Editorial: A Milestone for *CANDJ* in a Changed Landscape

Marianne Trevorrow,[1] MA, ND

We have just passed the one-year anniversary since our last print edition of *Vital Link* and the start of our digital transition to *CANDJ*. This is now our fourth digital edition, and at this point, it seems fitting to look back and see what we've accomplished in this time, which has been truly remarkable for our small publication team. In just under a year, we've increased our registered readers by approximately 25% and our registered reviewers by close to 50%. We've also expanded our submission guidelines and editorial policies to match those of our integrative medical peers, and we've done it while maintaining our naturopathic principles and support for T&CM, Indigenous, and planetary health perspectives.

Still, if the COVID pandemic has made all of us aware of anything, it's that the speed of knowledge translation in health care has been transformed, and like everyone else, we are emerging from the last two years to a vastly changed professional landscape. Beyond thinking about "long COVID," it does seem that many more patients are struggling with anxiety and grief over the dislocations and economic shocks of the past two years, and the uncertainties of knowing when, where, and even if this pandemic will be coming to an end over the next few months. Many of our colleagues are asking these same questions, and are also dealing with the shock of inflation and higher interest rates that present challenges to practice and household finances.

Nevertheless, we have also seen colleagues step into professional and community leadership roles, volunteer to help neighbours or support their local food banks, or donate professional time to Community Health Centres or outreach clinics. As mentioned previously, we build collective resilience by fostering bonds between colleagues, as well as supporting the volunteer work of our provincial and national associations for the good of the profession.

Leading off this issue we have a thought-provoking Perspectives article from Lara Briden on polycystic ovarian syndrome, also known as PCOS. In it, she argues that current diagnostic criteria could lead to over diagnosis and poor treatment outcomes, without careful attention to underlying endocrine mechanisms and drivers, especially of hyperandrogenism.

Our second article is a critical reflection by Solomonian et al. on the value of group naturopathic visits (GMEVs). In their article, they argue that this novel care delivery structure may benefit patients and practitioners alike, particularly in the areas of lifestyle interventions and health promotion, and is consistent with naturopathic principles of care. They also touch on the potentially thorny issues of billing and regulatory considerations for GMEVs.

Finally, Gilbert, Cardozo, and Vedadi from CCNM – Toronto report on a study of the impact of cultural competency training in final-year students at their institution. This is a very topical area of concern in naturopathic medical training, and the authors reported statistically significant improvements in subjective assessment of knowledge, skills, and attitudes towards working with diverse populations. It is our hope that there will be more of these types of studies arising from naturopathic institutions across North America, to help educators work towards formulating a set of best practices to guide curriculum development in the future.

Finally, as we were moving into production for this issue, we received word that *CANDJ* has been approved for inclusion on EBSCO*host,* a leading resource for scholarly research and libraries worldwide. Joining EBSCO will not only bring greater reach for our content, but also promote our aim to provide an accessible platform for evidence-informed Canadian naturopathic medicine. Part of our original planning for the 2022/2023 publication year, we were delighted to be able to add our entire library of digital editions to their database, dating back to our launch in September 2021.

As always, we welcome feedback and letters to the editorial team, and continue our work to raise knowledge and understanding of our profession to a broader audience.

AUTHOR AFFILIATIONS
[1] Editor in chief, *CAND Journal.*

ACKNOWLEDGEMENTS
Not applicable.

CONFLICTS OF INTEREST DISCLOSURE
I have read and understood the *CAND Journal*'s policy on conflicts of interest and declare that I have none.

FUNDING
This research did not receive any funding.

Correspondence to: Dr. Marianne Trevorrow, MA, ND, Canadian Association of Naturopathic Doctors, 20 Holly Street, Suite 200, Toronto, ON M4S 3B1, Canada.
E-mail: drmtrevorrow@cand.ca

To cite: Trevorrow M. Editorial: A milestone for *CANDJ* in a changed landscape. *CAND Journal*. 2022;29(2):1. https:/doi.org/10.54434/candj.117

Received: 19 May 2022; **Accepted:** 19 May 2022; **Published:** 28 June 2022

Beyond the Label: A Patient-Centred Approach to Polycystic Ovary Syndrome

Lara Briden[1]

ABSTRACT

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder affecting women of reproductive age. Importantly, it is not one disease with a single pathophysiology but is instead a heterogeneous syndrome with several underlying biological mechanisms. Careful diagnosis requires attention to the key symptom of androgen excess as well as the exclusion of similar disorders including hyperprolactinemia, late-onset congenital adrenal hyperplasia, and hypothalamic amenorrhea. A patient-centred approach to treatment requires further assessment of underlying drivers and mechanisms including neuroendocrine disturbance, insulin resistance, and adrenal hyperresponsiveness.

Key Words Overdiagnosis, neuroendocrine, hyperandrogenism, oral micronized progesterone

INTRODUCTION

The goal of health care is to alleviate symptoms and prevent negative health outcomes. To that end, medicine has become adept at categorizing and labelling constellations of symptoms in an attempt to deliver appropriate treatment. For some conditions, such an approach is highly effective, especially when there is a single and clearly identifiable underlying pathophysiology (e.g., infection). For other conditions, the approach is less effective, especially when there is multifactorial or heterogeneous pathophysiology (e.g., depression). If taken too far, enthusiastic diagnostic imaging and labelling of symptoms can result in overdiagnosis and overtreatment, as has been documented for depression, hyperlipidemia, and osteoporosis.[1,2] Polycystic ovary syndrome (PCOS) is, unfortunately, both 1) a syndrome with a heterogeneous pathophysiology and 2) subject to overdiagnosis and overtreatment, largely as a result of the expansion[3] of the Rotterdam diagnostic criteria to include non-androgenic PCOS.[4]

In this perspective article, I will outline how the current one-size-fits-all approach to diagnosing and treating PCOS can produce negative patient outcomes such as healthy women receiving an unnecessary disease label and the misdiagnosis of hypothalamic amenorrhea as PCOS. I will describe a more precise diagnostic approach which requires the key symptom of androgen excess and emphasizes the exclusion of disorders with similar clinical symptoms.

Furthermore, I will propose an individualized approach of "looking beyond the PCOS label" to identify the underlying physiological driver or drivers of hyperandrogenism in each patient. Such an approach will enable clinicians to mechanistically target the driver with evidence-based methods, such as myo-inositol, and deliver better patient-centred outcomes such as relieving androgen excess and a return to ovulatory cycles.

BACKGROUND

From the earliest descriptions in the medical literature, polycystic ovary syndrome (PCOS) was recognized as a condition of androgen excess, with high luteinizing hormone (LH) and testosterone levels generally regarded as key components of a diagnosis.[3] Although an abnormal ovarian appearance was observed in some patients, it was not required for diagnosis, in part because pelvic ultrasound was not yet available.

The first formal PCOS diagnostic criteria from the National Institutes of Health (NIH)[5] did not include ovarian morphology but, instead, characterized PCOS as *unexplained hyperandrogenic anovulation*. More precisely, the NIH criteria stated that PCOS can be diagnosed when *all* of the following criteria are present: symptoms of androgen excess (clinical or biochemical), infrequent ovulation, and exclusion of other disorders with similar clinical symptoms. This is consistent with the definition of "anovulatory androgen excess" later proposed by Canadian endocrinology professor Jerilynn C. Prior[6] and the criteria of the Androgen Excess and PCOS (AE-PCOS) Society Task Force, which state that "PCOS should be defined by the presence of hyperandrogenism (clinical and/or biochemical), ovarian dysfunction

Correspondence to: Lara Briden, Centre for Menstrual Cycle and Ovulation Research, in Endocrinology, University of British Columbia, 2775 Laurel Street, Vancouver, BC V5Z 1M9, Canada. **E-mail:** lara@larabriden.com

To cite: Briden L. Beyond the label: A patient-centred approach to polycystic ovary syndrome. *CAND Journal*. 2022;29(2):2-8. https:/doi.org/10.54434/candj.114

Received: 09 March 2022; **Accepted:** 06 May 2022; **Published:** 28 June 2022

(oligo-anovulation and/or polycystic ovaries), and the exclusion of related disorders."[7]

Therefore, according to the NIH, Professor Jerilynn Prior, and the AE-PCOS Society, PCOS is, *by definition*, a condition of androgen excess. In simplest terms, PCOS is the symptom of androgen excess when all other causes of androgen excess have been ruled out.

That clear focus on androgen excess changed in 2004 with the introduction of the Rotterdam Criteria,[4] which proposed for the first time polycystic ovarian morphology (PCOM) as a stand-alone criterion, thus enabling a PCOS diagnosis to be made based on only two of the following three criteria:

1. rare ovulation or lack of ovulation,
2. symptoms of androgen excess (clinical or biochemical),
3. polycystic ovarian morphology.

This small but important change dramatically increased the incidence of PCOS from 5% of women of reproductive age to an incredible 20%[8] and opened the door to the diagnosis of PCOS *in the absence of androgen excess*. According to the Rotterdam criteria, *non-androgenic* PCOS can be diagnosed based *only* on the symptoms of anovulation and polycystic ovaries, which equates to counting the same symptom twice because the polycystic (or more accurately, poly-follicular) appearance of the ovaries is merely an indicator of temporarily stalled follicle development and failure to ovulate in that cycle. In other words, anovulation (of any cause) is likely to correlate with PCOM, and the fact that anovulatory cycles are common (occurring in up to 30% of otherwise clinically normal menstrual cycles[9]) means that polycystic ovaries are common (occurring in up to 30% of women with normal cycles and hormones).[10]

The disconnect between the PCOM and androgen excess has been addressed in several papers including a 2010 commentary in *The Journal of Clinical Endocrinology & Metabolism*, which acknowledges that "an isolated PCOM in an ovulatory woman is not an indication for metabolic evaluation,"[11] and a 2022 paper about diagnostic criteria,[12] which notes that it is entirely possible to have the endocrine condition of androgenic PCOS but normal looking ovaries. The same paper goes on to say that "the presence of PCOM is neither necessary nor sufficient for diagnosis of PCOS" and concludes "there is no evidence that the presence of PCOM has any implications with regard to the endocrine or metabolic features of PCOS."

It's also worth noting that it is entirely possible to have androgenic PCOS but normal looking ovaries, especially in older women, who have fewer follicles.

So, polycystic ovaries occur in some (but not all) women with PCOS and in women with normal hormones. Polycystic ovaries also occur in women using hormonal birth control and women with any condition of oligo- or amenorrhea including the increasingly common scenario of hypothalamic amenorrhea or relative energy deficiency in sport (RED-s) as a result of undereating or underfueling. Of course, even under the Rotterdam Criteria, hypothalamic amenorrhea is supposed to be ruled out by asking patients about restricted eating. In practice, many clinicians do not ask about restricted eating, which means hypothalamic amenorrhea is frequently misdiagnosed as PCOS.[13]

The Problem of Misdiagnosis and Overdiagnosis

According to public health researcher Tessa Copp from The University of Sydney, the problem goes further than just misdiagnosis of hypothalamic amenorrhea as PCOS. In a recent *British Medical Journal* article titled "Driven by good intentions: Why widening the diagnostic criteria for polycystic ovary syndrome may be harming women,"[14] Copp argues that even the tightened diagnostic criteria of the 2018 International PCOS Guidelines[15] "still capture many women with few or mild symptoms," including women who would naturally *outgrow* their androgen symptoms.[16] Women who would naturally outgrow mild hyperandrogenism include young women and women experiencing what the author has clinically observed to be rebound hyperandrogenism upon discontinuation of androgen-suppressing medication such as cyproterone- and drospirenone-containing oral contraceptives.

Copp warns that in the case of mild or temporary PCOS, women are harmed by the unnecessary fear that "their condition will worsen, which threatens their perception of health and fertility."[14] As part of her research, Copp and her team conducted a qualitative study,[17] which found that "fear of infertility can result in adverse psychological and behavioural consequences including anxiety, depression, lower self-worth, altered life and education goals, risk-taking with contraception, and unintended pregnancies." In the same study, she called for "reducing the harms of unnecessarily labelling healthy women for whom the benefits of a diagnosis are small." Yet another paper[18] explored the subjective nature of assessing clinical hyperandrogenism (hirsutism) and warned that a "milder degree [of hirsutism] can be considered as normal patterns" for some ethnic groups and "not a reason for seeking medical care."

An additional concern is when a PCOS diagnosis is provided to patients seeking an explanation for pelvic pain. According to a 2017 study,[19] patients report pain as the most common symptom of PCOS. This is despite the fact that pain is not a symptom of PCOS.[15] The reason for this mismatch between what the patient needs (an explanation for pain) and what is provided (a possibly mistaken and unnecessary PCOS diagnosis) is that both PCOS and menstrual pain are common, so it's easy to have both a PCOS diagnosis and menstrual pain, including pain due to endometriosis.

Misdiagnosing hypothalamic amenorrhea and endometriosis as PCOS muddies the waters for both researchers and clinicians. In my own clinical practice, I commonly encounter patients who say: "I've tried everything for my PCOS but still have this pain." By which they mean they have tried metformin and a low-carb diet but still have pain, which is not surprising given that neither metformin nor a low-carb diet is a treatment for pelvic pain.

Finally, it's important to remember that PCOS is a "diagnosis of exclusion,"[20] with all formal diagnostic criteria (NHI, AE-PCOS, and Rotterdam) stipulating the exclusion of other disorders with similar clinical symptoms.[5,7,4] Clinicians should therefore take care to rule out other causes of anovulation and androgen excess

including thyroid disease, Cushing syndrome, nonclassical or late-onset congenital adrenal hyperplasia (CAH), hyperprolactinemia, hypothalamic amenorrhea, and side effects from medication, such as progestins with a high androgen index.

Androgenic PCOS is a Heterogeneous Syndrome

Even when properly diagnosed, androgenic PCOS is still an "umbrella diagnosis," which means a set of symptoms (i.e., a syndrome) resulting from one or more *different* underlying biological drivers or mechanisms. For context, another well-known umbrella diagnosis is irritable bowel syndrome (IBS), which is a set of digestive symptoms resulting from different underlying mechanisms including dysbiosis, food intolerances, altered intestinal motility, and more.[21]

The umbrella or heterogeneous nature of the PCOS diagnosis was acknowledged almost from the beginning, with a 2002 paper stating that "a single cause [of PCOS] is unlikely."[22] The Public Library of Science (PLOS) took it further in 2020, when they said that "PCOS is, in fact, a heterogeneous disorder with *different underlying biological mechanisms*" [emphasis mine] and that "grouping women with PCOS under a single diagnosis may be counterproductive because distinct disease subtypes will likely benefit from different interventions."[23]

Treat the Individual

When treating a heterogeneous syndrome like PCOS, the best clinical strategy is to look beyond the diagnostic label of PCOS to possible underlying biological drivers and treat those. By doing so, androgen excess can be relieved and ovulatory cycles restored.

