findings in an area that requires further research. Future research that addresses the size and powering limitations of the present study, as well as providing information on optimal dose and duration of therapy, will help to better understand the potential of *Rhodiola rosea* in the management of depression.

**Herbal medicine use during pregnancy in Australian women**


In Australia there is a high level of complementary and alternative medicine use amongst women, with substantial usage reported to occur during pregnancy. Herbal medicine use is particularly high, with reported prevalence between 18-36% during pregnancy. Despite research demonstrating high levels of herbal medicine use during pregnancy, low levels of disclosure, and limited safety data for many herbal products especially during early gestation, no large-scale study has previously been undertaken to investigate herbal medicine use for pregnancy-related health conditions, and the self-
prescription of herbal products. Accordingly, the present study was designed to determine the prevalence of herbal medicine use during pregnancy, and the determinants of its use and self-prescription in Australian women.

Study participants were obtained from the Australian Longitudinal Study on Women’s Health (ALSWH), which is a longitudinal study of women in three age groups (‘young’ 18-23, ‘mid age’ 45-50, and ‘older’ 70-75 years) who were randomly selected in 1996 from the Medicare database to follow and assess for multiple health and wellbeing factors over time. The findings from the present study are based on a sub-study survey administered in 2010, from the ‘young’ cohort, now aged 33-38 years, who identified as pregnant or recently given birth in the 2009 ALSWH Survey. Women were asked about their use of herbal medicine for pregnancy-related complaints, whether they self-prescribed or were prescribed by a health professional, sources of information that influences decision making of CAM use during pregnancy, and demographic measures including urban or nonurban residence, employment status and level of education.

The survey response rate was 79.2%, resulting in the data of 1,835 women available for analysis. Of these women, 34.4% reported using herbal medicine during their most recent pregnancy. Having a higher level of education, full-time employment, and living in an urban environment were all significantly associated with use of herbal medicine throughout pregnancy. Pregnancy-related conditions associated with use of herbal medicine included anxiety, back pain, sleeping problems, preparing for labour, constipation, varicose veins, fatigue, and anaemia. Women were more likely to use herbal medicine if they experienced anxiety, sleeping problems, fatigue, or in preparing for labour. Interestingly, authors reported a reduced likelihood of herbal medicine use for nausea. A major finding was that of the 588 who reported using herbal medicine during pregnancy, 77.9% chose to self-prescribe these products. These women were more likely to be influenced by family and friends, media, and their obstetrician, and less likely to be influenced by a midwife or alternative health practitioner.

Limitations of the study include being unable to determine which herbal medicines were prescribed or self-prescribed for which health outcomes, as well as the dosing schedule and duration. Some literature has evaluated and reported the safety of some herbal therapies during pregnancy, but this is limited. Information pertaining to which herbal medicines were used would give further insight into possible safety considerations. As the study relied on self-reported information, there is the potential for recall bias to affect findings. As only a small number of survey results were from women of non-Western or indigenous background this limits the generalisation of the results.

This study represents important and valid findings for the Australian community, being the first nationally representative study reporting on the use and self-prescription of herbal medicine for pregnancy-related health concerns. With significant numbers of women using herbal medicines throughout pregnancy, and with a high proportion of these users self-prescribing, consideration needs to be given to ensuring quality and safe use of such interventions, as limited safety data is often available. The study raises additional questions, the answers to which will further our understanding of this matter. These include: which herbal therapies are taken; what dose and duration; are they single or multiple types of herbal medicines; and what role do healthcare professionals take in discussing the use of herbal medicines and their safety during pregnancy. The role of media and nonprofessional sources of information in influencing women in their decision-making is also a concern requiring further attention.

Pelargonium extract in animal models of cough and acute bronchitis


*Pelargonium sidoides* (Pelargonium) is a medicinal plant native to southern Africa, traditionally used for a variety of complaints including diarrhea, dysentery liver disorders and dysmenorrhea. In European herbal medicine, *Pelargonium sidoides* has been used as therapy for tuberculosis and airways infections. A proprietary extract of *P. sidoides*, EPs®7630, licensed in Australia for acute bronchitis and acute sinusitis, has demonstrated mild to moderate antibacterial and antiviral properties, inhibition of bacterial adhesion on cell walls, and activation of innate immune responses in in vitro studies. Limited research, however, has been undertaken in an in vivo environment. Accordingly, the current study aimed to explore the efficacy of EPs® 7630 in an infective bronchitis animal model, and on common symptoms associated with airways infection, cough and mucociliary clearance.

EPs® 7630 (Dr William Schwabe Pharmaceuticals, Germany) is an aqueous ethanolic extract (11% m/m; drug extract ratio 1:8-10) with characteristic constituents including highly oxygenated coumarins, simple phenols and high molecular weight proanthocyanidins. Antitussive effects, including cough frequency and cough latency time, were assessed in mice and guinea pig models, as well as bronchosecretory activity in mice and rats. All investigations were performed with a single batch of the *P. sidoides* dry root extract EPs®7630, with dosing for different animal species adjusted and equivalent to once, twice or three times the average human dose for an adolescent or adult of 60mg/day.
Effects of EPs®7630 were compared to a placebo control and a reference drug, ‘radix glycyrrhizae oral solution’ (DeRun Pharmaceutical Co Ltd, China), containing licorice liquid extract, camphor tincture and guaiacol glycerol ether.

The antitusive effects of EPs®7630 were firstly evaluated in an ammonia-induced cough model in mice in which 59 mice were randomly distributed according to body weight to placebo control, reference drug, or one of the three dosing EPs®7630 groups. Drugs were administered once daily for three consecutive days by gavage at a volume of 0.2ml/10g. After the last treatment, mice were placed in a container and exposed to an ammonia vapour. Compared to the control group, cough frequency was significantly reduced in a dose-dependant manner. Cough latency time (time till first cough) was prolonged by EPs®7630 treatment in comparison to placebo by between 182-367%, with a significant increase in time till first cough in the twice and three times dose groups.

