
By: Lane, Alison Keywords: fertility and diabetes² male infertility³

In 2007, Ishola Agbaje, Deirdre Rogers, Carmel McVicar, Neil McClure, Albert Atkinson, Con Mallidis, and Sheena Lewis published “Insulin Dependent Diabetes Mellitus: Implications for Male Reproductive Function,” hereby “Diabetes Mellitus: Implications,” in the journal Human Reproduction. In their article, the authors explore the effects of elevated blood sugar in the form of diabetes mellitus on the quality of male sperm⁴. When investigating possible fertility issues, fertility specialists often study semen⁵, the male reproductive fluid that contains sperm⁴ cells to detect changes in sperm⁴ count, movement, and structure. In “Diabetes Mellitus: Implications,” the authors use both conventional semen⁵ analysis and technical molecular methods to assess the quality of sperm⁴ from diabetic and non-diabetic men. The authors found that men with diabetes had higher levels of DNA damage within their sperm⁴ and highlighted a need for additional research on the link between diabetes and male reproductive health.

At the time of the study’s publication in 2007, 11.2 percent of men in the United States older than twenty lived with diabetes. Agbaje, Rogers, McVicar, McClure, Atkinson, Mallidis, and Lewis theorized diabetes could cause damage to sperm⁴ DNA through oxidative stress, a process where oxygen radicals attack biological molecules like DNA, proteins, and fats. According to the Centers for Disease Control and Prevention, in 2007, about 2.6 percent of people between the ages of twenty and thirty-nine in the US had diabetes. Some research has suggested that sperm⁴ quality might decrease with age due to DNA damage caused by oxidative stress, which can result in sperm⁴ dysfunction and a decrease in fertility. In 2007, scientists had already established that diabetes can make oxidative stress worse, resulting in common complications of diabetes such as blindness, nerve damage, and heart diseases. However, researchers had not examined a possible relationship between diabetes and sperm⁴ DNA damage.

The authors of the study were based in Belfast, Northern Ireland, and affiliated with both the Regional Center for Endocrinology and Diabetes and the Regional Fertility Center. Agbaje, who led the research on “Diabetes Mellitus: Implications,” trained for his doctorate at the Queen’s University in Belfast, Northern Ireland, where he researched male infertility⁶. The study’s co-authors, Rogers, McVicar, McClure, Atkinson, Mallidis, and Lewis, were part of the Belfast Reproductive Medicine research group. According to a United Kingdom news outlet, BioNews, Lewis stated that their study was small, but served to highlight a possible overlooked concern for men’s reproductive health.

The authors divided “Diabetes Mellitus: Implications” into four main sections. In the introductory section, the authors address the growing prevalence of diabetes and previous studies linking diabetes to adverse effects on male reproductive health. They also indicate the motivation behind their use of both conventional semen⁵ analysis and molecular techniques to compare the sperm⁴ quality of diabetic and non-diabetic men. In the next section, the authors describe that they performed a variety of analysis studies on the semen⁶ from fifty-six participants from Belfast, Northern Ireland. The authors explain the results of the semen⁶ analysis studies in the next section, stating that the diabetic group had slightly lower semen⁶ volume, and increased evidence of DNA damage. In the final section, the authors discuss the validity of using sperm⁴ DNA damage as biomarkers for fertility issues. They also speculate a possible mechanism that could explain how diabetes might lead to damage of sperm⁴ DNA.

In the introductory section, the authors discuss the growing incidence of diabetes and assert that research should focus on the effect of diabetes on male fertility. The authors claim that diabetes is one of the greatest threats to global health, citing that the World Health Organization predicted that the number of people worldwide living with diabetes is projected to reach 300 million by 2025. In previous studies, researchers had already linked diabetes to generalized sexual dysfunction, although the extent of sperm⁴ DNA damage in that dysfunction remained unclear. Because diabetes causes high blood sugar and can damage nerves and blood vessels, diabetic men can have difficulty achieving an erection or ejaculating. Studies also suggested that diabetic men experienced higher rates of infertility⁶ and contributed to pregnancies with higher rates of miscarriage⁷.

Despite the results of previous studies, in 2007 there was relatively limited research that examined the effect of diabetes on human sperm⁴ quality. To make up for that, the authors compared the sperm⁴ of diabetic and non-diabetic men using both conventional and molecular techniques. If diabetes, which affects more men than women, does cause genetic damage to sperm⁴, theoretically scientists would be able to see that damage using molecular techniques. When DNA, a double-stranded
Sources

1. Agbaje, Ishola, Deirdre Rogers, Carmel McVicar, Neil McClure, Albert Atkinson, Con Mallidis, and Sheena Lewis. “Insulin...


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**Subject**

Diabetes [26], Type 1 diabetes [27], Infertility [28], Male infertility [29], Fertility clinic services [30], Semen [31], Semen Analysis [32], Semen Quality Analysis [33], Diabetes Mellitus, Type 2 [34], Diabetes Complications [35], Infertility, Male [36], Sperm Count [37]

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**Format**

Articles [40]