SEPTINTOJI TARPTAUTINĖ KONFERENCIJA

THE 7th INTERNATIONAL CONFERENCE

2026 m. liepos mėn. 7-10 d., Vilniaus universitetas, LIETUVA

7th-10th of July, 2026, Vilnius University, LITHUANIA

EVOLIUCINĖ MEDICINA: ŽMOGAUS RAIDOS PERSPEKTYVOS IR SVEIKATA BESIKEIČIANČIOJE APLINKOJE

EVOLUTIONARY MEDICINE: PERSPECTIVES ON HUMAN DEVELOPMENT AND HEALTH CONSEQUENCES IN A CHANGING ENVIRONMENT

Rengėjas:
Vilniaus universiteto Medicinos ir sveikatos mokslų
Doktorantūros mokykla, VU Medicinos fakultetas

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MALE REPRODUCTIVE CHARACTERISTICS AND POSSIBLE CONTRIBUTING FACTORS (A LITERATURE REVIEW)

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Background and Aim: Concerns about declining male reproductive capacity have grown over recent decades. This review aimed to summarise male reproductive characteristics and their potential determinants.
Materials and Methods: The literature search was conducted in the MEDLINE database and included articles published between 2000 and 2026, with the selection criteria focused on publications examining male reproductive characteristics and associated factors.
Results: According to established criteria, 4,297 publications were identified. After automated exclusion of 3,960 records and title/abstract screening (285 excluded), 52 records were sought for retrieval, of which 50 were assessed for eligibility. Ultimately, 43 studies were included in the review. Notably, among studies on environmental exposure, one large multicentre study (n = 25,682) found that higher exposure to ambient air pollutants – PM2.5 (median 27.60 μg/m³), PM10 (47.70 μg/m³), SO2 (9.00 μg/m³), NO2 (29.60 μg/m³), and CO (0.80 mg/m³) – was associated with reduced progressive motility and normal morphology, and elevated male infertility risk (all $p < 0.05$), with stronger effects during spermatogenesis stages I and II. Regarding lifestyle habits, a cross-sectional study (n = 3,302) found that coffee abstinence was positively associated with sperm total and progressive motility, physical activity correlated positively with semen volume, and both healthy sleep onset and longer sleep duration improved motility. Regarding one of the clinical factors, a longitudinal study (n = 74) found that COVID-19 infection transiently impaired sperm quality: concentration fell from 78.91 to 39.22 $\times 10^6$/mL and progressive motility from 57.58% to 36.41% at one month post-infection, with a median recovery of 5 and 3 months, respectively.
Conclusions: Ambient air pollution, lifestyle habits, and clinical factors, including COVID-19 infection, significantly affect sperm quality and male fertility, highlighting the need for preventive measures targeting these risk factors.

Keywords: biological factors, environmental factors, lifestyle, male reproductive health, semen quality