Review Article

Finasteride in Young Men: Effects on Semen and Hormones?

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Finasteride is widely used to treat male androgenetic alopecia (AGA) and has been shown to significantly improve hair count and appearance compared to placebo. Despite its effectiveness, concerns remain about its potential sexual adverse effects. While some studies suggest these effects are rare and reversible, the evidence is inconsistent. Notably, the dosage appears to influence reproductive outcomes: the common 1 mg dose shows minimal impact on sperm parameters, whereas the higher 5 mg dose is linked to reduced sperm count, motility, and volume, highlighting a dose-dependent effect and individual variability. A widely cited 2014 study by Irwig suggesting long-term sexual side effects has major flaws, including selection bias, lack of a control group, small sample size, and inadequate statistical methods. Most participants were recruited from a forum for users with negative experiences, making the findings unrepresentative. In contrast, a 2013 prospective study by Samplaski and collaborators found that most men saw improved sperm counts after stopping finasteride, with hormone levels and sperm quality remaining stable. Overall, while finasteride may affect fertility in some men, robust conclusions about long-term sexual side effects require larger, better-designed prospective studies to ensure accuracy and generalizability.

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Finasteride has been proven effective in treating hair loss associated with male androgenetic alopecia (AGA). A systematic review encompassing 12 studies and 3,927 men with AGA found that participants randomized to receive oral finasteride demonstrated a significantly greater increase in hair count and improved assessments of hair appearance by both investigators and patients, compared to those receiving a placebo[1]. However, consensus has yet to be reached regarding the presence, severity, and duration of sexual adverse effects induced by finasteride, particularly as a 5-α-reductase inhibitor. While

some studies suggest that such side effects are uncommon and tend to resolve spontaneously[2][3][4][5][6], definitive conclusions remain elusive.

The difference in finasteride dosage, 5 mg daily versus 1 mg daily, may account for the variations observed in spermatogenesis across different studies. At the lower 1 mg dose, no significant effects were observed on spermatogenesis parameters, including sperm concentration, count, and motility. In contrast, the higher 5 mg dose led to a substantial reduction in sperm volume, count, concentration, and motility. This suggests a dose-dependent impact of finasteride on spermatogenesis. Moreover, the significant changes in sperm parameters observed in a single participant from a previous study, as included in the recent review by Estill and collaborators (2023), suggest that individual sensitivity to finasteride may vary, with some individuals potentially more susceptible to its effects[7].

Much of the existing literature has emphasized the possibility of persistent sexual adverse effects in former healthy users of finasteride, largely based on the findings and conclusions of Irwig's 2014 study. However, this study had significant methodological and statistical limitations.

Firstly, the study was affected by selection bias, as participants were recruited through the author's practice and a specialized internet forum (www.propeciahelp.com), predominantly used by individuals reporting adverse effects from finasteride, thus skewing the sample toward those with negative experiences.

Secondly, the study lacked a control group, relying on a single-arm analysis. Additionally, 42% of participants were interviewed more than three years after discontinuing finasteride, with 25% interviewed over seven years post-cessation. The observed deterioration in sexual function, measured by frequency of sexual episodes per month and sexual dysfunction scores, could plausibly be attributed to other factors, such as aging. Individuals experiencing sexual dysfunction may also seek explanations and retrospectively attribute their condition to prior drug use, including finasteride. Moreover, objective markers of persistent sexual adverse effects, such as low serum androgen levels and spermatogenic deficits, lacked baseline reference values, meaning participants might have already had these conditions before finasteride use.

Thirdly, the study's small sample size, only 24 patients, raises concerns about the validity of its findings. Notably, two measurements of total testosterone were available for only 20 participants, with a clear non-parametric distribution, as reflected by the difference

between the mean (542 ng/dL) and median (474 ng/dL) levels. Additionally, only 10 participants provided two semen analyses, while 9 provided just one. Comparing results from this small, self-selected sample with those of a general, unscreened male population in a World Health Organization study, without proper age adjustment, is neither logical nor methodologically sound.

Lastly, non-parametric analysis is generally appropriate for studies with fewer than 30 subjects. In Irwig's study, paired tests for sexual episodes per month (including masturbation) and sexual dysfunction scores yielded p-values below 0.001. However, this method assumes a symmetric distribution of differences within each pair. The standard deviations for both variables before and after finasteride use exceeded one-third of their means, and overlapping 95% confidence intervals in graphical data presentations further weaken the statistical robustness and reliability of the reported findings[5].

In contrast to Irwig's conclusions, the prospective study conducted by Samplaski and collaborators (2013) evaluated semen and hormone parameters before and after finasteride discontinuation. The findings indicated that while finasteride may lead to reduced sperm counts in some men, the majority experienced a significant improvement following cessation. Moreover, hormone levels, sperm motility, and sperm morphology remained unaffected after discontinuation[4].

In conclusion, further research is necessary to better understand the potential sexual adverse effects of finasteride. Future studies should ideally be conducted on large prospective cohorts to enhance both their external and internal validity.

Statements and Declarations

Ethics Approval and Consent to Participate

Not Applicable.

Availability of data and material

Not Applicable.

Conflicts of interest

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Authors' contributions

Single author (M.F.A.); Author of original idea, field work supervision, analysis strategy and design, data management, data analysis and interpretation of results, decision making on content and paper write-up and revision of final draft.

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Declarations

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