With a similar trial design, 50 guinea pigs who had previously demonstrated cough reaction to exposure of citric acid solution were randomly distributed to assess the antitusive effects of EPs®7630 in a citric acid-induced cough model. Compared to the control group, cough frequency was significantly reduced by 67%, 63% and 73%, in the once, twice and three times dose equivalent groups, respectively. Cough latency time was also prolonged but did not differ significantly from placebo.

The secretolytic activity was assessed in 55 mice by the secretion of intraperitoneally injected phenol red into the tracheobronchial tract over a period of 30 minutes, after three days consecutive treatment. Dose-dependent increased elimination of the dye via the respiratory tract was observed in the EPs®7630 treated groups, with statistically significant increases in the twice and three times dose groups.

A model of acute bacterial bronchitis was used to assess anti-inflammatory action of EPs®7630 compared to control in 69 rats, after treatment for 10 days. No effect was observed on leucocyte number or protein content on bronchoalveolar lavage. A significant reduction in histopathological lesions due to the acute bacterial bronchitis was observed in the groups treated with EPs®7630 at the twice and three-times doses. The protective effect was suggested to be associated with an up-regulation of superoxide dismutase and subsequent protective effect against oxidative stress.

Authors did not comment on the effect of the reference drug, however data tables indicate a statistically significant improvement compared to placebo was observed for cough frequency in the mice and guinea pig antitusive models. No comparative data was available between the reference drug and the EPs®7630.

These animal studies provide evidence supporting the effectiveness of EPs®7630 in cough and acute bronchitis. Whilst difficult to extrapolate the findings to humans, it is interesting to note that a number of effects were significant only at twice and three times the equivalent human dose. Consideration and further investigation of safety, tolerability and efficacy in humans may be warranted at these higher doses, to ensure the optimal dose is being used in treatment.

*m/m = mass percentage concentration – that is the mass of solute divided by mass of solute plus solvent, expressed as a percentage.

Mechanisms of effect of Iberogast in functional dyspepsia


Functional dyspepsia (FD) is one of the most common gastrointestinal disorders, affecting up to 15-30% of the general population. With limited treatment options for FD and due to its chronic and relapsing nature, there is significant interest in effective therapeutics to reduce the burden of disease. The pathogenesis of FD remains unclear with gastric motility, compliance impairment, visceral hypersensitivity, low-grade inflammation and psychosocial disturbances implicated. Clinical studies have demonstrated that FD may be associated with stress in early life followed by stress in adulthood.

STW5, commercially known as Iberogast (Steigerwald Arzneimittelwerk GmbH, Germany) is a well-researched herbal preparation that consists of 50% (v/v) hydroethanolic fresh plant extract of Iberis amara whole plant, and 30% hydroethanolic extracts of Melissa officinalis, Matricaria chamomilla, Carum carvi, Mentha piperita, Angelica archangelica, Silybum marianum, Chelidonium majus and Glycyrrhiza glabra. Iberogast has previously demonstrated efficacy in the treatment of FD. The aim of the present study was two-fold; firstly, the study group aimed to develop an animal model for FD that paralleled the clinical situation of early life stress followed by further stress in adulthood, and secondly, to further understand the mechanisms behind the action of STW5 in FD. This summary will focus mostly on the action of STW5.

Briefly, the authors established a sequential stress model, where rats were exposed to repeated neonatal maternal separation (NMS) after birth to model early life stress, followed later by repeated restraint stress (RS) when the rats had reached adulthood (8-12 weeks). Stress hormones and ghrelin were measured in plasma, while responsiveness of stomach fundus strips to smooth muscle stimulants and relaxants were assessed ex-vivo. The effectiveness of treatment with STW5, at a dose of 5 ml/kg p.o. for one week prior to and for the seven days of RS, in preventing the changes associated with the stress model of NMS followed by RS (NMS/RS) were assessed.
The effects were further assessed and compared with adult rats that experienced RS only without prior NMS.

Stress models may influence different parameters affecting gastric functions. Active ghrelin, which has an important role in mediating gastric motility, was observed to be reduced in animals subjected to NMS but raised in those subjected to RS or NMS/RS. Authors proposed that the adult RS leads to increased ghrelin levels following activation of the sympathetic nerves. Pre-treatment of the rats with STW5 prior to subjecting rats to RS or NMS/RS provided some protection against the increase in plasma active ghrelin, however this was significant in the RS rats only.

Exposure of the non-treated rats to NMS, RS or NMS/RS resulted in an increase in plasma level of the stress hormones corticotrophin-releasing factor and corticosterone, statistically significant in the RS and NMS/RS rats. Treatment with STW5 protected against the rise in both stress hormones, with authors suggesting an effect on mast cells or a central effect.

Subjecting the rats to RS, NMS, or NMS/RS resulted in reduced responsiveness of the stomach fundus to the stimulants and relaxants investigated, including carbachol, potassium chloride, serotonin and adrenaline. Treatment with STW5 resulted in statistically significant protection against the reduction in responsiveness to carbachol and serotonin in both the RS and NMS/RS models and to adrenaline in the NMS/RS model only. Authors reported that treatment with STW5 largely protected against the desensitisation of the gastric muscarinic receptors, confirming this is the target of its action. The action of normalising sympathetic receptor function was also reported.

This study, whilst largely designed to test a sequential stress animal model, also provides further evidence in the effectiveness of STW5 in functional dyspepsia, and provides additional insight into the mechanism of action and therapy target of the herbal mix in eliciting its responses. The possible effect of STW5 on mast cells, and/or through a central effect, is currently under investigation.

**Zanthoxylum capense enhances antibiotic activity**


Increasing antibiotic resistance drives urgency for research into new therapies or redesigned therapeutic strategies to maintain effectiveness against bacterial infections. Numerous resistance mechanisms have been identified including antibiotic inactivation, target-based mutation compromising drug binding, reduced permeability and efflux mechanisms that pump the drugs out. This latter mechanism in particular can convey resistance to both specific classes of antibiotics, but also to different unrelated antimicrobial agents, thus conferring a multi-drug resistance (MDR) phenotype to bacteria. Strategies to overcome MDR resistance mechanisms include combination therapies of two or more antibiotics, or combining an antibiotic with a bacterial resistance-modifying agent, such as efflux pump inhibitors, to increase the activity of the antibiotic.