Documented physiological drivers of hyperandrogenism include neuroendocrine disturbance, insulin resistance, and adrenal hyperresponsiveness, all of which may be present simultaneously and interact.

Neuroendocrine Disturbance

In our paper, "The central role of ovulatory disturbances in the etiology of androgenic polycystic ovary syndrome,"[24] my co-authors Professor Jerilynn Prior and Sonia Shirin and I build the case that the central disturbance in many cases of androgenic PCOS is abnormally rapid pulsatility of gonadotropin-releasing hormone (GnRH). Such a disturbance is downstream from various origins including chronic inflammation[25] and genetic polymorphisms such as polymorphisms of the genes for FSH and LH receptors,[26] and 17-α-hydroxylase/17–20 lyase,[27] which is the rate-limiting step of androgen biosynthesis. Developmental factors are also important, especially *in utero* exposure to androgens,[28] which causes epigenetic changes to the genes associated with GnRH pulsatility and steroidogenesis[29] and creates a five-fold increased risk of androgenic PCOS in daughters of mothers with PCOS.[30]

Rapid GnRH pulsatility, in turn, promotes further impairment of the hypothalamic-pituitary-ovarian (HPO) axis by suppressing follicle-stimulating hormone (FSH) and stimulating LH resulting in stalled follicle development and high thecal cell androgen production, leading to aromatization and tonically high estrogen levels.[24] The resulting ovulatory disturbance and progesterone deficiency further deprive the system of the progesterone feedback that normally slows GnRH pulsatility, creating a vicious cycle,[24] as illustrated in Figure 1.

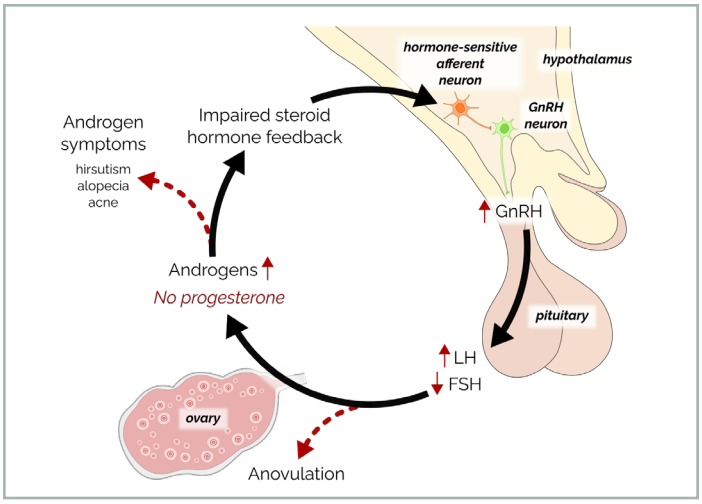

FIGURE 1 A model of the neuroendocrine disturbance causing androgen excess in some cases of androgenic PCOS. Dysregulation of the neural circuit of the GnRH/LH pulse generator leads to anovulation, absent progesterone, and consequent hyperandrogenism, creating a vicious cycle of impaired steroid feedback and further dysregulation of the neural circuit.

Assessing for Neuroendocrine Disturbance

The simplest way to clinically assess for rapid GnRH pulsatility is to measure serum LH and FSH on day two or three of the menstrual cycle, or, in the case of amenorrhea or no cycle, on a random day, taking care to not misinterpret a normal ovulatory surge of LH as elevated baseline LH. Androgenic PCOS with neuroendocrine disturbance typically presents with a high ratio (>2:1) of baseline serum LH to FSH.[31] Hypothalamic amenorrhea typically presents with a normal to low ratio of baseline serum LH to FSH.[31]

Treatments or Interventions for Neuroendocrine Disturbance

The nutrient myo-inositol amplifies intracellular FSH signalling and promotes ovulation[32]; it can therefore help to correct the rapid GnRH pulsatility of androgenic PCOS. Myo-inositol is one of the evidence-based PCOS treatments included in the 2018 "Recommendations from the international evidence-based guideline for the assessment and management of polycystic ovary syndrome."[15]

Cyclic progesterone therapy using oral micronized progesterone (OMP) given in a cyclic pattern for 14 days to mimic the luteal phase can also improve neuroendocrine disturbance by exerting beneficial negative feedback on GnRH pulsatility,[24] as illustrated in Figure 2. Oral micronized progesterone induces withdrawal bleeds, slows the GnRH pulse generator, suppresses LH, lowers androgens, and eventually promotes ovulatory cycles.[24] Mechanisms by which progesterone lowers androgens include 1) slowing of the GnRH pulse generator, thereby reducing the LH stimulation of thecal cells and 2) competing for the enzyme 5 alpha-reductase, thereby reducing dihydrotestosterone (DHT), which is the active

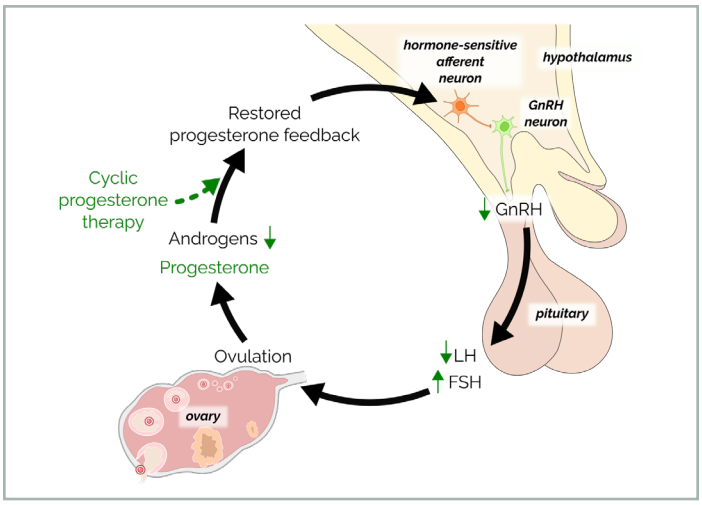

FIGURE 2 Treatment of androgenic polycystic ovary syndrome with cyclic oral micronized progesterone therapy. Oral micronized progesterone (OMP) given in a cyclic pattern for 14 days to mimic the luteal phase acts centrally to restore the healthy function of the GnRH pulse generator, suppress LH, and reduce androgen excess, promoting ovulation.

form of testosterone. Cyclic progesterone therapy is currently undergoing a clinical trial for PCOS.[33]

Insulin Resistance

A second driver of androgenic PCOS is insulin resistance or hyperinsulinemia, which contributes to androgen excess by:

- Directly stimulating ovarian thecal cells to produce androgens,[34] possibly by acting as a co-gonadotropin with LH[35]
- Increasing unbound or free testosterone by decreasing sex hormone-binding globulin (SHBG)
- Contributing to neuroendocrine disturbance by increasing GnRH pulsatility.[36]

Thus, hyperinsulinemia contributes to the vicious cycle of the first biological driver (neuroendocrine disturbance) to a greater or lesser degree depending on the severity. Severe hyperinsulinemia can even produce androgen excess in the absence of neuroendocrine disturbance or other source of hyperandrogenism.[37]

Hyperinsulinemia is, however, unlikely to be the primary initiating driver for most women with androgenic PCOS. Instead, insulin resistance is likely to be secondary to neuroendocrine anovulatory hyperandrogenism based on the findings that the androgenic anovulatory PCOS phenotypes have worse insulin sensitivity than do ovulatory phenotypes[38,39,40,41] and that increasing androgen burden often leads to a deterioration of insulin sensitivity.[42] Anovulatory hyperandrogenism was further demonstrated to be causal by a prospective study of a random sample of adolescents, which found that PCOS by age 18 was best predicted by oligomenorrhea at age 14, and not by obesity or insulin resistance.[43] In other words, androgen excess probably comes first and promotes insulin resistance,[44,45] via several mechanisms, including deposition of visceral fat,[46,47] the "masculinization" of adipose tissue,[48] decreased muscle glucose uptake,[49] decreased thermogenesis and energy expenditure,[50] and lipid accumulation in liver.[51]

Assessing for Insulin Resistance

Signs and symptoms of insulin resistance include a high waist measure, acanthosis nigricans, low HDL cholesterol, and high serum triglycerides. Other possible laboratory findings include high HbA1C, high fasting insulin,[52] and, most accurately, a high HOMA-IR index (homeostatic model for insulin resistance), which is a calculation of fasting glucose and insulin concentrations, defined as fasting plasma glucose (mmol/L) × fasting plasma insulin (μU/mL/22.5).[53] A recent study of HOMA-IR and insulin resistance concluded that "monitoring insulin may have clinical relevance," including in patients with normal fasting glucose.[54] And in a study of girls with PCOS, fasting insulin was identified as a simple blood test that can be used clinically to guide treatment.[55] Of note, a positive response to insulin-sensitizing medication has been observed in normal-weight women with PCOS,[56] suggesting that mild insulin resistance is a factor even in so-called "lean PCOS."

Treatment or Intervention for Insulin Resistance

Conventional treatment for insulin resistance includes diet, exercise, and insulin-sensitizing medication, such as metformin. Nutritional supplements that have been clinically trialled for insulin resistance include magnesium,[57] myo-inositol,[58] and the phytonutrients berberine[59] and silymarin.[60]

Adrenal Hyperresponsiveness

Most women with PCOS have an elevation of all types of androgens: testosterone from the ovaries, androstenedione from the ovaries and adrenal glands, and DHEA-S (dehydroepiandrosterone sulfate) from the adrenal glands. When only DHEA-S is elevated but testosterone and androstenedione are normal, it may be classified as the adrenal subtype of PCOS,[61] which researchers have described as "a subclinical form of micronodular bilateral adrenal hyperplasia,"[62] and which accounts for about 10% of PCOS diagnoses.[7] Adrenal PCOS is driven by hyperresponsiveness of the adrenal cortex and stress response system,[63] and may be the result of stress or trauma around the time of puberty.[64]

Assessing for Adrenal PCOS

The adrenal PCOS sub-type is suggested by elevated serum DHEA-S, together with normal testosterone and androstenedione. A similar condition of nonclassical or late-onset CAH should be ruled out by screening for elevated follicular phase 17-OH progesterone, followed by an adrenocorticotropic hormone (ACTH) stimulation test and genetic testing. Late-onset CAH accounts for up to 9% of cases of androgen excess and can be misdiagnosed as PCOS.[65]

Treatment or Intervention for Adrenal Hyperresponsiveness

Adrenal PCOS may benefit from nutrients and herbal medicines that support the stress response system, particularly pantothenic

acid, which helps to modulate the response of the adrenal cortex to ACTH.[66] Androgen symptoms can also be improved with progesterone, either by taking cyclic progesterone therapy or by promoting ovulatory cycles and robust luteal phases. Finally, adrenal androgens can be downregulated with hydrocortisone[67] and the herbal medicine licorice (*Glycyrrhiza glabra*), which slows the activity of 17-α-hydroxylase, thereby lowering androgens[68] and "could be considered as an adjuvant therapy for hirsutism and polycystic ovary syndrome."[68]

CONCLUSION

The first step in a patient-centred approach to PCOS is careful diagnosis, with attention to the key symptom of hyperandrogenism and exclusion of disorders with similar clinical symptoms such as hyperprolactinemia, thyroid disease, and hypothalamic amenorrhea. By focussing on hyperandrogenism, and avoiding *non-androgenic* PCOS phenotypes, clinicians can avoid the harms of labelling healthy women or women with hypothalamic amenorrhea with an unnecessary (and possibly inaccurate) PCOS diagnosis.

The next step in a patient-centred approach is to recognize that PCOS is not a single disease but is instead a heterogeneous syndrome with multiple underlying physiological drivers, including neuroendocrine disturbance, insulin resistance, and adrenal hyperresponsiveness. By looking beyond the disease label to the underlying physiological driver, clinicians can mechanistically target the driver with evidence-based methods such as myo-inositol and cyclic progesterone therapy. Such an approach can produce the desirable patient outcomes of relieving androgen excess and a return to ovulatory cycles.

AUTHOR AFFILIATIONS

[1]Centre for Menstrual Cycle and Ovulation Research (CeMCOR), University of British Columbia, Vancouver, BC, Canada.

ACKNOWLEDGEMENTS

Not applicable.

CONFLICTS OF INTEREST DISCLOSURE

I have read and understood the *CAND Journal*'s policy on conflicts of interest and declare that I have none.

FUNDING

This research did not receive any funding.

