Berberine Supplementation in Polycystic Ovarian Syndrome: A Narrative Review

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Introduction

- PCOS is an endocrine disorder that affects 116 million pre-menopausal women worldwide.
- It is commonly characterized by two of the following: hyperandrogenism, anovulation, or polycystic ovaries.
- Insulin resistance plays a significant role in the manifestation and progression of PCOS.
- PCOS is treated symptomatically combined with hormonal and glycemic regulating medications such as metformin (MTF) to help regulate menstrual cycles and address underlying insulin resistance.
- Berberine (BBR) is an isoquinoline alkaloid and has been shown to affect insulin, glucose, lipid, and hormonal regulation.

Objectives

This review aims to determine the effects of BBR on metabolic and hormonal parameters in people with PCOS.

Search Methods

- PubMed, Google Scholar and Science Direct were the databases searched.
- Limits were used to refine results to publication dates between 2010-2022, randomized control trials, systematic reviews, and meta-analyses.

Table 1: PICO framework

Population	Intervention	Outcomes
• Females diagnosed with PCOS based on Rotterdam criteria • According to the criteria, diagnosis requires the presence of at least two of the following three findings: hyperandrogenism, ovulatory dysfunction, and polycystic ovaries	• Intervention was BBR at dose of >300 mg • Frequency of administration of BBR differed between studies • Comparator group was placebo and/or metformin	• Outcomes were divided into four categories: 1) Clinical characteristics 2) Hormonal parameters 3) Carbohydrate parameters 4) Lipid profiles

Results

Table 2: Effects of BBR on clinical characteristics

Authors	Intervention	Comparison	Results
Wei et al., 2012	BBR (500mg TID)	MTF (500mg TID) Placebo (1 tablet BID)	Greater reduction in waist circumference in BBR compared to MTF and placebo group.
Meshra., 2022	BBR (500mg BID)	MTF (500mg TID)	Reduction in weight, waist circumference and BMI in both groups. Greater reduction in waist circumference and waist to hip ratio in BBR group compared to MTF.
Yuan et al., 2014	BBR (500mg TID)	MTF (500mg TID) Placebo (1 tablet TID)	Greater reduction in BMI among BBR group compared to MTF. Greater reduction in waist circumference and waist to hip ratio in BBR and MTF group compared to placebo.
Orio et al., 2013	BBR (588mg BID)	Placebo	No significant change in BMI was observed after treatment. BBR had a significant effect on decreasing waist circumference.
Xie et al., 2019	BBR (300mg TID)	MTF (500mg TID)	BBR was associated with slightly decreased BMI, but not significantly, compared with MTF. Waist circumference and waist to hip ratio were significantly reduced in BBR compared to MTF.
Li et al., 2018	BBR (300mg TID)	MTF (500mg BID)	Reduction in BMI in both BBR and MTF group. Greater reduction observed in BBR group.

Table 3: Effects of BBR on carbohydrate parameters

Authors	Intervention	Comparison	Results
Wei et al., 2012	BBR (500mg TID)	MTF (500mg TID) Placebo (1 tablet BID)	Insulin sensitivity and fasting glucose insulin ratio (FGIR) increased in both BBR and MTF group compared to placebo. Fasting insulin (FIN) and fasting blood glucose (FBG) decreased in both BBR and MTF groups compared to placebo. No difference between MTF and BBR group in terms of insulin sensitivity tests.
Meshra., 2022	BBR (500mg BID)	MTF (500mg TID)	Improvements in FBG, FIN and FGIR in BBR and MTF groups. No difference between BBR and MTF.
Yuan et al., 2014	BBR (500mg TID)	MTF (500mg TID) Placebo (1 tablet TID)	Improvements in FBG, FIN as well as HOMA-IR in BBR and MTF groups compared to placebo. No difference between BBR and MTF.
Orio et al., 2013	BBR (588mg BID)	Placebo	Significant reduction of HOMA-IR and AUC insulin in BBR group. Although BBR therapy improved insulin resistance, HOMA-IR and AUC insulin remained significantly higher compared to placebo.
Xie et al., 2019	BBR (300mg TID)	MTF (500mg TID)	No significant difference between BBR and MTF groups in reducing FBG, FIN, postprandial plasma glucose, or HOMA-insulin resistance.
Li et al., 2018	BBR (300mg TID)	MTF (500mg BID)	Significant reduction of HOMA-IR BBR and MTF group. Greater reduction observed in BBR group.

Table 4: Effects of BBR on lipid parameters

Authors	Intervention	Comparison	Results
Wei et al., 2012	BBR (500mg TID)	MTF (500mg TID) Placebo (1 tablet BID)	Greater reduction in triglyceride (TG), total cholesterol (TC) and low density lipoprotein (LDL) in BBR compared to MTF and placebo. Greater increase in high density lipoprotein (HDL) in BBR compared to MTF group and placebo.
Meshra., 2022	BBR (500mg BID)	MTF (500mg TID)	Greater reduction TG, total cholesterol TC, LDL and very low density lipoprotein (VLDL) in BBR compared to MTF and placebo. Greater increase in HDL in BBR compared to MTF group and placebo.
Yuan et al., 2014	BBR (500mg TID)	MTF (500mg TID) Placebo (1 tablet TID)	Greater reduction TC and LDL in BBR compared to MTF and placebo. No difference in HDL and TG between BBR and MTF groups.
Orio et al., 2013	BBR (588mg BID)	Placebo	Reduction in TC, TG and LDL among BBR group compared to placebo.
Xie et al., 2019	BBR (300mg TID)	MTF (500mg TID)	Slight reduction in TC and LDL as well as slight elevation in HDL among BBR group compared to MTF.
Li et al., 2018	BBR (300mg TID)	MTF (500mg BID)	Significant reduction in TG, TC and LDL among BBR and MTF. Greater reduction in LDL and TC in BBR compared to MTF.

Table 5: Effects of BBR on hormonal parameters

Authors	Intervention	Comparison	Results
Wei et al., 2012	BBR (500mg TID)	MTF (500mg TID) Placebo (1 tablet BID)	Significant increase in sex hormone binding globulin (SHBG) in BBR group compared to placebo. Significant reduction in testosterone (TT) and free androgen index (FAI) in BBR compared to placebo. No difference between BBR and MTF on TT and FAI outcomes.
Meshra., 2022	BBR (500mg BID)	MTF (500mg TID)	Significant decrease in TT and FAI and increase in SHBG in both BBR and MTF groups. Significant improvements in SHBG and FAI outcomes was greater in the BBR group compared to MTF.
Orio et al., 2013	BBR (588mg BID)	Placebo	TT, androstenedione and FAI significantly decreased in BBR group compared to placebo. SHBG and menses frequency significantly increased in BBR group compared to placebo.
Xie et al., 2019	BBR (300mg TID)	MTF (500mg TID)	TT significantly decreased in the BBR versus MTF groups. Significant decrease in LH/FSH ratio in both BBR and MTF groups
Li et al., 2018	BBR (300mg TID)	MTF (500mg BID)	Significant decrease in TT in the BBR group compared to MTF

Discussions

Strengths

- Trials included were double-blind controlled studies.
- Trials varied in length between three months up to 24 months. These timelines were sufficient to observe a change in the treatment group.

Limitations

- Most studies reviewed only included Chinese populations. This decreases the external validity of the study as beneficial outcomes may not be generalizable to other populations.
- Some trials prescribed the placebo at a different frequency than BBR in the treatment group which may have decreased the effectiveness of the purpose of blinding.

Proposed mechanism of action of BBR

- The underlying mechanism of action is thought to be through the activation of AMP-activated protein kinase (AMPK).
- AMPK is an enzyme that regulates the usage and production of energy within the body to maintain homeostasis.
- Through activation of AMPK, BBR may increase glucose uptake by muscle tissue even if insulin levels are low, increases glycolysis, decreases insulin resistance, oxidative stress, serum androgen levels, abnormal lipid metabolism, and alleviates chronic inflammation.

Clinical Application

BBR showed similar beneficial effects on improving carbohydrate parameters, insulin sensitivity, and reduction of hyperandrogenemia when compared to MTF. BBR had a greater impact on lipid parameters for improving dyslipidemia and body fat composition when compared to MTF and placebo.

Conclusions

Evidence suggests that BBR is a promising treatment for PCOS acting through mechanisms of decreasing blood sugar, insulin resistance, and androgen level as well as improving dyslipidemia. Further research with larger sample sizes and representation of various ethnic backgrounds is warranted.

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Investigating Acupressure, Vitamin E and Aerobic Exercise for Relieving Pain in Primary Dysmenorrhea: A Narrative Review

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Introduction

- Primary dysmenorrhea (PD) is the most common gynecological condition amongst women of reproductive age. It affects between 45-95% of women that menstruate.
- It is defined as having spasmodic pain originating from the uterus in absence of underlying pelvic pathology.
- Despite its high prevalence, it is often mistakenly accepted as a normal aspect of the menstrual cycle.
- First-line therapies emphasize the use of non-steroidal anti-inflammatory drugs and hormonal contraceptives; however, these involve adverse effects such as the increased risk of breast cancer and gastrointestinal disturbances.

Objectives

The objective of this study was to investigate the role of specific natural interventions: acupressure, vitamin E and aerobic exercise for relieving pain in primary dysmenorrhea.

Search Methods

- A general literature search was conducted for primary dysmenorrhea AND treatment in both PubMed and Google Scholar to assess the state and breadth of the literature.
- PubMed and Google Scholar were then used to search primary dysmenorrhea AND acupressure, primary dysmenorrhea AND vitamin E, and primary dysmenorrhea AND aerobic exercise.
- Both searches were limited to meta-analyses and randomized controlled trials (RCTs).
- In PubMed the human filter was applied and in Google Scholar an advanced search was conducted which included articles where search terms were present in the title.
- Across both databases acupressure yielded 43 studies, vitamin E yielded 47 studies and aerobic exercise yielded 52 studies of which 9 total met all criteria and are summarized in this study.
- Meta-analyses that focused solely on each of these interventions were not found, therefore only RCTs were included.

Table 1: PICO framework

Population	Intervention vs Comparison	Outcomes
• Females with PD	• Acupressure vs sham • Vitamin E vs placebo • Aerobic exercise vs no treatment	• Pain intensity measured by a visual analogue scale (VAS)

Results

Table 2: Acupressure

Authors	Intervention	Comparison	Results
Kafaei et al., 2013	Acupressure on Liver 3 for two minutes on each foot four times (16 minutes) across three menstrual cycles	Sham	Liver point 3 acupressure resulted in a reduction in pain when comparing first cycle pre-intervention and third cycle post-intervention
Mirbagher-Ajorpaz et al., 2011	Acupressure on Spleen 6 for ten second cycles for a total of 20 minutes on the first day of one menstrual cycle	Sham	Acupressure on spleen 6 point was effective in reducing pain for 73% of the intervention group. SP6 acupressure showed a significant pain reduction immediately and 1, 2 and 3 hours after treatment
Yeh et al., 2013	Auricular acupressure on Kidney, Liver, Internal Genitals, Central Rim, Endocrine and Shenmen points for one minute 4 times per day for 2 days from the onset of menses for one menstrual cycle	Sham	There was a significant within-group difference in VAS score in both experimental and control groups. For menstrual pain the VAS score analysis confirmed that auricular acupressure is efficacious.

Table 3: Vitamin E

Authors	Intervention	Comparison	Results
Ziaei et al., 2001	500 units of vitamin E (five tablets) per day beginning two days prior to the start of menses and continuing through to day three of menses (five days of total treatment) across two menstrual cycles	Placebo	There was a statistically significant difference in pain between baseline and post-treatment in both the control and treatment groups
Ziaei et al., 2005	200 units of vitamin E twice a day (two tablets twice daily) starting at two days before the onset of menses and following through to the third day of menstruation across four menstrual cycles	Placebo	There was a statistically significant reduction in pain in both the control and treatment groups, but in the treatment group the pain reduction was of significantly greater. In the vitamin E group pain severity was lower at two ($P < 0.001$) and four months ($P < 0.001$)
Kashanian et al., 2013	400IU (one tablet) of vitamin E per day starting two days before the onset of menses through to day five of menses across two menstrual cycles	Placebo	There was a significant reduction in pain in first and second cycles after treatment within both the control and treatment group but no significant difference between them. The treatment group showed a more significant reduction in pain after month two versus the control group.

Table 4: Aerobic Exercise

Authors	Intervention	Comparison	Results
Sutar et al., 2016	Eight-week aerobic training program (three days per week and 45 mins per day) across three menstrual cycles	No Treatment	Post exercise resulted in a significant decrease in pain intensity after each menstrual cycle. VAS score decreased after the beginning of the first exercise intervention and continued to decrease through the remaining three subsequent cycles ($p<0.05$).
Arora et al., 2014	Treadmill based aerobic exercise program three-five times per week for 12 weeks	No Treatment	There was an extremely significant reduction in pain when comparing pre and post intervention VAS scores ($p<0.0001$)
Kannan et al., 2019	Supervised aerobic training for four weeks followed by unsupervised home exercise for six months	No Treatment	At one month there was a significant reduction in pain intensity in the treatment group compared to control ($p<0.05$) and a continued reduction at four and seven months ($p<0.01$)

Discussion

Strengths

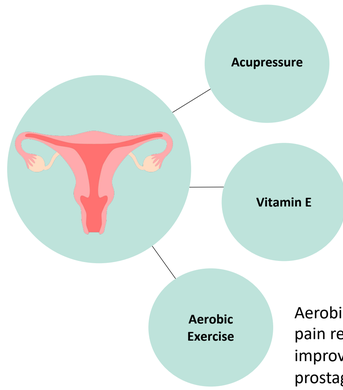
- Most RCTs were double-blinded, no significant differences between treatment and control groups at baseline, positive results for all interventions
- Most studies were conducted across multiple menstrual cycles

Limitations

- Small sample sizes and specific sample populations, method of intervention, duration, and dosage varied among studies

Mechanism of Action

- The etiology of pain in PD is a result of increased production of uterine prostaglandins
- All interventions follow a general theme of decreasing prostaglandin levels/synthesis



Acupressure's mechanism of action involves blocking pain gates through pressure as well as minimizing pain through the release of endogenous endorphins

Vitamin E's mechanism of action involves its inhibition of the release of arachidonic acid and subsequent conversion of arachidonic acid into prostaglandin

Aerobic exercise's mechanism of action on pain reduction is through its ability to improve endothelial function and regulate prostaglandin concentration

Figure 1: The mechanism of action of natural therapies

Further Research

- Additional research with larger sample sizes and longer study durations is needed to strengthen the quality of evidence and more confidently determine the magnitude of benefit.

