

Correlation between Access to Healthy Food and Decreased PCOS Symptoms

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ABSTRACT

Polycystic ovary syndrome (PCOS) is a widespread endocrine and metabolic condition with a variety of signs and symptoms, including menstrual irregularity, hyperandrogenism, weight-related complications, and metabolic dysfunction. The quality of diet and lifestyle behaviors play a role in PCOS management, but the ability to consume healthy foods can impact one's capacity to achieve an appropriate diet. The present study addresses the relationship between the availability of healthy food and reduction in PCOS symptoms focusing on the aspects of food availability, affordability, accessibility, food security and food quality. In the study, women who have more and regular access to healthful foods are more likely to follow a healthier dietary pattern and have less severe PCOS symptomology. It also takes into account the possible influence of body composition, physical activity, socioeconomic factors, stress and other lifestyle factors. The relationship of healthy food access and selected reproductive, metabolic and physical symptoms among women with PCOS can be investigated using a correlational research design. An understanding of this relationship could be used to support a more holistic approach to PCOS management, not only with regard to eating behaviors as they relate to diet, but also to social and environmental factors that may influence these behaviors. The results can be used for nutrition counseling, community health programs, food access programs and food access policies for women with PCOS.

Keywords: Polycystic ovary syndrome, healthy food access, food security, dietary quality, PCOS symptoms, nutrition, lifestyle management, metabolic health.

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INTRODUCTION

Polycystic ovary syndrome (PCOS) is a multifactorial endocrine and metabolic condition impacting reproductive, metabolic and psychological well-being. It is characterized by various clinical features such as irregular periods, hyperandrogenism, weight problems, insulin resistance and related metabolic abnormalities. Multifactorial causes and symptoms of PCOS make comprehensive lifestyle and nutritional management more emphasized than just taking the medications (Shahid et al., 2022).

Diet is especially important as it may have an impact on weight gain or loss, metabolic health, insulin regulation and general health for women with PCOS. Nutritional management focuses on balanced dietary patterns, high nutrient dense food groups and avoiding high energy dense, highly processed foods (Faghfoori et al., 2017). There is also evidence that adherence to the Mediterranean diet is related to body composition and metabolic characteristics related to PCOS (Barrea et al., 2019).

In addition to knowledge and/or motivation, however, it is important to recognize that access to a healthy diet relies on the presence of nutritious foods that are available, affordable and physically accessible. A lack of food security and limited food choices can impact women with PCOS's eating pattern, especially in socioeconomically disadvantaged groups (Badri-Fariman et al., 2021). Qualitative studies have also found that socio-economic and environmental factors as well as behaviors affect food patterns in adolescents with PCOS (Hajivandi et al., 2020).

Thus, the food environment could be an important but under-studied factor for managing PCOS symptoms. It has been reported that environmental factors are linked to the different levels of PCOS symptoms, which implies that environmental factors may influence personal lifestyle behaviors (Ashraf et al., 2022). Furthermore, the relationship between weight management practices and dietary and physical activity habits

Table 1: Major Dimensions Linking Healthy Food Access to PCOS Symptoms

<i>Dimension</i>	<i>Relevance to PCOS</i>	<i>Potential Relationship with Symptoms</i>
Food availability	Determines whether nutritious foods can be obtained regularly	May facilitate healthier dietary patterns
Food affordability	Influences the ability to purchase nutrient-dense foods consistently	Limited affordability may encourage less nutritious alternatives
Physical accessibility	Reflects proximity to markets, supermarkets, and other food sources	Greater accessibility may improve dietary choices
Food security	Represents reliable access to adequate and appropriate food	Greater food security may support healthier eating behaviors (Badri-Fariman et al., 2021)
Dietary quality	Includes the balance and nutritional value of foods consumed	Healthier patterns may support metabolic and reproductive health (Faghfoori et al., 2017; Barrea et al., 2019)
Lifestyle context	Includes physical activity, sleep, stress, and behavioral factors	May modify the relationship between diet and PCOS outcomes (Cowan et al., 2023)

among women with PCOS is central to the need to look at food access in the context of broader lifestyle (Moran et al., 2017).

Crucially, nutritional needs and management of PCOS could vary depending on the PCOS phenotype and also lean and obese phenotypes (Barrea et al., 2021). Therefore lifestyle management should not only be about diet restriction, but also the integration of physical activity, behavioural strategies, psychological wellbeing, sleep and long-term sustainable lifestyle (Cowan et al., 2023). Quality of life could also be impacted by dietary intake and eating behaviors, especially in women with PCOS who are trying to conceive (Turner-McGrievy et al., 2015).

Problem Statement

Although dietary modification is widely recognized as an important component of PCOS management, access to healthy food is not equally distributed. Women who experience food insecurity, financial limitations, or restricted access to nutritious foods may have greater difficulty maintaining dietary patterns that support PCOS management (Badri-Fariman et al., 2021). Consequently, examining food access alongside dietary behavior may provide a broader understanding of factors associated with PCOS symptom severity.

