

Women's Health *REPORT*

A QUARTERLY PUBLICATION OF WOMEN'S HEALTH DIETETIC PRACTICE GROUP

AGING WITH POLYCYSTIC OVARY SYNDROME (PCOS) By Angela Grassi, MS, RDN, LDN



Angela Grassi, MS, RDN, LDN, is the founder of The PCOS Nutrition Center, for which she provides evidence-based nutrition information and coaching to women with PCOS. Angela is the author of several books on PCOS, including *PCOS: The Dietitian's Guide*, *The PCOS Workbook: Your Guide to Complete Physical and Emotional Health*, and *The PCOS Nutrition Center Cookbook*. Angela is the past recipient of The Outstanding Nutrition Entrepreneur Award, The Award

in Excellence in Practice in Women's Health, and The Award for Excellence in Graduate Research, from the Academy of Nutrition and Dietetics. Having PCOS herself, Angela has been dedicated to advocacy, education, and research of the syndrome. For more information or to sign up for her monthly PCOS Nutrition Tips newsletter, visit her website.

This article is approved for 1 CPEU by the Academy of Nutrition and Dietetics. Please take the quiz at: <http://bit.ly/2Bi8JcH>.

Abstract

Polycystic ovary syndrome (PCOS) is the most common endocrinopathy in women of reproductive age, affecting 9% to 18% of this population worldwide. Once viewed as a reproductive disorder affecting women only during their fertile years, PCOS is now known to cause serious metabolic consequences that extend throughout the rest of the lifecycle. These risks include insulin resistance, type 2 diabetes (T2DM), dyslipidemia, metabolic syndrome, thyroid disorders, obstructive sleep apnea, and non-alcoholic fatty liver disease (NAFLD). Women with PCOS are also at an increased risk for endometrial cancer. The nutrition management for older women with PCOS should take into account the risk of long-term PCOS-related complications. Interventions when PCOS

is present include effective and aggressive treatment involving diet, nutritional supplements, lifestyle, and insulin sensitizers if metabolic complications are present. Early detection and proactive lifestyle management of PCOS are crucial to prevent the long-term metabolic consequences associated with this complex syndrome.

Registered dietitian nutritionists (RDNs) play an important role in the treatment and prevention of metabolic complications in women with PCOS throughout the lifecycle.

Introduction

Polycystic ovary syndrome (PCOS) is the most common endocrinopathy in women of reproductive age, affecting 9% to 18% of this population worldwide.¹ The prevalence of PCOS among ethnic groups vary, with a higher percentage of PCOS seen among Hispanic and African American women. The prevalence of PCOS in postmenopausal women is unknown. Twin studies demonstrate that genetics explain over 70% of the pathogenesis of PCOS.²

Despite being a common condition, PCOS is undertreated by the medical community. A recent international survey of 1,385 women with PCOS found that nearly 50% of the participants saw three or more health professionals or waited for more than two years before receiving a PCOS diagnosis.³ In addition, very few of the participants (11.9%) were satisfied with the information they received about lifestyle management upon receiving their diagnosis.³

Once viewed solely as a reproductive disorder affecting women only during their fertile years, PCOS is now known to have numerous metabolic risks that start early in adulthood and persist throughout a woman's lifespan.⁴ This article discusses PCOS and its associated risk factors, how PCOS changes with age, and effective evidence-based treatment options. It also examines implications for how dietetics professionals can best help their clients who have PCOS.

What Is PCOS?

PCOS is a complex genetic condition of clinical/biochemical androgen excess, ovulatory dysfunction, and polycystic ovaries (PCO). The ovaries secrete high levels of androgens (male hormones such as testosterone), creating the hormonal imbalance characteristic of PCOS. Hyperinsulinemia, also part of the syndrome, amplifies luteinizing hormone (LH) to stimulate the production of androgens from ovarian theca cells. Free-testosterone levels rise and levels of sex-hormone binding globulin (SHBG) fall. These imbalances cause follicular arrest and prevent follicles from developing and being released from the ovary. These immature, trapped follicles are commonly yet mistakenly referred to as "cysts," which then surround the inside of the ovaries.⁵

PCOS Signs and Symptoms

As a polygenic syndrome (genetic tendencies result in a variety of different features and symptoms), women with PCOS can

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FROM THE CHAIR Dawn Ballosingh, MPA, RDN, LMNT



Welcome, both returning and new WH DPG membership. I am excited to represent you this member year, to get to know you better, and help you succeed and be excellent in your practices. We can only get better when we optimally communicate so please engage by participating in the annual membership survey and letting us know how best we can serve you

I look forward to meeting you in person at FNCE® in Washington D.C., for our Women's Health DPG Spotlight Session: Integrating Nutrition in Fertility Treatment: Dietitian's Role in Reproductive Medicine, featuring our own WH member and Academy Fellow, Judy Simon, RDN, CD, CHES, FAND and Dr. Angela Thyer MD, a founding partner of Seattle Reproductive Medicine and expert in Polycystic Ovarian Syndrome, reproductive aging and fertility preservation.