Conclusion

Based on the available evidence, encouraging aerobic exercise, vitamin E supplementation, and acupressure acutely may be useful methods of pain relief for women with PD. These interventions are safe with minimal adverse effects and are cost-effective natural therapies to consider in practice.

For references or further questions, please email: dbarbaro@ndnet.ccnm.edu

Investigating Antioxidant Supplementation to Improve Sperm Quality: A Narrative Review

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Introduction

- Infertility affects 15% of couples worldwide
- Male-factor infertility (MFI) is believed to contribute to 50% of these cases
- Many environmental and lifestyle factors may impact fertility by increasing reactive oxygen species (ROS) in semen, which is observed in 30-80% of MFI cases
- Thought that increased seminal ROS damages sperm, decreasing the number and quality of gametes
- Suggests a potential role for antioxidant supplementation to improve sperm quality

Objectives

To analyze the effectiveness of the following antioxidants in improving sperm quality: vitamin E (vit E), L-carnitine/L-acetyl-carnitine (LC/LAC), and docosahexaenoic acid (DHA).

Search Methods

- PubMed was searched with the following MeSH terms:
  - (vitamin E) AND (semen);
  - (L-carnitine) AND (semen); and
  - (DHA) AND (semen)
- Results were filtered to only include randomized control trials (RCTs) and systematic reviews with meta-analyses
  - Only RCTs not summarized in selected meta-analyses were included in this review
- Animal studies were excluded
- Studies combining antioxidant supplementation with other naturopathic modalities (e.g., traditional Chinese herbal medicine) were excluded

Table 1: PICO framework

Population	Intervention	Outcomes
• Subfertile, reproductive-aged males (ages 18-65)	• Vitamin E vs. placebo • LC/LAC vs. placebo • DHA vs. placebo	• Improvement in sperm parameters

- Vitamin E yielded 35 results, LC/LAC yielded 32 results, and DHA studies yielded seven results of which nine met all criteria and are summarized

Results

Table 2: Vitamin E

Authors	Intervention	Comparison	Results
Zhou et al., 2022	Nine studies of varying dosage and duration (four-48 weeks)	Placebo, no treatment, or treatment without vit E	Vit E appeared to significantly improved total sperm number, sperm concentration, and progressive motility. Vit E did not appear to improve sperm motility or morphology. Vit E supplementation significantly improved pregnancy rates.
Kessopoulou et al., 1995	300 mg alpha-tocopheryl acetate BID for three months	Placebo	Vit E group exhibited no significant differences in sperm quality compared to placebo. ROS levels remained unchanged. Significant improvement was observed in zona-binding test following vit E treatment.
Sabetian et al., 2021	400 IUs alpha-tocopherol once daily for eight weeks	Placebo	Vit E group showed no significant improvements in sperm quality compared to placebo. Normal sperm morphology decreased significantly in the placebo group over eight weeks, but not in the vit E group. Pregnancy and live birth rates did not differ significantly between groups.

Table 3: L-Carnitine & L-Acetyl-Carnitine

Authors	Intervention	Comparison	Results
Khaw et al., 2020	Seven studies of varying LC/LAC dosage and duration (three-six months)	Placebo	LC/LAC treatment did not significantly improve sperm concentration. Significant improvements were seen in total sperm motility, progressive sperm motility, and sperm morphology in LC/LAC groups. No improvements in pregnancy rates were observed.
Micic et al., 2019	Proxeed Plus (1,000 mg LC + 500 mg LAC) BID for six months	Placebo	Progressive sperm motility, sperm vitality, and DNA sperm fragmentation significantly improved after six months of LC/LAC treatment compared to placebo.
Busetto et al., 2018	Proxeed Plus (1,000 mg LC + 500 mg LAC) BID for six months	Placebo	Significant improvements seen in sperm concentration, total sperm count, progressive sperm motility, total sperm motility, and sperm morphology in LC/LAC treatment compared to placebo. No differences were observed in semen volume.

Table 4: DHA

Authors	Intervention	Comparison	Results
Hosseini et al., 2019	Two RCTs of varying DHA dosage (400 or 800 mg) at 12 weeks duration	Placebo	DHA supplementation at 400 or 800 mg did not significantly improve sperm concentration compared to placebo. DHA treatment significantly improved total sperm motility compared to placebo.
Gonzalez-Ravina et al., 2018	Three treatment groups: 0.5, 1, or 2 g DHA per day for 12 weeks	Placebo	DHA groups showed no significant improvements in semen volume or sperm concentration. Significant increase in normal sperm morphology seen in 1 and 2 g DHA groups at 1 and 3 months. 1 and 2 g DHA improved progressive motility at 1 and 3 months. Significant increase in sperm ROS noted after 1 month of 0.5 and 2 g DHA. Difference in ROS was not noted after 3 months.
Martinez-Soto et al., 2016	500 mg DHA TID for 10 weeks	Placebo	DHA treatment significantly improved total antioxidant capacity and reduced sperm DNA fragmentation index compared to placebo. No significant improvements were observed in other sperm parameters.

Discussions

Strengths

- All included trials were randomized, double-blinded, and placebo-controlled, increasing study quality
- Three of the nine included studies are meta-analyses, which are the highest-quality research method
- All three interventions were generally well-tolerated
- The vitamin E and LC/LAC meta-analyses observed significant improvements in sperm quality

Limitations

- Most trials were short in duration, so benefit or harm of longer supplementation cannot be concluded
- There was limited or no follow-up period in most of the studies, so pregnancy and live birth rates could not be commented on in most cases
- There was significant heterogeneity in supplementation dose and duration among included studies
- Most of the studies were conducted in very small sample sizes

Clinical Applications

- Supplementing subfertile men with 300 to 600 mg of vitamin E (alpha-tocopherol) for four-six months may improve sperm quality and increase pregnancy rates
- Supplementing subfertile men with 1,000 mg LC + 500 mg LAC for three-six months may also improve sperm motility and morphology
- DHA therapy may have marginal benefit for improving progressive sperm motility
- Antioxidant supplementation can be used alongside standard care

Conclusions

Vitamin E and LC/LAC supplementation may be viable options to improve sperm quality in subfertile men. Further studies are needed to determine optimal therapeutic dosages, duration of treatment, long-term benefit/harm, and resultant live birth rates.

For references or further questions, please email: tbrohm@ndnet.ccnm.edu

Maternal Fiber Intake and Perinatal Anxiety and Depression: A Review

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Introduction

The gut microbiome mediates mental health outcomes via bidirectional communication of the gut-brain axis, serving as a new therapeutic target in mental health disorders. Pre/probiotics, and nutrients have profound affects on the gut microbiome.

Maternal anxiety and depression, the most common mental health disorders in new and expectant mothers, have long- term health consequences for the mother-child dyad. However, the association between maternal mental health and antenatal diet, via the GBA remains uncharted.

Modifying diet to improve mental health outcomes in the perinatal period, is a highly desirable intervention.

Objectives

To investigate the association between perinatal fiber intake and maternal anxiety and depression.

Search Methods

- **Search Methods:** A literature review of PubMed and Google Scholar using the MeSH terms in Table 1 was conducted. Observational and clinical trials published since 2015 were included. Reviews, meta-analyses, and animal studies were excluded. Article titles and abstracts were screened independently and data on diet, mental health outcomes and demographic factors were extracted.

Table 1: Search MeSH/KeyWords

Period	Mental Health	Fiber Intake
Antenatal Prenatal Postnatal Pregnancy Peripartum Gestational Lactation Breastfeeding Preconception Post conception	Mental health/disorders/conditions/ wellbeing Anxiety Depression Mood Stress Psychiatric/psychological Dysthymia Baby blues	Diet/Nutrition Dietary Pattern/Quality/Therapy Fiber/re Prebiotic/synbitoic/supplements Complex carbs Fructo/Galacto/Xylo-oligosaccharides Inulin Vegetables Grains Legumes/beans Vegetarian Fruits

Analysis: Fiber content and Fiber scores for food groups in each study will be derived, and the dietary patterns will be ranked accordingly (Very High, High, Low, Very Low). Anxiety and depression outcomes reported in each study will be converted to categorical data (improved, same, worsened). The mental health findings will then be restated in the context of fiber intake.

Descriptive data will be derived to compare the findings between all studies.

Results

		Dietary Assessment		Mental Health		Findings Reported	Fiber Analysis	
Country (# of studies)	Study #(N)	Dietary Assessment DP or FGI (# of FG)	Perinatal Period of Assessment	Mental Health Outcome	Perinatal Period of Assessment	Mental Health Outcomes by Dietary Pattern/Groups	Top Ranking Fiber Food Groups in Study	Ranking of High Fiber foods in each diet
Australia (4)	Study 8(168)	1) Healthy DP; 2) Unhealthy DP **(FG:34)**	Ant	Dep	Peri	Sig. ↑ 2nd trimester depression with Unhealthy DP in 2nd trimester	1) Breakfast Cereals; 2) Legumes; 3) Nuts; 4) Potato & Corn Chip; 5) Fruits	Sig. ↑ of 2, 3 &5 in the Healthy DP.
	Study 14(485)	FGI **(FG:8)**	Peri	Dep	Peri	Sig.↑in takeaway foods in women with untreated depression	In progress	In progress
	Study 15(491)	FGI **(FG:3)**	Ant	Dep	Peri	No. Sig. Association between fruit, vegetable or fish intake and depressive symptoms	In progress	In progress
	Study 25(457)	FGI **(FG:11)**	Post	Dep	Post	Sig. ↓ dep symptoms with ↑ dietary quality.	In progress	In progress
Brazil (2)	Study 1(196)	1) Common-Brazilian DP,2) Healthy DP, 3)Processed DP **(FG:19)**	Ant	Anx	Peri	Sig ↑ STAI scores associated with ↑ in processed DP ; sig ↓ anxiety scores with . ↑common-Brazilian & healthy patterns DPs.	In progress	In progress
	Study 6(780)	1) Varied DP, 2) Restricted DP, 3) Common Brazilian DP **(FG:9)**	Ant	Both	Peri	Sig ↑ MDD in Common Brazilian vs. Varied DP; . Sig. ↑ MDD prevalence with ↓ fruit and ↑ sweets & sugars intake (no association with GAD). Sig ↑ in anxiety with ↓ bean consumption.	In progress	In progress
China (4)	Study 12(565)	FGI **(FG:14)**	Ant	Dep	Post	**Sig.↓** intake of Vegetables, Fruits, Fish, beef, mutton and poultry, and **sig. ↑** intake of pork and meat in Depressed group.	1) Wheat based Staple Foods; 2) Other Vegetables; 3) Light Coloured Vegetables; 4) Fresh Fruits	Sig. ↓ intake of 2, 3 & 4 in depressed group
	Study 20(1659)	1) Beverage DP; 2) Vegetable DP; 3) Cereal & meat DP; 4) Nut-Fruit DP; 5) Seafood DP; 6) Eggs DP **(FG:13)**	Ant	Dep	Post	**Sig.↓** odds of PPD in the Seafood & Nut-Fruit Dietary Patterns	1) Legumes; 2) Nuts; 3) Fruits; 4) Course Cereals & Grains	**Nut-Fruit DP** highest in 1,2,3; **Seafood DP** highest in 1,2; **Vegetable DP** highest in 1, 3, 4
	Study 21(939)	1) Excessive Intake, 2) Insufficient intake, and 3) Imbalanced intake. **(FG:12)**	Post	Dep	Post	Insufficient and Imbalanced Intake significantly more prevalent in the Depressed group	1) Coarse Cereals (rice, Wheat Others); 2) Soybeans; 3) Fruits; 4) Vegetables (dark, light, Tubers, others)	All four lower in the Insufficient and Imbalanced DPs
	Study 24(17430)	1) Vegetable, 2) Fruits, 3) Cereal, 4) Milk, 5) Meat and 6) Varied DPs **(FG:30)**	Ant	Dep	Post	**Sig. ↓** OR of Dep. symptoms in the Milk, Fruit and Vegetable DPs	1) Nuts, 2) legumes, 3) Fruits, 4) Cereals	Only 1 & 2 were most consumed in the Milk, Fruit and Vegetable DPs
Japan (2)	Study 3(1757)	1) Healthy, 2) Western, 3) Japanese DPs **(FG: 33)**	Ant	Dep	Ant	**Sig inverse** association between depressive symptoms and higher adherence to Healthy & Japanese DPs . **No association** with Western DP.	In progress	In progress
	Study 18(104,102)	1) Western, 2) Japanese, 3)Unbalanced DPs **(FG:23)**	Ant	Both	Ant	**Sig ↓** in OR of poor mental health in Western DP; **Sig ↑** in Japanese and Unbalanced Diets	In progress	In progress
Singapore (2)	Study 5(1249)	1) Soup-Veg-Fruits, 2) Eat-Out, 3) Traditional Chinese, 4) Traditional Indian DPs; **(FG:84)**	Post	Both	Peri	**Sig ↓** in STAI &EPDS scores in Soup-veg-Fruit Diet PP; **Sig↓** in EPDS Scores and p(EPDS>13) in Traditional Indian Diet	In progress	In progress
	Study 23(1247)	FGI **(FG:11)**	Ant	Both	Peri	**Sig. ↓** in HEI-SGP Scores in depressed group; . **Sig ↓** in RR of depression with ↑ diet quality	In progress	In progress
USA (2)	Study 16(2136)	FGI **(FG:12)**	Ant	Dep	Ant	Poor Diet Quality **Sig.↑** w/prenatal depression; Also ↑ intake of empty kcal & ↓intake of greens, beans and fruits in women w/depression	In progress	In progress
	Study 17(2193)	FGI **(FG:12)**	Peri	Dep	Ant	Poor diet quality **Sig. ↑** in women with Moderate/severe depression	In progress	In progress
Vanuatu (1)	Study 22(187)	FGI **(FG:9)**	Ant	Both	Ant	**↓** dietary diversity observed among women w/**↑** distress levels	In progress	In progress

Acronyms: DP : Dietary Pattern; **FGI:** Food Group Intake; **FG:** # of Food groups analyzed, **Ant:** Antenatal; **Peri:** Perinatal (Antenatal + Postpartum); **Post:** Postpartum, **FFQ:** Food Frequency Questionnaire **DHQ:** Dietary History Questionnaire, **HEI:** Healthy Eating Index, **HEI-SGP:** Healthy Eating Index in Singapore, **DBI:** Diet Balance Index, **DQES:** Dietary Questionnaire for Epidemiological Studies, **DGI:** Dietary Guideline Index, **JECS-FFQ:** Japan Environment and Children's Study Food Frequency Questionnaire, **mo:** month, **hr:** hour, **Dep:** Depression; **Anx:** Anxiety; **Both:** Depression & Anxiety, **Ant:** Antenatal; **Peri:** Perinatal (Antenatal + Postpartum); **Post:** Postpartum, **EPDS:** Edinburgh Postnatal Depression scale, **PHQ-9:** Patient Health Questionnaire 9, SCID-IV: Structured Clinical Interview for DSM-IV, **CES-D:** Center for Epidemiological Studies Depression Scale, **STAI:** State-Trait Anxiety Inventory, **PRIME-MD-PHQ:** Primary Care Evaluation of Mental Disorders, **SF8:** 8-Item Short-Form Health Survey, **HRQOL:** Health-related quality of life, **K-10 Distress Scale:** Kessler-10 Distress Scale, **SDS:** Self-rating Depression Scale

- Fiber intake has not been quantified in any of the studies and had to be estimated using various methods by the authors.
- Depending on the food items included, **highest** fiber ranking foods vary for each study, and by country (See Table 2).
- At this time only results from Chinese and one Australian study is available
  - In these five studies, better/improved depression scores were associated with intake of highest fiber ranking foods.