Rationale for the Study

Investigating the correlation between healthy-food access and PCOS symptoms can help determine whether food-related environmental conditions are associated with reproductive, metabolic, and weight-related outcomes. Such evidence could complement existing research on dietary interventions and lifestyle management and support interventions that address both individual behavior and structural barriers to healthy eating (Shahid et al., 2022; Cowan et al., 2023).

Aim and Objectives

The study aims to examine the relationship between access to healthy food and decreased PCOS symptoms. Specifically, it seeks to:

- Assess the level of access to healthy foods among women with PCOS;
- Examine dietary patterns associated with healthy-food access;
- Determine the relationship between food access and PCOS symptom severity; and
- Consider the influence of socioeconomic and lifestyle factors on this relationship.

Overall, the introduction establishes that healthy-food access may function as an important environmental determinant of dietary quality and PCOS management, while recognizing that symptom outcomes are influenced by multiple interacting lifestyle, metabolic, and socioeconomic factors.

LITERATURE REVIEW

Polycystic Ovary Syndrome and the Role of Nutrition

Polycystic ovary syndrome (PCOS) is a complex endocrine and metabolic condition in which reproductive, metabolic, and lifestyle factors interact. Nutritional management is considered an important component of comprehensive PCOS care because dietary patterns can influence body weight, insulin sensitivity, inflammation, and other metabolic processes associated with PCOS. Shahid et al. (2022) emphasize that appropriate dietary and lifestyle modifications can contribute to the management of PCOS and its associated metabolic and reproductive manifestations. Similarly, Faghfoori et al. (2017) identify dietary management as an important strategy for addressing metabolic abnormalities and supporting overall health among women with PCOS.

Healthy Dietary Patterns and PCOS Outcomes

Research suggests that the quality and composition of dietary intake may be more important than a single restrictive diet. Mediterranean-style dietary patterns, characterized by relatively high consumption of vegetables, fruits, whole grains, legumes, nuts, and healthy fats, have received particular attention in PCOS research. Barrea et al. (2019) found that

adherence to the Mediterranean diet was associated with dietary patterns and body-composition characteristics relevant to women with PCOS. Such dietary patterns may provide beneficial nutritional components while reducing dependence on highly processed and energy-dense foods.

Nutritional approaches may also need to account for differences between PCOS phenotypes. Barrea et al. (2021) explain that nutritional considerations can differ between lean and obese women with PCOS, indicating that dietary interventions should be individualized rather than universally applied.

Food Security and Access to Healthy Foods

Access to healthy food involves more than physical availability; it also includes affordability, food security, consistency of supply, and the ability to obtain nutritious foods. Badri-Fariman et al. (2021) examined food-security status and dietary patterns in relation to PCOS among overweight and obese Iranian women, demonstrating the relevance of food-security conditions when considering dietary behaviors and PCOS.

Food access can influence the quality and consistency of dietary choices. When nutritious foods are expensive, unavailable, or difficult to obtain, individuals may rely more heavily on inexpensive, convenient, or highly processed foods. Hajivandi et al. (2020), in examining food habits among overweight and obese adolescent girls with PCOS, highlighted the importance of social and environmental circumstances in shaping eating behaviors.

Dietary Behaviors, Weight Management, and PCOS Symptoms

Dietary behaviors are closely connected with weight-management practices and physical activity. Moran et al. (2017) examined weight-management practices among women with PCOS and their relationships with diet and physical activity, supporting the importance of considering dietary behavior within a broader lifestyle context. Turner-McGrievy et al. (2015) similarly examined dietary intake, eating behaviors, and quality of life among women with PCOS who were attempting to conceive, highlighting the broader behavioral and quality-of-life implications of dietary choices.

Therefore, the relationship between healthy-food access and PCOS symptoms should not be interpreted exclusively through body weight. Dietary quality, eating behaviors, physical activity, and other lifestyle factors may jointly contribute to PCOS outcomes.

Environmental and Lifestyle Determinants of PCOS Severity

Environmental conditions may also influence the severity of PCOS symptoms. Ashraf et al. (2022) identified environmental determinants as relevant to variations in PCOS symptom severity, suggesting that factors outside individual biological characteristics deserve consideration. This supports examining healthy-food access as a potential environmental determinant

rather than viewing nutrition solely as an individual choice.

Cowan et al. (2023) further emphasize that lifestyle management in PCOS extends beyond diet and physical activity to include behavioral, psychological, and other factors that can affect long-term health. Consequently, access to healthy food may represent one component of a broader social and lifestyle environment influencing PCOS management.