*Zanthoxylum capense*, of the Rutaceae family, has long been used as a traditional medicine in Africa to treat a variety of conditions including colds, flu and tuberculosis. Previous studies on *Z. capense* have isolated compounds demonstrating antibacterial activity. In the present study, six compounds isolated from the roots of *Z. capense*, and seven ester derivatives were evaluated for antibacterial activity against methicillin-susceptible *Staphylococcus aureus* (MSSA) and methicillin-resistant *S. aureus* (MRSA), and for potential activity as antibiotic modulators and efflux pump inhibitors.

In a preliminary screening for antibacterial and antibiotic modulatory activity, a reference strain, *S. aureus* ATCC6538, was used for evaluation of the compounds. None of the *Z. capense* compounds demonstrated any antibacterial activity at the concentration ranges tested (ranging from 0.8 – 100 μg/ml). A combination assay between the 13 compounds and the antibiotics erythromycin, tetracycline and oxacillin, and ethidium bromide (EtBr) was performed to search for antibiotic modulatory activities. The best modulation effect was exhibited by the benzophenanthridine alkaloid oxychelerythrine, which reduced the MICs against *S. aureus* for oxacillin four-fold, and MICs of erythromycin, tetracycline and EtBr two-fold. Two other benzophenanthridine alkaloid compounds, ooxynitidine and arnottianamide demonstrated some modulatory effect in combination with tetracycline, but the remaining compounds demonstrated no effect.

To assess the potential activity of the 13 compounds as efflux pump inhibitors, a real-time EtBr accumulation assay in a *S. aureus* ATCC6538 model was employed; an increase in EtBr accumulation being indicative of potential efflux pump inhibitory activity. The *Z. capense* compounds, ailanthoidiol diacetate and ailanthoidiol di-2-ethylbutanoate, were most effective in increasing the EtBr accumulation, demonstrating a potential for efflux pump inhibition, and accordingly potential for use in combination with other antibiotics.

Following these findings, these two compounds were analysed in further assays against four additional *S. aureus* strains including reference strain ATCC25923, its derivative ATCC25923𝑡𝑖𝑝 adapted to overexpress the norA efflux pump gene, and two clinical MRSA strains with increased efflux activity; *S. aureus* SM1, resistant to methicillin and ciprofloxacin, and *S. aureus* SM39, methicillin resistant with reduced susceptibility to biocides. Both *Z. capense* compounds demonstrated
a modulation effect in combination with ciprofloxacin against all *S. aureus* strains, except for SM1, and in combination with EtBr. Despite these combination modulatory effects, only a weak efflux inhibitory activity was observed, with authors suggesting other mechanisms likely to contribute to their activity.

The results from this study suggest a potential role for *Z. capense* constituents in restoring antibiotic activity or increasing susceptibility of antibiotics against resistant strains. As the study revealed the modulatory effects of the *Z. capense* compounds were not due to efflux pump inhibition, further understanding of the modulatory mechanisms should be a focus of future research.

**Garlic for hypertension**


Hypertension is an important risk factor for morbidity and mortality. Affecting approximately two thirds of adults over 60 years worldwide, hypertension remains the leading risk factor for cardiovascular (CV) diseases. Numerous pharmaceutical interventions, including thiazides, angiotensin-converting enzyme inhibitors, beta-blockers, and calcium channel blockers, have demonstrated blood pressure (BP) lowering efficacy and reduced mortality and CV events. Despite these effective medications, treatment for many hypertensive patients remains unsatisfactory. Compliance, side effects and complexities of polytherapy are reasons suggested for these inadequately controlled hypertensives. Accordingly, complementary and alternative therapies are reported to be widely used by patients with hypertension.

*Allium sativa*, commonly known as garlic, has been used medicinally for thousands of years. Garlic has been demonstrated to exert a number of effects including antihypertensive, anti-atherosclerotic, lipid-lowering, plasma fibrinogen-lowering, fibrinolytic activity-increasing, and other CV-protective effects. Whilst a number of clinical investigations have reported short term BP lowering effects of garlic, previous meta-analyses and/or systematic reviews have reached inconsistent conclusions. The authors of the present review report that a large number of trials included in previous reviews were trials conducted in healthy volunteers or patients with hyperlipidaemia, or compared hypertensive patients with normotensive patients. Therefore, the aim of this review was to evaluate the effect of garlic or garlic-based preparations on patients with hypertension reported in randomised, placebo-controlled trials.

PubMed, the Cochrane Library and EMBASE were searched for appropriate articles from their respective inceptions until August 2014. Only randomised, controlled trials comparing garlic to placebo were considered. Study participants were required to have been diagnosed with hypertension according to established guidelines or definitions. No specifications were set for garlic preparation type, dose, or duration of study. From 213 identified records, a total of seven randomised, placebo-controlled trials containing 391 hypertensive patients were included for analysis. The studies were conducted from 1988 to 2013, with sample sizes ranging from 34 to 90. Six different garlic preparations were used in the trials with a variety of doses. The duration of treatment ranged between 8 and 12 weeks.

The primary outcome measures of the meta-analysis were mortality and CV events including coronary heart disease (CHD), myocardial infarction, heart failure, and stroke. However, as these measures were not reported in all of the trials included in the analysis, no conclusions could be made. Secondary outcome measures were systolic BP (SBP) and diastolic BP (DBP) at the end of treatment. Whilst seven trials were included in the analysis, only three studies had sufficient data to pool. Compared to placebo, the meta-analysis reported a statistically significant and clinically meaningful lowering effect of garlic on both SBP and DBP with reductions of 6.71 mmHg and 4.79 mmHg, respectively. The garlic interventions were safe and generally well tolerated. Authors noted that whilst there was insufficient data to look at clinical outcomes associated with garlic treatment regarding the primary outcome, a large recent meta-analysis involving 958,000 people revealed that a reduction of SBP by 10 mmHg or DBP by 5 mmHg by any of the main classes of antihypertensive medications was associated with a reduction of CHD events by about a quarter and stroke by a third.