Discussion

- Globally, the estimated prevalence of postpartum depression is 17.22%; while in Canada it is estimated at 17.9% and 13.8% for postpartum depression and anxiety, respectively.
- Dietary patterns have been associated with depression and anxiety. Further, alterations in the gut microbiome have been associated with major depressive and general anxiety disorders. It is plausible that the gut-brain axis may be mediated by high intakes of dietary fiber.
- None of the studies we identified specifically measure fiber intake. Few studies specify the food items included in their broader food groups.
- Typical serving sizes were determined subjectively and may not reflect actual serving sizes per individual per country;
  1. Reported typical daily food intakes varied by volume, i.e., grams/day (China), vs, grams or mL/serving (Australia)
  2. Fiber (g)/100 g food vary by database (Canadian Nutrient Profile or USDA), or by representative food item selected if original item is not available
  3. Raw vs cooked food items vary in fiber (g)/100 g; frequency of raw or cooked food intake is unknown
  4. The types of vegetables, fruits, legumes consumed in each country is determined by culture, availability and affordability. Few reputable sources disclose the most popular food items consumed in each country.

Conclusion

- Data extraction and analysis are still in progress.
- In the absence of reported fiber data, there are significant challenges in deriving intake. Efforts to harmonize reporting for fiber intake appear warranted.
- Given the pivotal role of indigestible carbohydrates in reshaping gut microbiome, more studies with designs tailored to assessing this role are required to better quantify this relationship and any subsequent impact on mental health.

For references or further questions, please email: nebrahimi@ccnm.edu

Cultural Stigma and Fertility: A Scoping Review

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Introduction

- Infertility can have a significant impact on individual mental health and quality of life.
- Many individuals trying to conceive may not seek or receive help due to barriers related to stigmatization.
- Fertility may be viewed differently across cultures, however there is a lack of literature synthesizing this topic.
- The questions become: why and how is culture shaping fertility, and can bringing this into awareness help support individuals trying to conceive.

Objectives

Explore and identify common and unique themes at the intersection of cultural stigma and infertility in the existing landscape of evidence.

Search Methods

- PubMed, MEDLINE and EBSCO (CINAHL, PsychInfo) databases will be used to develop and conduct the search.
- The Arksey and O'Malley framework for scoping reviews was used to guide methodology.
- A data extraction form will be piloted and tested by all authors on 10% of identified studies and adapted throughout the scoping review based on emergent outcomes.

Table 1: PCC framework

Population	Concept	Context
• >/ 18 years old • Currently experiencing infertility or have experienced infertility in the past	• Deductive systematic thematic analysis of each article will be employed to identify common themes regarding stigma, disclosure, and care seeking/avoidance, etc.	• Open to location, culture, religion, sex/gender

Results

This project is now in the stage of data collection

Search Terms:
"Infertility" OR "Family Planning"
"Stigma" OR "Cultural Barrier" OR "Cultural Stigma" OR "Infertility Stigma"

Inclusion Criteria	Exlusion Criteria	Study design	Study setting	Country/location	Cultures identified in study
Genders being studied	Outcomes assessed (or study question)	Key study results	Conclusion	Common Themes (framework, recommendations)	

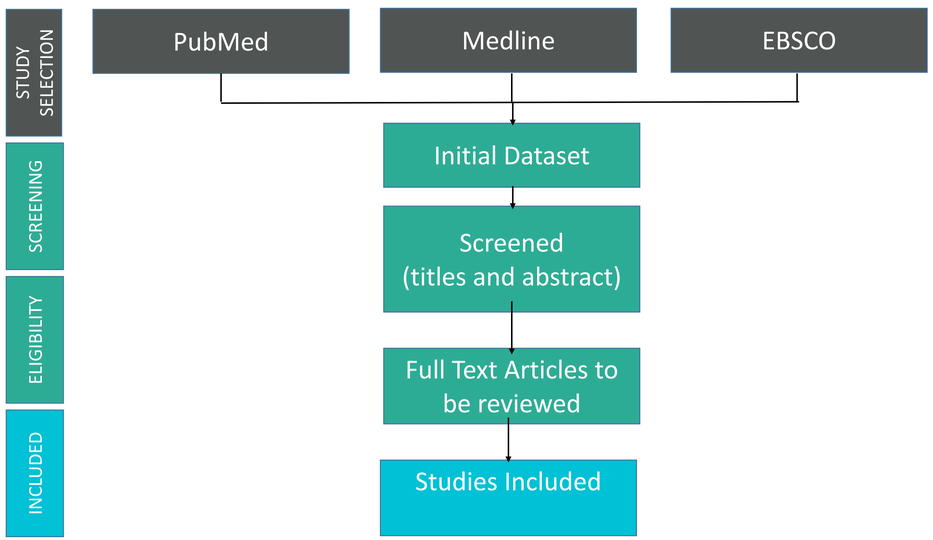

Figure 1. Data Collection Process

Figure 2. Stigma Categories to Consider

Discussions

- Titles and abstracts will be screened independently and in duplicate against the inclusion and exclusion criteria.
- Descriptive statistics will be used to describe, interpret and examine data.

Strengths

Using various cultures and locations in data extraction will help translate the findings across populations, particularly of use in regions that are comprised of various cultures.

Limitations

The search terms used may limit the literature that is reviewed. Data extraction by different reviewers could hinder the consistency of results. Most research is conducted on the sex demographic instead of gender or in heterosexual relationships which also needs to be considered.

Implications of Research

Identifying barriers related to cultural stigma while experiencing fertility or while seeking or receiving care can help raise awareness, introduce coping strategies, and ideally increase fertility care or education.

Future Research

After identification of how culture is shaping fertility, coping strategies can be defined, explored and evaluated to see if this reduces perception of stigmatization or if this changes how individuals will seek fertility care.

Conclusions

The results obtained through this scoping review may assist in guiding future initiatives to actively address cultural components of stigma and fertility, and may provide a useful tool for collaboration and advancement within this field.

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Investigating L-Arginine and Low-Intensity Extracorporeal Shock Wave Therapy for Erectile Dysfunction: A Narrative Review

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Introduction

- Erectile dysfunction (ED) is one of the most common sexual health conditions among males.
- In North America, 40% of men in their 40s are diagnosed with ED.
- ED has a profound impact on identity, confidence, mental health, and sexual satisfaction.
- Current treatments range from less invasive prescription drugs to more invasive procedures such as intracavernosal injections and penile implants.
- Patient willingness to seek treatment is dependent on the level of invasiveness, adverse effects, cost, and how quickly the treatment becomes efficacious.

Objectives

To analyze the effectiveness of L-arginine and Low-Intensity Extracorporeal Shock Wave Therapy (LI-ESWT) as non-drug treatments for erectile dysfunction.

Search Methods

- Databases included PubMed, Science Direct, and Google Scholar
- Selected articles were limited to randomized control trials (RCTs), systematic reviews and meta-analyses. Only the RCTs not summarized in the meta-analyses were included.
- Studies had to include either included the International Index of Erectile Function (IIEF) or Sexual Health Inventory for Men (SHIM) Questionnaires as outcome measures.
- Number of studies:
  - L-Arginine: 114 studies of which 2 RCTs and 1 meta-analysis met the criteria.
  - LI-ESWT: 240 studies of which 2 RCTs and 1 meta-analysis met the criteria.

Table 1: PICO framework

Population	Intervention vs. Control	Outcomes
Adult males with mild-to-moderate ED	• L-Arginine vs. Placebo • LI-ESWT vs. Sham Therapy	Increased score in IIEF or SHIM Questionnaires

Results

Table 2: L-Arginine

Authors	Intervention	Comparison	Results
Menafra et al., 2022	6g L-Arginine for three months	Placebo	IIEF-6 scores were significantly improved after 3 months compared to baseline ($p<0.0001$). 24% of participants (12 participants) reached the IIEF-6 criteria for absence of ED, two being from the mild-to-moderate subgroup and 10 from the mild subgroup. The L-Arginine showed additional side benefits including non-statistically significant increases in total testosterone and HDL levels.
Abu El-Hamd and Hegazy, 2020	5g L-Arginine for six weeks	Placebo	SHIM scores were significantly improved after six weeks ($p=0.0001$).
Rhim et al., 2019*	Three (total of 10 studies investigated in the study) RCTs on L-Arginine. Doses ranged from 1500-5000mg L-Arginine. Durations varied from 17 days- six weeks.	Placebo or No Treatment	Arginine dosing between 1500-5000mg was shown to significantly improve ED compared to placebo or no treatment (OR 3.37 [1.29,8.77], $P=0.01$,$I^2= 44$). IIEF overall satisfaction (WMD 0.37 [0.07,0.68], $P=0.02$) and orgasmic function (WMD 0.73 [0.17,1.3], $P=0.01$) scores significantly improved , while there was no significant improvement in IIEF- intercourse satisfaction scores or sexual desire scores.

Table 3: Low-Intensity Extracorporeal Shock Wave Therapy (LI-ESWT)

Authors	Intervention	Comparison	Results
Kalyvianakis et al., 2022	12 sessions of LI-ESWT with 5,000 impulses, 0.096mJ/mm^2 energy flux density, and 5Hz frequency for six weeks (two sessions per week).	Sham Therapy	MCID was achieved by 79% of patients in the LI-ESWT group compared to none in the placebo group at three months follow up. The IIEF-EF baseline-adjusted mean between-group-difference scores were 3.9 points at one month follow up (95% CI [2.7-5.2], $p<0.001$) and 4.4 points at three months follow up (95% CI [3.4-5.4], $p<0.001$).
Ortac et al., 2021	Four sessions of LI-ESWT with 3,000 impulses, 0.20mJ/mm^2 energy flux, and 5Hz frequency for four weeks (one session per week).	Sham Therapy	MCID was achieved by 74% of the LI-ESWT group at three months follow up regardless of age, BMI, and ED duration. IIEF-EF scores were 23.10+/- 2.82 and 20.95+/- 2.19 in the LI-ESWT and sham groups respectively ($p=0.003$). IIEF-EF scores remained high six months post treatment in the LI-ESWT group (22.67 +/- 3.35) compared to the sham group (19.82 +/- 1.56). MCID according to baseline was defined as mild (2 points), moderate (5 points), severe (7 points).
Dong et al., 2019*	7 RCTs on LI-ESWT. Number of impulses ranges from 1,500-3,000, 0.09mJ/mm^2 energy flux, and 5Hz. Number of treatment sessions ranged from 5-12 sessions (1-2 sessions per week).	Sham Therapy	LI-ESWT showed a higher IIEF-EF scores (MD:1.99 points, 95% CI [2.99,4.25], $p<0.00001$) and increased IIEF-EF scores (MD: 3.62 points, 95% CI [2.999, 4.25], $p<0.00001$). Positive effects were seen in all degrees of ED.

Discussions

Strengths:

- L-Arginine and LI-ESWT had good safety profiles with the most common adverse effects being gastric irritation, itching, headache, and insomnia.
- Studies investigating LI-ESWT include long-term follow-up (12 months post-treatment) showing long-term results.

Limitations:

- L-Arginine studies lack long-term follow-up (beyond three months) making it difficult to determine if there are any long-lasting results from short-term use.
- L-Arginine dosing and duration varied significantly between the studies (1.5 – 6 g and 17 days - 3 weeks).
- MCID was not determined in any of the L-arginine studies and was limited in the LI-ESWT making clinical applicability difficult to determine.

Clinical Application:

- L-Arginine and LI-ESWT produced clinically relevant improvements for ED.
- Based on the studies, LI-ESWT showed the highest efficacy with organic ED (vasculogenic) while L-arginine showed efficacy in mixed-type, psychogenic, and organic ED.
- LI-ESWT showed a significant and sustained improvement in erectile function both acutely and long-term.
- LI-ESWT is the only restorative treatment for ED since other conventional and naturopathic treatments address only the symptomatology.

Conclusions

L-Arginine and LI-ESWT are potential treatments for ED. Additional longitudinal studies with larger sample sizes are needed to investigate the long-term effects and optimal treatment protocol for positive clinical outcomes.

For references or further questions, please email: kkallio@ndnet.ccnm.edu

Investigating Mindfulness Practices, Aerobic Exercise and Cognitive Behavioural Therapy for Post-Traumatic Stress Disorder: A Narrative Review

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Introduction

- Post-traumatic stress disorder (PTSD) has a 6.8% prevalence worldwide, but incidence may be higher in certain populations, including military personnel and first responders.
- Pharmacological treatments may provide short-term relief, but due to the highly individualized nature of PTSD, it can be difficult to treat long-term.
- PTSD symptoms including anhedonia, hyperarousal, flashbacks, and suicidality can severely impact daily functioning.

Objectives

Investigate the effectiveness of mindfulness practices, aerobic exercise, and cognitive behavioural therapy (CBT) as nonpharmacologic treatments for PTSD.

Search Methods

- A review of the existing literature was conducted using PubMed, PsycARTICLES, and Google Scholar databases
- Selected articles include randomized control trials (RCTs) and meta-analyses. Only RCTs not reviewed in the meta-analyses were included.
- The included studies used either the Posttraumatic Stress Disorder Checklist (PCL) or the Clinician Administered PTSD Scale (CAPS) screening tools as outcome measures.