REFERENCES

1. Kale MS, Korenstein D. Overdiagnosis in primary care: framing the problem and finding solutions. *BMJ*. 2018;362:k2820. https://doi.org/10.1136/bmj.k2820
2. Mintzes B, Swandari S, Fabbri A, Grundy Q, Moynihan R, Bero L. Does industry-sponsored education foster overdiagnosis and overtreatment of depression, osteoporosis and over-active bladder syndrome? An Australian cohort study. *BMJ Open*. 2018;8(2):e019027. https://doi.org/10.1136/bmjopen-2017-019027
3. History of discovery of polycystic ovary syndrome. *Adv Clin Exp Med*. 2017;26(3):555-558. https://doi.org/10.17219/acem/61987
4. Rotterdam ESHRE/ASRM-Sponsored PCOS Consensus Workshop Group. Revised 2003 consensus on diagnostic criteria and long-term health risks related to polycystic ovary syndrome. *Fertil Steril*. 2004;81(1):19-25. https://doi.org/10.1016/j.fertnstert.2003.10.004
5. Zawadzki J, Dunaif A. Diagnostic criteria for polycystic ovary syndrome: towards a rational approach. In: Dunaif A, Givens HR, Haseltine FP, Merriam GR, ed. *Polycystic ovary syndrome*. Blackwell Scientific; 1992:377-384.
6. Prior JC, Kalyan S, Seifert-Klauss V. Re-naming PCOS: suggest anovulatory androgen excess (Letter to the editor). *J Clin Endocrinol Metabol*. 2013;98:4325-4328.
7. Azziz R, Carmina E, Dewailly D, et al. The androgen excess and PCOS society criteria for the polycystic ovary syndrome: the complete task force report. *Fertil Steril*. 2009;91(2):456-488. https://doi.org/10.1016/j.fertnstert.2008.06.035
8. Wilcock J, Taylor D. Polycystic ovarian syndrome: overdiagnosed and overtreated?. *Br J Gen Pract*. 2018;68(670):243. https://doi.org/10.3399/bjgp18X696113
9. Prior JC, Naess M, Langhammer A, Forsmo S. Ovulation prevalence in women with spontaneous normal-length menstrual cycles—A population-based cohort from HUNT3, Norway. *PLOS One*. 2015;10(8):e0134473. https://doi.org/10.1371/journal.pone.0134473
10. Polson DW, Adams J, Wadsworth J, Franks S. Polycystic ovaries—a common finding in normal women. *Lancet*. 1988;1(8590):870-872. https://doi.org/10.1016/s0140-6736(88)91612-1
11. Johnstone EB, Rosen MP, Neril R, et al. The polycystic ovary post-Rotterdam: a common, age-dependent finding in ovulatory women without metabolic significance. *J Clin Endocrinol Metab*. 2010;95(11):4965-4972. https://doi.org/10.1210/jc.2010-0202
12. Chang S, Dunaif A. Diagnosis of polycystic ovary syndrome: which criteria to use and when?. *Endocrinol Metab Clin North Am*. 2021;50(1):11-23. https://doi.org/10.1016/j.ecl.2020.10.002
13. 13. Alemyar A, van der Kooi ALF, Laven JSE. Anti-Müllerian hormone and ovarian morphology in women with hypothalamic hypogonadism. *J Clin Endocrinol Metab*. 2020;105(5). https://doi.org/10.1210/clinem/dgaa116
14. Copp T, Doust J, McCaffery K, Hersch J, Jansen J. Polycystic ovary syndrome: why widening the diagnostic criteria may be harming women. *BMJ*. 2021;373:n700. https://doi.org/10.1136/bmj.n700
15. Teede HJ, Misso ML, Costello MF, et al. Recommendations from the international evidence-based guideline for the assessment and management of polycystic ovary syndrome. *Fertil Steril*. 2018;110(3):364-379. https://doi.org/10.1016/j.fertnstert.2018.05.004
16. Copp T, Jansen J, Doust J, Mol BW, Dokras A, McCaffery K. Are expanding disease definitions unnecessarily labelling women with polycystic ovary syndrome?. *BMJ*. 2017;358:j3694. https://doi.org/10.1136/bmj.j3694
17. Copp T, Hersch J, Muscat DM, et al. The benefits and harms of receiving a polycystic ovary syndrome diagnosis: a qualitative study of women's experiences. *Hum Reprod Open*. 2019;2019(4):hoz026. https://doi.org/10.1093/hropen/hoz026
18. Soares-Jr JM, Sá MFS, Baracat EC. New criteria for the clinical diagnosis of hyperandrogenism in polycystic ovarian syndrome and the risk of overdiagnosis. *Rev Bras Ginecol Obstet*. 2019;41(6):361-362. https://doi.org/10.1055/s-0039-1693530
19. Martin ML, Halling K, Eek D, Krohe M, Paty J. Understanding polycystic ovary syndrome from the patient perspective: a concept elicitation patient interview study. *Health Qual Life Outcomes*. 2017;15(1):162. https://doi.org/10.1186/s12955-017-0736-3
20. Kyritsi EM, Dimitriadis GK, Kyrou I, Kaltsas G, Randeva HS. PCOS remains a diagnosis of exclusion: a concise review of key endocrinopathies to exclude. *Clin Endocrinol (Oxf)*. 2017;86(1):1-6. https://doi.org/10.1111/cen.13245
21. Bellini M, Gambaccini D, Stasi C, Urbano MT, Marchi S, Usai-Satta P. Irritable bowel syndrome: a disease still searching for pathogenesis, diagnosis and therapy. *World J Gastroenterol*. 2014;20(27):8807-8820. https://doi.org/10.3748/wjg.v20.i27.8807
22. Balen A, Michelmore K. What is polycystic ovary syndrome? Are national views important?. *Hum Reprod*. 2002;17(9):2219-2227. https://doi.org/10.1093/humrep/17.9.2219
23. Dapas M, Lin FTJ, Nadkarni GN, et al. Distinct subtypes of polycystic ovary syndrome with novel genetic associations: an unsupervised, phenotypic clustering analysis. *PLOS Med*. 2020;17(6):e1003132. https://doi.org/10.1371/journal.pmed.1003132

24. Briden L, Shirin S, Prior JC. The central role of ovulatory disturbances in the etiology of androgenic polycystic ovary syndrome (PCOS)—evidence for treatment with cyclic progesterone. *Drug Discov Today Dis Model*. 2020;32:71-82.

25. Bressler BH, Dusik LA, Menard MR. Tension responses of frog skeletal muscle fibres to rapid shortening and lengthening steps. *J Physiol*. 1988;397:631-641. https://doi.org/10.1113/jphysiol.1988.sp017022

26. Hayes MG, Urbanek M, Ehrmann DA, et al. Publisher correction: genome-wide association of polycystic ovary syndrome implicates alterations in gonadotropin secretion in European ancestry populations. *Nat Commun*. 2020;11(1):2158. https://doi.org/10.1038/s41467-020-15793-w

27. Xu X, Hu K, Shi H, Yu Y, Xu J, Sun Y. The single-nucleotide polymorphism rs743572 of CYP17A1 shows significant association with polycystic ovary syndrome: a meta-analysis. *Reprod Biomed Online*. 2021;43(5):941-951. https://doi.org/10.1016/j.rbmo.2021.06.012

28. Falbo A, Rocca M, Russo T, et al. Changes in androgens and insulin sensitivity indexes throughout pregnancy in women with polycystic ovary syndrome (PCOS): relationships with adverse outcomes. *J Ovarian Res*. 2010;3:23. https://doi.org/10.1186/1757-2215-3-23

29. Dumesic DA, Abbott DH, Padmanabhan V. Polycystic ovary syndrome and its developmental origins. *Rev Endocr Metab Disord*. 2007;8(2):127-141. https://doi.org/10.1007/s11154-007-9046-0

30. Risal S, Pei Y, Lu H, et al. Prenatal androgen exposure and transgenerational susceptibility to polycystic ovary syndrome. *Nat Med*. 2019;25(12):1894-1904. https://doi.org/10.1038/s41591-019-0666-1

31. Abou Sherif S, Newman R, Haboosh S, et al. Investigating the potential of clinical and biochemical markers to differentiate between functional hypothalamic amenorrhoea and polycystic ovarian syndrome: a retrospective observational study. *Clin Endocrinol (Oxf)*. 2021;95(4):618-627. https://doi.org/10.1111/cen.14571

32. Facchinetti F, Unfer V, Dewailly D, et al. Inositols in polycystic ovary syndrome: an overview on the advances. *Trends Endocrinol Metab*. 2020;31(6):435-447. https://doi.org/10.1016/j.tem.2020.02.002

33. Prior JC, Singer J, Goshtasebi A, et al. Phase II 6-month cyclic progesterone/spironolactone pilot therapy trial in polycystic ovary syndrome: pre-post, single-arm feasibility study. 2022. The University of British Columbia. https://doi.org/10.14288/1.0396377. Retrieved from https://open.library.ubc.ca/soa/cIRcle/collections/facultyresearchandpublications/52383/items/1.0396377

34. Qu J, Wang Y, Wu X, Gao L, Hou L, Erkkola R. Insulin resistance directly contributes to androgenic potential within ovarian theca cells. *Fertil Steril*. 2009;91(5 Suppl):1990-1997. https://doi.org/10.1016/j.fertnstert.2008.02.167

35. Barbieri RL, Smith S, Ryan KJ. The role of hyperinsulinemia in the pathogenesis of ovarian hyperandrogenism. *Fertil Steril*. 1988;50(2):197-212. https://doi.org/10.1016/s0015-0282(16)60060-2

36. Kim HH, DiVall SA, Deneau RM, Wolfe A. Insulin regulation of GnRH gene expression through MAP kinase signaling pathways. *Mol Cell Endocrinol*. 2005;242(1-2):42-49. https://doi.org/10.1016/j.mce.2005.07.002

37. Rager KM, Omar HA. Androgen excess disorders in women: the severe insulin-resistant hyperandrogenic syndrome, HAIR-AN. *Sci World J*. 2006;6:116-121. https://doi.org/10.1100/tsw.2006.23

38. Panidis D, Tziomalos K, Misichronis G, et al. Insulin resistance and endocrine characteristics of the different phenotypes of polycystic ovary syndrome: a prospective study. *Hum Reprod*. 2012;27(2):541-549. https://doi.org/10.1093/humrep/der418

39. Diamanti-Kandarakis E, Panidis D. Unravelling the phenotypic map of polycystic ovary syndrome (PCOS): a prospective study of 634 women with PCOS. *Clin Endocrinol (Oxf)*. 2007;67(5):735-742. https://doi.org/10.1111/j.1365-2265.2007.02954.x

40. Kauffman RP, Baker TE, Baker VM, DiMarino P, Castracane VD. Endocrine and metabolic differences among phenotypic expressions of polycystic ovary syndrome according to the 2003 Rotterdam consensus criteria. *Am J Obstet Gynecol*. 2008;198(6):670.e1-e10. https://doi.org/10.1016/j.ajog.2008.01.037

41. Wiltgen D, Spritzer PM. Variation in metabolic and cardiovascular risk in women with different polycystic ovary syndrome phenotypes. *Fertil Steril*. 2010;94(6):2493-2496. https://doi.org/10.1016/j.fertnstert.2010.02.015

42. O'Reilly MW, Taylor AE, Crabtree NJ, et al. Hyperandrogenemia predicts metabolic phenotype in polycystic ovary syndrome: the utility of serum androstenedione. *J Clin Endocrin Metabol*. 2014;99(3):1027-1036. https://doi.org/10.1210/jc.2013-3399.

43. van Hooff MH, Voorhorst FJ, Kaptein MB, Hirasing RA, Koppenaal C, Schoemaker J. Predictive value of menstrual cycle pattern, body mass index, hormone levels and polycystic ovaries at age 15 years for oligo-amenorrhoea at age 18 years. *Hum Reprod*. 2004;19(2):383-392. https://doi.org/10.1093/humrep/deh079

44. Diamanti-Kandarakis E, Papalou O, Kandaraki EA. The role of androgen excess on insulin sensitivity in women. *Front Horm Res*. 2019;53:50-64. https://doi.org/10.1159/000494902

45. Ruth KS, Day FR, Tyrrell J, et al. Using human genetics to understand the disease impacts of testosterone in men and women. *Nat Med*. 2020;26(2):252-258. https://doi.org/10.1038/s41591-020-0751-5

46. Dumesic DA, Oberfield SE, Stener-Victorin E, Marshall JC, Laven JS, Legro RS. Scientific statement on the diagnostic criteria, epidemiology, pathophysiology, and molecular genetics of polycystic ovary syndrome. *Endocr Rev*. 2015;36(5):487-525. https://doi.org/10.1210/er.2015-1018

47. Borruel S, Fernández-Durán E, Alpañés M, et al. Global adiposity and thickness of intraperitoneal and mesenteric adipose tissue depots are increased in women with polycystic ovary syndrome (PCOS). *J Clin Endocrinol Metab*. 2013;98(3):1254-1263. https://doi.org/10.1210/jc.2012-3698

48. Montes-Nieto R, Insenser M, Martínez-García MÁ, Escobar-Morreale HF. A nontargeted proteomic study of the influence of androgen excess on human visceral and subcutaneous adipose tissue proteomes. *J Clin Endocrinol Metab*. 2013;98(3):E576-E585. https://doi.org/10.1210/jc.2012-3438

49. Inada A, Fujii NL, Inada O, Higaki Y, Furuichi Y, Nabeshima YI. Effects of 17β-estradiol and androgen on glucose metabolism in skeletal muscle. *Endocrinology*. 2016;157(12):4691-4705. https://doi.org/10.1210/en.2016-1261

50. Morford J, Mauvais-Jarvis F. Sex differences in the effects of androgens acting in the central nervous system on metabolism. *Dialogues Clin Neurosci*. 2016;18(4):415-424. https://pubmed.ncbi.nlm.nih.gov/28179813

51. Kanaya N, Vonderfecht S, Chen S. Androgen (dihydrotestosterone)-mediated regulation of food intake and obesity in female mice. *J Steroid Biochem Mol Biol*. 2013;138:100-106. https://doi.org/10.1016/j.jsbmb.2013.04.001

52. Zhang X, Li J, Zheng S, Luo Q, Zhou C, Wang C. Fasting insulin, insulin resistance, and risk of cardiovascular or all-cause mortality in non-diabetic adults: a meta-analysis. *Biosci Rep*. 2017;37(5). https://doi.org/10.1042/BSR20170947

53. Wallace TM, Levy JC, Matthews DR. Use and abuse of HOMA modeling. *Diabetes Care*. 2004;27(6):1487-1495. https://doi.org/10.2337/diacare.27.6.1487

54. Caporaso NE, Jones RR, Stolzenberg-Solomon RZ, Medgyesi DN, Kahle LL, Graubard BI. Insulin resistance in healthy U.S. adults: findings from the National Health and Nutrition Examination Survey (NHANES). *Cancer Epidemiol Biomarkers Prev*. 2020;29(1):157-168. https://doi.org/10.1158/1055-9965.EPI-19-0206

55. Cree-Green M, Cai N, Thurston JE, et al. Using simple clinical measures to predict insulin resistance or hyperglycemia in girls with polycystic ovarian syndrome. *Pediatr Diabetes*. 2018;19(8):1370-1378. https://doi.org/10.1111/pedi.12778

56. Nestler JE, Jakubowicz DJ. Lean women with polycystic ovary syndrome respond to insulin reduction with decreases in ovarian P450c17 alpha activity and serum androgens. *J Clin Endocrinol Metab*. 1997;82(12):4075-4079. https://doi.org/10.1210/jcem.82.12.4431

57. Morais JBS, Severo JS, de Alencar GRR, et al. Effect of magnesium supplementation on insulin resistance in humans: a systematic review. *Nutrition*. 2017;38:54-60. https://doi.org/10.1016/j.nut.2017.01.009

58. Fruzzetti F, Perini D, Russo M, Bucci F, Gadducci A. Comparison of two insulin sensitizers, metformin and myo-inositol, in women with polycystic ovary syndrome (PCOS). *Gynecol Endocrinol*. 2017;33(1):39-42. https://doi.org/10.1080/09513590.2016.1236078

59. Zhao H, Xing C, Zhang J, He B. Comparative efficacy of oral insulin sensitizers metformin, thiazolidinediones, inositol, and berberine in improving endocrine and metabolic profiles in women with PCOS: a network meta-analysis. *Reprod Health*. 2021;18(1):171. https://doi.org/10.1186/s12978-021-01207-7

60. MacDonald-Ramos K, Michán L, Martínez-Ibarra A, Cerbón M. Silymarin is an ally against insulin resistance: a review. *Ann Hepatol*. 2021;23:100255. https://doi.org/10.1016/j.aohep.2020.08.072

61. Gourgari E, Lodish M, Keil M, et al. Bilateral adrenal hyperplasia as a possible mechanism for hyperandrogenism in women with polycystic ovary syndrome. *J Clin Endocrinol Metab*. 2016;101(9):3353-3360. https://doi.org/10.1210/jc.2015-4019