If I miss seeing you there, please stay engaged throughout the year with the many digital avenues to connect such as the bi-annual Women's Health Report, webinars, our WH DPG Website and follow us on social media Facebook, Twitter(@Women'sHealthDPG) and Pinterest.

It is with deepest condolences to family and friends, that I would like to acknowledge the work and life of Ms. Denise Andersen, MS, RDN, LD, CLC. Denise was my mentor and my friend and she will be greatly missed. To Katie Leahy, MS, RDN, LD, thank you, for your excellent leadership and continued personal encouragement to me and expert contributions to the DPG as you continue to serve in the role as Past Chair/Secretary.

Our DPG has such talented awesome member volunteers who serve in varying capacities but always in dedication to advocate for Women's Health issues and your professional practices, and I would like to encourage you, if you would like to optimize your impact on Women's Health issues, get involved! Learn more about our volunteer opportunities by contacting our Nominating Chair nominating@womenshealthdpg.org or get more information at info@womenshealthdpg.org

My hope and challenge for our DPG this year comes from the national motto of my birth country- state country: "Together we Aspire, Together we Achieve"

Most Sincerely,
Dawn

FROM THE EDITOR Kathleen Pellechia, MS, RDN



Dear WH DPG Members,

I am pleased to share our Issue 4 for 2018 with you. It is my last edition at the helm, after serving three years in this wonderful position. I have learned so much with each issue and am truly grateful to the writers, reviewers, editors, etc. who have made our content so rich and engaging. I am also thankful for the contributions of our assistant editor Lee Crosby who has taken over as editor. I will be transitioning to be your House of Delegates representative – a roll that will have me following a dear friend and mentor, Denise Andersen, who passed away unexpectedly earlier this summer. I pay tribute to her in this issue.

We are also featuring an article by Angela Grassi on PCOS on Aging with Polycystic Ovary Syndrome. This article was produced with the Healthy Aging DPG and we are happy to share it with you. We also have an article by our Treasurer, Alena Clark, on her experience providing nutrition training in Africa and a research brief on Weight Management Practices and Health Knowledge and Beliefs among Women with PCOS by Christine Garner.

I hope you enjoy this issue and thank you for your support of our publication.

Kathleen

The Women's Health Report (ISSN-3233) is an online quarterly publication of the Women's Health Dietetic Practice Group (WH DPG) of the Academy of Nutrition and Dietetics. The WH Report features articles, as well as information on programs, materials, positions, and products for use of its readers. News of members, book reviews, announcements of future meetings, requests for information, or other items of interest to women and reproductive nutrition dietetics practitioners should be sent to the Publications Editor at publications@womenshealthdpg.org.

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experience a wide range of manifestation types and severities. PCOS is the main cause of ovulatory infertility. Most women with PCOS have irregular or absent menstrual cycles, although a small percentage of women will have regular menses. Overproduction of androgens (male hormones such as testosterone) causes hirsutism (excess hair growth on the face, chest, back, and inner thighs). Thinning hair (alopecia) and acne are also associated symptoms of elevated androgens.

Associated Complications

Although PCOS diagnosis uses reproductive criteria, most women with PCOS present with associated metabolic, vascular, and/or psychological complications. The metabolic complications may present in young women with PCOS, and worsen with age. Complications include insulin resistance, type 2 diabetes (T2DM), dyslipidemia, metabolic syndrome, thyroid disorders, obstructive sleep apnea, and non-alcoholic fatty liver disease (NAFLD).^{4,6,7} Women with PCOS are at higher risk for metabolic diseases post-menopause than their age-matched peers are.^{4,6} Additionally, the presence of PCOS increases the risk for endometrial cancer.⁷

Approximately 50% to 70% of all women with PCOS, regardless of weight, and 95% of obese women with PCOS are insulin resistant.⁸ Weight gain with fat accumulation in the midsection of the body is common. In the international survey, struggles with weight was reported as the most frustrating symptom reported by women with PCOS.³ Due to the higher prevalence of insulin resistance, PCOS is considered an independent risk factor for T2DM. A review of 35 studies found that PCOS is associated with a 2.5-times increased prevalence of impaired glucose tolerance (IGT) and a 4-times increased prevalence of T2DM.⁶

