The forest and the trees—the importance of male dietary patterns extends beyond in vitro fertilization outcomes

As more attention is focused on the male during infertility evaluation, identifying potential lifestyle modifications to optimize fertility has increasing importance. Among these potential changes, dietary patterns in men remain an ongoing area of interest to help infertile couples. A growing body of evidence supports a positive association between healthier diets and semen parameters, although the degree of impact is a topic of active investigation. Indeed, current American Urological Association/American Society for Reproductive Medicine guidelines acknowledge that there is low-quality evidence of a small association between diet and male fertility (1). A 2017 meta-analysis investigating diet patterns and semen parameters found that higher adherence to healthy diets was associated with increased sperm concentration (2). More importantly, however, healthy diets are associated with increased longevity and a reduced incidence of major cardiovascular events (3).

In this issue of *Fertility and Sterility*, Salas-Huetos et al. (4) investigated specific dietary patterns and their association with in vitro fertilization (IVF) outcomes and semen parameters among couples undergoing IVF. Note that in the title and throughout the article, the investigators continually refer to "assisted reproductive technology," although couples who underwent intrauterine insemination were excluded from the primary analysis. The cohort included 245 men who had completed a food frequency questionnaire with female partners who had completed at least 1 IVF cycle, and 438 IVF cycles were examined. The food frequency questionnaire is a validated form that assesses the frequency of certain foods consumed in the past year, allowing for the assessment of adherence to the 8 dietary patterns promoted for cardiovascular health. The study's primary outcomes included fertilization, implantation, pregnancy, and live birth per treatment cycle, whereas its secondary outcomes included semen parameters measured by computer-assisted semen analysis.

The most common primary infertility diagnosis for couples undergoing IVF in the study was male factor infertility (36.7%), which was identified by low total and progressive motility on the basis of mean baseline semen parameters. A formal evaluation including urologic examination of the male was not performed, which is a significant limitation in this study and in many other similar studies. The results demonstrated a slight inverse association with adherence to Panagiotakos Mediterranean diet and the American Heart Association diet with lower fertilization; however, there was no significant association between any dietary pattern and implantation, pregnancy, or live birth. Additionally, there was no significant association between any of the diets and semen parameters (4).

This article is commendable as there are no prior publications on the association between male diet and IVF outcomes. This study's strengths included the use of a prospectively established database, a comprehensive dietary assessment, a strong statistical analysis, a large cohort, and a thorough follow-up of IVF outcomes. However, the lack of a complete assessment of the male participants misses the vast majority of etiologies of male factor infertility, which then cannot be controlled for in the analysis. Additionally, limiting the analysis to couples undergoing IVF narrows the focus beyond the typical mild male factors that might be affected by diet and other lifestyle choices. Moreover, lifestyle improvements are typically implemented months or years before IVF is pursued; therefore, by the time IVF is initiated, male partners are simply less likely to have a contributing dietary etiology for the male factor and are more likely to have an unrelated urologic diagnosis, such as a varicocele, testicular atrophy, or hypogonadism.

The current literature suggests that healthier diets lead to improved semen parameters (5), whereas the findings by Salas-Huertos et al. (4) found little association between them. However, their study examines a specific population—men in couples pursuing IVF—that makes it impossible to extrapolate the results to the general population of men either trying to conceive or even experiencing infertility but not undergoing IVF. For most couples, the fertility journey begins long before IVF, which may never become necessary. Thus, although the findings of the study by Salas-Huertos et al. (4) largely found no association between male dietary patterns and IVF outcomes, these results should be interpreted with extreme caution.

Overall, the study by Salas-Huertos et al. (4) could be useful when counseling men in couples who are undergoing IVF to help set expectations regarding the effect of current dietary choices on semen parameters and IVF outcomes. The bigger questions, not examined in this study, are whether male diet correlates with natural fecundity and whether dietary changes can improve assisted reproductive technology outcomes. In addition to the growing literature supporting healthier diets and male fertility, recommending healthy diets for all patients in the preconception journey is something that we should encourage for all our patients, not only to improve their fertility but also for their overall health.

Let us not lose sight of the forest for the trees. We must continue to advocate healthy lifestyle choices for patients who pursue IVF, even when data suggest that IVF outcomes may not be altered by current dietary choices during the stressful period of fertility treatment. It has been our experience that we are in a unique position to have a lasting positive impact on patients' lifestyle choices because of the strong motivation patients have during this period of their lives. Although dietary patterns likely have little correlation with male fertility in the setting of IVF, the broad and extensive long-term benefits of healthy dietary choices certainly extend beyond semen parameters for a man's health (3). As

reproductive medicine specialists, we have a tremendous opportunity to positively influence the lifestyles of our patients, which can have a lasting impact on future generations of each family under our care.

Jacob A. Brems, M.D.[a,b]
R. Matthew Coward, M.D.[a,b]
[a] Department of Urology, University of North Carolina School of Medicine, Chapel Hill, North Carolina; and [b] UNC Fertility, Raleigh, North Carolina

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REFERENCES

1. Schlegel PN, Sigman M, Collura B, De Jonge CJ, Eisenberg ML, Lamb DJ, et al. Diagnosis and treatment of infertility in men: AUA/ASRM guideline part I. Fertil Steril 2021;115:62–9.
2. Arab A, Rafie N, Mansourian M, Miraghajani M, Hajianfar H. Dietary patterns and semen quality: a systematic review and meta-analysis of observational studies. Andrology 2018;6:20–8.
3. Estruch R, Ros E, Salas-Salvadó J, Covas MI, Corella D, Arós F, et al. Primary prevention of cardiovascular disease with a Mediterranean diet. N Engl J Med 2013;368:1279–90.
4. Salas-Huetos A, Mínguez-Alarcón L, Mitsunami M, Arvizu M, Ford JB, Souter I, et al. Paternal adherence to healthy dietary patterns in relation to sperm parameters and outcomes of assisted reproductive technologies. Fertil Steril 2022;117:298–312.
5. Nassan FL, Chavarro JE, Tanrikut C. Diet and men's fertility: does diet affect sperm quality? Fertil Steril 2018;110:570–7.