Limitations of the analysis include the small number of trials available for analysis, the heterogeneity of clinical assessment, the different garlic preparations used as well as differences in dose and duration, and the lack of comment about the quality of methods due to insufficient reporting of methodology from the trials. The review and meta-analysis does, however, aim to provide a better understanding of the effect of garlic in a clearly defined patient. Whilst the present review concludes that the available evidence suggests garlic is an effective and safe approach for the management of hypertension, it is highlighted that the evidence supporting this is limited and insufficient with more high-quality clinical trials required and reporting of long-term clinical outcomes.
Vitamin E’s role in head and neck cancer


Vitamin E is a fat-soluble antioxidant nutrient found mainly in vegetables and oils of plant origin. Since the 1980s it has been one of the various nutrients with a growing evidence base to show a protective role in the prevention of cancers of the oral cavity and other sites. More recent studies support the hypothesis that complex mixtures of nutrients and bioactive substances found in foods may have more of a protective role than single nutrient interventions.

The International Head and Neck Cancer Epidemiology (INHANCE) consortium was established in 2004 to elucidate the aetiology of head and neck cancers (HNCs) through pooled analyses of individual-level data on HNCs on a large scale, and previous investigations have focused on dietary habits. This particular analysis used data from 10 case-control studies (3 from Europe, 6 from the US and 1 from Asia), which provided information on vitamin E intake derived from natural sources to the INHANCE consortium. They aimed to:

- describe and account for central tendency and variation in the intakes of vitamin E from natural sources;
- investigate the association between vitamin E intake and the risks of two HNC outcomes – oral and pharyngeal cancers combined and laryngeal cancer – after adjusting for several dietary and non-dietary factors;
- explore whether effect estimates differ by cancer subsites or in subgroups of subjects (particularly nonsmokers/nondrinkers of alcohol-containing beverages);
- explore the potential interaction effect between the intakes of vitamin E and other selected factors – putatively associated with HNC and to our main exposure (other selected nutrients, total fruit and vegetables, supplemental use of vitamin E) – on the two HNC outcomes of interest.

Cases were included in this analysis if their tumour had been classified as an invasive tumour of oral cavity, oropharynx, hypopharynx, oral cavity or pharynx not otherwise specified, larynx or HNC unspecified. Cases with missing information on natural vitamin E intake, site of cancer origin or alcohol intake were excluded from the study. Overall, 18 207 subjects were included, with 5959 HNC cases and 12 248 controls.

The analysis found a significant inverse association between vitamin E intake and oral/pharyngeal cancer (OR for the fifth vs. the first quintile category. 0.59, 95% CI: 0.49–0.71; P for trend o0.001) and laryngeal cancer (OR 0.67, 95% CI: 0.54–0.83, P for trend o0.001). This correlation persisted despite adjustment for major confounding and risk factors (e.g. overall fruit or vegetable intake; other nutrients such as vitamin C). A more marked protective effect was found for current smokers (compared with non-smokers) in the second and third quintiles, but there was substantial heterogeneity over several strata.

Despite some heterogeneity of the estimated effect across studies for oral/pharyngeal cancer, vitamin E from foods was inversely correlated with incidence of HNC in this large study. The association remained, despite adjustment for other potentially protective nutrients and food components. These results contrast with those of a systematic review and meta-analysis that suggest a lack of effect with supplemental forms of vitamin E. Thus, at present, the best evidence is to recommend vitamin E-rich foods (rather than supplements) for prevention against cancers of the head and neck (in addition to reducing other risk factors such as smoking and alcohol intake).

Expanding waist circumference and diet soda intake


Abdominal adiposity has been a focus of health over recent years, having been prospectively associated with greater risk of a number of adverse health outcomes, including cardiovascular disease, depression, cognitive decline, cancer mortality, and all-cause mortality. Age-related increase in waist circumference (WC) may reflect a disproportionate increase in visceral fat. With concerns of negative health effects of sugar consumption, an increase in use of non-nutritivesweeteners (NNSs) has also been observed in recent years. Despite this, obesity
prevalence has continued to increase whilst the long-term effects of NNSs and diet soda (DS) remain unclear. The primary aim of the current study was to prospectively examine the relationship between DS intake (DSI) and long-term WC change (ΔWC) in a biethnic cohort of adults over the age of 65 years.

Study participants were recruits from the San Antonio Heart Study (SAHS) cohort, which was a community-based prospective study of cardiovascular risk factors in Mexican Americans and European Americans conducted in Texas between 1979 and 1996. All surviving SAHS participants aged 65 years and older at the time of baseline examination (between 1992-1996) were invited to participate. From the initial examination, participants were invited to return for three follow-up intervals over approximately 10 years. Examinations undertaken at each visit included height, weight, WC, fasting plasma glucose, intake of beverages including soft drinks, leisure time expenditure, and diabetic mellitus status. Dietary questionnaires were administered to a subset of 598 individuals. Participants were classified by DSI based on quantity of DS consumed as nonusers, occasional users >0 but <1/day, and daily users ≤1/day. Each participant’s status as a DS user or non-user was reset at the beginning of each follow-up interval. The endpoint of ΔWC between the beginning and end of each follow-up interval was assessed and compared across the three DSI categories.

Of 749 Mexican-American and European-American individuals who were examined at baseline, data for more than one interval was available for 466 participants and used in the analysis. With a mean total follow-up period of 9.4 years, this represented a total of 4,479 person-years of follow-up. Age and sex characteristics of DS users did not differ significantly from nonusers, however users displayed a general pattern of greater socioeconomic advantage and health behaviours such as high levels of education, higher leisure-time energy expenditure and less likelihood of smoking. Despite this, DS users had a significantly higher BMI score than non-users at baseline, and a non-significant larger WC.