Chronic inflammation accompanies PCOS and is believed to be part of the pathogenesis.⁹ Compared to women without the condition, women with PCOS have higher levels of high-sensitivity C-reactive protein (hs-CRP) as well as higher levels of insulin, regardless of weight.⁹ Higher levels of oxidative stress have also been found with women with PCOS showing higher concentrations of IL-6, IL-8 and lower total antioxidant capacity (TAC) compared with controls.¹⁰

In regards to blood pressure regulation, data about the risk of hypertension in women with PCOS are lacking. Schmidt and colleagues did a long-term prospective study on a small number of women (n=35), with age-match controls, and found a high hypertension prevalence in women with PCOS.¹¹

Because of the associated metabolic abnormalities and chronic inflammation that accompany PCOS, women with PCOS who also have the following comorbidities are at high risk for cardiovascular disease (CVD):¹²

- Obesity
- Hypertension
- Dyslipidemia
- IGT
- A family history of cardiovascular disease

The Androgen Excess and PCOS Society (AE-PCOS) has issued recommendations for preventing CVD in PCOS women, based on AHA guidelines; ordering a full lipid panel and measuring blood pressure is suggested.¹² Despite the associated risk factors for CVD among women with PCOS, evidence of CVD in this population is conflicting.

Causes may include the large heterogeneity existing among members of this population, as well as a lack of good studies.⁴ It has been suggested that higher androgen levels could be cardioprotective.⁴ In addition to the reproductive and metabolic complications associated with PCOS, women with this condition have a higher prevalence of psychological problems such as mood disorders (especially anxiety and depression).¹³ Higher incidences of eating disorders are also present. In particular, binge-eating disorder has been found to affect 60% of obese women with PCOS.^{14,15}

Diagnosing PCOS

At the time of this writing, no formal set of diagnostic criteria for women with PCOS exists. The diagnostic criteria agreed upon is that PCOS is present when two of the following three conditions exist:¹⁶

- Oligomenorrhea (period intervals of > 40 days) or amenorrhea
- Clinical and/or biochemical signs of hyperandrogenism
- Polycystic appearing ovaries on an ultrasound, with exclusion of other causes.

How PCOS Changes with Age

Age-related PCOS changes were once considered a “medical black hole;”¹⁷ it was unstudied prior to the last decade. It is argued that upon menopause, when a woman is no longer ovulating, PCOS no longer exists. According to the American Association of Clinical Endocrinologists Practice Guidelines, diagnostic criteria for older women with PCOS does not exist.¹⁸ However, the limited research on PCOS in the aging woman shows changes that both improve her symptoms of PCOS and decrease her risk for chronic disease.

Reproductive Changes

Numerous studies have found that testosterone levels in women with PCOS gradually decrease to normal-for-age levels, but that this decrease was slower than for women without PCOS.^{11,19–21} Levels of DHEA, the precursor to testosterone, remained higher after menopause in those with PCOS.¹¹ This evidence shows that women with PCOS reach menopause later than do women without PCOS, due to higher and prolonged androgen levels.

Decreases in androgens have been shown to improve menstrual regularity, perhaps increasing the chances of conception in some women who struggled with infertility for years. In addition, hirsutism symptoms have been shown to persist or worsen after menopause, possibly from lifelong exposure to high androgen levels.²⁰

Anti-Mullerian Hormone (AMH) is a marker of ovarian reserve. AMH levels have been shown to remain significantly elevated in older women with PCOS, which may be a more reliable diagnostic criterion for the condition than testosterone is, since AMH levels naturally decrease with age.²²

Metabolic Changes

It is now known that PCOS is a lifelong disease, although its manifestation changes as a woman approaches menopause. Weight and metabolic changes—particularly for women who are overweight or obese prior to menopause—tend to worsen with age.²³

Several studies show that premenopausal women with PCOS tend to have higher body mass index (BMI) than do their counterparts without PCOS, and that BMI continues to increase in older women with PCOS.^{19,21} Conversely, Schmidt and colleagues found that as

women with PCOS age, BMI differences are the same as those seen in the general aging population.¹¹

Up to 40% of women with PCOS will develop IGT or T2DM by the fourth decade of life.²⁴ Compared to age- and weight-matched women, those with PCOS have a fivefold increased risk for T2DM over an eight-year period.²⁵ There is a rapid progression of IGT to T2DM when PCOS is present. For this reason, the Androgen Excess and PCOS Society have recommend annual screening for women with PCOS who have IGT, utilizing an oral glucose tolerance test (OGTT). AE-PCOS also recommends that all women with PCOS and normal glucose levels receive OGTT screening every two years.²⁶

