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Author: Ms. Khulood Ahrari  
Mohammed Bin Rashid University of Medicine and Health Sciences, United Arab Emirates

Dr. Temidayo Omolaoye  
United Arab Emirates  
Prof. Stefan S Du Plessis  
United Arab Emirates

EFFECTS OF SPACEFLIGHT ON SPERM FUNCTION AND INTEGRITY ON ANIMALS AND  
HUMANS: A SYSTEMATIC REVIEW.

**Abstract**

**Introduction** The United Arab Emirates aims to establish the first inhabitable human settlement on Mars by 2117. With plans for colonizing Mars, it places human procreation, under conditions of ionizing radiation and microgravity, in the spotlight. Sperm function and integrity are fundamental to reproduction and can potentially be affected by the environmental changes experienced in space. This research project was conducted to gather, filter and collate all the relevant information on the effects of space travel on sperm function in males. **Objective** The main objective of this study is to review the literature regarding all the space parameters that affect the sperm and its function in humans and rodents. **Methods** A systematic review was conducted on the effect of space on sperm function and integrity in humans as well as animals using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Data collection was conducted using the major electronic databases including PubMed as well as other credible literature sources. MeSH search terms and keywords that were used included “spermatozoa”, “microgravity”, and “ionizing radiation”. The literature search did not discriminate against papers published before a certain date due to the very limited number of articles available. However, there was a restriction on the male gender. Studies featuring both animals and humans were included. The sperm and reproductive factors that have been included in this study are sperm motility, total sperm count, sperm DNA fragmentation (SDF), testosterone levels, and testes weight. **Results** Following a well conducted literature search, a total of 243 articles were retrieved and screened, 232 articles were excluded due to the irrelevance to the topic, and 11 articles met the inclusion criteria. From the limited data, it was evident that sperm motility was decreased after exposure to microgravity and ionizing radiation. Total sperm count was also found to be decreased by microgravity only. SDF, a marker of DNA damage, was increased by both ionizing radiation and microgravity. Testosterone levels and testes weight were also decreased by microgravity; as for ionizing radiation effects, no studies were found. The review identified a dearth in the literature regarding the effects of microgravity and ionizing radiation on male reproductive parameters. **Conclusion** This study supports our hypothesis that spaceflight negatively affects the male reproductive system sperm and sperm function. However, there is a paucity in the scientific data on the specific topic, thus further research on this subject is recommended.