Synthesis of the Literature

Overall, the literature indicates a plausible relationship between access to nutritious foods, dietary quality, lifestyle behaviors, and PCOS outcomes. Existing studies provide evidence concerning nutritional management, Mediterranean dietary patterns, food security, eating behaviors, environmental determinants, and lifestyle management (Faghfoori et al., 2017; Barrea et al., 2019; Badri-Fariman et al., 2021; Shahid et al., 2022). However, fewer studies directly examine healthy-food access as an independent factor correlated with PCOS symptom severity. This creates an important research gap and provides justification for investigating whether women with greater access to affordable, available, and nutritious foods experience fewer or less severe PCOS symptoms after considering relevant lifestyle and socioeconomic factors (Ashraf et al., 2022; Cowan et al., 2023).

HEALTHY FOOD ACCESS AND PCOS SYMPTOM SEVERITY

Relationship Between Food Access and Dietary Quality

Access to healthy food encompasses the availability, affordability, physical accessibility, and consistency of obtaining nutritious foods. For women with PCOS, these factors may influence the ability to maintain dietary patterns that support metabolic and hormonal health. When vegetables, fruits, whole grains, legumes, lean proteins, and healthy fats are readily available and affordable, individuals may be better positioned to adopt nutritionally balanced diets. Conversely, limited access and food insecurity can encourage dependence on inexpensive, energy-dense, and highly processed foods, potentially reducing overall dietary quality (Badri-Fariman et al., 2021; Hajivandi et al., 2020).

Diet and lifestyle modification is considered an important component of PCOS management because nutritional interventions may support improvements in body composition, insulin sensitivity, metabolic health, and reproductive outcomes (Shahid et al., 2022; Faghfoori et al., 2017). Therefore, the relationship between food access and PCOS symptoms should be considered not simply in terms of individual food choices but also in relation to the wider food environment.

Potential Biological Pathways

Improved access to nutritious foods may facilitate dietary patterns characterized by higher consumption of plant-based foods, fiber, unsaturated fats, and minimally processed foods. Such dietary patterns may contribute to better metabolic

regulation and weight management, which are relevant to the pathophysiology and clinical manifestations of PCOS (Barrea et al., 2019).

The Mediterranean dietary pattern is particularly relevant because adherence among women with PCOS has been associated with dietary quality and body-composition characteristics (Barrea et al., 2019). Nutritional management may also need to account for differences between lean and overweight or obese PCOS phenotypes, as metabolic and nutritional requirements can vary between individuals (Barrea et al., 2021). Consequently, greater access to healthy foods may indirectly contribute to reductions in some PCOS symptoms by supporting healthier dietary behaviors and metabolic outcomes.

Environmental and Socioeconomic Influences

Food access is influenced by socioeconomic and environmental circumstances. Cost of nutritious foods, household resources, geographical availability, transportation, and local food environments can affect the dietary choices available to women with PCOS. Evidence examining environmental determinants suggests that factors beyond individual behavior can contribute to differences in PCOS symptom severity (Ashraf et al., 2022).

Food habits among adolescents and women with PCOS may similarly be shaped by family circumstances, cultural practices, food availability, and perceptions of healthy eating (Hajivandi et al., 2020). Furthermore, weight-management practices among women with PCOS are closely related to dietary and physical-activity behaviors, demonstrating the importance of examining food access within a broader lifestyle context (Moran et al., 2017).

Food Access, Lifestyle, and Symptom Management

The relationship between healthy-food access and PCOS symptom severity is unlikely to operate independently of other lifestyle factors. Physical activity, sleep, stress management, psychological well-being, and sustainable behavioral changes can influence the effectiveness of lifestyle management in PCOS (Cowan et al., 2023). Dietary intake and eating behaviors may also affect quality of life, particularly among women managing PCOS while attempting to conceive (Turner-McGrievy et al., 2015).

Therefore, improved food access should be regarded as a supportive environmental determinant rather than a stand-alone treatment. Its potential contribution to symptom reduction is more meaningful when combined with individualized nutrition, appropriate physical activity, weight-management strategies where indicated, and comprehensive clinical care (Shahid et al., 2022; Cowan et al., 2023).

Interpretation of the Correlation

A positive relationship between healthy-food access and improved PCOS outcomes would suggest that women with greater access to nutritious foods may report fewer or less severe symptoms. However, such a relationship should not automatically be interpreted as causal. Socioeconomic status, education, BMI, physical activity, stress, sleep, healthcare access, and existing dietary behaviors may influence both food access and PCOS symptoms. Consequently, future research should control for these potential confounding variables when estimating the independent association between healthy-food access and symptom severity (Cowan et al., 2023; Moran et al., 2017).