Other Age-Related Changes

A 2017 meta-analysis suggests that when PCOS is present, stroke risk increases by 36% but the risk for all-cause mortality does not increase.²⁷ The reason for increased stroke risk is unknown but the authors suggest that practitioners “aggressively screen patients with PCOS for stroke risk factors and initiate treatments.”²⁷ Studies on bone mineral density (BMD) and fractures in postmenopausal women with PCOS are lacking. Androgens are important for bone mass and may be protective against fractures and bone loss. Fracture rates were decreased in a large population of women with PCOS living in Denmark.²⁸ More importantly, this study found that:

- Fracture risk reduction was the same regardless of testosterone levels (high versus normal)
- The risk reduction was nominally smaller for overweight women versus normal-weight women.

A small (n=25) prospective 21-year follow-up study found that postmenopausal women with PCOS had higher androgen levels and similar body fat, lean mass, and BMD compared with controls. The fracture incidence was similar to that of controls.¹¹ Currently it is unknown if women with PCOS are at an increased risk for dementia or Alzheimer’s disease.

PCOS Treatment

PCOS is currently an incurable disease, and treatment goals are to reduce symptoms and/or increase fertility. Symptoms of PCOS can be alleviated with lifestyle modifications, nutritional supplements, and insulin-lowering medications.

Medications

Oral contraceptives restore and regulate menstrual function and hormone levels as well as decrease acne and hirsutism.⁵ However, use of oral contraceptives has also been shown to increase triglycerides and worsen hs-CRP levels in women with PCOS.²⁹ Androgen-lowering medications such as spironolactone may also be prescribed, but hirsutism may take many months to improve.³⁰ Metformin improves insulin sensitivity and is associated with improving lipid levels in women with PCOS.³¹

Nutrition Management for PCOS

Diet and lifestyle changes involving regular exercise, adequate sleep quality, smoking cessation, and stress reduction are recommended as the first-line approach to treating PCOS. RDNs can provide nutrition counseling and education to women with PCOS to encourage positive changes in their eating habits and lifestyles, subsequently reducing their disease risk and improving their health and fertility. Weight loss of 5% to 10% of total body weight has been shown to

improve both reproductive and metabolic parameters associated with PCOS, but these parameters can be improved through lifestyle modifications even without weight loss.³²

Currently, the ideal diet for PCOS is unknown. A systematic review on diet and PCOS published in the Journal of the Academy of Nutrition and Dietetics found that the type of diet did not matter as much as weight loss did. Losing weight improved both metabolic and reproductive parameters associated with PCOS. This review, however, included only six studies.³³

Because a one-size-fits-all eating plan for PCOS does not exist, nutrition recommendations should be individualized. Studies demonstrate that certain meal plans can reduce reproductive and metabolic markers associated with PCOS. Such plans include foods with a lower glycemic index (GI) and glycemic load (GL); and to modify carbohydrate, fat, or protein amounts.^{32,34}

Nutrition Strategies

Compared to women without PCOS, those with PCOS have higher levels of oxidative stress, insulin, and inflammatory markers.⁹ Low levels of both magnesium and zinc have been found in women with PCOS.³⁵ These lower levels could be caused by increased needs, poor absorption, increased excretion, or poor diet intake, although one study did show that zinc intake was similar between women with and without PCOS. Magnesium and zinc are antioxidants that help to prevent oxidative damage and inflammation, and they also play a role in insulin regulation. For women with PCOS, supplementing with zinc and magnesium has improved their biomarkers of inflammation and oxidative stress, as well as their hormonal profiles.³⁶

JUST PUBLISHED!

Malnutrition in Pregnancy Systematic Reviews

The **Evidence Analysis Library (EAL)** is pleased to announce the publication of the Malnutrition in Pregnancy Systematic Reviews.

The **Systematic Reviews**, focus on six sub-topics areas:

- Screening and Assessment
- Hyperemesis Gravidarum
- Health Effects (Famine, Micronutrient Deficiency, and Nutrition Assessment)
- Diet and Supplements (Omega-3 and Vitamin D)
- Weight Loss Surgery
- Medical Nutrition Therapy

Visit the EAL at www.andeal.org/mip to view the results. Access the EAL with your Academy member login information.