62. Hoffman DI, Klove K, Lobo RA. The prevalence and significance of elevated dehydroepiandrosterone sulfate levels in anovulatory women. *Fertil Steril*. 1984;42(1):76-81. https://doi.org/10.1016/s0015-0282(16)47961-6

63. Rasmusson AM, Vasek J, Lipschitz DS, et al. An increased capacity for adrenal DHEA release is associated with decreased avoidance and negative mood symptoms in women with PTSD. *Neuropsychopharmacology*. 2004;29(8):1546-1557. https://doi.org/10.1038/sj.npp.1300432

64. Lobo RA, Granger LR, Paul WL, Goebelsmann U, Mishell DR Jr. Psychological stress and increases in urinary norepinephrine metabolites, platelet serotonin, and adrenal androgens in women with polycystic ovary syndrome. *Am J Obstet Gynecol*. 1983;145(4):496-503. https://doi.org/10.1016/0002-9378(83)90324-1

65. Witchel SF. Nonclassic congenital adrenal hyperplasia. *Curr Opin Endocrinol Diabetes Obes*. 2012;19(3):151-158. https://doi.org/10.1097/MED.0b013e3283534db2

66. Pan L, Jaroenporn S, Yamamoto T, et al. Effects of pantothenic acid supplement on secretion of steroids by the adrenal cortex in female rats. *Reprod Med Biol*. 2012;11(2):101-104. https://doi.org/10.1007/s12522-011-0113-6

67. Rezvani I, Garibaldi LR, Digeorge AM, Artman HG. Disproportionate suppression of dehydroepiandrosterone sulfate (DHEAS) in treated patients with congenital adrenal hyperplasia due to 21-hydroxylase deficiency. *Pediatr Res*. 1983;17(2):131-134. https://doi.org/10.1203/00006450-198302000-00010

68. Armanini D, Mattarello MJ, Fiore C, et al. Licorice reduces serum testosterone in healthy women. *Steroids*. 2004;69(11-12):763-766. https://doi.org/10.1016/j.steroids.2004.09.005

Naturopathic Medicine and Group Visits: A Natural Alignment

Leslie Solomonian,[1] ND, MPH, **Zeynep Uraz,**[1] ND, **Shehab El-Hashemy,**[2] MBChB, ND, Med, **Alan Vu,**[1] ND, and **Tori Hudson,**[2,3,4] ND

ABSTRACT

Group visits are a delivery mode well-suited to the principles of naturopathic medicine. Group visits are cost-effective, allowing practitioners to provide thorough lifestyle education, an important domain of both prevention and management of health concerns, to more participants. The interactive nature of group visits adds unique support, motivation and learning opportunities that one-on-one appointments often cannot provide. When structured opportunities are created for reflection, peer exchange and goal setting, the likelihood of behaviour change appears to be enhanced. Group visits may also benefit practitioners, allowing for greater efficiency and reduced risk of burnout, ultimately enabling greater impact. This paper maps the alignment of group visits to naturopathic principles, highlighting benefits, risks and strategies to harness this effective approach to health care.

Key Words Naturopathic practice, social determinants, behaviour change

INTRODUCTION

Group medical/educational visits (GMEVs) consist of a group of participants with similar backgrounds or needs coming together for educational sessions facilitated by a practitioner.[1] Three of the authors (LS, ZU, AV) have experience designing, delivering, and evaluating group visits for the provision of naturopathic medicine and education to particular populations. Anecdotally, we have observed the value of this approach, in particular its alignment with the principles of naturopathic practice. This paper is the outcome of a scholarly process of mapping the evidence-based benefits of GMEVs to naturopathic principles.

In order to more objectively examine the value of GMEVs to the provision of naturopathic care, two additional authors were invited to participate in a process of critical analysis. We drew on existing reviews (as opposed to evaluations of individual programs) to engage in this process. We systematically mapped the evidence for the benefits of GMEVs to the principles of naturopathic medicine. The relationships are described in the text. We then mapped attributes and principles of core frameworks of learning to the benefits of GMEVs to highlight the importance of using an evidence-informed approach to design and delivery. The map is shown in Figure 1.

Anecdotes provided by the authors who have facilitated programs are woven throughout the paper to provide examples and give colour to the theoretical perspective; we encourage readers to revisit these anecdotes after finishing the entire paper to identify examples of the educational frameworks described.

Developing the knowledge and skills to effectively plan and deliver group sessions involves more than this perspective article can hope to provide. As with all naturopathic care, there are myriad approaches that can be taken. Although we have synthesized our findings to make recommendations for starting to plan and implement group visits, we encourage motivated readers to explore detailed analyses of specific methodologies, conditions, and approaches for their population of interest. With this paper, we have attempted to provide inspiration and a starting point for exploration of this approach to naturopathic care.

Benefits of Group Visits

Group sessions may yield greater success than one-on-one clinical encounters for some medical and behavioural outcomes.[2] Existing reviews have looked broadly at the beneficial impact of GMEVs, including improved access to health care, ability of practitioners to serve more patients, and greater value per visit, all of which have the potential to improve efficiency and effectiveness for all involved.[3-5] Both providers and participants identify greater personal satisfaction and self-esteem associated with participation.[2,4]

There are a few dominant conditions for which literature regarding group visits is readily available. Group visits for type 2 diabetes, for example, have been well-studied. Existing reviews have noted there is positive benefit to this approach for these and other

Correspondence to: Leslie Solomonian, 1255 Sheppard Avenue East, Toronto, ON M2K 1E2, Canada. **E-mail:** lsolomonian@ccnm.edu

To cite: Solomonian L, Uraz Z, El-Hashemy S, Vu A, Hudson T. Naturopathic medicine and group visits: a natural alignment. *CAND Journal*. 2022;29(2):9-17. https:/doi.org/10.54434/candj.110

Received: 17 February 2022; **Accepted:** 24 May 2022; **Published:** 28 June 2022

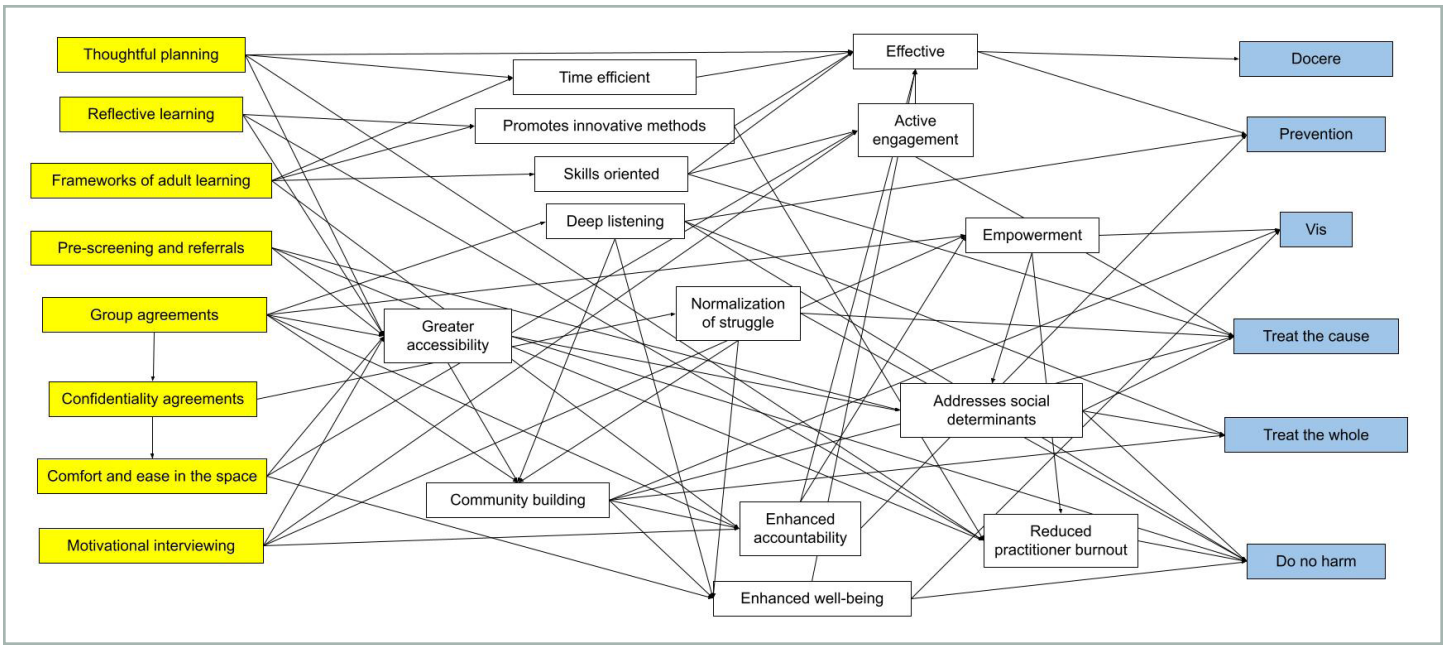

FIGURE 1 Mapping the alignment between naturopathic principles and group visits. Best practices for evidence-informed design of group visits (yellow) yield benefits (white) that align with and fulfill the principles of naturopathic medicine (blue).

conditions in the domains of patient-oriented (e.g., self-esteem, quality of life), behaviour-oriented (e.g., dietary changes), and disease-oriented (e.g., BMI, HbA1C) outcomes.[6,7] It is hypothesized that this likely translates to cost-savings in the healthcare system through the value of prevention and the building of participant self-efficacy.[7,8]

Alignment of GMEVs with Naturopathic Principles

Many of the benefits noted in the literature exemplify the philosophy of naturopathic medicine.

Docere (Doctor as Teacher)

Effective doctors must be effective teachers; however, practitioners often lack the time for thorough education in one-on-one appointments.[5] GMEVs are an efficient model for delivering education,[2] and may benefit both practitioners and patients by allowing for more creative freedom in educational approaches.[1]

GMEVs allow patients to spend more time with the practitioner while engaging with the material. This allows for more thorough interaction with concepts and skills,[9] which may promote a nuanced and personally applicable exploration. GMEVs ideally align with the concepts of adult learning, which emphasize relevance and internal motivation as well as goal-oriented, active, and self-directed learning,[10] all of which support better patient outcomes.[9]

LS—with the support of CCNM students—designed, delivered and evaluated multiple iterations of a six-session group-based program for parents of young children called "Healthy Families, Healthy Kids," (HFHK) the goal of which was to promote positive determinants of pediatric health.

> "For community members participating in the HFHK program[11]—many of whom are marginalized and have low health literacy[12] or limited access to foods—basic principles of nutrition can be tricky. I ask a small group to organize a deck of cards containing pictures of common foods in whatever way they choose. Using manipulables with visual prompts in a group activity engages multiple styles of learning (cognitive, visual, kinesthetic, social, auditory), and helps to overcome language barriers (common in this particular population). Participants tend to start by organizing the cards into traditional "food groups," which allows us to talk about macronutrients. When organized by meals, we discuss strategies for optimizing glycemic load. When organized by colour, we discuss phytonutrients and micronutrition. When cards have been organized along a continuum of "closer to the earth," we have had rich conversations about the relationship between people and the planet. I am flexible with what I reinforce based on what I hear from the group, correcting misconceptions, filling gaps, and—very importantly—affirming what is already known. Multicultural groups share what is common in their tradition; how foods are grown or combined; and often—again, very importantly—where these foods can be accessed in the community." (LS)

Praevenic (Prevention)

Preventive medicine can be neglected in one-on-one care due to lack of time in appointments.[13,14] Structured opportunities within GMEVs for reflection, peer exchange, and goal setting enhance the likelihood of behaviour change.[6,15,16] This impact has been best documented among individuals with diabetes mellitus, for which GMEVs have been shown to improve glycosylated hemoglobin (HbA1C) values.[6] Because of the model's greater accessibility and

cost effectiveness, GMEVs allow more members of the community to be reached, resulting in an overall economically sustainable practice model.

> "In the HFHK program, we focused on six key topics important for caregivers of young children. While there was space in each session for participants to bring up active concerns or problems, the focus was squarely on health promotion strategies for kids. When we studied the effects of the program, one of the outcomes identified among participants was a greater sense of confidence as a caregiver to keep their kids healthy."[11] (LS)

Tolle causum (Identify and Treat the Cause); *Tolle totum* (Treat the Whole)

Focusing on the spectrum of relevant determinants of health enables participants to explore the cause(s) of their own dis-ease. By grouping populations together (fertility, diabetes, parenting, menopause, etc.), we can more closely align the topics and activities with the cause(s). We have found that when participants are given structured opportunities to set and share goals, GMEVs allow for a more nuanced exploration of content and an opportunity to identify how it is personally applicable. Participants may develop insights about themselves as they listen to the circumstances and stories of others in the group, who may also be better positioned to anticipate obstacles and potential solutions than the naturopathic doctor. This process cultivates empowerment by building relationships and community, key domains of psychosocial well-being.[2] Although most programs studied in the reviews on which this analysis drew primarily focused on disease-oriented outcomes such as biomarkers of diabetes mellitus, naturopathic doctors are most interested in treating the person living with a disease. That GEMVs seem to improve both disease-oriented and person-oriented outcomes makes this approach highly relevant to the holistic goals of naturopathic practice.