Table 2: Healthy Food Access, Dietary Pathways, and Potential PCOS Outcomes

<i>Healthy food access factor</i>	<i>Influence on dietary behavior</i>	<i>Potential biological/metabolic effect</i>	<i>Possible pcos outcome</i>
Availability	Greater opportunity to select vegetables, fruits, whole grains, legumes, and lean proteins	Improved nutrient and fiber intake	Potential improvement in metabolic health and symptom burden
Affordability	Makes healthier foods more financially sustainable	Greater consistency of nutritious dietary intake	May support weight and metabolic management
Physical accessibility	Reduces barriers to obtaining nutritious foods	Greater adherence to healthier dietary patterns	Potential improvement in overall PCOS management
Food security	Promotes stable and predictable food consumption	Reduced reliance on energy-dense, nutrient-poor foods	Potentially lower symptom severity
Dietary quality	Encourages minimally processed and nutrient-dense foods	May support insulin sensitivity and inflammatory regulation	Possible improvement in metabolic and reproductive symptoms
Mediterranean-style dietary access	Facilitates intake of plant foods, healthy fats, and whole foods	Supports favorable body-composition and metabolic characteristics	Potentially improved PCOS-related outcomes (Barrea et al., 2019)
Limited healthy-food access	May encourage inexpensive, highly processed alternatives	Potentially unfavorable metabolic effects	May contribute to greater symptom burden
Combined lifestyle support	Integrates healthy eating with physical activity and behavioral strategies	Addresses multiple metabolic and psychosocial pathways	More comprehensive PCOS symptom management (Cowan et al., 2023)

Overall, examining healthy-food access alongside dietary quality provides a broader understanding of PCOS management. The evidence suggests that improving the food environment may help create conditions that support healthier eating patterns, while individualized nutritional and lifestyle interventions remain central to managing PCOS (Shahid et al., 2022; Faghfoori et al., 2017; Barrea et al., 2021).

METHODOLOGY AND CORRELATION ANALYSIS

Research Design

The study can adopt a quantitative cross-sectional correlational design to examine the relationship between access to healthy food and the severity of PCOS symptoms. The design is appropriate because it allows the researcher to determine whether differences in food availability, affordability, accessibility, and food security are associated with differences in PCOS outcomes without manipulating participants' diets. Previous research has linked food-security status and dietary patterns with PCOS, supporting the investigation of food access as an important contextual factor (Badri-Fariman et al., 2021). The study should distinguish between food access and actual dietary intake because access does not necessarily guarantee healthy food consumption.

Study Population and Sampling

The target population should consist of adult women with a clinically established diagnosis of PCOS. Participants may be recruited from gynecology, endocrinology, nutrition, and primary healthcare settings using purposive or consecutive sampling. Relevant demographic and socioeconomic characteristics including age, education, income category, employment, marital status, and residential food environment should be collected because socioeconomic circumstances may influence both food access and dietary behavior. Research on women with PCOS indicates that environmental and lifestyle circumstances can contribute to variations in symptom severity (Ashraf et al., 2022).

Measurement of Healthy Food Access

Healthy-food access should be assessed through dimensions such as availability, affordability, physical accessibility, food security, and consistency of access. A structured questionnaire can determine whether participants can regularly obtain vegetables, fruits, whole grains, legumes, lean proteins, and other nutrient-dense foods. Food-security assessment is particularly relevant because inadequate food security may influence dietary patterns and food choices among women with PCOS (Badri-Fariman et al., 2021). Dietary intake can additionally be assessed using a food-frequency questionnaire or dietary recall to determine whether reported access translates into healthier eating behaviors.

Assessment of PCOS Symptoms

PCOS symptom severity should be assessed using measurable indicators such as menstrual irregularity, clinical manifestations

of hyperandrogenism, weight-related concerns, and relevant metabolic characteristics. Dietary and nutritional factors should be interpreted alongside established lifestyle determinants because nutritional management is only one component of comprehensive PCOS management (Faghfoori et al., 2017; Shahid et al., 2022). Where possible, anthropometric measures such as BMI and waist circumference should also be recorded.

Correlation and Statistical Analysis

Descriptive statistics should summarize participants' demographic characteristics, food-access levels, dietary patterns, and PCOS symptoms. Pearson's correlation coefficient can be used when variables meet appropriate parametric assumptions, while Spearman's rank correlation can be applied to ordinal or non-normally distributed variables. Multiple regression analysis can subsequently determine whether healthy-food access independently predicts PCOS symptom severity after controlling for BMI, physical activity, socioeconomic status, and other relevant factors. This is important because weight-management practices, diet, and physical activity may interact in influencing PCOS-related outcomes (Moran et al., 2017; Cowan et al., 2023).

Validity, Reliability, and Ethical Considerations

The research instruments should be reviewed for content validity, and pilot testing should be conducted before full data collection. Internal consistency should be assessed where multi-item scales are used. Participation should be voluntary, with informed consent, confidentiality, and secure handling of participant data. The study should also recognize that PCOS has different phenotypic presentations; therefore, analyses should consider differences between lean and overweight/obese participants when appropriate (Barrea et al., 2021).