Researchers have investigated the use of an anti-inflammatory diet in women with PCOS. In one study, 100 overweight women with PCOS ate a reduced-calorie diet for 12 weeks. The diet consisted of five small meals of 25% protein, 25% fat, and 50% carbohydrate. The diet was designed to include moderate to high amounts of fiber, with an emphasis on anti-inflammatory foods such as fish, legumes, green tea, and low-fat dairy. Chicken, red meat, and added sugars were limited. The results were encouraging. The mean weight loss was 7.2% with significant reductions in cholesterol, blood pressure, and fasting blood glucose. Levels of hs-CRP were reduced by 35%, and 63% of the women regained menstrual cyclicity.³⁷

The DASH diet, also rich in antioxidants, has been investigated in women with PCOS. Women with PCOS who followed the DASH diet for three months saw significant reductions in insulin and hs-CRP levels, along with significant weight loss and lowered BMI and waist-circumference measurements. The investigators also observed a significant increase in antioxidant status.³⁸

These results show that women with PCOS benefit from diets high in fiber (both soluble and insoluble) as well as antioxidant-rich foods. RDNs can educate clients on sources of high-fiber and anti-inflammatory foods to include in their diets on a regular basis, such as cold-water fish, nuts, avocados, whole grains, beans, legumes, fruits, vegetables, and green tea.

Nutrition Supplements for PCOS

The majority of women with PCOS reported wanting alternative treatments to address their PCOS. Some nutrition supplements, such as myo and d-chiro inositol and the antioxidant n-acetylcysteine (NAC), have been shown to improve metabolic aspects of PCOS, working as well as if not better than metformin.^{39–41} Other supplements shown to improve aspects of PCOS include vitamin D, zinc, magnesium, and omega-3 fatty acids.³⁶ RDNs who work with women with PCOS should familiarize themselves with these supplements.

Vitamin B12 deficiency is a concern for older individuals. Long-term metformin use has been shown to reduce levels of vitamin B12. Women with PCOS who take metformin must have their vitamin B12 levels checked annually and supplement their diets with vitamin B12 if needed.⁴²

Conclusion and Implications for Practice

PCOS is a lifelong condition with serious long-term health risks. The nutrition management for older women with PCOS should take into account the risk of long-term complications associated with this disease. Effective and aggressive treatment is needed, with interventions involving diet, nutritional supplements, lifestyle, and insulin sensitizers for older women with PCOS who have metabolic complications.

Studies in the last decade have revealed that many of the reproductive symptoms of PCOS are ameliorated with age. However, body weight may increase, and the metabolic abnormalities that may have been present during premenopausal years can worsen, increasing the risk for chronic disease. Weight loss has been shown to improve the markers of chronic disease, yet it can be very difficult for women

with PCOS to lose weight, and it might become even more difficult to do so after menopause.

Early detection and proactive lifestyle management of PCOS are crucial to prevent the long-term metabolic consequences associated with this complex syndrome. RDNs play an important role in the treatment and prevention of metabolic complications in women with PCOS throughout the lifecycle.

The author wishes to disclose that she does retail nutrition supplements at the PCOS Nutrition Center.

[Click here to see the references for this article.](#)

JUST RELEASED!

International evidence-based guideline for the assessment and management of polycystic ovary syndrome (PCOS). Released July 2018
<https://www.monash.edu/medicine/sphpm/mchri/pcos/guideline>

Highlights:

- Endorsement of the Rotterdam PCOS diagnostic criteria in adults.
- Anti-Müllerian hormone levels are not yet adequate for diagnosis.
- Recognition that PCOS is an insulin resistant and metabolic disorder; tests for insulin resistance, however, lack accuracy and should not be incorporated into the diagnostic criteria for PCOS at this time.
- Ultrasound should not be used for the diagnosis of PCOS in those with a gynecological age of < 8 years (< 8 years after menarche), due to the high incidence of multi-follicular ovaries in this life stage.
- Postmenopausal persistence of PCOS could be considered likely with continuing evidence of hyperandrogenism.
- Depressive and anxiety symptoms as well as eating disorders should be screened, assessed and managed with the need for awareness of other impacts on emotional wellbeing.
- Combined oral contraceptive pills are first-line pharmacological management for menstrual irregularity and hyperandrogenism.
- Metformin is recommended in addition or alone, primarily for metabolic features.
- Letrozole is first-line pharmacological infertility therapy.
- Overall evidence is low to moderate quality, requiring significant research expansion in this neglected, yet common condition.