A positive, dose-response relationship was observed between initial DSI and subsequent long-term increases in WC. A significantly greater increase was seen from all DS users combined compared to non-users, with the mean ΔWC of all users almost three times that of non-users. When analysed at a consumption level, daily users experienced a ΔWC nearly four times that of non-users. When results were adjusted according to sex, ethnic group, BMI category, and diabetes mellitus status, ΔWC remained significantly or trending to higher for DS users compared to nonusers in all but one stratum: BMI less than 25 kg/m2. Of note, BMI of participants remained stable over time, and no consistent relationship was observed between regular soda use and mean ΔWC.

The association between DSI intake and ΔWC does not imply causation, and numerous other factors may have influenced outcomes. Dietary intake data was not available for all participants, and personal factors including family history, medications, and weight management behaviours were not captured. Furthermore, the population of the current study was Mexican-American and European-American over 65 years of age and whether similar observations would be noted in a younger population or different ethnic background remains unclear. The study does however highlight the importance of adequate dietary counselling and alternatives to sweetened beverages. The present study has reported an association between DSI and waist circumference, and accordingly the use of diet-products by those motivated to manage weight may be being consumed with good intentions; however, negative outcomes may result.

No link between MMR vaccine and autism


Vaccination is a contentious issue for many within the community. Some years back there was research published that suggested an association between the measles-mumps-rubella (MMR) vaccine and autism spectrum disorders (ASD). Since this time the original study has been discredited and a large volume of research since has shown no link between the MMR vaccine and ASD. This study is the most recent with the same message.

Researchers in the United States designed a retrospective cohort study to investigate the issue, using an administrative claims database associated with a large US health care plan (the Optum Research Database). They were particularly interested in families with children already affected by ASD, as their siblings are known to be at a higher genetic risk of the condition, and their parents may be additionally concerned about the effects of vaccinations. Enrolment criteria were thus that children were born between 1 January 2001 and 31 December 2007; were continuously enrolled in the health plan from birth to at least 5 years of age; and also had an older sibling with ASD continuously enrolled in the health plan at least 6 months between the beginning and end of the study period. ASD status was determined by at least two claims on separate dates associated with an ICD-9-CM diagnosis code for autistic disorder, other specified pervasive developmental disorder (PDD) including Asperger syndrome, or unspecified PDD. MMR vaccine receipt was defined as having a particular code indicating receipt of each component between birth and age 5 years.

A total of 95,727 children in the database had older siblings, and 1,929 (2.01%) had an older sibling with
which school they attended. The children had a mean age to either intervention or control group, depending on urban Changzhi, northern China. 279 children in grade 5 randomised controlled trial, set in 28 primary schools in to help reduce CVD burden. They designed a cluster salt reduction measures are one of the most cost effective blood pressure and reduces the risk of CVD. Scientific evidence showing that salt reduction lowers China, there is a high intake of added salt. There is many developed and developing nations, including strokes and 49% of ischaemic heart disease cases. In is a major contributor to CVD, accounting for 62% of both morbidity and mortality worldwide. Hypertension cardiovascular disease (CVD) is the leading cause of both morbidity and mortality worldwide. Hypertension is a major contributor to CVD, accounting for 62% of strokes and 49% of ischaemic heart disease cases. In many developed and developing nations, including China, there is a high intake of added salt. There is scientific evidence showing that salt reduction lowers blood pressure and reduces the risk of CVD.

To this end, the researchers in this trial suggest that salt reduction measures are one of the most cost effective to help reduce CVD burden. They designed a cluster randomised controlled trial, set in 28 primary schools in urban Changzhi, northern China. 279 children in grade 5 of primary school were enrolled and randomly assigned to either intervention or control group, depending on which school they attended. The children had a mean age of 10.1, and associated with 553 adult family members in total (with a mean age 43.8).

Local health educators educated children in the intervention group and the normal health lessons were replaced by lessons on salt reduction (a 40 minute lesson every 2 weeks – a total of 8 sessions). Lessons were delivered to the whole class, but only 10 children were selected for assessments. Children were also asked to complete some homework tasks, including reminding the whole family of salt reduction targets/methods and tips. They were also to develop a salt reduction action plan for their family and supervise its implementation at home. Parents were provided with education materials via a newsletter. The aim was to reduce salt intake by a minimum of 20%, and to achieve this, 50% reduction was set as the target for the intervention strategy. Intervention duration was one school term (3.5 months or so).

Families were monitored for their salt intake every 2 weeks. They were each given a container for salt, and asked to use only salt from this container to add to their cooking. The weight of this container was measured fortnightly, and salt use was calculated per person per day. The primary outcome was the difference between the intervention and the control group in the change of salt intake as measured by 24 hour urinary sodium from baseline to the end of the trial. The secondary outcome was the difference between the two groups in the change of blood pressure.

At baseline, the mean salt intake in children was 7.3 (SE 0.3) g/day in the intervention group vs. 6.8 (SE 0.3) g/day in the control group. In adult family members the salt intakes were 12.6 (SE 0.4) and 11.3 (SE 0.4) g/day, respectively.

During the study, the intervention group reduced their salt intake, whereas in the control group salt intake increased. Researchers note that this may have been due to seasonal dietary changes, as the initial assessment was in summer and the follow-up occurred in winter. The mean effect on salt intake for intervention versus control group was -1.9 g/day (95% confidence interval -2.6 to -1.3 g/day; P < 0.001) in children and -2.9 g/day (-3.7 to -2.2 g/day; P < 0.001) in adults. The mean effect on systolic blood pressure was -0.8 mm Hg (-3.0 to 1.5 mm Hg; P = 0.51) in children and -2.3 mm Hg (-4.5 to -0.04 mm Hg; P = 0.05) in adults.

These statistically significant differences in salt intake and blood pressure (in adults) could have profound effects on CVD, as the researchers calculated that a 2.3 mm Hg reduction in blood pressure could reduce stroke incidence by about 9% and IHD incidence by around 5%, which translates to 153,000 and 47,000 deaths per year in China, respectively. Overall, this novel school-based intervention may provide significant health benefits in the families of the children enrolled. These children are also more likely to grow up with an awareness of their salt intake and its effects on health.
Physical activity for smoking cessation in pregnancy


Maternal smoking during pregnancy is known to have a number of effects on the foetus, including congenital abnormalities, low birth weights and intrauterine foetal death. It is also associated with adverse pregnancy outcomes from miscarriage/stillbirth to prematurity and sudden infant death syndrome. An estimated 10% of women in high income countries continue to smoke during their pregnancy, and thus it is imperative that health professionals offer women efficacious pharmacological and behavioural strategies to help them quit.