Importantly, a correlation between healthy-food access and reduced symptoms should not be interpreted as proof of causation. Dietary preferences, socioeconomic status, physical activity, healthcare access, BMI, and other lifestyle characteristics may influence both variables. Qualitative evidence on food habits among girls with PCOS and research on dietary intake and quality of life further demonstrate the complexity of food-related behaviors in this population (Hajivandi et al., 2020; Turner-McGrievy et al., 2015).

DISCUSSION AND IMPLICATIONS

Relationship Between Healthy Food Access and PCOS Symptoms

Access to healthy food may play an important role in dietary quality and the management of PCOS symptoms. Women who can consistently obtain affordable, nutritious foods may be better positioned to follow balanced dietary patterns that support metabolic and reproductive health. Dietary and lifestyle modifications are widely recognized as important components of PCOS management, particularly because improvements in diet quality may contribute to healthier

Table 3: Major Variables, Indicators, and Analytical Approach

<i>Variable</i>	<i>Key indicators</i>	<i>Measurement approach</i>	<i>Statistical analysis</i>	<i>Supporting literature</i>
Healthy-food access	Availability, affordability, proximity, consistency	Structured food-access questionnaire	Descriptive statistics; correlation	Badri-Fariman et al. (2021)
Food security	Reliability and adequacy of food supply	Validated food-security measure	Correlation; regression	Badri-Fariman et al. (2021)
Dietary quality	Fruits, vegetables, whole grains, legumes, healthy fats, processed foods	FFQ or 24-hour dietary recall	Dietary-quality scoring; correlation	Barrea et al. (2019); Shahid et al. (2022)
PCOS symptom severity	Menstrual irregularity, hyperandrogenic symptoms, weight-related symptoms	Standardized symptom assessment	Correlation; regression	Faghfoori et al. (2017); Ashraf et al. (2022)
BMI/body composition	BMI, waist circumference	Anthropometric measurements	Covariate/regression	Barrea et al. (2019); Barrea et al. (2021)
Physical activity	Frequency and duration of activity	Validated activity questionnaire	Covariate/regression	Cowan et al. (2023); Moran et al. (2017)
Eating behavior	Meal patterns, food choices, dietary behaviors	Questionnaire/dietary assessment	Descriptive and correlational analysis	Hajivandi et al. (2020); Turner-McGrievy et al. (2015)
Socioeconomic factors	Income, education, employment, household conditions	Structured demographic questionnaire	Stratification; regression adjustment	Badri-Fariman et al. (2021); Ashraf et al. (2022)

weight, insulin regulation, and overall metabolic function (Shahid et al., 2022; Faghfoori et al., 2017).

Food Security and Dietary Quality

Food security may influence the ability of women with PCOS to maintain healthy eating patterns. Limited or inconsistent access to nutritious foods can encourage dependence on inexpensive, energy-dense, and highly processed foods. Evidence examining food-security status and dietary patterns suggests that the broader food environment should be considered when investigating PCOS rather than focusing exclusively on individual dietary choices (Badri-Fariman et al., 2021). Qualitative evidence among adolescents with PCOS also demonstrates that food habits can be shaped by household, economic, cultural, and environmental circumstances (Hajivandi et al., 2020).

Mediterranean-Style Dietary Patterns and PCOS Management

The potential relationship between healthy-food access and reduced symptoms is particularly relevant to Mediterranean-style dietary patterns. Such patterns emphasize vegetables, fruits, legumes, whole grains, nuts, healthy fats, and other nutrient-dense foods. Greater adherence to the Mediterranean diet has been associated with dietary and body-composition characteristics relevant to PCOS management (Barrea et al., 2019). However, access to these foods must be considered because affordability and availability can determine whether recommended dietary patterns are realistically achievable.

Metabolic and Weight-Management Implications

Improved access to healthy foods may support weight-management practices and healthier dietary behaviors among

women with PCOS. Weight management can be particularly relevant for women experiencing overweight or obesity, although nutritional management should not be restricted to weight reduction alone. Evidence indicates that dietary and physical-activity practices are interconnected in PCOS weight management (Moran et al., 2017). Nutritional strategies may also need to be individualized according to PCOS phenotype because women with lean and obese phenotypes can have different nutritional and metabolic considerations (Barrea et al., 2021).

Broader Lifestyle and Environmental Implications

The relationship between food access and PCOS symptoms should be interpreted within a broader lifestyle and environmental context. Physical activity, sleep, psychological well-being, stress, and behavioral factors may influence PCOS outcomes alongside dietary intake (Cowan et al., 2023). Environmental determinants may also contribute to differences in symptom severity, suggesting that PCOS management requires attention to social and contextual conditions rather than dietary behavior alone (Ashraf et al., 2022). Furthermore, dietary intake and eating behaviors can affect quality of life, demonstrating that nutritional interventions should consider both clinical outcomes and women's everyday experiences (Turner-McGrievy et al., 2015).