> ZU and AV designed a six-week program for individuals who were undergoing active treatment at a fertility clinic in downtown Toronto. The objective of the group-based program was to deliver evidence-based dietary and lifestyle advice to participants. "The ability to draw on different participants' perspectives and experiences helped participants implement the diet and lifestyle changes discussed. Participants shared recipes and time-saving cooking methods. In the post-program survey, participants mentioned benefiting from group ideas for troubleshooting challenges in implementing changes." (ZU and AV)

Causes of disease go beyond individual choices.[17] Treating the whole involves considering social and ecological determinants of health. Thoughtful design of group-based programs takes social, cultural, economic, and ecological determinants into consideration and seeks to destigmatize health struggles. This may be particularly relevant when working with populations marginalized by systemic racism and capitalism.[12,18] Approaching care through relationship building and community may itself serve to break down these structures.[19,20] One method to support a group identifying strategies to address obstacles is community asset mapping.[21]

> "One of the most rewarding experiences of running group programs is creating space for and witnessing group problem-solving. When participants live in the same community, tips on where to find certain foods or what affordable programs are available for recreation add so much more to the value than what I could provide on my own. The group removes the focus from me, swiftly identifying common obstacles to cure and solving them together." (LS)

> "We aim to delve into the mental and emotional, but it is often a time challenge in one-on-one settings. One of our favourite things about the group sessions was watching participants lend comforting words, helpful alternate perspectives, and compassionate ears. It normalized their experiences. It was wonderful to see community building within the group." (ZU and AV)

Vis medicatrix naturae (The Healing Power of Nature)

Naturopathic practitioners uphold the principle of reliance on an inherent self-healing process. However, myriad factors impact the ability of this *vis medicatrix naturae* to maintain homeostasis, including persistent or intolerable stress (psychological or physiological). The healing potential within an individual is facilitated when the experience, perception, or embodiment of stress are diminished or removed. This may occur in GMEVs through the development of knowledge and skills to optimize physiological conditions for health (such as improving nutrition or movement) or skills and strategies to process and navigate psychological or social stressors (for example, group cognitive-behavioural workshops). GMEVs can offer normalization and destigmatization of struggle through opportunities for vulnerability, especially if others are witnessed doing the same.[3] Skillfully facilitated groups can serve to build connection and community, which are important determinants of good health. Improved healing capacity associated with stress reduction has been shown to be mediated by modulation of the immune system[22] associated with the upregulation of endorphins, oxytocin, and serotonin, and the reduction of cortisol.[23]

The healing power of nature can also include making choices more consistent with one's own values, beliefs, and intentions in life. In essence, becoming true to one's own nature. This concept is rich material for group conversation, possibly similar to the mutual support that occurs in 12-step fellowship.[24,25] If the *vis* is viewed as an element of the spirit, the deep listening and flow of energy between participants and facilitator could also be a mechanism by which the *vis* is enhanced.[26]

> "By the last few sessions, it was heartening to see participants naturally gather and check in with each other, interact with genuine smiles and even sometimes hug each other." (ZU and AV)

> Group visits might also be able to incorporate practical aspects of facilitating a connection with nature. GMEVs could incorporate outdoor walks, or plant exploration. "As a founding member of an educational community garden, I have hosted workshops in which participants meet and learn from the plants in the garden, as well as those growing wild in the surrounding park space. I always draw on participants' observations of the plants that attract their attention and include a practical component, such as making a tea or a poultice, so that participants leave feeling more capable of doing so on their own. Having the opportunity to use all their senses enhances learning and accessibility." (LS)

Primum non nocere (First, Do No Harm)

The "business" of naturopathic practice can be draining, due to compassion fatigue, financial strain, and the challenges of motivating adherence. GMEVs can improve the well-being of the practitioner, maintaining or building their capacity to continue to serve. Observing relationships being built, epiphanies occurring in community, and positive outcomes is deeply satisfying.[2,27] GMEVs can enhance accountability, easing that burden for the practitioner.[4,27] The freedom that group visits offer to practice creatively can enhance cognitive and emotional well-being.

> "Having members of the group interact with each other helped keep the material fresh so that it wasn't always just us presenting, decreasing boredom. It really did make the experience more enjoyable and less tiring; our group sessions were something we really looked forward to as facilitators!" (ZU and AV)

The ability of a doctor to practice with a sense of social responsibility and purpose also greatly impacts their own well-being, which speaks to the spirit of "right livelihood."[28] However, seeking to practice this way often requires sacrifice on the part of the practitioner in the form of money or time, which can challenge one's coping reserve. The reduced cost per participant inherent in group visits and/or socially innovative partnerships improves access for individuals and communities that might not otherwise benefit from naturopathic care. It also allows for shared responsibility and recruitment, easing the burden of marketing from the practitioner and targeting recruitment in a more personalized way.[2] For example, the Healthy Families iterations offered in partnership with Ontario Early Years Centers were promoted by centre staff personally to community members who were likely to be interested in the subject matter. These individuals were more likely to engage in the program and indicate value from participating.[11]

The literature exploring GMEVs does not suggest that significant harm has been documented due to this approach.[3,29] However, education generalized to a group may fail to meet the needs of individual participants. This could cause harm through unheeded activation, or inappropriate application. Group visits also introduce an expectation of vulnerability, which may enhance their value[3] but may also expose participants to the risk of confidentiality breaches, or the group to disruption. Strategies to minimize the risk of harm will be discussed below.

IMPLEMENTATION

Applying Evidence-Informed Educational Frameworks

Just as a medicinal herb will only be effective if delivered in the right form in the right dose to the right person at the right time, group visits must be thoughtfully developed and delivered to be effective. Methodologies should be thoughtfully selected for specific learners (e.g., age, culture, language), concerns (e.g., diabetes, anxiety, pregnancy), intended outcome (e.g., disease-oriented vs. behaviour-oriented; treatment vs. primary or secondary prevention), and context (online vs. in-person; single workshop vs. ongoing program; group familiar with one another vs. strangers). The authors with experience delivering GMEVs have deliberately drawn on evidence-informed educational frameworks to optimize benefit to group participants (although there is evidence for the value of GMEVs for youth, the authors' experience is with adults). It is beyond the scope of this paper to delve into the details of these frameworks, but practitioners interested in offering GMEVs are encouraged to familiarize themselves with the following core concepts and theories.

Didactic lecturing rarely works. Facilitation strategies that centre attributes of adult learners, integrate diverse learning preferences (e.g., cognitive, visual, spatial, verbal), and enable application of the material with other participants have a significant impact on outcomes,[9] and preparedness is critical to ensure the most effective use of time.[4,30] Bloom's taxonomy supports the educator in determining appropriate objectives of the program or workshop,[32,33] which then provides direction for activity planning. Knowles's principles of adult education can guide the design of program elements to maximize effectiveness (Figure 2).[10] Didactic lecturing rarely works. Frates et al. provide a broad overview of considerations when creating a model for group delivery,[27] and a plethora of available resources offer inspiration for planning (Appendix 1).

Given that GMEVs are particularly well suited to conditions that benefit from behaviour change, the framework of motivational interviewing can also be effective in empowering participants.[16] Hall et al. provide a concise summary of the principles and strategies within this framework.[34] The collective process of identifying objectives, naming obstacles, and setting specific and feasible goals allows participants to individualize the application of content and increases the likelihood of success, inspired both by others' experiences and a sense of group accountability.[27]

> "In a workshop at my local library intended to encourage physical movement, the design required participants to move. I drew circles on the floor with string, representing the intersection between "cardiovascular activity,"

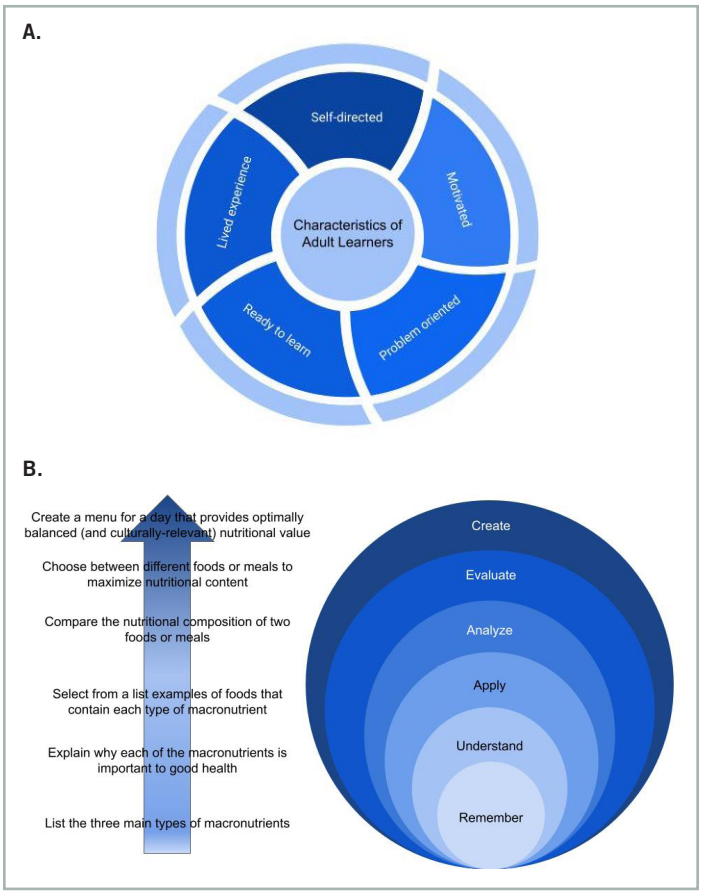

FIGURE 2 Knowles's principles of adult learning (A) and Bloom's taxonomy of higher learning (B). Incorporating assumptions about adult learners and higher-level educational strategies into workshop design will enhance the likelihood of effectiveness.

"mobility activities," "strength-building activities," and "active lifestyle." After defining these domains, I provided the group with a stack of cards representing the benefits of different kinds of movement, as well as cards naming various activities. Participants worked together to place the cards in the intersecting circles, requiring them to move about the room, bend down, and interact at a higher level of Bloom's taxonomy. I also asked participants to physically position themselves along a 0 to 10 spectrum for each domain, in accordance with motivational interviewing methods. I invited reflections on obstacles and barriers, and the group generated ideas and strategies to overcome them. Finally, participants worked in pairs to derive a goal related to their experience and share with the group." (LS)

Overprepare

In order to be flexible and responsive to the fluid needs of individual groups, practitioners often feel best when they are overprepared. That requires competence with basic educational strategies, strong comfort with the content, familiarity with the plan, and having all materials prepared in advance. It helps to have a systematic way of creating lesson plans (a template can be found in Appendix 2) and to deliberately engage in the experiential learning cycle proposed by Kolb (Figure 3) to improve effectiveness over time.[35] The steps are:

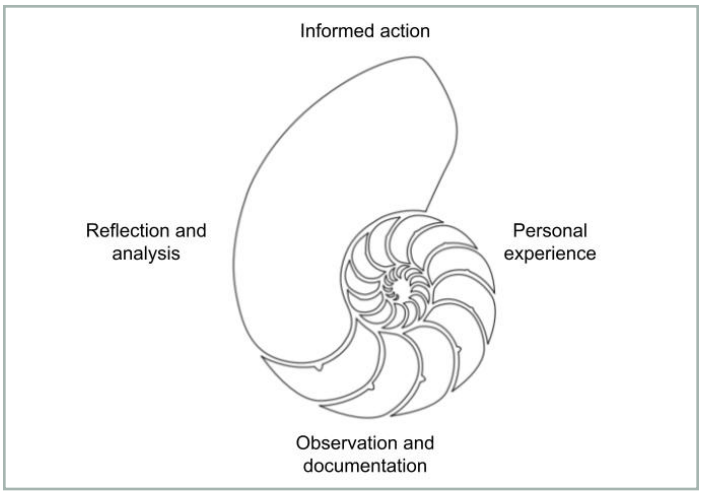

FIGURE 3 The experiential learning cycle (adapted from Kolb and Kolb[35]). Facilitators as well as participants should be engaged in learning. Actively reflecting on experiences and critically modifying one's approach is more likely to lead to growth.

1. Design and deliver an evidence-informed workshop.
2. Actively reflect on what went well and what could have been improved. This is always enhanced by seeking constructive feedback from participants.
3. Return to the evidence base or consult with other sources to identify strategies to improve on the next iteration.
4. Repeat.

Promoting Comfort and Safety

Success is contingent on participants feeling comfortable and safe. The space in which a workshop is offered may not be fully within the control of the facilitator, but there are a few key considerations. For example:

- What is the likelihood of external noise, or the chance of interruptions?
- Where is the nearest toilet and access to drinking water?
- Are participants prepared for the temperature of the space; if you are going outside, do they have appropriate clothing?
- Is childcare being provided?
- Do you have access to tables and chairs?
- Do you have access to a computer and projector?
- Is the space physically accessible?
- Will you need a translator?

In GMEVs, participants are invited to be vulnerable. It is helpful to establish group expectations and commitments at the start of a workshop or series. Some suggestions are listed below:

- Confidentiality: personal information is not shared outside the group

- Right to pass: everyone can determine the degree to which they would like to participate
- Step up or step back: those who tend to participate easily challenge themselves to give space to others; those who tend to hold back challenge themselves to be brave
- Assume good intentions: everyone is doing the best they can at any given moment, and everyone has their own lived experience
- Two ears, one mouth: active listening promotes everyone's learning; this includes not interrupting or talking while someone else is talking
- Group well-being: the success of individuals in this group is a reflection of the health of the group overall; this includes keeping our attention on the topic of focus
- Personal responsibility: participants are encouraged to use 'I' statements, both in the context of speaking of their own experience, and responding to others' sharing

Having participants sign a confidentiality agreement ensures all are clear about expectations and limits.[36] Informed consent discussions should centre around the potential benefits and harms of participation, including psychological distress that may be caused by difficult discussions. Facilitation strategies can both promote trust and help a group navigate through disruption or distraction (it may be appropriate to screen participants for attributes that may disrupt the nature of the program). Individuals must be aware ahead of time that if needs arise that are beyond the scope of the goals of the group model, appropriate referrals will be made. As was identified in the study by Wong et al, group visits may be an excellent opportunity for and avenue towards greater collaborative care, especially if offered in a community health centre setting.[36]

> "Once baseline safety was established within the group, the opportunity to interact with the material in a group of peers allowed for different and deeper engagement. Listening to peers' successes and as well as obstacles inspired many. Feedback included comments such as 'I liked listening and hearing from everyone' and '(the group format) was very comfortable, and in fact it was motivating.'" (ZU and AV)

Billing Considerations

Practitioners can bill GMEVs as a fee-for-service at a lower rate than a private appointment. If a one-on-one relationship has been established between a participant and a naturopathic doctor, it may be possible to invoice as a naturopathic visit; it is important to be clear on the invoice that the session was delivered in a group so that insurance providers have transparency about what is being submitted.

The authors are keen on cultivating socially innovative models, which enhance access for marginalized community members, and build relationships within the community. Partnerships with community health or social centres, libraries, places of worship, schools, or private funders can harness private and public dollars to the benefit of individuals and populations who may otherwise not have access to naturopathic care or education, while fairly compensating the practitioner for their time and expertise. Capturing data about the impact of the program (satisfaction, behaviour change, or health-specific outcomes) can build the case for the value of such approaches, increasing the likelihood of future partnerships and funding. We suspect that there is a cost-benefit to this kind of program, and this may be an avenue through which naturopathic principles can be integrated into public health promotion.

CONCLUSION: A CALL TO ACTION

Naturopathic medicine is beautifully suited to group-based delivery. There is a tremendous gap in health promotion education in the primary healthcare system; naturopathic doctors claim excellence in this domain (*docere*). Group-based care may increase the potential for lifestyle change (*praevenic*), address root causes of disease (*tolle causum*), including psychosocial determinants of health (*tolle totum*), and effectively liberate the individual's natural capacity to heal (*vis medicatrix naturae*). Not all GMEVs are alike. To optimize effectiveness, methodologies must be carefully selected and grounded in evidence. We recommend that naturopathic medical schools and continuing education programs offer evidence-informed opportunities to develop these skills in order to maximize benefit and minimize harm.