In non-pregnant populations, there is convincing evidence that physical activity may be beneficial for the initiation and continuation of abstinence from smoking, as it reduces the intensity of urges to smoke, which is the main cause of relapse. Thus, researchers conducted this study across 13 hospital sites in England to determine whether these effects were also present in pregnant mothers attempting smoking cessation. Between April 2009 and January 2014, 789 pregnant smokers were enrolled in, and completed the study. To be eligible, women had to be between 16 and 50 years of age, at 10-24 weeks gestation, smoking at least one cigarette daily and be prepared to quit smoking one week after enrolment. They were randomised in a 1:1 ratio, but it was not feasible to mask participants or researchers to group allocation.

Interventions began one week before an agreed quit date. One group received behavioural cessation support alone, or behavioural cessation support plus a physical activity intervention (fourteen sessions of supervised exercise over 8 weeks – twice a week for 6 weeks, then weekly for 2 weeks). At these exercise sessions, women walked at a moderate intensity on a treadmill for up to 30 minutes. Immediately before each session, the women received behavioural support aimed at identifying opportunities to incorporate physical activity into their lives; to motivate them to use physical activity to reduce urges to smoke; and to help them use behavioural strategies to improve adherence. They were advised to be active for at least 10 minutes at a time, working up to 30 minutes of activity on at least 5 days a week, with an emphasis on brisk walking.

The primary outcome was self-reported continuous abstinence from cigarette smoking between quit date and the end of the pregnancy. The researchers permitted lapses of up to 5 cigarettes in total (on up to five occasions). Self-reported abstinence was validated by exhaled carbon monoxide or urinary cotinine levels.

Adherence to physical activity were measured via self-reporting, and in a random subsample of 90 (11.5%) participants, physical activity was objectively measured by an accelerometer.

Overall, no significant difference was found between the intervention and control group with regard to rates of smoking abstinence (8% v 6%; odds ratio 1.21, 95% confidence interval 0.70 to 2.10). This was despite women in the physical activity group reporting 33% to 36% greater increases in physical activity than women in the control group during the intervention period.

This was the largest study conducted in the area to date (double the size of previous RCTs) and had high follow-up rates, with low rates of missing data.

It found that a physical activity intervention has no benefits for helping women to quit smoking in pregnancy. Researchers suggest that confounding factors could include already high rates of physical activity in the group, or over-reporting of physical activity by participants. Despite the study results, regular physical activity remains indicated for general health benefits in pregnancy and beyond.

Menopausal hormone use and ovarian cancer risk


Hormone therapy remains a commonly prescribed treatment for women during menopause with over 6 million users in the UK and USA alone. After its use dramatically increased during the 1990’s, the publication of the Women’s Health Initiative and its associated health concerns led to about half the number of users by early 2000’s. Current guidelines are inconsistent with statements regarding the use of hormone therapy and ovarian cancer, with some stating possible increased risk with longer-term use and insufficient evidence. Half the epidemiological studies with information about menopausal hormone use and ovarian cancer remain unpublished and as retrospective studies may be biased, the intent of this study was to assess, with minimal bias, the effect of hormone therapy and ovarian cancer risk using data from all epidemiological studies of ovarian cancer, published and unpublished.

The Collaborative Group on Epidemiological Studies of Ovarian Cancer was established in 1998 to bring together and analyse centrally individual participant data from all epidemiological studies of ovarian cancer, assessing the risks associated with hormonal and other factors. Since its establishment, published and unpublished epidemiological studies have been sought through computer searches, review articles, written communication and discussions at scientific meetings to identify and incorporate data.
Eligible studies have information on hormone therapy use, parity, oophorectomy and hysterectomy. Of 58 such studies identified, datasets from 52 studies are included in the current analysis. Cases were postmenopausal women with malignant or borderline-malignant epithelial or non-epithelial ovarian cancer, and controls were postmenopausal women without ovarian cancer or previous oophorectomy. Information about demographics, reproductive factors and hormonal use were sought. For ovarian cancer cases, histology classified tumour types was used when available.

Information was available for 21,488 postmenopausal women with ovarian cancer (cases) from 52 studies, of which 17 were prospective and 35 retrospective. The prospective studies provided information on 12,110 postmenopausal ovarian cancer cases, 55% of whom had used hormone therapy with a median duration of 6 years. Ovarian cancer risk was significantly greater in ever-users than in never-users in both the prospective studies analysis (relative risk (RR) = 1.20) and for all studies combined (RR = 1.14).

Further analyses were undertaken and restricted to women with information both on duration of use and on time since last use of hormone therapy. Risk was strongly related to recency of use. In prospective studies, greatest risk was observed in current users of hormone therapy (RR = 1.41), with risk significant even in those with less than 5 years hormone therapy (RR = 1.43). After discontinuation of hormone therapy, risk remained significantly increased within the first five years after last use. In ex-users, risks decreased the longer ago hormone therapy use had ceased, however women who had used hormone therapy for longer than 5 years were still at significant risk more than 5 years later. Risk for current-or-recent hormone therapy use within the last 5 years from the prospective analysis was 1.37. Other risks were similar when prospective and retrospective studies were combined, except for the risk of current users, which was somewhat smaller (RR = 1.04).

Authors noted that the retrospective studies may be influenced by recall bias and selection bias, and that the median year of diagnosis in the retrospective studies was in 1992, well before peak hormone therapy use. The RRs did not differ significantly amongst current-or-recent users, between users of oestrogen-only and oestrogen-progestogen preparations, or between women who had commenced hormone therapy before the age of 50 or during their 50’s. Risk did differ across the four most common epithelial tumour types, being definitely increased only for the two most common, serous (RR = 1.53) and endometroid (RR = 1.42).