Practical and Public-Health Implications

The findings have implications for healthcare providers, nutritionists, community health programs, and policymakers. PCOS interventions should address barriers to healthy eating, including food affordability, availability, accessibility, and food insecurity. Nutritional counseling should emphasize realistic

and sustainable dietary choices rather than imposing restrictive approaches. Programs that improve access to nutritious foods while incorporating physical activity, behavioral support, stress management, and other lifestyle interventions may provide a more comprehensive approach to PCOS management (Shahid et al., 2022; Cowan et al., 2023).

Overall, the proposed correlation should be interpreted carefully: better access to healthy food may be associated with improved dietary quality and lower PCOS symptom burden, but access alone does not establish causation. Future longitudinal and intervention studies should determine whether improving healthy-food access directly contributes to measurable improvements in reproductive, metabolic, and quality-of-life outcomes.

CONCLUSION

Access to healthy food may represent an important environmental and socioeconomic factor influencing dietary quality and PCOS symptom management. Adequate availability, affordability, and accessibility of nutritious foods can facilitate healthier eating patterns, while food insecurity and limited access may contribute to less favorable dietary behaviors (Badri-Fariman et al., 2021; Hajivandi et al., 2020). Dietary approaches emphasizing balanced, nutrient-dense foods may support improvements in body composition and metabolic health among women with PCOS (Barrea et al., 2019; Faghfoori et al., 2017). Evidence also indicates that nutritional strategies may need to be individualized according to PCOS phenotype and metabolic characteristics (Barrea et al., 2021).

However, the relationship between healthy-food access and reduced PCOS symptoms should not be interpreted as purely causal. PCOS outcomes are influenced by multiple interacting factors, including physical activity, weight-management practices, psychological well-being, sleep, and broader lifestyle behaviors (Cowan et al., 2023; Moran et al., 2017). Environmental conditions may also contribute to differences in symptom severity (Ashraf et al., 2022). Therefore, improving healthy-food access should be considered one component of a comprehensive PCOS management strategy.

RECOMMENDATIONS

Improve access to nutritious foods

Community and public-health initiatives should promote the affordability and availability of vegetables, fruits, whole grains, legumes, lean proteins, and other nutrient-dense foods for women affected by PCOS.

Address food insecurity

Healthcare and community programs should identify food-security challenges and connect affected women with appropriate nutritional and social-support resources (Badri-Fariman et al., 2021).

Promote individualized nutrition counseling

Dietary interventions should account for individual metabolic characteristics, body composition, preferences, and PCOS phenotype rather than applying a single dietary prescription to all women (Barrea et al., 2021; Faghfoori et al., 2017).

Integrate diet with broader lifestyle management

Nutrition should be combined with physical activity, behavioral support, stress management, sleep improvement, and sustainable weight-management practices where appropriate (Cowan et al., 2023; Shahid et al., 2022).

Strengthen nutrition education

Women with PCOS should receive practical guidance on meal planning, healthy food selection, portion management, and sustainable eating behaviors (Turner-McGrievy et al., 2015).

Encourage further research

Future studies should use longitudinal and intervention-based designs to determine whether improving healthy-food access directly contributes to reductions in PCOS symptoms, while controlling for socioeconomic status, BMI, physical activity, and other potential confounding factors.

Overall, improving access to healthy food has potential value as part of a broader, socially responsive approach to PCOS management. Combining improved food environments with individualized dietary and lifestyle interventions may provide greater opportunities for sustainable improvements in reproductive, metabolic, and overall health outcomes (Shahid et al., 2022).

REFERENCES

1. Shahid, R., Mahnoor, Awan, K. A., Iqbal, M. J., Munir, H., & Saeed, I. (2022). Diet and lifestyle modifications for effective management of polycystic ovarian syndrome (PCOS). *Journal of food biochemistry*, 46(7), e14117.
2. Badri-Fariman, M., Naeini, A. A., Mirzaei, K., Moeini, A., Hosseini, M., Bagheri, S. E., & Daneshi-Maskooni, M. (2021). Association between the food security status and dietary patterns with polycystic ovary syndrome (PCOS) in overweight and obese Iranian women: a case-control study. *Journal of ovarian research*, 14(1), 134.
3. Barrea, L., Arnone, A., Annunziata, G., Muscogiuri, G., Laudisio, D., Salzano, C., ... & Savastano, S. (2019). Adherence to the mediterranean diet, dietary patterns and body composition in women with polycystic ovary syndrome (PCOS). *Nutrients*, 11(10), 2278.
4. Faghfoori, Z., Fazelian, S., Shadnough, M., & Goodarzi, R. (2017). Nutritional management in women with polycystic ovary syndrome: A review study. *Diabetes & metabolic syndrome: Clinical research & reviews*, 11, S429-S432.
5. Barrea, L., Frias-Toral, E., Verde, L., Ceriani, F., Cucalón, G., Garcia-Velasquez, E., ... & Muscogiuri, G. (2021). PCOS and nutritional approaches: Differences between lean and obese phenotype. *Metabolism Open*, 12, 100123.
6. Cowan, S., Lim, S., Alycia, C., Pirotta, S., Thomson, R., Gibson-Helm, M., ... & Moran, L. (2023). Lifestyle management in polycystic ovary syndrome—beyond diet and physical activity.