Weight Management Practices and Health Knowledge and Beliefs among Women with PCOS

Polycystic ovary syndrome (PCOS) is the most common reproductive disorder among women, affecting an estimated 10% of women of reproductive age.¹ It is defined by the presence of at least two of the following: 1) oligo- or amenorrhea, 2) excessive androgen production, and 3) polycystic ovaries. Diet and physical activity modifications are often recommended as a first line of treatment for symptoms of PCOS and the prevention of adverse health outcomes such as cardiovascular disease, diabetes, infertility, and endometrial cancer.²

This issue's Research Brief features two studies about PCOS and nutrition: one by Moran et al.³ that investigated whether and how weight management practices differ between women with and without PCOS, and one by Lin et al.⁴ that investigated whether and how health-related knowledge, beliefs and self-efficacy differ between women with and without PCOS.

Data for the study by Moran et al.³ came from the Australian Longitudinal Study on Women's Health, a population-based study. Women were randomly selected from the national health insurance database, drawing from the cohort born 1973-1978. Women were thus 31-36 years old when the survey was completed in 2009. The 7,767 women who responded to the question about PCOS diagnosis were included in the analysis (n=556 PCOS; n=7211 non-PCOS). Demographic characteristics such as parity, education, and income were collected.

Women self-reported height, weight, BMI, and waist circumference. Dietary data were collected using a validated food frequency questionnaire, and the dietary guidelines index (DGI) was used to assess diet quality using a DGI score (higher scores more closely followed dietary guidelines). Weight management practices were assessed by asking participants to indicate whether they used certain methods to control their weight or shape in the last 12 months. Weight management practices fell into one of two groups: healthy lifestyle practices or non-lifestyle-related alternative practices. Healthy lifestyle practices included exercise, commercial weight loss programs, meal replacements, reducing meal or snack size, cutting down on fats and/or sugars, following a low glycemic index (GI) diet, or following a diet book. Alternative practices included use of laxatives, diuretics or diet pills, fasting, or smoking.

For statistical analyses, comparisons between women with and without PCOS were made using Student's t-test and Chi-square test. Logistic regression was used to assess associations between weight management practices and PCOS, and linear regression was used to assess the association between weight management practices and diet. Models were adjusted for age, BMI, marital status, education, occupation, income and country of birth.

Results showed that, when adjusted for multiple demographic characteristics, women with PCOS had higher BMI, weight, and waist circumference and were less likely to have children. Women with PCOS were also more likely to have reduced their meal or snack size (OR 1.5, p=0.003), reduced fat or sugar intake (OR 1.32, p=0.027), followed a low GI diet (2.88, p<0.001), smoked (OR 1.6, 0.043), and overall used

more alternative weight management practices (OR 1.45, p=0.017) than women without PCOS. Among women with PCOS, use of meal replacements, reducing meal or snack size, and the use of any healthy weight management practice was associated with higher protein intake. Following a low GI diet was associated with higher DGI scores, lower GI, and lower total fat and saturated fat intake. Use of laxatives and the combined use of any alternative practices was associated with a lower DGI score.

Overall, the authors concluded that women with PCOS were more likely to have used both healthy and alternative weight management practices. Furthermore, healthy weight management practices were associated with improved diet quality and alternative practices, particularly laxative use, were associated with worse diet quality.

Data for the study by Lin et al.⁴ were collected from a cross-sectional study of women in the U.S. who were recruited through paper and web-based advertisements. These women self-reported either being diagnosed with PCOS or having regular menstrual cycles. Women were excluded if their surveys were incomplete, if BMI values were missing or outside of plausible values, or if they had been diagnosed with a major chronic disease.

Participants completed an online instrument that was developed using the Social Cognitive Theory and the Health Belief Model to assess 1) reproduction-, nutrition-, and PCOS-related knowledge, 2) beliefs about health outcomes and confidence in lifestyle behaviors, and 3) self-evaluation of their current lifestyle behaviors. Information about demographics was also collected.

For statistical analyses, groups were compared using t-tests and Fisher's exact tests. To assess the associations between PCOS with health-related beliefs and self-efficacy linear regression was used. Multiple linear regression was used to adjust for potential confounders including age, BMI, and education level.

Of the women who responded, 475 (n=255 with PCOS; n=220 without PCOS) met eligibility criteria. Women with PCOS were older, more likely to be obese, and more likely to have an advanced degree than women without PCOS.

There were no differences in basic nutrition-related knowledge between women with and without PCOS. Interestingly, women with PCOS incorrectly identified some weight-related symptoms as diagnostic criteria for PCOS including sudden weight gain (64%), insulin resistance (81%), and trouble losing weight (86%). Women with PCOS tended to believe that they were more susceptible to cardiovascular disease, diabetes, and weight gain, but also that these were preventable and that healthy lifestyle behaviors could reduce their risk for adverse health outcomes. However, only 47% of women with PCOS had attempted to follow government dietary recommendations. Women with PCOS were less likely to agree that a healthy diet (p=0.03) or physical activity (p=0.03) could reduce their risk of weight gain. No differences were observed in how the two groups rated their diet and lifestyle or in self-efficacy of dietary behaviors in adjusted models.