This study provides some important findings when analysing the data on ovarian cancer and hormone therapy use. The current study is able for the first time to analyse sufficient evidence from prospective studies to incorporate into a strong meta-analysis. The authors conclude that the findings of the study strongly suggest a causal relationship between hormone therapy use and ovarian cancer. If it is indeed causal, authors suggest that women who use hormone therapy for 5 years from around 50 years have about one extra ovarian cancer per 1000 users, and with typical prognosis, about one extra ovarian cancer death per 1700 users. These figures rise to one additional ovarian cancer per 600 users and one additional ovarian cancer death per 800 users respectively, based on 10 years of hormone therapy use from around 50 years of age. Hormone therapy use remains a common treatment for menopausal women and these findings provide further clarity about associated health concerns with the use of such treatment.

**Acupuncture and anaesthesia**


Neurosurgical procedures are medically complicated. To allow neurological evaluation, the main objective immediately post-operation is a rapid recovery from anaesthesia. This has led to the practice of using short-acting opiates during the procedure itself. However, due to this practice (and particular characteristics of the opiates used), postoperative pain management may be difficult. It is thus important to manage postoperative pain after surgery by taking into consideration both pain levels, and the medical objective of maintaining a clear conscious state.

Researchers in China hypothesized that acupuncture may provide a useful adjunct to opiates both during and after neurosurgery. In this study, 92 patients scheduled for supratentorial craniotomy under general anaesthesia were randomly allocated to receive either multipoint transcutaneous electrical acupuncture stimulation (TEAS) or sham TEAS. Both groups also received total intravenous anaesthesia (TIVA) with propofol and sufentanil. Sufentanil dosing was titrated to mean arterial pressure (MAP), heart rate (HR) and bispectral index (BIS). Patients in the TEAS group were given TEAS half an hour prior to anaesthesia induction, and this was maintained throughout the entire procedure at 4 pairs of acupuncture points. Postoperative recovery, pain and side effects were used as the primary end points of the study.

Of the enrolled participants, 88 completed the study. Whilst there were no differences between the two groups in terms of intraoperative MAP, HR and BIS results, sufentanil target plasma concentration in TEAS patients was significantly lower at some points during the study (p < 0.05). Overall sufentanil consumption was significantly lower in the active treatment group compared to the patients receiving sham TEAS (p <
0.05). The primary end points of postoperative recovery and pain were significantly improved by TEAS (p < 0.001) and there was a lack of significant postoperative side effects.

This study demonstrates that proximal and distal application of TEAS in combination with standard TIVA for supratentorial craniotomy may reduce drug requirements and improve postoperative recovery (including pain levels) without additional side effects. Whilst it does point to a role for adjuvant TEAS in the anaesthetic management of neurosurgical procedures, larger studies are required in other populations and broader settings in order to be able to assess applicability to local patient groups.

Editorial: The pluralistic nature of contemporary maternity care in Australia

continued from page 90

AJHM based CPE Questionnaire

The AJHM based CPE questionnaire system is a voluntary system designed to assist members in the accumulation of NHAA CPE points. Questions are divided into the appropriate subject categories (herbal medicine and medical science) and each question refers to an article in this issue of the Australian Journal of Herbal Medicine. Points accumulated through completion of these questions should be recorded in the NHAA CPE diary. Each completed question is worth one mark in the relevant category. Your completed CPE diary should be returned with your membership renewal at the end of the calendar year. For further information please see the NHAA CPE Member’s Manual on the NHAA website www.nhaa.org.au.

MedPlant

1. The meta-analysis investigating the effect of echinacea reported a number of findings. Which of the following is incorrect?
   a) The meta-analysis revealed a significantly reduced risk of recurrent respiratory infection in echinacea-treated versus placebo-treated groups
   b) Complications including pneumonia, otitis media/externa, and tonsillitis/pharyngitis were less frequent in the echinacea-treated group compared to placebo
   c) Ethanolic/glycerol echinacea extracts appear to offer greater risk reduction compared to pressed echinacea juice extracts
   d) Those that may benefit most from echinacea supplementation are those with a presumed higher immune function and consequently lower susceptibility of infection

2. With reference to the study investigating the effect of a *Pelargonium sidoides* extract, EPs®7630, in cough and acute bronchitis, which of the following is incorrect:
   a) Cough latency time in mice was prolonged by EPs®7630 treatment in comparison to placebo by between 182-367%, with significant reduction in the twice and three times dose groups
   b) Cough frequency in guinea pigs was significantly reduced by 57%, 53% and 63%, in the once, twice and three times dose equivalent groups, respectively
   c) Dose-dependent increased elimination of the dye via the respiratory tract was observed in the EPs®7630 treated groups, supporting beneficial secretolytic effect
   d) The protective effect on histopathological lesions due to the acute bacterial bronchitis was suggested to be associated with up-regulation of superoxide dismutase and subsequent protective effect against oxidative stress

3. For the study investigating the effect of *Iberogast* (STW5) in functional dyspepsia, which of the following is correct:
   a) Active ghrelin was reduced in animals subjected to NMS or NMS/RS but raised in those subjected to RS
   b) Treatment with STW5 protected against the rise in plasma levels of corticotrophin-releasing factor and corticosterone
   c) Treatment with STW5 resulted in statistically significant protection against the reduction in responsiveness to adrenaline, carbachol and serotonin in both the RS and NMS/RS models
   d) STW5 largely protected against the increased sensitisation of the gastric muscarinic receptors

4. Which of the following is incorrect with reference to the study analysing herbal medicine use during pregnancy in Australian women:
   a) 34.4% of women reported using herbal medicine during their most recent pregnancy
   b) Of the women who used herbal medicine during pregnancy, 77.9% chose to self-prescribe these products
   c) Treatment with STW5 resulted in statistically significant protection against the reduction in responsiveness to adrenaline, carbachol and serotonin in both the RS and NMS/RS models
   d) STW5 largely protected against the increased sensitisation of the gastric muscarinic receptors

5. The meta-analysis investigating the effect of garlic in patients with hypertension found:
   a) Garlic was associated with a significant lowering effect on both systolic and diastolic blood pressure, with respective reductions of 6.71 mmHg and 4.79 mmHg
   b) Compared to placebo, a non-statistically significant lowering effect of garlic on blood pressure was observed when data was pooled from the seven studies
   c) Garlic intervention was associated with a reduction of CHD events by about a quarter and stroke by a third
   d) The evidence supporting the meta-analysis findings of garlic in hypertension is strong and sufficient
MedJourn

1. Which of these is correct?
   a) 2 doses of MMR vaccine was associated with the development of ASD.
   b) Those with siblings affected by ASD are not at a higher risk of developing the condition.
   c) The MMR vaccine was not associated with an increased risk of ASD at any age.
   d) Children who had siblings with ASD did not have lower rates of MMR vaccination than those children without affected siblings.
   e) Children who had one dose of MMR were more likely to develop ASD.