- BMC endocrine disorders*, 23(1), 14.
7. Ashraf, S., Aslam, R., Bashir, I., Majeed, I., & Jamshaid, M. (2022). Environmental determinants and PCOS symptoms severity: A cross-sectional study. *Health care for women international*, 43(1-3), 98-113.
 8. Moran, L. J., Brown, W. J., McNaughton, S. A., Joham, A. E., & Teede, H. J. (2017). Weight management practices associated with PCOS and their relationships with diet and physical activity. *Human Reproduction*, 32(3), 669-678.
 9. Hajivandi, L., Noroozi, M., Mostafavi, F., & Ekramzadeh, M. (2020). Food habits in overweight and obese adolescent girls with polycystic ovary syndrome (PCOS): a qualitative study in Iran. *BMC pediatrics*, 20(1), 277.
 10. Turner-McGrievy, G., Davidson, C. R., & Billings, D. L. (2015). Dietary intake, eating behaviors, and quality of life in women with polycystic ovary syndrome who are trying to conceive. *Human Fertility*, 18(1), 16-21.
 11. Ravikumar, V. (2025). Therapeutic Bot: Ethical Concerns in AI therapy for Neurodivergence. *J Int Scient Re Rep*.
 12. Areghan, E. (2025). Cyber Resilience in Digital Twin and Smart Manufacturing Environments: Challenges, Strategies, and Future Direction. *Journal of Computational Analysis and Applications*, 34(8), 573-593.
 13. Awodire, M. (2025). Data governance and privacy-by-design frameworks (GDPR/HIPAA) in multi-cloud data pipelines. *Journal of Data Analysis and Critical Management*, 1(02), 116-126.
 14. Mehta, S. (2025). Enhancing Enterprise Data Governance Maturity Through Cloud Based Data Integration Frameworks in Modern Organizations. *International Journal of Technology, Management and Humanities*, 11(01), 59-67.
 15. Jimoh, M., & Khadijah, A. (2025). Hydroinformatics and GIS Integration for Intelligent Water Resource Management. *International Journal of Scientific Research in Science and Technology*, 12(3), 1470-1489.
 16. Begum, S., Hassaan, A., Hussain, M. A., Mudaber, M., Jamshaid, Z. A., Niaz, S., & Jobiullah, M. I. (2025). AI-driven fraud detection in real-time financial transactions: A deep learning approach. *Well Testing Journal*, 34, 727-748.
 17. Areghan, E. (2025). Emerging Frontiers in Cybersecurity: Navigating AI-Powered Threats, Quantum Risks, and the Rise of Zero-Trust Architectures. *International Journal of Advanced Trends in Computer Science and Engineering* 14 (3). 120, 136.
 18. Ojuri, M. A. (2025). Ethical AI and QA-Driven Cybersecurity Risk Mitigation for Critical Infrastructure. *Euro Vantage journals of Artificial intelligence*, 2(1), 60-75.
 19. Omolayo, O., Oloruntoba, O., Adepoju, S., & Audu, K. (2025). Comparative Analysis of Graph Partitioning Strategies for Enhancing Scalability and Performance in Distributed Graph Databases.
 20. Rehan, H., Janjua, J. I., Ali, R. A., & Khan, T. A. (2025, December). AI-Driven DNA Insights and Public Health Data Integration for Enhancing Personal Healthcare in Critical Disease Prevention. In *2025 International Conference on AI-Driven STEM Education and Learning Technologies (AISTEMEDU)* (pp. 1-6). IEEE.
 21. Awodire, M. (2025). Master Data Management (MDM) integration strategies in hybrid cloud environments. *Journal of Data Analysis and Critical Management*, 1(04), 41-50.
 22. Ezeagwuna, D. (2025). Artificial Intelligence for IT Service Management: Developing a Framework for ROI Optimization Using Service Now and Machine Learning Technologies. *Well Testing Journal*, 34(S4), 394-419.
 23. Chukwu, M., Huang, X., Audu, K., Wang, H., & Subasish, D. (2025). Unequal paths to nature: Mobile-phone insights into park visits in nine major cities in the United States. *Urban Forestry & Urban Greening*, 129196.
 24. Mehta, S. (2025). Role of Metadata Management and Data Governance in Achieving Regulatory Compliance in Enterprise Data Ecosystems. *International Journal of Technology, Management and Humanities*, 11(02), 144-152.
 25. Ojuri, M. A. (2025). Quality Metrics for Cybersecurity Testing: Defining Benchmarks for Secure Code. *Well Testing Journal*, 34(S3), 786-801.
 26. Begum, S. (2025). Artificial intelligence and economic resilience: A review of predictive financial modelling for post-pandemic recovery in the United States SME sector. *International Journal of Innovative Science and Research Technology*, 10(7), 3620-3627.
 27. Moetiara, E. (2020). Risk assessment of airborne PM2. 5 exposure of forest and land fire haze to petrol-pump officers in Pekanbaru. *Acta Scientific Medical Sciences*, 4(9), 152-157.
 28. Adekoya, A. S. (2024). Enterprise Risk Compliance Architecture in Systemically Important Banks: Integrating Stress Testing, Capital Adequacy, and FX Exposure Modeling. *ADHYAYAN: A JOURNAL OF MANAGEMENT SCIENCES*, 14(02), 66-74.
 29. Anifowose, K. (2024). Development and Validation of an HPLC-Based Analytical Method for Simultaneous Quantification of Biomarkers in Human Biological Samples. *Well Testing Journal*, 33(S2), 788-803.
 30. Adekoya, A. S. (2023). Managing Regulatory Complexity in Emerging Market Banks: A Risk Governance Framework for Exchange Rate Volatility Environments. *ADHYAYAN: A JOURNAL OF MANAGEMENT SCIENCES*, 13(02), 70-76.
 31. Moetiara, E. (2023). Effectiveness of Integrated Occupational Health Protection Programs During Transboundary Haze Events: A Multi-Site Evaluation in the Oil and Gas Sector. *SRMS JOURNAL OF MEDICAL SCIENCE*, 8(02), 161-166.
 32. Adepoju, S. A., & Adepoju, M. A. (2024). From Portals to Case Graphs: A Reference Architecture and Benchmark for Safety Investigation Operations with Agentic Orchestration.
 33. Awodire, M. (2024). Zero-trust and least-privilege IAM design in federal/regulated cloud deployments. *ADHYAYAN: A JOURNAL OF MANAGEMENT SCIENCES*, 14(02), 84-93.
 34. Khan, H. A. (2024). Data-Driven Epidemiological Modeling Using Machine Learning For Disease Spread Forecasting And Public Health Decision Support In The United States. *International Journal of Applied Mathematics*, 37(6s), 178-192.
 35. Areghan, E., & Ndibe, O. S. (2024). Explainable AI for autonomous threat detection in critical infrastructure systems. *Journal of Computational Analysis and Applications*, 33(8), 6841-6857.
 36. Taiwo, S. O., Aramide, O. O., & Tiamiyu, O. R. (2024). Explainable AI models for ensuring transparency in CPG markets pricing and promotions. *Journal of Computational Analysis and Applications*, 33(8), 6858-6873.