Number of studies:

- Mindfulness: one meta-analysis and two RCTs met criteria (of the available 83 studies)
- Exercise: one meta-analysis and two RCTs met criteria (of the available 38 studies)
- CBT: one meta-analysis and two RCTs met criteria (of the available 168 studies)

Population	Intervention	Outcomes
Adults with PTSD	Mindfulness interventions Aerobic exercise CBT	Primary: Reduction in PTSD symptom severity, CAPS, PCL

Results

Table 2. Mindfulness Interventions

Authors	Intervention	Comparison	Results
Hopwood & Schutte, 2017.	Mindfulness interventions (meditation, deep breathing, etc.) CAPS and PCL screening tools were used to to assess primary outcome measures.	Waitlist	Mindfulness was associated with greater PTSD symptom reduction than controls. Programs focused on patient education were more effective than instructional programs alone.
Kim et al., 2013.	Sixteen standardized, 60-min mindfulness sessions (stretching and breathing) over eight weeks. The PCL screening tool was used to assess primary outcome measures.	Waitlist	Participation in the mindfulness program significantly decreased PTSD symptom severity compared to controls, reducing PCL scores by 41% on average (p=0.01). Symptom remission in experimental groups persisted at eight-week follow-up (p=0.001). Mindfulness interventions reduced hyperarousal, avoidance, and re-experiencing symptoms (p<0.001).
Wahbeh et al., 2016.	Mindfulness meditation, slow breathing with biofeedback, mindful breathing, or non-treatment for six sessions. CAPS and PCL screening tools were used to to assess primary outcome measures.	Waitlist/non-treatment	Mindfulness meditation more significantly reduced PTSD symptom severity compared both to other forms of mindfulness and to controls. All three mindfulness practices (meditation, mindful breathing, and breathing with biofeedback) reduced PTSD symptoms.

Table 3: Exercise Interventions

Authors	Intervention	Comparison	Results
Rosenbaum et al., 2015.	Six or 12-week aerobic exercise program. CAPS and PCL screening tools were used to to assess primary outcome measures.	Waitlist	Exercise conditions were associated with greater PTSD symptom reduction than controls (p=0.02).
Hall et al., 2020.	Three weekly sessions of group aerobic exercise for 12 weeks. The PCL screening tool was used to assess primary outcome measures.	Waitlist	The exercise group saw significantly reduced PTSD symptoms compared to controls and improved quality of life.
Goldstein et al., 2016.	Three one-hour group exercise sessions for 12 weeks (36 total sessions). The CAPS screening tool was used to assess primary outcome measures.	Waitlist	Exercise conditions reported greater PTSD symptom reduction than controls (d=0.09) with an average point reduction of 30.64 on the CAPS scale, and improved quality of life (p=0.005).

Table 4: CBT Interventions

Authors	Intervention	Comparison	Results
Alshahrani et al., 2022.	CBT (or another psychological intervention). CAPS and PCL screening tools were used to to assess primary outcome measures.	Waitlist	CBT was associated with significant reductions in PTSD symptom severity. Clinician-led interventions were more effective than self-guided interventions (p=0.01). Increased number of sessions in the treatment plan was associated with reduced symptoms.
Hobfoll et al., 2016.	Seven online CBT sessions over 12 weeks.The PCL screening tool was used to assess primary outcome measures.	Waitlist	CBT interventions displayed greater PTSD symptom reduction compared to controls at 12-week follow-up, and an average PCL score change of 10 points (p=0.001). Over 25% of participants saw a 10 point reduction in PCL scores.
McDonagh et al., 2005.	Fourteen weekly virtual CBT sessions. The CAPS screening tool was used to assess primary outcome measures.	Waitlist	Intervention groups saw reduced PCL and CAPS scores of up to 10 points. Following treatment, 47.1% of CBT participants no longer met diagnostic criteria for PTSD (p<0.01).

Discussion

Strengths

- Mindfulness practices, aerobic exercise, and CBT achieved PTSD symptom reduction, are associated with few adverse effects, and can be made accessible to many patients via virtual counselling and community programs without compromising efficacy.
- Studies investigating mindfulness interventions and CBT showed lasting symptom remission post-intervention for up to six months.

Limitations

- Research investigating aerobic exercise for PTSD treatment is limited and existing studies have small sample sizes.
- Available studies generally lack data regarding long-term effects of treatment and outcomes following treatment cessation.
- Only mindfulness interventions included individual symptom reduction outcomes (hyperarousal, avoidance, re-experiencing, and cognitive symptoms), therefore, direct comparisons on this basis with CBT is not possible.

Clinical Applications

- Mindfulness interventions, aerobic exercise, and CBT reduced PTSD symptom severity on PCL or CAPS measures.
- Based on these results, mindfulness interventions and CBT showed the most promising results for individual symptom reduction and global improvements in quality of life.
- Mindfulness interventions and CBT demonstrated significant long-term improvements in symptom severity.
- Further research is necessary to identify mechanisms of action.

Conclusion

Mindfulness practices, aerobic exercise, and CBT are promising alternative interventions for PTSD treatment.

Long-term guided mindfulness interventions appear to most significantly reduce PTSD symptom severity and maintain symptom remission.

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A Multi-modal Naturopathic Approach in a Patient with Schizoaffective Disorder: A Case Report

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Introduction

Over 1.5 million Canadians live with schizophrenia and other psychotic disorders, having an extended impact on family members, friends, and the surrounding community. Schizoaffective disorder (SAD) is a chronic mental health condition where the individual experiences schizophrenic symptoms like hallucinations or delusions along with mood disorder symptoms like mania and depression. No research was found with respect to a multi-modal/whole systems naturopathic approach to managing schizophrenia spectrum disorders and more specifically SAD.

Case Presentation

Patient was a middle-aged male with a diagnosis of schizoaffective disorder. The patient was well groomed, neatly dressed and looked his stated age. Speech was normal in rate and rhythm but muted tone and he was slow to respond to questions. Mood was described as apathetic during the visit. Affect was very serious, his range was restricted and he did not smile in the first couple of visits. The patient was logical, coherent, and goal-directed. He reported no suicidal ideation. He had to discontinue his monthly injections of Apriprazole, an atypical antipsychotic due to change in physicians. He was unable to work due to the severity of his illness and day-to-day activities were difficult for him to perform.

Table 1: Interventions implemented for RSNC patient with SAD

Nutraceutical	Acupuncture	Diet & Lifestyle
➢ High-dose micronutrient supplement ➢ Omega-3 fatty acids ➢ 5-HydroxyTryptophan (5-HTP)	➢ Bilateral: Kd 1 Kd3, Kd 6, Kd7, Sp6, Sp9, Lv3, Heart 7, Lu7, Lu9, Li 21; ➢ Unilateral: Yin tang, GV21, GV 20 (pointing inferior)	➢ Personal goal setting, ➢ mindfulness exercises, ➢ encouraging nature exposure, ➢ a healthy well-balanced diet.

Results

- Over the three months of treatment, the patient showed remarkable improvement in mood-related symptoms.
- There was a significant decrease in his Patient Health Questionnaire-9 (PHQ-9) score from September- November (i.e., baseline PHQ-9 of 18 to 10 by the end of treatment). The patient started with moderately severe depression and went down to moderate depression according to the PHQ-9 validated questionnaire.
- Additionally, energy levels reportedly increased, and there were significant observational developments including an improvement in psychomotor retardation, speech rate, rhythm and tone, and engagement throughout the visit.
- The patient reported that his quality of life had improved and that he felt more like “himself” and was considering job opportunities. Since starting treatment no positive schizophrenia symptoms were reported.

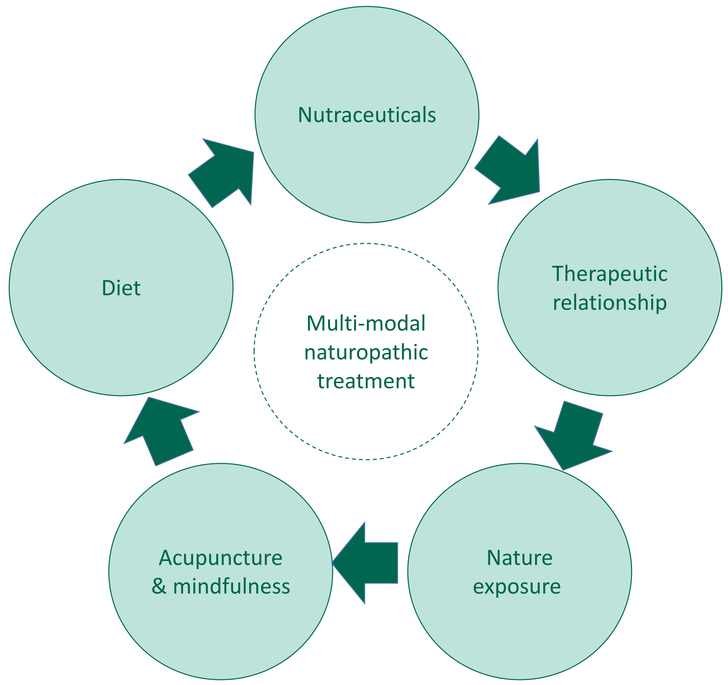

Figure 1. Multi-modal naturopathic approach to SAD

Discussions

This patient showed significant improvements throughout the treatment duration. That being said, SAD is a chronic disorder, and it is imperative to track changes over the course of one-five years to get a more thorough understanding of treatment efficacy.

This patient had a strong desire to see improvements in his symptoms and was committed to naturopathic treatment by coming to the clinic once a week for three consecutive months. Due to both time and cost of treatment, this may not be a realistic or viable option for many patients living with SAD and could be a barrier to treatment. This patient also had significant support from a caretaker who made him well-balanced vegetable-rich meals and encouraged him to go for walks in nature.

Table 2: Patient Health Questionnaire-9 (PHQ-9) Scores and depression severity

Total Score	Depression severity
0-4	None
5-9	Mild
10-14	Moderate
15-19	Moderately Severe
20-27	Severe

Larger and longer whole-practice naturopathic investigations with respect to schizophrenia spectrum disorders are needed to assess efficacy.

Conclusions

This case highlights the positive clinical outcomes that can be achieved from a naturopathic multi-modal approach to treating schizoaffective disorder.

For references or further questions, please email: rlester@ndnet.ccnm.edu

Sensitivity to Dairy Products: Investigating the Effects of a Casein Polymorphism on Human Health

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Introduction

- Recent years have seen increasing interest in the health effects of bovine beta-casein, which comprises 80% of the proteins in cow's milk.
- A genetic polymorphism creates the A1 Beta casein variant; during digestion, A1 beta casein is hypothesized to create the bioactive peptide B-casomorphin-7 (BMC-7).
- A1 beta-casein and BMC-7 are proposed to be responsible for a range of health effects, compared to A2 products.
- The distribution of this casein polymorphism differs based on cattle subspecies which varies globally, suggesting geographic risk.
- A2 products are becoming increasingly available and promoted to the "dairy sensitive."

Objectives

This scoping review aimed to:

- ✓ Map the literature regarding the health effects of A1 vs those of A2 dairy products
- ✓ Briefly sketch the history, consumption, and availability of products from A2 cattle
- ✓ Summarize the proposed pathophysiological mechanism of the A1 hypothesis

Search Methods

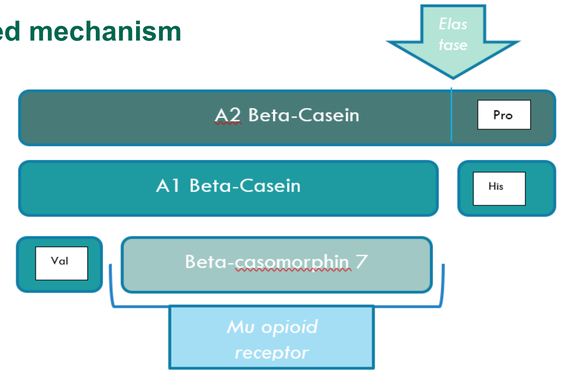
- **Search terms** included: "[A2 AND Casein] ," "[BCM7] ," and "[casomorphin AND A2]."
- **Inclusion criteria**: RCTs and animal studies that compared the effects of A1 and A2 beta-casein, and reports on A1/A2 cattle genetics.
- **Exclusion criteria**: Studies that measured BMC-7 only, reports in languages other than English.

PubMed searches

- Randomized controlled trials (RCTs) comparing health effects of A1 and A2 dairy
- Animal studies investigating the effects of BMC7
- Reports on regional A2 consumption

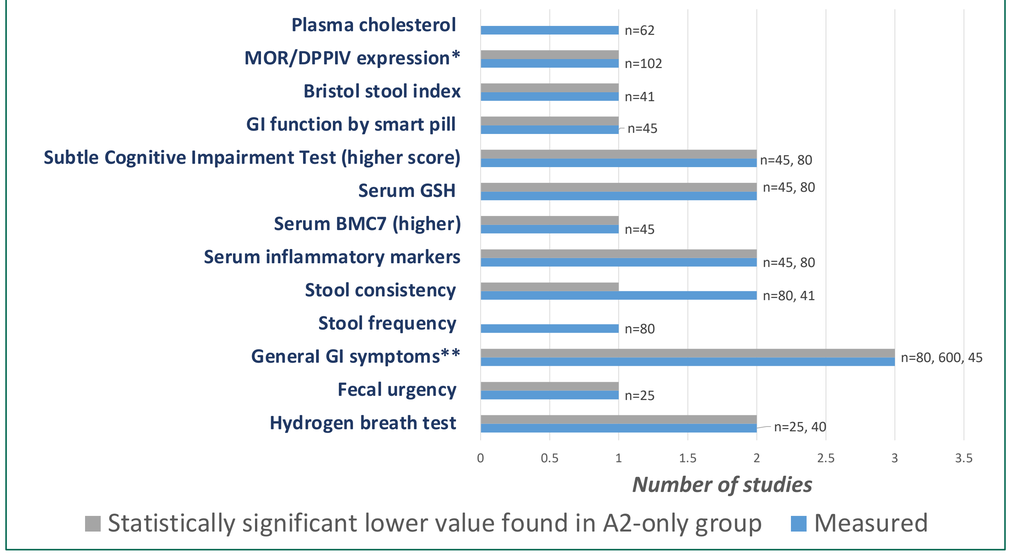
Results

Figure 1. Proposed mechanism



According to the A1 hypothesis, A2 beta casein is does not undergo enzymatic cleavage during digestion, and because of the histidine replacement, A1's cleavage produces BMC7 which acts as a mu-opioid receptor agonist.

Figure 2. Study outcomes and results



- Six animal studies found significantly higher levels of fatty streaks in aorta, GI inflammation, GI transit time, diabetes incidence (third generation), total blood cholesterol, and GI immune response. One animal study found no association between A1 and blood glucose levels.
- Nine RCTs compared the health effects of A1 and A2 (Figure 3). Three studies involving lactose intolerant participants saw relief of some symptoms (inflammatory markers, transit time, stool consistency) on an A2-only diet but no relief of others (bloating, discomfort, H2 production).