Overall, researchers concluded that women with PCOS believe that they are susceptible to adverse health outcomes and weight problems with or without healthy dietary behaviors.

[Continued on page 7](#)

Together, these studies indicate that women with PCOS could benefit from targeted healthy dietary and lifestyle interventions. Registered dietitians have unique knowledge and training and can play an important role in helping women with PCOS manage their weight and health concerns. Women with PCOS tend to have similar nutrition knowledge to women in the general population, but may believe that positive changes will be less likely to help them. They also may be more likely to try weight management methods that could be harmful. Based on results from the studies presented here, dietitians and their clients may benefit from targeting counseling on the potential harms from weight management through use of laxatives or other alternative methods, as well as targeting women's beliefs about the effects of making positive dietary and physical activity changes on health outcomes.

Featured articles:

Moran LJ, Brown WJ, McNaughton SA, Joham AE, Teede HJ. Weight management practices associated with PCOS and their relationships with diet and physical activity. *Hum Reprod.* 2017; 32(3):669-678. doi: 10.1093/humrep/dew348.

Lin AW, Dollahite JS, Sobal J, Lujan ME. Health-related knowledge, beliefs and self-efficacy in women with polycystic ovary syndrome. *Hum Reprod.* 2018;33(1):91-100. doi: 10.1093/humrep/dex351.

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4. Lin AW, Dollahite JS, Sobal J, Lujan ME. Health-related knowledge, beliefs and self-efficacy in women with polycystic ovary syndrome. *Hum Reprod.* 2018;33(1):91-100. Epub 2017/11/29. doi: 10.1093/humrep/dex351.

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www.eatrightpro.org/sop.



In May, our past chair and immediate past House of Delegates (HOD) representative, **Denise Andersen**, MS, RDN, LD, CLC, passed away unexpectedly. Denise's contributions to the profession extended far beyond the HOD, as her service included being a member of the Academy Quality Management Committee, Past Chair of the Academy Political Action Committee, member of the Academy Positions Committee, Past Chair of the Women's Health DPG, and Past President of the

Minnesota Academy of Nutrition and Dietetics. Her public policy and advocacy work at the state and national level will be missed; but more importantly we will miss Denise's warm personality, giving nature, quiet strength, and passion for the profession.

I met Denise 15 years ago, when she was the Chair-elect of the WH DPG and I was a new dietitian. From the very first question I asked her back then, to the last question I asked her a few short weeks before she passed, she was always there for me with a quick response on email. When I was elected Chair in 2013, Denise readily shared her knowledge, and as Publications Editor for the past three years, I could always count on Denise for author ideas. She knew everyone! I recently had a student move to Minnesota and I immediately con-

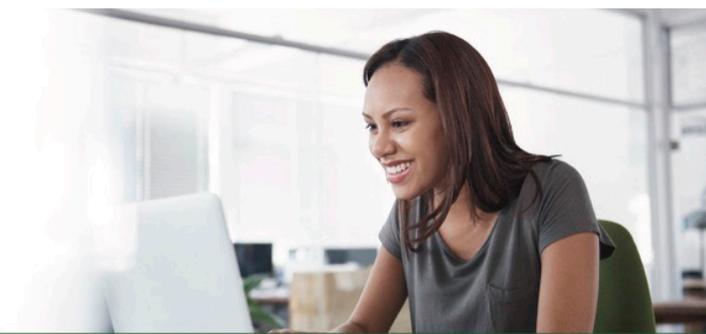
nected her with Denise – I knew she was in the best hands. My last dialogue with Denise was about the HOD. I was interested in running for the position but knew I couldn't fill Denise's shoes. She gave me the encouragement I needed.

I haven't always been able to attend FNCE®, but when I have, I have most looked forward to my hug from Denise and her questions about my kids, life, etc. I am saddened to miss that hug and great conversation, but I know she will be there with me. Her legacy to the profession, the Academy, and the WH DPG will live on – I will make sure of it.

Thank you Denise and I will miss you.