37. Ojuri, M. A. (2024). Cybersecurity Vulnerability Testing as a Core Component of Quality Assurance. *Pioneer Research Journal of Computing Science*, 1(3), 122-138.
38. Begum, S. (2025). AI at scale: Predictive analytics as a strategic engine for national competitiveness in US startup and small business financing. *International Journal of Progressive Research in Engineering Management and Science Development*, 2582, 7421.
39. Kola, J. N. (2024). Longitudinal Cohort Intelligence for Self-Insured Employer Groups: A Predictive Framework for Healthcare Cost Trajectory Modeling and Proactive Risk Intervention. *Journal of Information Systems Engineering & Management*, 10.
40. Mehta, S. (2024). Architecting the Hub-and-Spoke Governance Model: Balancing Centralized Guardrails with Federated Domain Agility. *SAMRIDDHI: A Journal of Physical Sciences, Engineering and Technology*, 16(04), 206-215.
41. Ezeagwuna, D. (2024). Enterprise Workflow Automation and Workforce Productivity: Evaluating the Economic Benefits of Service Now Adoption Across Industries. *International Journal of Technology, Management and Humanities*, 10(04), 299-313.
42. Ojuri, M. A. (2024). Integrating Cybersecurity Standards into Software Quality Assurance Frameworks: A Holistic Approach. *Journal of Computer Science and Technology Studies*, 6(1), 258-271.
43. Areghan, E., & Onwuegbuchi, O. (2024). Predictive Cyber Threat Analysis in Cloud Platforms Using Artificial Intelligence and Machine Learning Algorithms. *Applied Science, Computing, and Energy*, 1(1), 197-205.
44. Kola, J. N. (2024). Longitudinal Cohort Intelligence for Self-Insured Employer Groups: A Predictive Framework for Healthcare Cost Trajectory Modeling and Proactive Risk Intervention. *Journal of Information Systems Engineering & Management*, 10.
45. Anifowose, K. (2025). Development and Validation of AI-Assisted Analytical Methods for Biochemical Compound Detection in Pharmaceutical Chemistry. *Journal of Applied Pharmaceutical Sciences and Research*, 8(4), 41-52.