**Mu opioid receptors/Dipeptidyl peptidase IV **by Visual Analogue Scale or questionnaire*

Discussion

Strengths

- This study assessed the available evidence for the health effects of the A1 casein variant in the context of estimated trends of consumption.

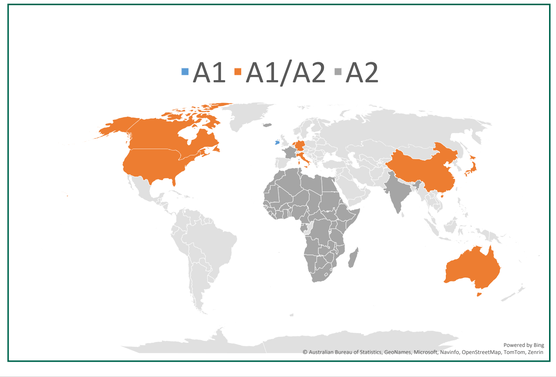
Limitations

- Limited number of populations from the US, Australia, New Zealand, China, and Poland.
- Import and export substitutions of both milk and bovine genetics make geographic risk difficult to assess, except for India and Africa.

Clinical Applications

- A2 casein is marketed in Australia, the United Kingdom, the United States, New Zealand, and The Netherlands, and A1 formula is being marketed in China and Australia.
- Dairy consumed in India, New Zealand, Japan, and Africa is primarily A2, whereas that in the US, Canada, and Northern Europe is mostly A1. However, markets for A2 milk and cheese are emerging in the US, Canada, and China.
- The general estimated intake of A1 casein is 40% in developed countries such as Canada.
- BMC7 levels may also be altered by processing.

Figure 3. Global beta-casein predominance



Conclusions

While the A1 hypothesis is well-developed, more rigorous controlled trials are necessary. This review suggests that patients may experience fewer negative effects from consuming A2 dairy products, which are becoming more available globally.

For references or further questions, please email: clitjens@ndnet.ccnm.edu

Evolution of Key Themes in the Published Literature Related to Animal and Plant Source Foods in Regard to Environmental Health: Review and Thematic Analysis

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Introduction

The push towards plant-based diets and reduction of animal source food consumption is becoming pervasive in the published literature and guideline documents in regard to both human and planetary health. But where did these ideas originate, and how have they changed over time? This study will explore the evolution of themes regarding animal and plant source foods and environmental health in the published literature.

Objectives

1. Identify current themes or arguments relating to animal and plant source foods and planetary health in the published literature.
2. Assess the evolution of current themes or arguments relating to animal and plant source food consumption and planetary health by identifying the emergence and popularity of these key themes in the published literature.
3. Identify the original studies used to support these themes, including the number of unique studies used to support each theme.
4. Evaluate the quality of original studies cited by recent publications, how well they support the theme, and whether findings have been supported by additional, newer publications.
5. Identify knowledge gaps in our understanding of the interaction between animal and plant source food production and consumption and planetary health that have been revealed.

Search Methods

This study will be completed in five parts and is currently ongoing. PubMed/Medline and CINAHL Complete databases were searched for relevant articles. Abstract and full-text screening are still in progress.

- Part 1 will use open coding to identify themes in a random subset of articles.
- Part 2 will involve closed coding for the presence of themes identified in Part 1.
- Part 3 will identify the number of unique original studies used to support the themes in articles from Part 2.
- Part 4 will review the unique original studies identified in Part 3, by theme.
- Part 5 will identify gaps in understanding of the interaction between these foods and environmental impacts.

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
1. Published in English 2. Mentions animal source foods or plant source foods in relation to planetary health or sustainability (either for, against, or neutral) 3. Is an article that provides commentary, synthesis, or summary of existing data rather than generating new data (review, editorial, commentary, letters, conference proceedings, guidelines, meta-analysis)	1. Not part of the plant or animal kingdoms 2. Published in language other than English 3. Published prior to January 1, 2012 or after December 31, 2021 4. Does not mention planetary health or sustainability 5. Is a study that generates new data or reanalysis of (for example) cohort data 6. Poster presentation, oral abstract, or book 7. Mentions impact of environment on food production but not impact of food production on environment 8. Focused on environment solely in terms of agriculture and livestock production and does not mention planetary health (e.g., use of antibiotics without mention of impact on environment) 9. Focused on breastfeeding or breast milk (without regard to environment/planetary health) 10. Focused solely on diet and health, with no mention of planetary health/sustainability (e.g., plant-based diets for kidney disease)

Results

The results of this study will reveal current themes in the discussion of animal and plant source foods and planetary health, the frequency of these themes in published literature, the number of unique original studies used to support these themes, and the general stance of these articles over the span of a decade. Also noted will be the ratio of sentiment for or against reducing animal source food production/consumption in the published literature over time.

Discussions & Conclusions

Dietary recommendations are a key component of naturopathic care and as part of this, the environmental impacts of diet may be considered. However, these conversations do not necessarily capture the nuance of food impacts, and origins of promoted positions may be unclear. In analysing the evolution and frequency of key themes in regard to animal and plant source foods and their impact on environmental health over time, as well as the evidence that supports them, gaps in our understanding, or potentially missing themes, will be identified with the goal of inviting experts from the many fields involved in food production and planetary health to weigh in. This study will provide insights into the foundations and credibility our beliefs surrounding the impacts of various dietary recommendations.

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Investigating the Effect of Cannabis on Atopic Dermatitis: A Scoping Review

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Introduction

- Atopic dermatitis (AD) is a skin condition that presents with chronically inflammatory and pruritis lesions
- There are limited options for topical intervention and anti-pruritic agents because of adverse effects and unsatisfactory relief
- There are several different forms of class of ligands called cannabinoids (CBD), like endocannabinoids
- The endocannabinoid system regulates appetite, pain, mood, memory, and especially skin homeostasis.
- This system contains two G protein coupled receptors called:
  - Cannabinoid 1 receptor (CB1R): located in the CNS and responsible of inflammation and metabolic activity
  - Cannabinoid 2 receptor (CB2R): responsible of immune activation and wound healing
- Imbalance in CB1R and CB2R may decrease immune system activation, impede wound healing, and increase inflammation
- Cannabinoids can be produced by the body; however, dysregulation of the endocannabinoid system may cause an impairment in the skin barrier, leading to AD

Objectives

To analyze the effectiveness of cannabis (cannabinoids) on symptoms of atopic dermatitis.

Search Methods

- PubMed was used to search cannabinoids AND atopic dermatitis for randomized control trials (RCTs) and meta-analyses using both animal and human models with AD using the search terms: cannabis, cannabinoids, atopic dermatitis, dermatology, atopic eczema
- The literature search for atopic dermatitis and cannabinoids yielded for a total of 23 studies of which eight studies conducted on animal and humans were included – four of the eight studies were conducted on humans

Table 1: PICO framework

Population	Intervention/Control	Outcome
Animal and human models	• Cannabinoid Vs. Placebo • Cannabinoid Vs. Other substances	• Changes in symptoms and lesions of atopic dermatitis • SCORAD

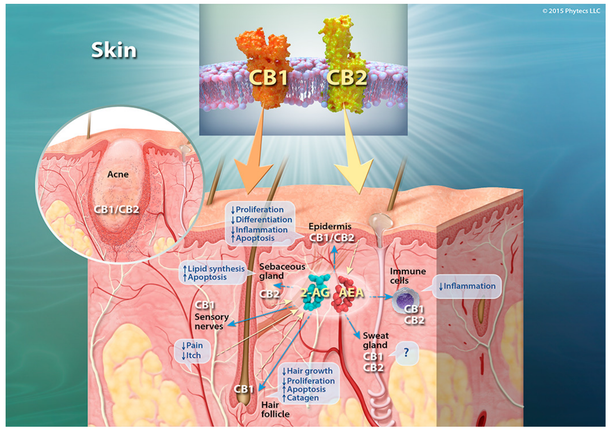

Figure 1: Dermatological effects of CB1R and CB2R stimulation

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Results

Table 2: Human Studies - Cannabinoids Impact on Atopic Dermatitis

Authors	Intervention	Study Type	Results
Attila et al., 2017	Alkylamines (from echinacea purpurea) - *In vitro* injection of endocannabinoid extract-based cream	Randomized double blind clinical trials	Potential in alleviating symptoms of atopic eczema and exerts anti-inflammatory actions and restores and the epidermal lipid barrier
Palmieri et al., 2019	Cannabinoid ointment (w/o tetrahydrocannabinol (THC)) applied two times daily for three months	Anecdotal, retrospective study	SCORAD score used to assess the lesions. Improvement found in all the skin lesions and scarring. The PASI index score was also better.
Yanrui Gao et al., 2022	Three treatment groups: 1) cannabidiol and aspartame combination treatment (JW-100), 2) Cannabinoid alone, 3) Placebo	Randomized double blinded place controlled interventional study	JW-100 - demonstrated statistically significant ISGA score reduction (p = 0.042). 50% of patients in the JW-100 group achieved ISGA score of clear or almost clear (0 or 1) with at least a 2-grade improvement from baseline after treatment (p = 0.028). CBD only - 20% and 15% of patients Placebo groups - reported ISGA score of clear or almost clear (0 or 1)

Table 3: Animal Studies - Cannabinoids Impact on Atopic Dermatitis

Authors	Intervention	Study Type	Results
Roberto Chiocchetti et al., 2022	Cannabinoid receptor type 2 (CB2R) Cannabinoid-related receptors G protein-coupled receptor 55 (GPR55) Transient receptor potential vanilloid 1 (TRPV1) Ankyrin 1 (TRPA1)	Canine tissue immunofluor-escence	When the expression of the receptors on the sample tissue skins of the dogs was tested on macrophages, mast cells, dendritic cells, T-cells, and neutrophiles there was immunoreactivity. Mast cell and Macrophage – CB2R, GPR55, TRPA1, TRPV1 T cells – CB2R, GPR55, TRPA1 Neutrophils – GPR55
Hyun Jong Kim et al., 2015	CB1R or CB2R cDNA constructs	Murine and *in vitro* studies	Application of the CB1R increased the rate at which the epidermal permeability barrier function restored. There was an anti-inflammatory activity in both the acute and chronic models
Gaewon Nam et al., 2016	CB1R agonists on mast cells	Rat basophilic leukemia cell line *in vitro* study	CB1R were able to prevent release of inflammatory mediates without causing cytotoxicity in other cells. They were also able reduce mast cell proliferation – this was variable based on the dose used.

Discussion

Human Studies:

- Human studies primarily tested the impact of external cannabinoid sources on AD lesions and symptoms.
- Research conducted on humans suggests that cannabinoid use improves overall skin lesions, scarring, and inflammation, and reduction in SCORAD scores.
- Studies illustrated a greater effect on AD when CBD was combined with other substances.
- Both human and animal studies support that CBD is successful in accelerating the restoration process of the epidermal lipid barrier.

Animal Studies:

- Studies primarily focused on the use and activation of the CB1 and CB2 receptors within the animal and how this may be effective in reducing AD symptoms.
- Results illustrated the impact of each receptor on different immune cells activated during atopic dermatitis.
- Mechanisms suggest CB1R and CB2R stimulation alter immunoreactivity in the cells, decreased cell proliferation, reduction in inflammatory factors such as cytokines and histamine which reduced overall inflammation.
- CBD effects were found to target specific cells, without causing adverse effects or cytotoxicity to other cells.

Limitations:

- Lack of clinical trials on the effect of CBD alone without the inclusion of another substance on human participants.
- Information is lacking on the impact of different dosages, forms of CBD used, and how these may impact its effectiveness in treatment.

Conclusion

CBD is effective in reducing inflammation, decreasing lesions, scarring, and most importantly in restoring the epidermal lipid barrier. Animal studies illustrate a decrease in mast cells as a result of CB1R. CBD and its receptors appear to have several benefits for atopic dermatitis, however when administered in combination with other substances may provide enhanced benefits. Therefore, more research on human participants is required.

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Perinatal Diet and Offspring Anxiety: A Scoping Review

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Introduction

- A developing offspring is extremely sensitive to their environment which can be impacted by a range of intrauterine exposures and interventions.
- Emerging evidence shows that many components of maternal diet are critical in shaping aspects of the offspring's health.
- Dietary factors play a role in the development of mental illness among adults; however, less is known about the impact of diet factors during pre-conception, gestation, and lactation on anxiety levels in offspring.
- Numerous animal models have been employed to understand the intricate biological mechanisms of developmental programming in maternal exposures and its impact on offspring anxiety.

Objectives

Systematically map out the current body of literature on perinatal diet and offspring anxiety to identify nutritional interventions which may be effective for the prevention of offspring anxiety symptoms.