"I enjoyed times working on the WH-DPG board with her. I sat next to her at one of our dinners at FNCE and she was such a lovely lady. I remember Denise being so devoted to the profession. She was truly passionate about women's health and happily gave her time and energy to our DPG because that is what we are all about. When I think of the term "gentle woman," I think of Denise. She had a quiet way about her---soft-spoken, patient, caring, kind, and very intuitive. She was a joy to have on our board because she was a wonderful listener and could always offer valuable feedback. She was one of our "wise ones" and it is truly a huge loss to our practice group. She has left her mark and her legacy in the field of women's health. I will miss her." ~ Ginger Carney, WH DPG Leadership Team Member

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Alena & Godlove

The literal translation of chop fayne is to “eat good” – a common saying during my two week time in Cameroon, Africa. In May 2015, I had the opportunity to go to Mbingo, Cameroon and assist with a training for nutrition educators who were employed by Cameroon Baptist Convention Health Services (CBCHS). CBCHS is a non-profit, faith-based health care organization providing holistic health services including preventative, curative and rehabilitative care throughout six regions of Cameroon.

Cameroon is a sub-Saharan African country bordering Nigeria, Chad, Central Africa Republic, Gabon and the Congo. The language of the country includes English in 2 regions and French in the other 6 regions. Throughout Cameroon, Pidgin English is spoken including phrases such as chop fayne and over-vexed (deeply annoyed). Malnutrition is a central health and welfare problem among infants and young children, and associated with improper infant and young child feeding practices, inadequate food intake, illness, lack of basic health services, poverty, poor water and sanitation, and limited education. Both overweight and obesity are prevalent, and are increasing in rural and urban areas. In addition, Cameroon’s HIV prevalence rate is the highest in all of the Western and Central Africa sub-regions; six individuals are infected per hour.

The CBCHS started the Nutrition Improvement Program (NIP) with the overall purpose of improving the nutritional status of mothers and infants, particularly HIV exposed infants. Since 2007, NIP has sought to build the capacity of health care providers in integrating infant and young child feeding counseling in clinics throughout Cameroon, Africa. In one year, approximately 60,000 clients, patients and caregivers received chronic health condition and infant feeding counseling. The demand for nutrition counseling outside of infant feeding practices increased. A colleague, Dr. Kate Reinsma, and the Program Manager, Nkuoh Godlove, at CBCHS invited me to develop and deliver medical nutrition therapy (MNT) lesson plans (e.g. nutrition after surgery, nutrition and hepatitis). The current curriculum was lacking in MNT. Since I have always had an interest in international nutrition, they invited me to lead part of the training.



njamajama with fufu

I had the opportunity to provide training, nutrition consultation in the hospital, and a nutrition lecture to health care providers. Training was provided to 39 nutrition counselors, and lasted six days a week, 9 to 10 hours a day. Adult learning methods included lectures, case studies, independent work and small group discussions. In addition, the self-efficacy and perceived barriers of the nutrition counselors after the training were qualitatively assessed. Reflective journaling was completed at the beginning, middle and end of the six-week training. Using qualitative inductive content analysis, journals were coded, categorized for themes and checked for inter-consistency. The counselors were asked, “why do you want to be a nutrition counselor”? Many of their friends, family and community members are suffering from illnesses and diseases that could be improved by “good nutrition” and they felt called to help the situation in their community. Training nutrition counselors is one approach towards increasing human resources to implement nutrition interventions in Cameroon. Results indicated that trainings should include active teaching methods such as role-playing, dramas (e.g. skits) songs and reflective journaling while attending to barriers such as transportation, interpersonal communication and finances.



Mbingo Baptist Hospital

When traveling to a country different than one’s own, it is important to understand cultures and traditions such as clothing (e.g. do not dress casually, clean shoes are very important, no tank tops or shorts, unless “doing sport”) and greetings (e.g. starting a conversation with a hand shake, and always asking how one slept and about family). My favorite part of traveling to any new country is trying the foods of the region. The diet in Cameroon is high in carbohydrates and low in protein. Fruits are plentiful including pineapple, papaya, mango, bananas and pear, which is actually an avocado. Protein sources include beans/rice, ground nuts, bush rat, chicken and fish. The primary fat is palm oil. Traditional meals include njamajama (bitter greens) with fufu (corn meal mixture), and puff-puff (fried dough) with beans. Sweet drinks are popular as is beer and palm wine. Lodging was hostel-style; all meals were provided in a communal setting with all of the other health care providers. Fellowship was important to unwind after a long day and to prevent the loneliness of missing one’s family. Movies, reading books, hiking and game nights were an instrumental part of enjoying the time in Cameroon. In addition, I had the opportunity to witness a celebration called “20th of May”, similar to Independence Day in the United States.

The opportunity to go to Cameroon for two weeks was an experience of a lifetime. I established many relationships that have continued since that time and I continue to serve as a resource to the CBCHS staff. Future plans to return to Cameroon are in the works. As one nurse shared with me, “Cameroon gets in your blood, and you will be back, because now, you are family.”

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