AUTHOR AFFILIATIONS

[1]Canadian College of Naturopathic Medicine, Toronto, ON, Canada; [2]National University of Natural Medicine, Portland, OR, USA; [3]Bastyr University, Seattle, WA; [4]Southwest College of Naturopathic Medicine, Phoenix, AZ, USA.

ACKNOWLEDGEMENTS

The authors wish to thank the participants of their various group delivery programs, the students who participated in their delivery and assessment, and Dr. Laura Macleod, ND, for her valuable contributions to this manuscript.

CONFLICTS OF INTEREST DISCLOSURE

We have read and understood the *CAND Journal*'s policy on conflicts of interest disclosure and declare the following interests: AV, LS, and ZU all engage in coordinating, delivering and assessing group medical and educational visits, and are committed to promoting their use in naturopathic practice. All these authors profit from some of their initiatives. No other competing financial interests exist for any of the authors.

FUNDING

This research did not receive any funding.

REFERENCES

1. Noffsinger E, Sawyer DR, Scott JC. Group medical visits: a glimpse into the future? (Enhancing Your Practice). *Patient Care*. 2003;37(3):18.
2. Lavoie JG, Wong ST, Chongo M, Browne AJ, MacLeod ML, Ulrich C. Group medical visits can deliver on patient-centered care objectives: results from a qualitative study. *BMC Health Serv Res*. 2013;13:155. https://doi.org/10.1186/1472-6963-13-155
3. Wong ST, Browne A, Lavoie J, Macleod ML, Chongo M, Ulrich C. Incorporating group medical visits into primary healthcare: are there benefits?. *Health Policy*. 2015;11(2):27-42.
4. Jones KR, Kaewluang N, Lekhak N. Group visits for chronic illness management: implementation challenges and recommendations. *Nurs Econ*. 2014;32(3):118-147.
5. Patel Saxena S. Leveraging time with lifestyle-based group visits. *Am J Lifestyle Med*. 2016;10(5):330-337. https://doi.org/10.1177/1559827616638018

6. Housden LM, Wong ST. Using group medical visits with those who have diabetes: examining the evidence. *Curr Diabetes Rep*. 2016;16(12):134. https://doi.org/10.1007/s11892-016-0817-4
7. Housden L, Wong ST, Dawes M. Effectiveness of group medical visits for improving diabetes care: a systematic review and meta-analysis. *CMAJ*. 2013;185(13):E635-E644. https://doi.org/10.1503/cmaj.130053
8. Quiñones AR, Richardson J, Freeman M, et al. Group visits focusing on education for the management of chronic conditions in adults: a systematic review [Internet]. Washington (DC): Department of Veterans Affairs (US); 2012 Dec. RESULTS. Available from: https://www.ncbi.nlm.nih.gov/books/NBK184310/
9. Kirk JK, Devoid HM, Strickland CG. Educational strategies of diabetes group medical visits: a review. *Curr Diabetes Rev*. 2018;14(3):227-236. doi: 10.2174/1573399813666170203111851
10. McGrath V. Reviewing the evidence on how adult students learn: an examination of Knowles' model of andragogy. *Adult Learn Irish J Adult Commun Educ*. 2009;99:110.
11. Solomonian L, Kwan V, Bhardwaj S. Group-based naturopathic education for primary prevention of noncommunicable disease in families and children: a feasibility study. *J Altern Complement Med*. 2019;25(7):740-752. doi:10.1089/acm.2019.0067
12. Schillinger D. The intersections between social determinants of health, health literacy, and health disparities. *Stud Health Technol Inform*. 2020;269:22-41. https://doi.org/10.3233/SHTI200020
13. Spring B, King AC, Pagoto SL, et al. Fostering multiple healthy lifestyle behaviors for primary prevention of cancer. *Am Psychol*. 2015;70(2):75-90.
14. Brotons C, Björkelund C, Bulc M, et al. Prevention and health promotion in clinical practice: the views of general practitioners in Europe. *J Prev Med*. 2005;40(5):595-601.
15. Polak R, Pojednic RM, Phillips EM. Lifestyle medicine education. *Am J Lifestyle Med*. 2015;9(5):361-367.
16. Livia B, Elisa R, Claudia R, et al. Stage of change and motivation to a healthier lifestyle before and after an intensive lifestyle intervention. *J Obes*. 2016;2016:6421265.
17. Sweeney E. The role of healthcare professionals in environmental health and fertility decision-making. *New Solut*. 2017;27(1):28-50. https://doi.org/10.1177/1048291117691074
18. Castillo EG, Ijadi-Maghsoodi R, Shadravan S, et al. Community interventions to promote mental health and social equity. *Curr Psychiatry Rep*. 2019;21(5):35. https://doi.org/10.1007/s11920-019-1017-0
19. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Population Health and Public Health Practice; Committee on Community-Based Solutions to Promote Health Equity in the United States; Baciu A, Negussie Y, Geller A, et al., editors. Communities in action: pathways to health equity. Washington (DC): National Academies Press (US); 2017 Jan 11. 3, The Root Causes of Health Inequity. Available from: https://www.ncbi.nlm.nih.gov/books/NBK425845/
20. Smith-Morris C, Rodriguez S, Soto R, Spencer M, Meneghini L. Decolonizing care at diagnosis: culture, history, and family at an urban inter-tribal clinic. *Med Anthropol Q*. 2021;35(3):364-385. https://doi.org/10.1111/maq.12645
21. Douglas JA, Subica AM, Franks L, et al. Using participatory mapping to diagnose upstream determinants of health and prescribe downstream policy-based interventions. *Prev Chronic Dis*. 2020;17:E138. https://doi.org/10.5888/pcd17.200123
22. Troyer EA, Kohn JN, Hong S. Are we facing a crashing wave of neuropsychiatric sequelae of COVID-19? Neuropsychiatric symptoms and potential immunologic mechanisms. *Brain Behav Immun*. 2020;87:34-39. https://doi.org/10.1016/j.bbi.2020.04.027
23. Pascoe MC, Thompson DR, Ski CF. Yoga, mindfulness-based stress reduction and stress-related physiological measures: a meta-analysis. *Psychoneuroendocrinology*. 2017;86:152-168. https://doi.org/10.1016/j.psyneuen.2017.08.008
24. Kelly JF. Is Alcoholics Anonymous religious, spiritual, neither? Findings from 25 years of mechanisms of behavior change research. *Addiction*. 2017;112(6):929-936. https://doi.org/10.1111/add.13590
25. Davidson L, White W, Sells D, et al. Enabling or engaging? The role of recovery support services in addiction recovery. *Alcohol Treat Q*. 2010;28(4):391-416. https://doi.org/10.1080/07347324.2010.511057
26. Sutherland E. Spirituality in the medical encounter: the grace of presence. *Perm J*. 2005;9(3):73-74. https://doi.org/10.7812/tpp/05-041
27. Frates EP, Morris EC, Sannidhi D, Dysinger WS. The art and science of group visits in lifestyle medicine. *Am J Lifestyle Med*. 2017;11(5):408-413. https://doi.org/10.1177/1559827617698091
28. Solomonian, L. Resilience as right livelihood. *The Pulse (Journal of the Ontario Association of Naturopathic Doctors)*. Fall 2020.
29. Miller D, Zantop V, Hammer H, Faust S, Grumbach K. Group medical visits for low-income women with chronic disease: a feasibility study. *J Women's Health*. 2004;13(2):217–25.
30. Twaddell JW. Educating parents about vitamin K in the newborn using Knowles' theory of adult learning principles as a framework. *Crit Care Nurs Q*. 2019;42(2):205-207. https://doi.org/10.1097/CNQ.0000000000000256
31. Gilmer C, Buchan JL, Letourneau N, et al. Parent education interventions designed to support the transition to parenthood: a realist review. *Int J Nurs Stud*. 2016;59:118-133. https://doi.org/10.1016/j.ijnurstu.2016.03.015
32. Krau SD. Creating educational objectives for patient education using the new Bloom's taxonomy. *Nursing Clinics*. 2011;46(3):299-312.
33. Williams AE. Promoting meaningfulness by coupling Bloom's taxonomy with adult education theory. *Transform Dialogues Teach Learn J*. 2017;10(3).
34. Hall K, Gibbie T, Lubman DI. Motivational interviewing techniques: facilitating behaviour change in the general practice setting. *Australian Family Physician*. 2012;41(9):660-667.
35. Kolb A, Kolb D. Eight important things to know about the experiential learning cycle. *Australian Educational Leader*. 2018;40(3):8-14. (https://learningfromexperience.com/downloads/research-library/eight-important-things-to-know-about-the-experiential-learning-cycle.pdf)
36. Wong ST, Lavoie JG, Browne AJ, et al. Patient confidentiality within the context of group medical visits: is there cause for concern?. *Health Expect*. 2015;18(5):727-39.

APPENDIX 1 – RECOMMENDED RESOURCES FOR WORKSHOP PLANNING

- Seeds for change; https://seedsforchange.org.uk/tools.pdf
  - Facilitation tools for meetings and workshops
- SessionLab; https://www.sessionlab.com/
  - Online workshop design software and resources
- Readiness Ruler; https://iprc.iu.edu/sbirtapp/mi/ruler.php
  - Interactive motivational interviewing tools
- The Community Mapping Toolkit; https://ucanr.edu/sites/CA4-HA/files/206668.pdf
  - Community mapping toolkit

APPENDIX 2 – WORKSHEET TEMPLATE FOR PLANNING A GROUP SESSION

Characteristics/needs/goals of participants:

Characteristics of space/setting:

Topic:

Themes/Questions:

Time available:

Objectives (action words; what should participants be able to DO by the end?):

Key references/resources:

Quick reference outline:

Time	Activity	Materials needed	Objectives addressed

Detailed outline of each activity:

Impact of Cultural Competency Training in Naturopathic Medical Students: Self-Assessed Changes in Awareness, Knowledge, Skills, and Attitudes

Cyndi Gilbert,[1] ND, **Valentina Cardozo,**[1,2] MSc, and **Hanieh Vedadi,**[1] BSc, ND

ABSTRACT

Introduction: Cultural competency training is a growing requirement in medical schools across North America. Although accredited naturopathic medical schools now include some elements of cultural competency training throughout their programs, no literature to date has evaluated the effect of cultural competency curriculum among naturopathic medical students. This study evaluated the impact of a cultural competency training program of 4th-year naturopathic medical students at an accredited naturopathic medical educational institution in North America.

Methods: Pre- and post-training online surveys were completed by naturopathic medical students using a 1 to 5 numerical scale (least to most confident), self-evaluating their awareness, knowledge, skills, and willingness to change behaviours, with some survey items adapted from the short version of the Cross-Cultural Care Survey (Harvard). Descriptive statistics were calculated, and a paired two-sided Wilcoxon signed-rank test was used to examine changes between pre- and post-training responses.

Results: Out of 134 students enrolled in the training, 46 participants completed both the pre- and post-training surveys and were included in the final analysis. There was a statistically significant increase in self-rated confidence from pre- to post-training across all individual survey items spanning improvements in cultural competency awareness, knowledge, skills, and attitudes among students who completed both surveys.

Conclusions: Results from this study indicate that cultural competency training of naturopathic students may improve their subjective assessment of their awareness, knowledge, skills, and attitudes related to working with diversity in clinical practice. Future research would benefit from using validated assessment scales, reducing loss to follow up, and investigating factors such as social demographics, prior training, and lived experience amongst participants.

Key Words Medical education, anti-racism, anti-oppression, cross-cultural care, professionalism, diversity, health equity, DEI

INTRODUCTION

Cultural competency is an intervention-based approach focused on building skills, knowledge, and attitudes that allows people, in particular health professionals, to work respectfully and effectively with people from other cultural, religious, racial, or other demographic backgrounds. It was developed primarily in response to the recognition that implicit bias and barriers exist between healthcare providers and patients that both perpetuate and propagate health inequities.[1] As a result of the growing understanding of the impact of physician bias on healthcare providers' performance and patient health outcomes, cultural competency is now considered one of the main core competencies for entering medical students.[2] It has therefore increasingly become a key aspect of medical education in schools across North America to better prepare health professionals to deliver care that is patient-centred, acknowledges the health impacts associated with social determinants, and seeks to redress existing health disparities related to racial, socioeconomic, and other demographic sociocultural and historical inequities.[3]

In North America, cultural competency training is included as a requirement in many medical schools; however, training is not standardized and varies significantly depending on the school.[4] Training typically includes material intended to increase cultural awareness, develop an understanding of cultural differences, and teach specific strategies for adapting healthcare delivery and communication. Interventions range from skills-based approaches with prescriptive "do's and don'ts" to deeper analyses of physician bias and the institutional and structural sociocultural barriers to health care.[5] In spite of significant heterogeneity that exists between learning objectives, curriculum content, delivery of the

Correspondence to: Cyndi Gilbert, 1255 Sheppard Ave. East, Toronto ON M2K 1E2, Canada. **E-mail:** cgilbert@ccnm.edu

To cite: Gilbert C, Cardozo V, Vedadi H. Impact of cultural competency training in naturopathic medical students: self-assessed changes in awareness, knowledge, skills, and attitudes. *CAND Journal*. 2021;29(2):18-24. https:/doi.org/10.54434/candj.113

Received: 27 February 2022; **Accepted:** 28 April 2022; **Published:** 28 June 2022

training, and methods of evaluating efficacy, medical schools across North America have worked to incorporate cultural competency training into their programs, using a variety of practical interventions, and workshops.[6,7]

Measuring Efficacy of Cultural Competency Training

Measuring the effectiveness of these programs presents its own specific challenges, as there are many different instruments currently in use to measure the outcomes of the interventions used in cultural competency training.[8-11] The most common validated instruments used in the training of medical professionals include the Tool for Assessing Cultural Competence Training (TACCT), Health Beliefs and Attitudes Survey (HBAS), Trans-cultural Self-Efficacy Tool (TSET), Cultural Self-Efficacy Scale (CSES), and the Cross-Cultural Care Survey (CCCS).[1,7,10,12-20]

Developed by the Liaison Committee on Medical Education (LCME), the TACCT was introduced, and later shortened and validated, in order to evaluate curricula but is not appropriate for individual use.[14,21] The HBAS assesses attitudes towards how cultural competency relates to healthcare quality but does not measure knowledge, preparedness, or skills.[15,16] Both the TSET and CSES are geared towards nurses. The TSET is a lengthy tool with 83 items and not readily available for use, while the CSES assesses confidence in caring for members of limited, specific cultural groups.[17,18] The CCCS, originally developed for medical residents, has been shortened and adapted for medical students, and it measures identification of training received as well as attitudes, skills, and preparedness in working to deliver cross-cultural care.[16,19,20] The heterogeneity in the measurement tools used in different studies makes it challenging to objectively assess the outcome of cultural competency training when reviewing the literature.[12]

There is some evidence to indicate that cultural competency interventions used to train healthcare providers can improve patient satisfaction, health outcomes, communication, and healthcare access.[1,5,11,22,23] Beach et al. included 34 studies in a review of cultural competency training interventions, finding improvement in health professional knowledge, attitudes and skills, as well as patient satisfaction.[22] A Cochrane review included five randomized controlled trials (RCTs) to assess the effects of cultural competency training on patient outcomes, health professional outcomes, and healthcare organization outcomes. Although studies were generally of poor methodological quality and heterogenous, results pointed towards positive evidence showing improvements in patient satisfaction and involvement of cultural and linguistically diverse patients.[5] Govere and Govere conducted a systematic review, likewise concluding that cultural competency training improves healthcare professionals' competency in treating patients from minority groups, also using patient satisfaction as the primary outcome measure.[12]

The cultural competency training and its effects on health care have also been studied in other healthcare professional students, such as dental and physician assistant and midwifery students.[24-26] Overall, data point to the benefits of integrating cultural competency training into the curriculum to positively influence cultural competency in healthcare professional students.[25,27]

Cultural Competency Training in Naturopathic Medical Students

Naturopathy is a distinct multimodal system of traditional and complementary medicine (T&CM) recognized by the World Health Organization, defined by core therapeutic modalities and philosophical principles that bridge traditional and biomedical approaches to clinical practice and patient care.[28] In North America, naturopathic medical education is a standardized, accredited system with consistent training competencies leading to licensure with a defined scope of practice in regulated jurisdictions.[29] Unfortunately, research is lacking on the effects of cultural competency training for naturopathic medical students. There are no validated and standardized assessment tools designed to measure the outcome of cultural competency training for naturopathic medical students. Exercising cultural safety, respecting cultural diversity and addressing cultural and social determinants of health are among the core competencies of graduating naturopathic students, according to the Association of Accredited Naturopathic Medical Colleges' (AANMC) guidelines.[30] Licensed naturopathic doctors must also practice in accordance with ethics and jurisprudence legislation specific to their state/provincial licensing requirements as well as relevant federal law. There are currently no publications detailing cultural competency training provided within accredited naturopathic medicine schools in North America nor any studies investigating the impact of such training.