Search Methods

- The databases Ovid MEDLINE and Embase Classic + Embase were searched.
- Abstract screening completed with Abstrackr

Table 1: PICO framework

Population	Intervention	Outcomes
• Human participants • Animals	• Dietary patterns, macronutrients, micronutrients, individual foods, and natural health products containing nutrients present in the typical North American diet. • Exclude: herbs, constituents not found in a North American diet	• Offspring anxiety levels

Results

- A total of 55,914 results were identified as part of a larger scoping review, and 120 articles met the criteria for inclusion in the present project.
- A vast majority of studies used rodent models (*n*= 117, 98%), with the remaining studies involving human participants.
- Animal evidence shows that supplemental omega-6 fatty acids worsen anxiety symptoms. Whereas a diet containing adequate omega-3 fatty acids may have anti-anxiety effects.
- More than two thirds (*n* = 14, 70%) of animal studies assessing the impact of protein malnutrition reported a worsening of anxiety symptoms.
- A reduction of 20–40% of calories along with all necessary nutrients was associated with decreased anxiety whereas severe maternal restriction of 40% increased perinatal anxiety.
- An increase in choline, vitamin B3, D, and E showed a reduction in anxiety whereas an increase in folic acid worsened anxiety in several studies

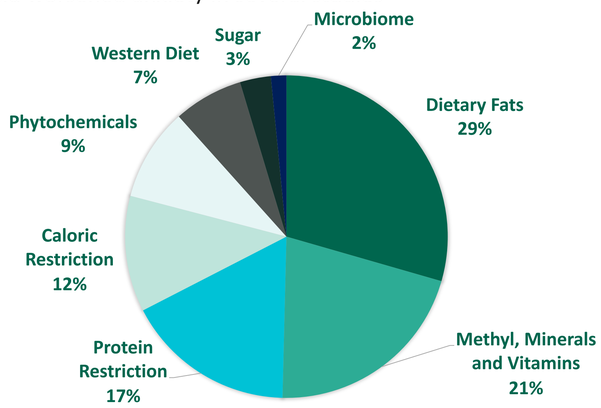
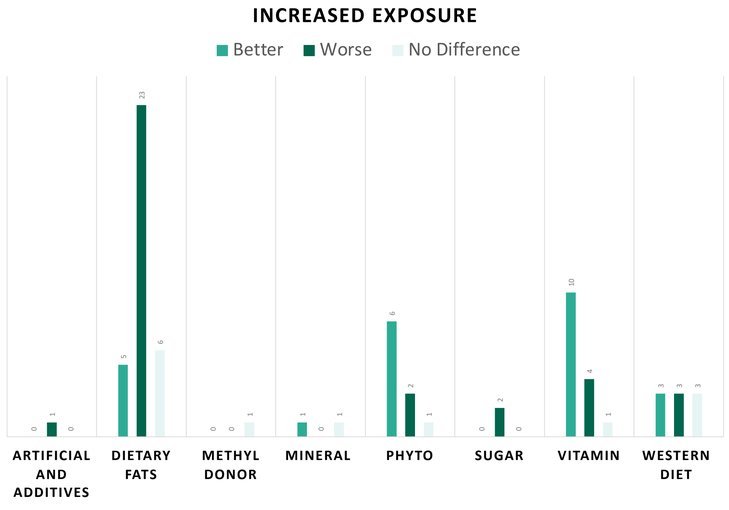


Figure 1. Distribution of included animal studies by intervention



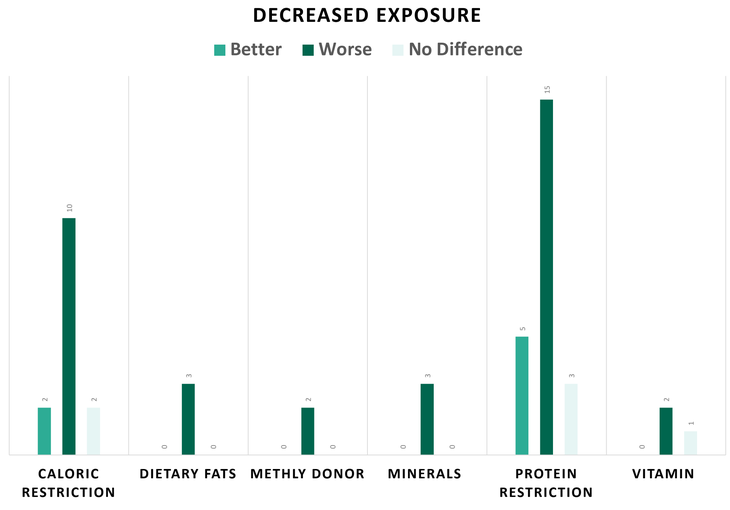


Figure 2 and 3. Change in anxiety levels in animals in response to exposure to dietary factors

Discussions

- Overall, there is preliminary evidence that dietary exposures during the perinatal period may impact offspring anxiety levels.
- An increase in anxiety was associated with severe caloric restriction, protein restriction, reduced omega-3 consumption, and exposure to a high fat diet.
- Conversely, increased consumption of phytochemicals and vitamins were predominantly associated with a decrease in anxiety symptoms.

Strengths and Limitations

- Pre-clinical trial designs allow for highly controlled manipulation of the diet which is rarely possible in human trials.
- The most significant limitation of this review, is that most of the studies involved animal subjects rather than humans.
- The research on this topic is limited to primarily preclinical research and is highly heterogenous with respect to the interventions provided to study subjects.

Conclusions

Despite the need for more research in this area, this review highlights the need for adequate nutrition during the perinatal period. Future research should involve human subjects in order to understand how the associations observed in animal studies might translate to human health.

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Naturopathic Approaches for Long-term Care Home Residents with Dementia: A Scoping Review

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Introduction

- Dementia is a progressive neurodegenerative disease with an increasing number of people diagnosed yearly.
- Eventually, most older adults with dementia will require long-term care home support.
- 87% of long-term care home residents have some form of cognitive impairment (Continuing Care Reporting System, 2015–2016, Canadian Institute for Health Information).
- Guidance on nonpharmacological approaches has been developed to manage cognitive function and dementia-related symptoms in this setting; however, the full breadth of naturopathic interventions has not been examined.

Objective

The aim of this study is to explore the evidence and role of therapies within the scope of naturopathic medicine for older adults with dementia residing in long-term care homes.

Search Methods

- This scoping review follows the Arksey and O'Malley methodological framework.
- A literature search of PubMed, Web of Science, and EBSCO's CINAHL and Medline databases was conducted from the date of inception until 2022 for studies that provided outcome data on relevant nonpharmacological therapies within the scope of naturopathic medicine in Canada in adults >65 years old with dementia residing in long term care homes. Articles available in English and full-text articles were eligible for inclusion.
- The titles and abstracts of the initial dataset was screened to remove duplicates and irrelevant studies using open-source reference management software (Zotero).
- After the initial screening, full-text articles will be reviewed in duplicate to finalize the study selection and data extraction. A data extraction form was created, pilot tested, and refined.
- Extracted data will be categorized by naturopathic modalities and analyzed for study design, effectiveness, safety, setting, and implementation factors using a narrative approach.

Results

Search Terms:
Dementia OR "Cognitive Dysfunction"
"Nursing Home" OR "Homes for the Aged" OR "Assisted Living Facilities"
Naturopathy OR "Complementary Therapies" OR "Herbal Medicine" OR Diet OR "Dietary Supplements" OR "Medicine, Chinese Traditional" OR Acupuncture OR "Acupuncture Therapy" OR CAM subset (a comprehensive list of complementary and alternative medicine interventions and references)

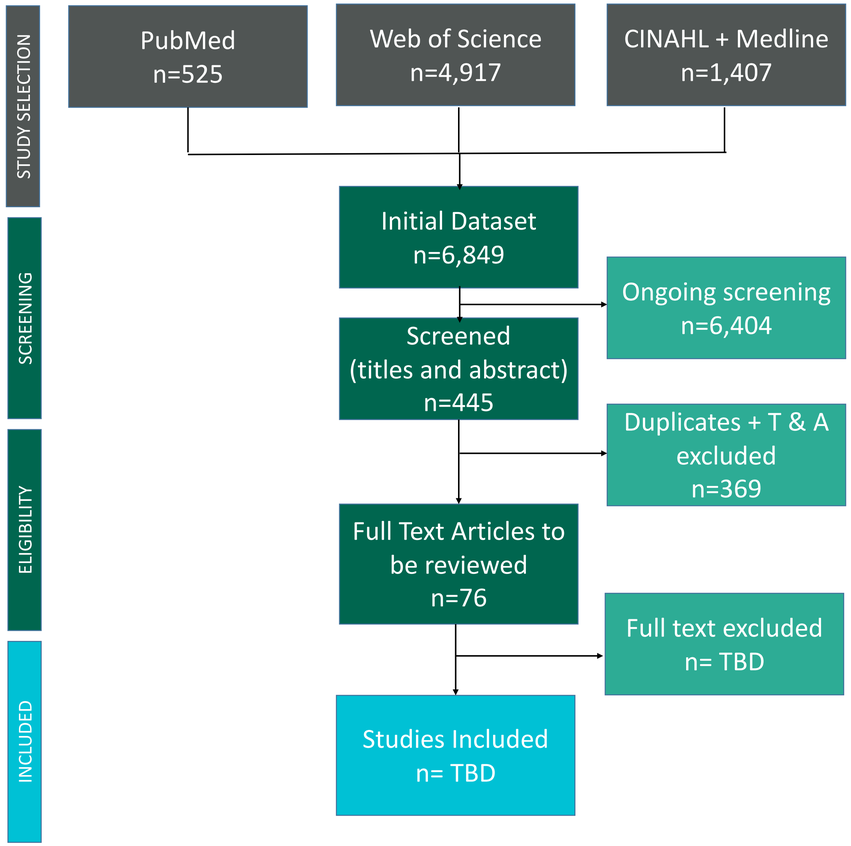

Figure 1. Initial Dataset and Preliminary Screening Results

- The initial searches of each database resulted in the following number of articles that formed our dataset: PubMed (525), Web of Science (4,917), CINAHL + Medline (1,407).
- So far, 445 articles (6.5%) have been screened. Out of this, 76 (17.1%) of the research studies have met the inclusion criteria.
- Most interventions comprise sensory and immersive interventions, multimodal and patient-centred care approaches, mindfulness and behavioural strategies, and nutrition. Fewer studies were on physical activity, botanical medicine and Traditional Chinese Medicine (TCM).

Discussion

- Search results varied between databases requiring caution and testing to ensure the proper application of search terms. One of the databases, Web of Science, did not have the filter to select full-text articles and specific age groups, which required additional screening compared to the other databases.
- Utilizing reference management software that was readily accessible and user-friendly helped organize a large dataset and streamline the screening process among multiple reviewers.
- Initial results are quite promising. However, further deliberation on the importance and implication of including interventions that may not primarily be within the naturopathic scope of practice but can be recommended is necessary. Examples of this are music therapy and other sensory and immersive interventions.
- Our study is limited by uncertainty inherent in the accuracy and precision of the search strategy. A medical librarian was used to assist in the creation and verification of the search terms and approach.

Conclusions

There is a body of evidence for interventions within the scope of naturopathic medicine for older adults living with dementia in long-term care residences. These complementary or adjunctive therapeutic approaches may prove to be safe and effective for dementia care or quality of life of residents. However important gaps or deficiencies in the evidence base may yet be revealed, including strength of the evidence, degree of bias, or challenges in implementation. A more in-depth understanding on the safety and effectiveness of naturopathic interventions provided by this scoping review will help identify opportunities for further research.

Acknowledgements

The authors wish to thank Michael David Reansbury for his assistance in developing and pilot testing the search strategy.

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The Effects of Mindfulness-Based Stress Reduction Programs in Perinatal Depression: A Narrative Review

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Introduction

- Perinatal depression is defined as a minor to major episode of depression occurring during pregnancy or up to the first postpartum year
- Up to 20% of women in North America have been diagnosed with perinatal depression
- According to the Canadian Pharmacist Association, SSRIs are first-line for moderate-to-severe episodes of perinatal depression
- Interpersonal psychotherapy and cognitive behavioural therapy are first-line therapy psychotherapeutics for mild-to-moderate episodes of perinatal depression

Objectives

To analyze the effectiveness of mindfulness-based stress reduction (MBSR) programs to treat perinatal depression.

Search Methods

- PubMed, Web of Science, and PsycARTICLES were used to identify English peer-reviewed journal articles that reported any outcomes on MBSR interventions and perinatal depression.
- Search terms included “perinatal depression,” “postpartum depression,” “postnatal depression,” “prenatal depression,” “mindfulness-based interventions,” “mindfulness-based stress reduction programs,” “mindfulness-based cognitive therapy,” and “mindfulness-based stress reduction programs.”
- Studies were limited to randomized control trials (RCTs), systematic reviews and meta-analyses. Only the RCTs not summarized in the meta-analyses were included.
- The Edinburgh Postnatal Depression Scale (EPDS) must be reported as an outcome measure.

Table 1: PICO framework

Population	Intervention	Outcomes
Perinatal women with depression	• Mindfulness-based stress reduction programs vs. treatment as usual (TAU)	Changes in EPDS score

Our search yielded 315 studies, 12 studies were included in the review

Results

Table 2: Interventions that studied mindfulness-based stress reduction programs in women with perinatal depression

Authors	Interventions	Comparison	Results
Shi and MacBeth, 2017	MBSR programs or mindful yoga, web-based yoga DVD	TAU	Two studies showed statistically significant reductions in EPDS scales in the intervention group. One study had one participant show clinical improvement. Whereas three studies had no statistically significant reduction in EPDS.
Lever et al., 2016	Computerized MBSR, MBCE program, eastern based meditative intervention, MBCT, antenatal adapted MBCT	TAU	Four of the eight studies that looked at EPDS found statistically significant improvements in EPDS in the intervention group compared to the control group. Uncontrolled findings also found that mindfulness-based interventions may also improve self-confidence during pregnancy and birth, and social support can improve anxiety and depression.
Dhillon et al., 2017	Interpersonal therapy, MBT, MBCE program, adapted MBCT, body scan with reflective intervention	TAU	Four of the six studies reviewed found statistically significant reductions in EPDS in the intervention group. The other two studies found clinical improvements in depression and mindfulness.
Corbally and Wilkinson, 2021	MBCE, MBT, eastern based meditative intervention, MBCP, home-guided sessions	TAU, interpersonal therapy	Three of the five studies that looked at EPDS found statistically significant improvements in EPDS in the intervention group compared to the control group by forest-plot analysis.
Mao et al., 2023	MBCT, mindfulness self-compassion, gratitude diary & mindfulness listening	TAU, wait-list control	None of the seven studies that looked at the EPDS found that statistically significant changes between the intervention and control group. However, all seven studies saw clinical improvements in either anxiety, depression, and perceived stress.
Walker et al., 2022	Culturally tailored CBT, MBCT, Mamas and Babies Course	TAU	Five of the six studies that looked at EPDS found statistically significant improvements in EPDS in the intervention group compared to the control group.
Pan et al., 2019	MBCE program	Hospital’s routine childbirth education	In this RCT, they found statistically significant reductions in EPDS the treatment group compared to the control group.
Parameswaran et al., 2022	Group VCI (MBCT)	TAU	In this RCT, VCI helped normalize feelings of depression and reducing the stigma of depression. The EPDS scores ranged from 2 to 23 pre-intervention and 1-17 post-intervention.
Warriner et al., 2018	MCBP Program	TAU	The RCT found statistically significant reduction in EPDS scores post-intervention in the treatment group.
Mei et al., 2022	MBI	TAU	The EPDS scores of the treatment and control groups were not statistically different before and after the intervention ($P > 0.05$).
Müller et al., 2020	Electronic MBI	TAU	This study found MBIs help reduce perinatal anxiety and depression. However, EPDS scores were not statistically significant.
Sacristan-Martin et al., 2019	Adapted MBCP Program	TAU	The study found that mindfulness-based practices are an effective way in improving mental and physical health. However, changes in EPDS were not significant.

Abbreviations: EPDS = Edinburgh Postnatal Depression Scale, MBI = Mindfulness-Based Intervention, MBT = Mindfulness-based Therapy, MBCT = Mindfulness-Based Cognitive Therapy, MBCE = Mindfulness-Based Child Education, MBCP = Mindfulness-based Childbirth and Parenting , MBSR = Mindfulness-based Stress Reduction, MIPP = Mindfulness in Pregnancy Program, RCT = Randomized Controlled Trials, TAU = Treatment as Usual, VCI = Videoconference Intervention

The average program frequency and length were eight weekly sessions, two hours in duration.

