Lifestyle causes of male infertility

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Abstract Objective: To examine the potential effects of lifestyle factors on male reproductive health. Evidence of a global decline in human sperm quality over recent decades has been accumulating. Environmental, occupational, and modifiable lifestyle factors may contribute to this decline. This review focuses on key lifestyle factors that are associated with male infertility such as smoking cigarettes, alcohol intake, use of illicit drugs, obesity, psychological stress, advanced paternal age, dietary practices, and coffee consumption. Other factors such as testicular heat stress, intense cycling training, lack of sleep and exposure to electromagnetic radiation from mobile phone use are briefly discussed.

Materials and method: A comprehensive literature search was performed to identify and synthesise all relevant information, mainly from within the last decade, on the major lifestyle factors associated with male infertility and semen quality. Database searches were limited to reports published in English only. A manual search of bibliographies of the reports retrieved was conducted to identify additional relevant articles.

Results: In all, 1012 articles were identified from the database search and after reviewing the titles and abstract of the reports, 104 articles met the inclusion criteria. Of these, 30 reports were excluded as the full-text could not be retrieved and the abstract did not have relevant data. The remaining 74 reports were reviewed for data on association between a particular lifestyle factor and male infertility and were included in the present review.

Conclusion: The major lifestyle factors discussed in the present review are amongst the multiple potential risk factors that could impair male fertility. However,
Introduction

There has been increasing evidence on the global decline in human sperm quality over the past few decades [1–4]. In the most recent report, Levine’s group performed a systematic review and meta-regression analysis of the current trends in sperm counts. The comprehensive study involved 42,935 men with samples spanning over 40 years. They reported a significant decline of 50–60% in sperm counts amongst men from North America, Europe, Australia and New Zealand [5]. This latest finding has sparked even greater concern over the reasons behind the apparent decline in the sperm count of Western men.

As male fertility can be influenced by a variety of factors, one possible explanation for the declining trend would be that there are environmental and/or occupational factors along with lifestyle practices that contribute to the deterioration of semen quality [6–9].

The present article reviews the available evidence examining the potential effects of lifestyle factors on male reproductive health. It focuses on the following lifestyle factors that are associated with male infertility: smoking cigarettes, alcohol intake, use of illicit drugs, obesity, psychological stress, advanced paternal age, dietary practices, and coffee consumption. Other factors such as testicular heat stress, intense cycling training, lack of sleep, and exposure to electromagnetic radiation from mobile phone use are also briefly touched upon.

Materials and methods

A systematic review of literature was conducted using PubMed over the last 10 years (from December 2008 to November 2017) for all published reports on the major lifestyle factors associated with male infertility (Fig. 1). The inclusion criterion was English language studies reporting on the lifestyle factors associated with male infertility such as ‘smoking’, ‘alcohol’, ‘marijuana’, ‘cocaine’, ‘anabolic steroids’, ‘diet’, ‘obesity’, ‘BMI’, ‘psychological stress’, ‘advanced paternal age’, and ‘caffeine’. The keyword search terms for each of these factors were used in combination with the following search terms: ‘male infertility’, ‘male fertility’, ‘sperm quality’, ‘semen parameters’, ‘DNA fragmentation’, ‘paternal’, ‘maternal’, ‘ART’, and ‘IVF’. Pertinent studies that were published prior to the 10-year timeframe were included at the discretion of the author, as were some studies on testicular heat stress, intense cycling training, lack of sleep, and exposure to electromagnetic radiation from mobile phone use. Reference lists of the reports were searched for further relevant citations, which were subject to the inclusion criteria. All non-English language studies and those without a published abstract were not included.

Results

In all, 1012 articles were identified from the database search and after reviewing the titles and abstract of the
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