This study aims to begin to fill some of these gaps by evaluating the effects of cultural competency training on naturopathic students' subjective rating of their self-reported confidence in working with diversity in naturopathic clinical practice through the use of pre- and post-training surveys.

METHODS

Participants

Participants included naturopathic students at the beginning of their 4th year of study at the Toronto Campus of the Canadian College of Naturopathic Medicine (CCNM). There were 134 students enrolled in the mandatory course shell on the online learning platform used by the institution for all courses. Participants included naturopathic students who were enrolled in both the 4-year full-time Doctor of Naturopathy degree program as well as those enrolled in the 2-year IMG (International Medical Graduate) bridge delivery program. Demographic characteristics of participants were not included in the current study, and information about general student demographics is not currently collected by the institution.

Description of Training

Cultural competency training was delivered both asynchronously and synchronously through a combination of existing online training, live facilitated Zoom sessions, readings, videos, and discussion forums over 6 weeks in the summer of 2021. After completion of the pre-training survey, students individually completed the Stanford Unconscious Bias in Medicine online, uploading

their certificate of completion into an online assignment submission folder. Other relevant required readings and videos were posted to the online course shell to be completed prior to the first session, as well as additional material provided for asynchronous self-study throughout the 6 weeks. Three 2-hour facilitated, virtual synchronous training sessions focused on transformational learning through the use of reflective exercises, discussion, polling, annotations, and problem-based learning in breakout rooms and focused didactic teaching over Zoom. If students missed one or more of these sessions, they were expected to view the recordings. Learning was supported by short review quizzes and discussion forums on relevant topics after each synchronous session.

Although students are expected to complete all the material on the course shell, there is no numerical evaluation or grading assigned. Additionally, there are currently no academic consequences for incomplete review of the material, lack of participation, or failure to attend synchronous sessions or view recorded sessions.

It is important to note that we use certain terminology in the naming of the training as well as our reporting of results. We primarily use the term "cultural competency" as it is consistent with the terminology used to describe training in most medical schools and comparable research literature. However, it should be noted that there is significant and valid criticism of this term and associated approaches to training.[6,31,32] Within the naturopathic educational institution, the term "cultural competency" is often used to describe the training; however, the course coordinator and facilitator of the synchronous sessions developed the sessions and training materials based on an anti-racism anti-oppression framework.[33,34] Information is also provided about other commonly used terms, including cultural competency, cultural safety, and cultural humility throughout the training to complement and explore concepts related to privilege, positionality, oppression, bias, discrimination, harassment, and health inequities.

Pre- and Post-Training Surveys

Voluntary pre- and post-training surveys were conducted online using an 18-item 5-point linear numeric scale (least confident to most confident) to assess self-reported awareness, knowledge, skill, and attitudes across 18 competencies (Table 1).

The survey included items adapted from the preparedness section of the Cross-Cultural Care Survey (CCCS), a validated tool used to assess attitudes of cultural competency in medical students and residents across a range of specialties. Permission to use and adapt the survey was obtained from Maria Chun, PhD, omitting items on the use of alternative/complementary medicine and distrust of the US health system.[19,20] In addition, the survey included questions specific to the learning objectives of the training program that were not derived or adapted from the CCCS. The overall survey included questions evaluating awareness and knowledge of key concepts related to cultural competency, preparedness to work with patients from diverse populations, and attitudes towards changes in behaviour, programs, policies, and procedures.

Both pre- and post-training surveys were distributed and delivered online through the online course shell developed exclusively for the cultural competency training. Announcements of both the pre- and post-training surveys and links to complete them were listed at the top of the online course shell and in the course announcements which are sent via email to all enrolled students. Individual responses were anonymous to encourage honest participation.

The post-training survey was available online immediately after the last synchronous session with reminders to complete the survey 2 and 4 weeks later, respectively. No incentive was provided to complete the surveys nor any of the training material. Our study protocol was deemed exempt by the Canadian College of Naturopathic Medicine's Research Ethics Review Board.

Data Analysis

Survey data were collected to analyze potential changes in self-assessed cultural competency between participants' pre- and post-training responses. Descriptive statistics were calculated for each individual item of both pre-and post-training surveys. Given the ordinal nature of the linear numeric scale items and the non-parametric distribution of the responses, a paired two-sided Wilcoxon signed-rank test was used to examine changes in pre- and post-training responses. Significance was set to $p < 0.05$. The data were analyzed using Microsoft Excel with XLSTAT 2022.1.1.[35]

RESULTS

Prior to the first synchronous session when the survey closed, 114 participants completed the pre-training survey (response rate of 85%). Fifty participants completed the post-training survey (43.9% of pre-training survey respondents). However, one of the post-training survey participants did not complete all the survey questions and their data was excluded from analysis. Four participants completed the post-training survey but not the pre-training survey; their results were also excluded from analysis. The pre–post analysis evaluated the scores of the 46 participants who completed both pre- and post-training surveys.

Individual baseline (pre-training, $n = 114$) survey scores spanned the full range of the linear numeric scale (1 = least confident, 5 = most confident) for 12 items (67%) and ranged from 2 to 5 for the remaining 6 items (33%) (Table 1). The lowest mean score at baseline was related to a skill-based competency, "Apply techniques for identifying unconscious bias and addressing the challenges it creates" (M = 3.10), closely followed by a knowledge-based competency "Describe the relationship between intent and impact in unconscious bias." (M = 3.11). On the other hand, the highest mean scores were all related to attitudes "Willingness to shift my language to accommodate its impact on others" (M = 4.36), "Willingness to advocate for programs, policies and procedures that challenge systemic oppression" (M = 4.19), and "Willingness to challenge behaviours, programs, policies and procedures that reinforce systemic oppression" (M = 4.18).

Similarly, the lowest mean pre-training score for the paired data ($n = 46$), was for "Apply techniques for identifying unconscious bias and addressing the challenges it creates" (M = 3.06), followed by "Work with patients who are new immigrants or refugees" (M = 3.11) and "Work with patients whose religious beliefs or

Table 1. Baseline pre-training survey scores (n = 114).

Survey Item	Range	Mean (SD)	Median (IQR)
Awareness of my own personal culture and how it affects my perceptions of others.	(2–5)	4.01 (0.723)	4 (1)
Awareness of how I live with my privilege and my oppression.	(2–5)	3.85 (0.767)	4 (1)
Describe the effects of unconscious bias, stereotyping, systemic discrimination, and microaggressions in clinical care, clinic operations, and the educational environment.	(1–5)	3.32 (0.886)	3 (1)
Describe the relationship between intent and impact in unconscious bias.	(1–5)	3.11 (0.935)	3 (1.25)
Identify behaviours that ought to be known to be unwelcome.	(2–5)	3.95 (0.881)	4 (2)
Identify personal assumptions, biases, world views, and behaviours that impact my environment and myself.	(2–5)	3.91 (0.759)	4 (1)
Work with diverse populations and navigate the impact of culture and systemic discrimination.	(1–5)	3.47 (1.01)	3 (1)
Work with patients from cultures and/or religions different than your own.	(1–5)	3.71 (0.957)	4 (1)
Work with patients with limited English proficiency.	(1–5)	3.19 (1.128)	3 (2)
Work with patients who are new immigrants or refugees.	(1–5)	3.28 (1.101)	3 (2)
Work with patients who are LGBTQ2S+.	(1–5)	3.37 (1.041)	4 (1)
Work with patients living with disabilities.	(1–5)	3.42 (1.021)	3 (1)
Work with patients whose religious beliefs or cultural customs might affect clinical care.	(1–5)	3.17 (1.080)	3 (2)
Apply techniques for identifying unconscious bias and addressing the challenges it creates.	(1–5)	3.10 (0.959)	3 (2)
Address behaviours of others that reflect bias and create an unhealthy work/study/care environment.	(1–5)	3.44 (0.893)	4 (1)
Willingness to shift my language to accommodate its impact on others.	(1–5)	4.36 (0.832)	5 (1)
Willingness to challenge behaviours, programs, policies, and procedures that reinforce systemic oppression.	(2–5)	4.18 (0.868)	4 (1)
Willingness to advocate for programs, policies, and procedures that challenge systemic oppression.	(2–5)	4.19 (0.819)	4 (1)

SD = standard deviation; IQR = interquartile range. Linear numeric scale: 1 = least confident, 5 = most confident

cultural customs might affect clinical care" (M = 3.24) (Table 2). The highest mean pre-training scores for the paired data corresponded to highest scoring items for the entire baseline: "Willingness to shift my language to accommodate its impact on others" (M = 4.37), "Willingness to advocate for programs, policies and procedures that challenge systemic oppression" (M = 4.20), and "Willingness to challenge behaviours, programs, policies, and procedures that reinforce systemic oppression" (M = 4.17).

The paired two-sided Wilcoxon signed-rank test (n = 46) revealed a statistically significant increase in self-rated confidence across all individual items ($p < 0.05$) between the pre-training and post-training survey responses (Table 2). The largest pre–post training change was an improvement in confidence with being able to "Describe the relationship between intent and impact in unconscious bias" (Z = -5.04, $p < 0.05$) with a mean difference of 1.13, a median increase of 1 point, p; the smallest improvement in pre-post confidence levels was in "Willingness to shift my language to accommodate its impact on others" with a mean difference of 0.28 and equal pre–post median (Mdn = 5).

DISCUSSION

Results of this study showed that cultural competency training of naturopathic students significantly improves their subjective confidence rating of items related to: their awareness of how positionality, privilege and bias impact social relations; knowledge about the effects of bias and discrimination in naturopathic medicine; skills such as working with patients who are LGBTQ2S+; and attitudes including willingness to change their own behaviour and advocate for social change.

While numerous studies have evaluated the efficacy of cultural competency training for medical students, residents, nurses, and other regulated healthcare providers,[5,10,22,36-39] few studies exist that evaluate training and/or curriculum amongst T&CM students. In a study investigating naturopathic medicine, traditional Chinese medicine, and integrative medicine research student perceptions of diversity and institutional cultural climate, Tippens et al. noted that very few (30.9%) students reported that their school's curriculum included information on working effectively with patients of diverse backgrounds.[40] Amongst naturopathic medicine students specifically, Hourston et al. reported year-over-year improvements in self-reported comfort working with patients living with disabilities, noting the importance of improving disability education in order to improve competency.[41] The current study, however, is the first to examine the impact of more comprehensive cultural competency training among naturopathic students in North America.

The current research has several limitations, including the use of non-validated survey items, the self-report style of the survey tool, the potential for selection bias, and the absence of participant demographic data. As such, the results of this study should be interpreted with caution and the generalizability of the findings is limited.

In particular, the pre- and post-training survey questionnaire was designed to evaluate the program learning objectives as well as student cultural competency and used a single linear numerical scale for all items, which adapted the question stem and Likert scale groupings used in the CCCS – short form.[19,20] As a result, the survey items utilized were not validated. Future research would benefit from inclusion of a greater number of items from the

Table 2. Changes in cultural competency scores between pre- and post-training (n = 46)

Survey Item	Pre-Training		Post-Training		Wilcoxon Signed-Rank Test	
	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Test statistic (Z)	p
Awareness of my own personal culture and how it affects my perceptions of others.	4.02 (0.745)	4 (1.75)	4.43 (0.501)	4 (1)	-3.19	<0.05
Awareness of how I live with my privilege and my oppression.	3.91 (0.725)	4 (0.75)	4.39 (0.577)	4 (1)	-3.76	<0.05
Describe the effects of unconscious bias, stereotyping, systemic discrimination, and microaggressions in clinical care, clinic operations, and the educational environment.	3.45 (0.935)	3.5 (1)	4.37 (0.610)	4 (1)	-4.82	<0.05
Describe the relationship between intent and impact in unconscious bias.	3.26 (0.929)	3 (1)	4.39 (0.649)	4 (1)	-5.04	<0.05
Identify behaviours that ought to be known to be unwelcome.	3.78 (1.031)	4 (2)	4.39 (0.614)	4 (1)	-3.68	<0.05
Identify personal assumptions, biases, worldviews, and behaviours that impact my environment and myself.	3.80 (0.859)	4 (1)	4.35 (0.640)	4 (1)	-3.67	<0.05
Work with diverse populations and navigate the impact of culture and systemic discrimination.	3.43 (1.109)	3 (1)	4.24 (0.705)	4 (1)	-4.36	<0.05
Work with patients from cultures and/or religions different than your own.	3.65 (1.037)	4 (1)	4.22 (0.814)	4 (1)	-3.41	<0.05
Work with patients with limited English proficiency.	3.20 (1.240)	3 (2)	3.76 (0.822)	4 (1)	-3.09	<0.05
Work with patients who are new immigrants or refugees.	3.11 (1.215)	3 (2)	3.93 (0.929)	4 (2)	-4.23	<0.05
Work with patients who are LGBTQ2S+.	3.46 (1.005)	4 (1)	4.20 (0.806)	4 (1)	-4.46	<0.05
Work with patients living with disabilities.	3.48 (0.983)	3 (1)	4.07 (0.772)	4 (1)	-3.59	<0.05
Work with patients whose religious beliefs or cultural customs might affect clinical care.	3.24 (1.079)	3 (2)	4.00 (0.730)	4 (1.5)	-4.00	<0.05
Apply techniques for identifying unconscious bias and addressing the challenges it creates.	3.06 (1.020)	3 (2)	4.11 (0.849)	4 (1)	-4.51	<0.05
Address behaviours of others that reflect bias and create an unhealthy work/study/care environment.	3.37 (0.928)	3 (1)	4.22 (0.696)	4 (1)	-4.61	<0.05
Willingness to shift my language to accommodate its impact on others.	4.37 (0.771)	5 (1)	4.65 (0.482)	5 (1)	-2.48	<0.05
Willingness to challenge behaviours, programs, policies, and procedures that reinforce systemic oppression.	4.17 (0.902)	4 (1)	4.54 (0.585)	5 (1)	-3.10	<0.05
Willingness to advocate for programs, policies, and procedures that challenge systemic oppression.	4.20 (0.906)	4 (1)	4.50 (0.658)	5 (1)	-2.63	<0.05

SD = standard deviation; IQR = interquartile range. Linear numeric scale: 1 = least confident, 5 = most confident

CCCS – short version, as well as adherence to the question stem wording and Likert scale groupings.