Discussions

Strengths:

- Seven of the 12 studies found statistically significant reductions in MBSR programs in women with perinatal depression.
- In some studies, a difference in three points and above in the Edinburgh Postnatal Depression Scale was considered clinically significant.
- Some MBSR programs were able to be implemented in the comfort of the patient’s homes.
- MBSR programs have few safety concerns.
- Group sessions also provided beneficial effects in lowering the severity of depression in this population.
- All interventions can be used in conjunction with standard prenatal care.

Limitations:

- The heterogeneity between MBSR program sessions and lengths within systematic reviews and between studies makes it difficult to assess which program length and session would be most suitable for perinatal women with depression.
- Many used a small sample size, which contributed to large but non-significant effect sizes.
- The EPDS is a self-reported assessment, which can create social desirability bias.
- Confounding variables occurred in some studies where some women were undergoing psychotherapy or taking medication at the same time as the mindfulness intervention.

Future Research:

- Further research is needed to understand whether MBSR programs can be used to prevent postpartum depression in women who have not been clinically diagnosed with anxiety and depression before pregnancy.
- Further research should investigate MBSR programs in combination with drug therapy.

Conclusions

The use of MBSR practices are a viable option for reducing the severity of perinatal depression with minimal adverse effect. The introduction of MBSR programs may improve depression in this population.

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Investigating Acupuncture, Mindfulness-Based Stress Reduction, and Resistance Exercise on Pain Intensity in Patients with Fibromyalgia: A Narrative Review

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Introduction

- Fibromyalgia (FM) is a complex, chronic condition characterized by diffuse musculoskeletal pain that impairs quality of life.
- FM affects up to 3% of Canadians, with a higher prevalence among women and adults over the age of 40.
- Few pharmaceuticals are licensed to treat FM, and many are prescribed off-label for symptom management.
- Despite non-pharmacologic therapies growing in popularity, the 2012 Canadian guidelines for FM management advise health practitioners to inform patients there is currently insufficient evidence to recommend these therapies.

Objectives

To evaluate the strength of current evidence for specific non-pharmacologic therapies, acupuncture, mindful-based stress reduction (MBSR), and resistance exercise, in the treatment of pain associated with FM.

Search Methods

- This review included only randomized controlled trials (RCTs) or meta-analyses.
- Any RCTs summarized in included meta-analyses were excluded from the review.

Table 1: PICO framework

Population	People ≥ 18 years of age diagnosed with FM		
Intervention	Acupuncture	Resistance Exercise	MBSR
Comparison	Sham Acupuncture	No Treatment	Wait-List Control
Outcome	Pain intensity as measured by the Visual Analogue Scale (VAS)		

- Literature searches were conducted on PubMed and Omni Academic Search Tool.
- Acupuncture yielded 361 articles, and two RCTs and one meta-analysis met the criteria.
- Resistance exercise yield 234, two RCTs and one meta-analysis met the criteria.
- MBSR yielded 144 articles, and two RCTs met the criteria.

Results

Table 2: Acupuncture vs Sham Acupuncture

Study	Sample Size (n)	Intervention	Comparison	Results	Quality of Research
Karatay et al 2018	72	Eight acupuncture sessions in four weeks with the following protocol: DU 14, SI 15, LI 4, LI 11, HT 7, PC 6, Ren 6, LV 3, ST 36, and SP 6.	Sham or simulated acupuncture	Both groups showed significantly improved pain scores at rest, at night, and during activity at 1 month follow-up ($p<0.05$), with only the acupuncture group having sustained significance at 2 month follow-up.	Moderate
Deare et al 2013	395	Meta-analysis selected interventions were those that broke the skin for a therapeutic effect; this meta-analysis included 9 RCTs.	Sham, placebo, or fake acupuncture	Authors concluded that acupuncture may improve scores in pain, overall wellbeing, stiffness, and fatigue. Recommendation for 25-minute sessions, two times per week for four weeks total.	High
Uğurlu et al 2017	50	12 acupuncture sessions in 5 weeks with the following protocol: LI 4, ST 36, LV 3, GB 41, GB 34, GB 20, SI 3, SI 4, UB 62, UB 10, SP 6, HT 7, DU 20, DU 14, KD 27, Ren 6, and PC 6.	Sham acupuncture	Statistically significant improvements in VAS scores ($p<0.05$) at one and two months follow-up. Authors concluded that acupuncture may immediately improve pain scores in FM.	Low

Table 3: Resistance Exercise vs No Treatment

Study	Sample Size (n)	Intervention	Comparison	Results	Quality of Research
Assumpção et al 2018	44	Forty-minute training sessions, 2x/week for 12 weeks, using dumbbells and shin pads for load-bearing exercises, with a weekly addition of 0.5 kg extra repetitions of eight.	Stretching group or no treatment	The resistance exercise group had significant improvements to number of tender points ($p=0.03$) in addition to pain threshold ($p=0.01$), FM symptoms ($p=0.01$), and quality of life parameters (i.e., physical function, vitality, mental health).	Moderate
Busch et al 2013	241	Meta-analysis included interventions defined as resistance exercise with progressive addition of resistance load at a minimum of 2x/week.	No treatment or another physical activity intervention	Significant improvements were seen in multidimensional function, pain, and muscle strength compared to control. Authors recommend moderate-to-high intensity resistance training for 16 to 21 weeks to provide benefit.	High
Latorre Román et al 2015	39	60-minute functional training sessions 3x/week for 18 weeks; two of the weekly sessions consisted of water training exercise and one session on land.	No treatment	Significant improvements in FIQ scores ($p=0.042$), pain threshold and sensitivity ($p=0.008$), tender points ($p<0.001$), and VAS pain scores ($p<0.001$).	Moderate

Table 4: Mindfulness-Based Stress Reduction (MBSR) vs Wait-List Control

Study	Sample Size (n)	Intervention	Comparison	Results	Quality of Research
Cash et al 2015	91	Eight weeks of 2.5 hour weekly sessions; "homework" to practice learned techniques 45 minutes/day, 6x/week; a half-day meditation retreat on the sixth week	Wait-List Control	Significant improvements in perceived stress, sleep quality, fatigue, and symptom severity. No significant differences found for pain, physical functioning, and cortisol levels.	Low
Schmidt et al 2011	177	Eight weeks of 2.5 hour weekly sessions; "homework" to practice learned techniques 45-60 minutes/day daily; one 7-hour weekend day session	Active or Wait-List Control	Secondary outcome analysis revealed significant improvement in the Fibromyalgia Impact Questionnaire (FIQ) in the MBSR group, which included 7 VAS scores for pain, fatigue, stiffness, and mood.	Moderate

Discussions

Strengths

- All interventions are generally low-risk for adverse effects.
- Dosage recommendations for acupuncture and resistance exercise were guided by high-quality Cochrane Reviews.
- Acupuncture studies evaluated participants immediately post-intervention and at long-term follow-up.
- All resistance exercise studies included weekly addition of weight to encourage strength building.
- MBSR studies were highly similar since both followed the parent program from the University of Massachusetts.

Limitations

- Heterogeneity between acupuncture protocols (i.e., point selection, duration) and resistance exercise training programs (i.e., specific exercises, equipment used).
- Failure of studies to consistently report adverse effects.
- Small sample sizes ($n<50$) increase the risk of type 2 statistical error and bias in the results.
- Lack of information about the MBSR meditation retreat.

Clinical Application

- Resistance exercise had moderate-to-high quality evidence to recommend as a first-line intervention for FM.
- Moderate evidence to suggest acupuncture as an adjunct to a multi-dimensional treatment plan.
- Evidence to suggest MBSR for pain relief from FM is low.

Resistance Exercise: 2-3 weekly training sessions for 16-24 weeks

Acupuncture: 2 weekly 25-minute sessions for 4 weeks

MBSR: 1 weekly 2.5-hour therapist led sessions for 8 weeks + 30-45 min daily practice + one 7-hour retreat

Conclusions

The evidence reviewed is conclusive to support the efficacy of acupuncture and resistance exercise at reducing pain intensity in people with FM. Trials with larger sample sizes and better methodological design are warranted to properly evaluate the efficacy of MBSR for pain in FM.

For references or further questions, please email: ssimpson@ndnet.ccnm.edu

The Teaching Kitchen Landscape in Canada & the United States: A Scoping Review

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Introduction

Public health researchers have concretely established the role of diet and nutrition and their role in disease prevention and management across all population levels. While many programs aim to enhance the nutrition literacy of its participants, there is a role for food skill instruction in equipping individuals with the skills needed to translate nutritional knowledge at a practical level. Teaching kitchens provide "hands-on culinary instruction with concurrent education of nutritional concepts, exercise, mindfulness, and behavioural change". This study will be the first scoping review on the topic, providing a foundation to inform future implementation practices of such education practices to improve health outcomes, food literacy and food agency in program participants.

Objectives

- The extent of teaching kitchen utilization in North America
- Common methods used to implement such programs
- What benefits they provide at the individual and population level
- To build a foundation of evidence to inform future research

Methods

Table 1: Arksey and O'Malley Framework Stages

Identify the research question	• What does the existing body of literature reveal on the use of teaching kitchens to improve cooking skills, food literacy, and health outcomes?
Identify relevant studies	• A preliminary search of key databases (PubMed and CINAHL) was undertaken to identify articles on the topic. • All identified keywords and index terms were then adapted for each information source and included searches on PubMed, MEDLINE, CINAHL, and Cochrane Library. • Sources of unpublished studies and grey literature will be searched across multiple platforms (targeted search engines, clinical trial databases, government documents, and institutional repositories). • Studies published only in English, from 2011 onwards, and only those conducted in the United States and Canada were included.
Study selection	• All identified citations were collected and exported to online screening tool and duplicates were removed. • Titles and abstracts screened by two independent reviewers for assessment against the inclusion criteria for full-text review. • Full-text review was completed by two independent reviewers.
Chart the data	• Data is currently being extracted using an extraction tool developed by the reviewers, including standard information (e.g., author, year of publication) and specific details about the participants, concept, context, study methods and key findings relevant to the review question.
Collect, summarize, and report the results	• The extracted data from the sources selected for inclusion in the scoping review will be charted and presented in a narrative summary and descriptive analysis will be conducted to report on the variety of implementation strategies, methods, objectives and the context of delivered programs.

Study Protocol

Brown, Gina. "The Teaching Kitchen Landscape in Canada and the United States: A Scoping Review Protocol." OSF, 17 June 2022. Web.
https://osf.io/gnas4

Screening Protocol

PRISMA Flow Diagram

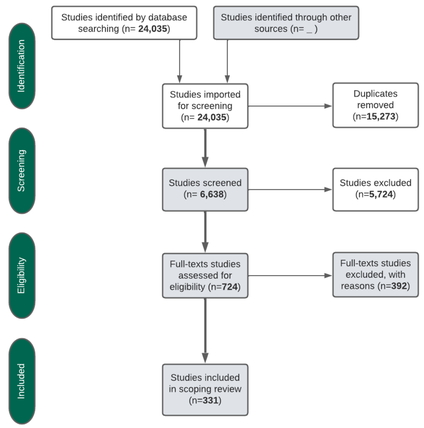

Figure 1. PRISMA Flow Diagram of our scoping review study selection protocol. White boxes represent steps completed, while grey boxes represent future steps. This diagram is subject to change over the course of the project.

Reasons for study exclusion (n=392)

- No experiential component (n=230)
- Outside of US or Canada (n=72)
- Commentary or editorial (n=27)
- Protocol or ongoing study (n=18)
- Full text unavailable (n=15)
- Not relevant (n=12)
- Published prior to 2011 (n=9)
- Duplicate (n=4)
- Nutrition survey validation study (n=4)
- Not published in English (n=1)

Results & Discussion

Emerging Themes

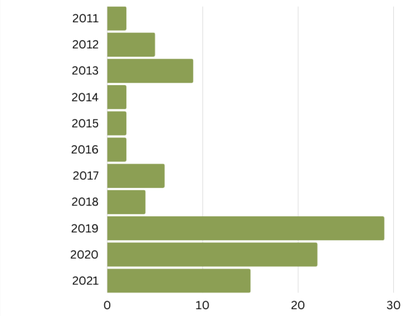

Figure 2. Year of study publication (n=98)

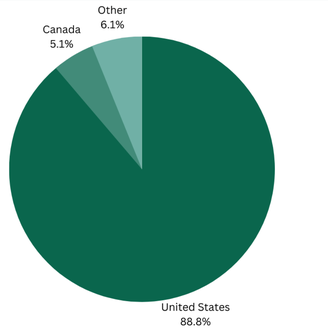

Figure 3. Country of study publication (n=98)

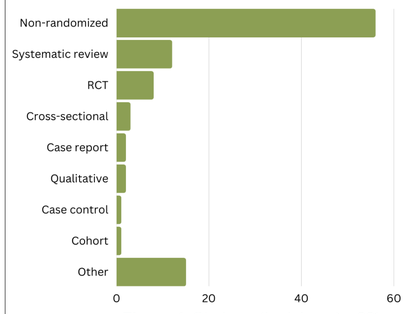

Figure 4. Study methodology (n=98)

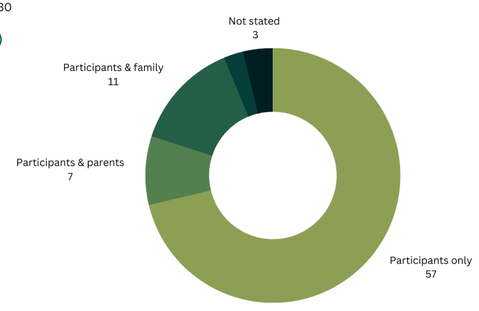

Figure 5. Participants studied (n=80)

Figure 6. Outcome characteristics

Discussion

Intervention Components

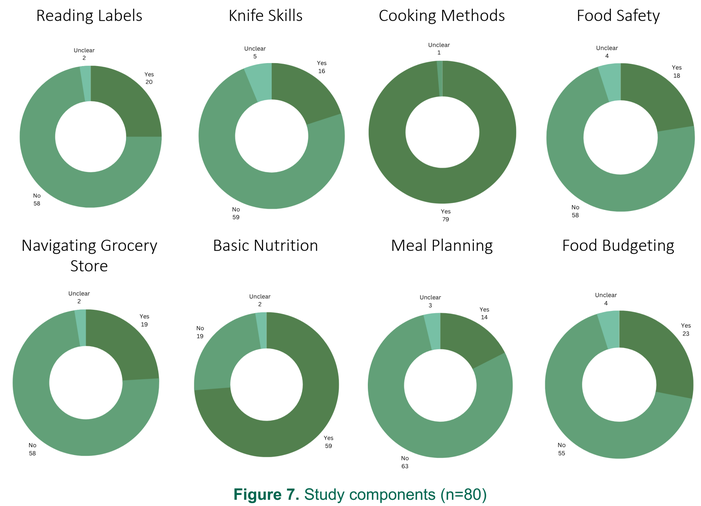

Figure 7. Study components (n=80)

Additional Program Components

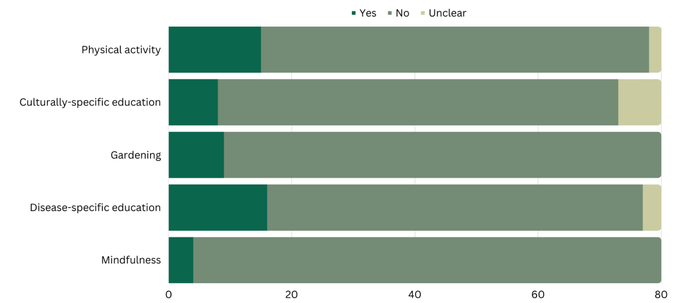

Figure 8. Additional components (n=80)

Current Stage & Results

- Updated study import to Covidence completed to capture the remainder of 2021 year
- 98 of 331 studies were fully extracted by two reviewers
- Following the completion of data extraction, information will be reviewed to compile information on teaching kitchen programs and their general themes

Future Implications

The results obtained through this scoping review may assist in guiding future initiatives to actively map teaching kitchen resources in Canada and may provide a useful tool for collaboration and advancement within this field.