2. With reference to the study investigating diet soda intake and waist circumference in adults over 65 years, which of the following statements is incorrect?
   a) When results were adjusted according to sex, ethnic group, and BMI, the change in waist circumference remained significantly lower for diet soda users.
   b) No consistent relationship was observed between regular soda use and mean change in waist circumference.
   c) When results were adjusted according to sex, ethnic group, and BMI, the change in waist circumference remained significantly higher for diet soda users.
   d) A dose-response relationship was observed between initial diet soda intake and subsequent long-term increases in waist circumference.

3. The meta-analysis investigating the effects of hormone therapy on ovarian cancer risk found:
   a) Risk differed across the four most common epithelial tumour types, being definitely increased only in serous (RR = 1.53) and mucinous (RR = 1.42).
   b) Risk for current-or-recent hormone therapy use within the last 5 years, from the retrospective analysis was 1.37.
   c) In ex-users, women who had used hormone therapy for longer than 5 years were still at significant risk more than 5 years later.
   d) Authors suggest that women who use hormone therapy for 5 years from around 50 years have about one extra ovarian cancer per 600 users and one extra ovarian cancer death per 800 users.

Health Solutions for a Busy Life

Fast paced living, deadlines, poor diet, traffic jams, pollution, noise, living closely together, longer work hours, bigger mortgages...
No wonder so many people need a helping hand.

© NHA 2015
Why do some patients who follow the ‘right’ diet and exercise programs still show signs of insulin resistance? Why is it that others can remain lean and metabolically healthy whilst eating a high carbohydrate diet? Why do some patients present with symptoms of ‘hypoglycaemia’ with normal blood test results? This seminar will provide you with the latest answers to these common clinical questions and enhance your confidence and success in treating patients with a range of metabolic and blood sugar conditions.

Diabetes, Metabolic Syndrome and Blood Sugar Imbalances: Clinically Tested Strategies for Great Patient Outcomes.

OCTOBER - NOVEMBER 2015

Metagenics provide quality information and products, and really value the Practitioner’s key interests in a clinical setting.

MELISSA, NATUROPATH, GLEN WAVERLEY

Locations

QLD
- Caloundra Thursday 08 October
- Noosa Friday 09 October
- Rockhampton Monday 12 October
- Toowoomba Tuesday 13 October
- Mackay Wednesday 14 October
- Townsville Friday 16 October
- Cairns Saturday 17 October
- Brisbane Sunday 18 October
- Gold Coast Friday 06 November

NSW & ACT
- Ballina Saturday 10 October
- Coffs Harbour Sunday 11 October
- Port Macquarie Tuesday 13 October
- Kingscliff Thursday 15 October
- Baulkham Hills Saturday 17 October
- Manly Sunday 18 October
- Newcastle Monday 19 October
- Forster Thursday 21 October
- Lake Macquarie Friday 22 October
- Batemans Bay Friday 23 October
- Orange Friday 23 October
- Tamworth Saturday 24 October
- Port Macquarie Tuesday 27 October
- Sydney Sunday 01 November

VIC
- Glen Waverley Monday 19 October
- Geelong Tuesday 20 October
- Mornington Wednesday 21 October
- Albury Friday 23 October
- Melbourne Sunday 25 October
- Sydney Friday 30 October
- Launceston Friday 16 October

TAS
- Hobart Thursday 15 October

SA
- Burra Friday 30 October
- Adelaide Saturday 31 October

WA
- Perth Sunday 25 October
- Bunbury Monday 26 October
- Albany Tuesday 27 October

NT
- Darwin Thursday 27 October

This seminar is recognised for Continuing Education and Development Points/Formal Learning hours with various associations. Please enquire with your individual association for more details.

CALL CUSTOMER SERVICE NOW ON 1800 777 648 TO RESERVE YOUR PLACE TODAY.

metagenics.com.au

Metagenics is committed to providing the best education to all Practitioners no matter where they are. That's why Metagenics seminars are presented at 46 venues throughout Australia and New Zealand.

Metagenics reserves the right to refuse entry to any person, or competitor, or employee thereof. No tape recorders or video cameras allowed within any venue.
VegeNAC™
Vegan N-Acetyl-Cysteine Capsule

- The first ‘Practitioner Only’ vegan NAC capsule
- Convenient vegetable capsules to encourage greater patient compliance
- Proven independent stability
- Low excipient formula
- Provides a flexible, divided delivery option for an individualised approach

For further information contact our naturopaths on 1800 151 493 or visit www.professional.blackmores.com.au

Celloid® Minerals

The Blackmores Professional Celloid® Minerals range is the core of Mineral Therapy which was developed by Maurice Blackmore in the 1930s, based upon the principle that certain mineral deficiencies and lifestyle factors may negatively impact one’s health.
Where nature, science and health come together

The Pharmaceutical Plant Company has **25 years experience** in manufacturing and distributing the highest quality traditional herbal extracts, fresh plant tinctures and listed medicines in Australia.

From its Victorian based production facility, PPC manufactures herbal extracts utilising a traditional cold percolation process and a range of certified organic Australian grown fresh plant herbal tinctures for healthcare professionals.

For more information about our herbal extracts or herbal medicines visit [www.ppcherbs.com.au](http://www.ppcherbs.com.au) or contact us at sales@ppcherbs.com.au.