Further limitations relate to the self-report style of the survey tools themselves, which may be an unreliable outcome measure of professional competency.[7] Some research suggests that training and self-reported preparedness may not necessarily translate into the application of knowledge, skills, and attitudes within clinical practice settings. Patient-centred outcomes, satisfaction, and other quality indicators may provide more accurate metrics of training efficacy, allowing for greater longitudinal evaluation of cultural competency education.[5,12]

Moreover, there was a relatively large proportion of participants who completed the pre-training survey (44%) but did not complete the post-training survey, introducing the potential for selection bias. In particular, it is possible that students who completed both pre- and post-training surveys were more interested and engaged with the material presented during the training and, as a result, more likely to engage in self-reflection and growth (exhibiting a greater change in awareness, knowledge, skills, and willingness to change their attitudes) than those who did not complete the post-training survey. In turn, participant self-selection may have inflated the effect size, limiting the significance of findings. Future program evaluation studies would benefit from tracking whether students completed all the elements of the training and measuring their level of engagement and participation in the training. In addition, survey completion could be incentivized or made mandatory as part of coursework to improve the response rate of the post-training survey and decrease the potential for selection bias.

Furthermore, the absence of sociodemographic survey questions and information about lived experiences of discrimination and prior training of the participants in the current study limits the generalizability and transferability of the findings. Interestingly, in studies examining the impact of sociodemographic factors on implicit bias and patient outcomes, research has demonstrated that a physician's gender and race may impact the extent of their implicit bias.[42-45] Prior work, lived experiences of

discrimination, and previous social contacts with people of different races, ethnicities and genders, or lack thereof, can also affect a healthcare provider's degree of implicit bias. For example, several studies have shown that physicians of colour and/or female physicians demonstrate significantly less implicit bias compared with their peers who are White and/or men.[42-44] Recent research has confirmed these findings, showing that implicit biases are less prominent in female physicians, and that cultural competency training has a positive effect on reducing physicians' unconscious biases in general.[45] Hence, being able to describe the sociodemographic characteristics, prior experiences of oppression, as well as prior training of the participants, would improve generalizability and transferability of the findings.

CONCLUSIONS

Findings from this study reveal that cultural competency training of naturopathic medicine students may improve self-reported perception of awareness, knowledge, skills, and attitudes related to working with diverse patients and populations. The results of this study provide a baseline with which program evaluation at other naturopathic medicine educational institutions and future programs can be compared. Future research should attempt to replicate these findings with improved survey design and collection of demographic data to assess whether sociodemographic factors impact the efficacy of cultural competency training of naturopathic medicine students.

AUTHOR AFFILIATIONS

[1]Canadian College of Naturopathic Medicine, Toronto, ON, Canada; [2]SE Research Centre, Markham ON, Canada.

ACKNOWLEDGEMENTS

Special thanks to Douglas Stewart of Competence Consultants & Associates for developing the overall cultural competency training and facilitating the synchronous online training sessions.

CONFLICTS OF INTEREST DISCLOSURE

We have read and understood the *CAND Journal*'s policy on conflicts of interest disclosure and declare the following interests: CG has received fees from CCNM for coordinating and facilitating the cultural competency training described in this study. Neither HV nor VC have any conflicts to declare.

FUNDING

This research did not receive any funding.

REFERENCES

1. Truong M, Paradies Y, Priest N. Interventions to improve cultural competency in healthcare: a systematic review of reviews. *BMC Health Serv Res.* 2014;14:99. doi:10.1186/1472-6963-14-99
2. Association of American Medical Colleges. *Core competencies for entering medical students.* AAMC. https://www.aamc.org/services/admissions-lifecycle/competencies-entering-medical-students. Accessed February 23, 2022.
3. Association of American Medical Colleges. *Cultural competence education for medical students.* Association of American Medical Colleges; 2005:19. https://www.aamc.org/media/20856/download. Accessed January 27, 2022.
4. Vasquez Guzman CE, Sussman AL, Kano M, Getrich CM, Williams RL. A comparative case study analysis of cultural competence training at 15 U.S. medical schools. *Acad Med.* 2021;96(6):894-899. doi:10.1097/ACM.0000000000004015
5. Horvat L, Horey D, Romios P, Kis-Rigo J. Cultural competence education for health professionals. *Cochrane Database Syst Rev.* 2014;(5):CD009405. doi:10.1002/14651858.CD009405.pub2
6. Curtis E, Jones R, Tipene-Leach D, et al. Why cultural safety rather than cultural competency is required to achieve health equity: a literature review and recommended definition. *Int J Equity Health.* 2019;18(1):174. doi:10.1186/s12939-019-1082-3
7. Brottman MR, Char DM, Hattori RA, Heeb R, Taff SD. Toward cultural competency in health care: a scoping review of the diversity and inclusion education literature. *Acad Med.* 2020;95(5):803-813. doi:10.1097/ACM.0000000000002995
8. Osmancevic S, Schoberer D, Lohrmann C, Großschädl F. Psychometric properties of instruments used to measure the cultural competence of nurses: a systematic review. *Int J Nurs Stud.* 2021;113:103789. doi:10.1016/j.ijnurstu.2020.103789
9. Yadollahi S, Ebadi A, Asadizaker M. Measuring cultural competence in nursing: a review study. *J Client-Centered Nurs Care.* 2020;6(3):203-212. doi:10.32598/JCCNC.6.3.338.1
10. Chun MBJ, Jackson DS. Scoping review of economical, efficient, and effective cultural competency measures. *Eval Health Prof.* 2020:163278720910244. doi:10.1177/0163278720910244. Published online March 9, 2020.
11. Jongen C, McCalman J, Bainbridge R. Health workforce cultural competency interventions: a systematic scoping review. *BMC Health Serv Res.* 2018;18(1):232. doi:10.1186/s12913-018-3001-5
12. Govere L, Govere EM. How effective is cultural competence training of healthcare providers on improving patient satisfaction of minority groups? A systematic review of literature. *Worldviews Evid Based Nurs.* 2016;13(6):402-410. doi:10.1111/wvn.12176
13. Domenech Rodríguez MM, Phelps PB, Tarp HC. Baseline cultural competence in physician assistant students. *PLOS One.* 2019;14(4):e0215910. doi:10.1371/journal.pone.0215910
14. Lie D, Boker J, Crandall S, et al. A revised curriculum tool for assessing cultural competency training (TACCT) in health professions education. *MedEdPORTAL.* 2009;5:3185. doi:10.15766/mep_2374-8265.3185
15. Crosson JC, Deng W, Brazeau C, Boyd L, Soto-Greene M. Evaluating the effect of cultural competency training on medical student attitudes. *Fam Med.* 2004;36(3):199-203.
16. Green AR, Chun MBJ, Cervantes MC, et al. Measuring medical students' preparedness and skills to provide cross-cultural care. *Health Equity.* 2017;1(1):15-22. doi:10.1089/heq.2016.0011
17. Barham PD, Benjamin R, Burrell P, et al. Transcultural self-efficacy tool (TSET). In: *Teaching Cultural Competence in Nursing and Health Care*, 3rd ed. Springer Publishing Company; 2021. Accessed January 31, 2022. https://connect.springerpub.com/content/book/978-0-8261-1997-1/part/part02/chapter/ch04
18. Gozu A, Beach MC, Price EG, et al. Self-administered instruments to measure cultural competence of health professionals: a systematic review. *Teach Learn Med.* 2007;19(2):180-190. doi:10.1080/10401330701333654
19. Weissman JS, Betancourt J, Campbell EG, et al. Resident physicians' preparedness to provide cross-cultural care. *JAMA.* 2005;294(9):1058-1067. doi:10.1001/jama.294.9.1058
20. Chun MBJ, Yamada AM, Huh J, Hew C, Tasaka S. Using the cross-cultural care survey to assess cultural competency in graduate medical education. *J Grad Med Educ.* 2010;2(1):96-101. doi:10.4300/JGME-D-09-00100.1
21. Association of American Medical Colleges. *Tool for assessing cultural competence training (TACCT).* Accessed January 27, 2022. https://www.aamc.org/media/20841/download?attachment
22. Beach MC, Price EG, Gary TL, et al. Cultural competence: a systematic review of health care provider educational interventions. *Med Care.* 2005;43(4):356-373. doi:10.1097/01.mlr.0000156861.58905.96
23. Saha S, Beach MC, Cooper LA. Patient centeredness, cultural competence and healthcare quality. *J Natl Med Assoc.* 2008;100(11):1275-1285.
24. Venturin JS, Durall PS, Enciso R, Clark GT, Mulligan R. Comparing methods of cultural competency training and assessment in a predoctoral dental course. *J Dent Educ.* 2013;77(4):476-484.

25. Bahrke B, De Oliveira K, Scheel MH, Beck B, Hopp J. Longitudinal integration of cultural components into a physician assistant program's clinical year may improve cultural competency. *J Physician Assist Educ.* 2014;25(1):33-37. doi:10.1097/01367895-201425010-00005

26. Gordon WM, McCarter SAU, Myers SJ. Incorporating antiracism coursework into a cultural competency curriculum. *J Midwifery Womens Health.* 2016;61(6):721-725. doi:10.1111/jmwh.12552

27. Slobodin O, Clempert N, Kula Y, Cohen O. Educating health professionals for cultural competence in emergency situations: a study protocol for a randomized controlled trial. *J Adv Nurs.* 2020;76(1):380-386. doi:10.1111/jan.14245

28. Lloyd I, Steel A, Wardle J, eds. *Naturopathy: practice, effectiveness, economics & safety.* World Naturopathic Federation; 2021.

29. Dunn JM, Steel AE, Adams J, et al. Characteristics of global naturopathic education, regulation, and practice frameworks: results from an international survey. *BMC Complement Med Ther.* 2021;21:67. doi:10.1186/s12906-021-03217-1

30. Association of Accredited Naturopathic Medical Colleges. *AANMC core competencies of the graduating naturopathic student.* 2019. https://aanmc.org/wp-content/uploads/2019/10/Competencies_Amended_10.25.19.pdf. Accessed November 29, 2021.

31. Gray M, Thomas Y, Bonassi M, Elston J, Tapia G. Cultural safety training for allied health students in Australia. *Aust J Indig Educ.* 2021;50(2):274-283. doi:10.1017/jie.2020.2

32. Isaacson M. Clarifying concepts: cultural humility or competency. *J Prof Nurs.* 2014;30(3):251-258. doi:10.1016/j.profnurs.2013.09.011

33. Burke B, Harrison P. Anti-oppressive practice. In: Barrett S, Komaromy C, Robb M, Rogers A, eds. *Communication, relationships and care.* London and New York: Routledge; 2003:131-138.

34. Dalrymple J, Burke B. *Anti-oppressive practice: social care and the law.* 2nd ed. Open University Press; 2006.

35. XLSTAT | Statistical Software for Excel. XLSTAT, Your data analysis solution. Published 2022. https://www.xlstat.com/en/. Accessed February 23, 2022.

36. Wu D, Saint-Hilaire L, Pineda A, et al. The efficacy of an antioppression curriculum for health professionals. *Fam Med.* 2019;51(1):22-30. doi:10.22454/FamMed.2018.227415

37. Singh B, Banwell E, Groll D. Canadian residents' perceptions of cross-cultural care training in graduate medical school. *Can Med Educ J.* 2017;8:e16-e30. doi:10.36834/cmej.36872

38. Deliz JR, Fears FF, Jones KE, Tobat J, Char D, Ross WR. Cultural competency interventions during medical school: a scoping review and narrative synthesis. *J Gen Intern Med.* 2020;35(2):568-577. doi:10.1007/s11606-019-05417-5

39. Arruzza E, Chau M. The effectiveness of cultural competence education in enhancing knowledge acquisition, performance, attitudes, and student satisfaction among undergraduate health science students: a scoping review. *J Educ Eval Health Prof.* 2021;18:3. doi:10.3352/jeehp.2021.18.3

40. Tippens KM, Wild H, Campbell C, et al. Perspectives on diversity and institutional cultural climate among complementary and alternative medicine students. *J Best Pract Health Prof Divers.* 2012;5(2):850-862.

41. Hourston S, Hanes D, Zwickey H. Self-reported disability competency in naturopathic medical students. *CAND J.* 2020;27(3):31-36. doi:10.54434/candj.78

42. FitzGerald C, Hurst S. Implicit bias in healthcare professionals: a systematic review. *BMC Med Ethics.* 2017;18(1):19. doi:10.1186/s12910-017-0179-8

43. Chapman EN, Kaatz A, Carnes M. Physicians and implicit bias: how doctors may unwittingly perpetuate health care disparities. *J Gen Intern Med.* 2013;28(11):1504-1510. doi:10.1007/s11606-013-2441-1

44. Hall WJ, Chapman MV, Lee KM, et al. Implicit racial/ethnic bias among health care professionals and its influence on health care outcomes: a systematic review. *Am J Public Health.* 2015;105(12):e60-e76. doi:10.2105/AJPH.2015.302903

45. Champagne-Langabeer T, Hedges AL. Physician gender as a source of implicit bias affecting clinical decision-making processes: a scoping review. *BMC Med Educ.* 2021;21(1):171. doi:10.1186/s12909-021-02601-2