For references or further questions, please email: gbrown@ndnet.ccnm.edu

Dietary Counselling Plus Omega-3 Supplementation in the Treatment of Generalized Anxiety Disorder: Protocol for a Randomized Wait-list Controlled Pilot Trial (the "EASe-GAD Trial")

Rebecca Lester[1], Sasha Monteiro[1], Meagan McLaren[1], Monique Aucoin[1,2], Laura LaChance[3], Inge van der Wurff[4], Sean Miller[5], Umadevi Naidoo[6], Andrew Jenkins[8], Kieran Cooley[1, 8, 9, 10]

1. Canadian College of Naturopathic Medicine; 2.University of Guelph; 3. McGill University; 4. Open University of the Netherlands; 5. Peer Connections Manitoba; 6. Harvard Medical School; 7. Lipid Analytical Laboratory; 8. Southern Cross University; 9. University of Technology Sydney; 10. Pacific College of Health and Science

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Introduction

Generalized anxiety disorder (GAD) affects 5% of individuals from high-income countries and many individuals report that treatment options are not accessible, effective, or tolerable. Clinical evidence suggests that nutrition interventions based on the Mediterranean diet and supplementation of omega-3 fatty acids can significantly improve symptoms of depression; however, the effects of nutrition interventions on anxiety symptoms among people with anxiety disorders have not been studied to date.

Objectives

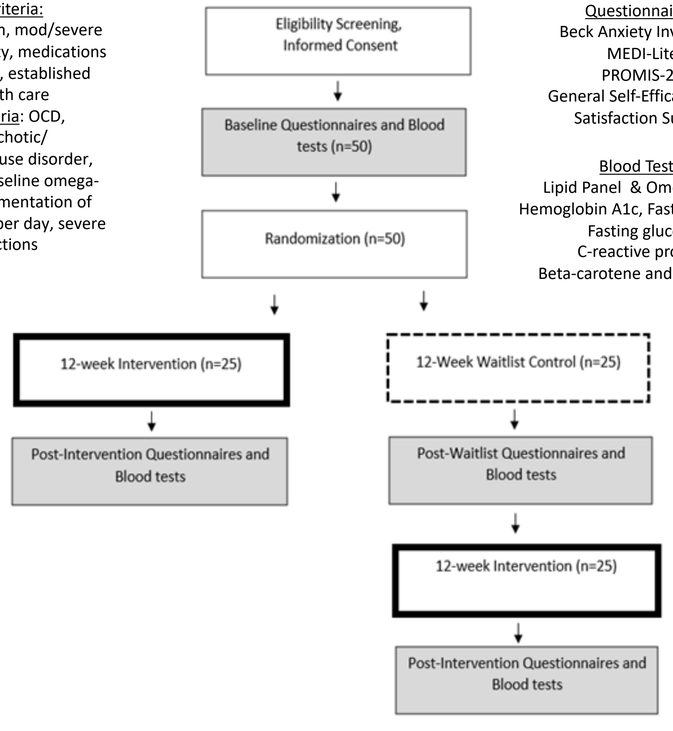
PRIMARY: assess the **feasibility** and **acceptability** of a dietary counselling and omega-3 fatty acid supplementation intervention delivered to adult women with GAD.

SECONDARY: assess changes in anxiety symptom severity, changes in quality of life, changes in biomarkers and evaluation of the components of the program.

Methods

- Randomized, wait-list controlled pilot trial delivering a 12-week, dietary counseling intervention and omega-3 supplementation to adult women with moderate to severe GAD.
- Questionnaires and blood work will be completed at baseline, after the wait period (for those in the waitlist group) and after the intervention.

Inclusion criteria:
Identify as a woman, mod/severe GAD, low diet quality, medications stable four weeks, established mental health care
Exclusion criteria: OCD, bipolar/psychotic/ eating/substance use disorder, high suicidality, baseline omega-score>5%, supplementation of vitamin D >4000IU per day, severe diet restrictions



Questionnaires:
Beck Anxiety Inventory
MEDI-Lite
PROMIS-29
General Self-Efficacy Scale
Satisfaction Survey

Blood Tests:
Lipid Panel & Omega Score
Hemoglobin A1c, Fasting insulin & Fasting glucose
C-reactive protein
Beta-carotene and Vitamin C

Figure 1: Diagram of participant flow through the trial

Diet Recommendations & Supplement

Intervention Delivery

- The intervention will consist of seven bi-weekly individual dietary counselling sessions delivered over 12 weeks by a nutrition professional. Omega-3 supplement & some food provided at first and fourth sessions.
- Participants will be provided with clear recommendations including rationale, meal ideas, recipes, and cooking education resources.
- Motivational interviewing techniques and individual goal setting will be used.
- Participants will learn about mindful eating and strategies to avoid eating for emotional regulation.
- Recipes aim to reflect the multicultural nature of Canada.

Diet Recommendations

- The recommendations are based on the Mediterranean diet with minor modifications based on the results of a recent scoping review. This additional considerations include: limitation of caffeinated beverage intake, inclusion of culinary herbs and spices, green tea and herbal teas, dietary factors that support microbiome health and an emphasis on adequate protein and lower glycemic index foods (1).

Table 1: Diet recommendations provided to participants

Protein
- Include a serving of protein at every meal.
- Eat legumes 3-4 times per week
- Eat fish or seafood two times per week

Fat
- Use olive oil as the main added dietary fat
- Eat ¼ cup of nuts or seeds every day

Vegetable & Fruit
- Include vegetables with every meal. Aim to cover half of your plate.
- Eat two servings of fruit per day

Carbohydrates
- Choose complex carbohydrates instead of simple carbohydrates at each meal.

Water
- Drink water as your main drink

Mindful Eating
- Be aware and present when you eat

Omega-3 Supplement

Participants will also take an omega-3 supplement containing a total of 3456 mg of omega-3 fatty acids: 2659 mg of Eicosapentaenoic acid (EPA, 532 mg of docosahexaenoic acid (DHA), and 800 IU of Vitamin D daily.

Concomitant Therapies

All concomitant medication, psychotherapy or natural health products will be allowed during this trial. Participants will be encouraged to maintain these at the current dose but may make changes if recommended by a health care provider.

Discussions

- Results from this study will lay the foundation for future large-scale studies in this area and may provide preliminary evidence of the role of diet counselling and omega-3 supplementation in the management of GAD.
- This type of evidence may create a rationale for the inclusion of nutrition professionals in mental health care teams and use of dietary counselling in the treatment of mental illness.
- Nutrition interventions can be low in risk, acceptable to patients, cost effective and may have additional benefits to overall health.
- Research on the role of nutrition in psychiatric care has been identified as a priority by a number of international organizations.
- The present trial directly addresses the call for research that is most needed to advance the field – evaluation of the effects of nutrition interventions on anxiety symptoms among individuals with diagnosed disorders (2) and address issues of underrepresentation of women participants in clinical research.

Key References

1. Aucoin M, LaChance L, Naidoo U, Remy D, Shekdar T, Sayar N, et al. Diet and Anxiety: A Scoping Review. Nutrients. 2021;13(12).
2. Firth J, Marx W, Dash S, Carney R, Teasdale SB, Solmi M, Stubbs B, Schuch FB, Carvalho AF, Jacka F, Sarris J. The effects of dietary improvement on symptoms of depression and anxiety: a meta-analysis of randomized controlled trials. Psychosomatic medicine. 2019 Apr;81(3):265.

This protocol was registered at Clinicaltrials.gov on October 7, 2022; NCT05573672
Funding or gifts in kind provided by: Ekhagastiftelsen, AquaOmega, Mitacs Accelerate, Lipid Analytical Laboratories and Sobeys Inc
For additional references or further questions, please email: maucoin@ccnm.edu

Investigating Exercise, Infant Massage, and Cognitive Behavioural Therapy for Postpartum Depression: A Narrative Review

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Introduction

- Postpartum depression (PPD) affects one in seven mothers within three months of delivery.
- Hallmark features of PPD include dysphoric mood, fatigue, anorexia, sleep disturbances, anxiety, excessive guilt and suicidal thoughts
- Having PPD increases risk of developing depression again later in life
- Nonpharmacological interventions are often desired given compatibility concerns around breastfeeding in the postpartum period.

Objectives

To analyze the effectiveness of exercise, infant massage, and cognitive behavioural therapy (CBT) to decrease depressive symptoms for mothers in the postpartum period who have depression based on the Edinburgh Postnatal Depression Scale (EPDS).

Search Methods

- PubMed and Google Scholar were used to search infant massage AND postpartum depression AND EPDS, exercise AND postpartum depression AND EPDS, cognitive behavioural therapy AND postpartum depression AND EPDS.
- Selected articles were limited to randomized control trials (RCTs) and systematic reviews with meta-analyses. Only the RCTs not summarized in the meta-analyses were included.

Table 1: PICO framework

Population	Intervention vs. Control	Outcomes
Individuals who have postpartum depression	• Infant Massage vs. Placebo • Exercise vs. Placebo • Cognitive Behavioural Therapy vs. Placebo	Changes in EPDS scores

- Infant massage yielded 256 studies; 3 RCTs met criteria.
- Exercise yielded 44 studies; 2 RCTs and 1 systematic review with meta-analysis met the criteria.
- CBT yielded 46 studies; 3 RCTs and 1 systematic review with meta-analysis met the inclusion criteria.

Results

Table 2: Infant Massage vs. Placebo

Authors	Intervention	Comparison	Results
Hosseini-Baharanchi et al., 2019	Trained 15-minute infant massage administered at home twice daily for six consecutive weeks from the third week postnatal.	Control group of no training/no massage	Mean score and relative frequency of PPD in the intervention group had a statistically significantly decrease compared to the control group, while both groups showed no clinically significant change.
O'Higgens, St James Roberts, Glover, 2008.	Attend six sessions of one-hour infant massage classes.	Control group of weekly support group sessions for six weeks	Baseline to outcome had no statically or clinically significant change in EPDS scores. At one-year follow up, the massage group was below the cut off for possible depression where the control group was not, although this was non-significant.
Onozawa et al., 2001	Attend weekly one-hour infant massage classes for five weeks.	Control group of weekly support group sessions for five weeks	The reduction in the EPDS score from recruitment to the final session for the massage group was statistically significant than for the control group, but both groups had a clinically significant reduction.

Table 3: Exercise vs. Placebo

Authors	Intervention	Comparison	Results
Özkan et al., 2020	Four-week exercise program at home; two weeks of mild-moderate intensity and two weeks of moderate-severe intensity, five days, 30 minutes.	Standard care at family health care centers	Posttest EPDS mean scores found to be statistically and clinically significant between the exercise and control group.
Haruna at al., 2013	Weekly 90-minute ball-exercise classes for four weeks (not clinically)	Standard care	No clinical or significant difference of EPDS scores found between the exercise and control groups.
Pentland et al., 2022	Five RCTs analyzed of walking as the sole or primary exercise modality.	Standard care	Walking as an exercise modality has a positive clinically significant effect on reducing PPD and the EPDS.
Yi-Li et al., 2015	10-week one-hour postpartum exercise support program	Standard care	Women in the intervention group with a high EPDS score at four weeks postpartum showed a statistically significant decrease in the EPDS score at five months postpartum, but not clinically significant.

Table 4: Cognitive Behavioural Therapy

Authors	Intervention	Comparison	Results
Amani et al., 2021	Nine weekly two-hour peer-delivered CBT sessions	Waitlist control	Statistically and clinically significant change in the EPDS scores with stability up to six months
Van Lieshout et al., 2022	Nine weekly two-hour sessions of group CBT	Standard care	Those in the experimental group, immediately post treatment of CBT, had significantly greater reductions in PPD, were more likely to manifest a clinically significant improvement in EPDS scores, and no longer have symptoms consistent with current major depressive disorder. At six months, the experimental group had higher odds of clinically significant PPD improvements.
Huang et al., 2018	14 RCTs analyzed CBT sessions	Standard care	Scores of EPDS in the intervention group were significantly lower than those in the control group. Both short- and long-term effects were significantly significant with mixed results of clinical significance.
Jannati et al., 2020	Eight lessons over eight weeks of App-based CBT.	Standard care	The intervention group had a statistically and clinically significant drop in their EPDS scores compared to the control group.

Discussions

Strengths:

- Infant massage studies included training or supervision of how to perform the massage.
- Exercise studies took into consideration frequency, duration, type, and accountability.
- CBT studies used previously established and approved protocols.
- All three interventions have few safety concerns.

Limitations:

- Infant massage sample size and high dropout rates make it difficult to make definitive conclusions.
- Exercise interventions used various forms of programs making it difficult to standardize recommendations.
- CBT studies used varied resources for delivering the intervention making it difficult to conclude the best method.
- Study definitions of PPD were variable on their EPDS scores.

Clinical Application:

- All interventions can be used in tandem together and alongside standard care.
- Clinically significant improvement would be four points on the EPDS.
- Both exercise and CBT showed clinically significant improvements with 30 minutes of moderate-intensity exercise, such as walking, five days per week and a minimum of eight weeks of CBT with choice of delivery potentially providing benefit
- Further research is needed to standardize programs of infant massage, exercise, and CBT for women with PPD.

Conclusions

Infant massage, exercise and CBT are all viable low risk options that can all be use adjunctively together for the treatment of PPD. Infant massage may not see clinical benefit alone.

For references or further questions, please email: llohnes@ndnet.ccnm.edu