

**LETTER TO THE EDITOR**

# Relationship between COVID-19 infection and erectile dysfunction; a literature review examining the link and proposed mechanisms behind this phenomenon

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**Keywords**

COVID-19; Erectile dysfunction; Sexual function; Pathophysiology

There have been considerable volumes of literature published on the coronavirus disease (COVID) pandemic with an emphasis now shifting to the aftereffects of COVID, especially in the longer term. Although COVID primarily infects the respiratory system, involvements in other organ systems such as cardiac, renal, and peripheral vasculature are not uncommon [1]. This review paper [2] concluded that patients with COVID have a higher probability to suffer from erectile dysfunction (ED) compared to patients without COVID based on 4 papers. While I appreciate that the authors try to establish a causative link between COVID and ED, this notion is not new since there are several published reviews on this issue already [3–6].

In addition to the nasal mucosa goblet secretory cells and alveolar pneumocytes, COVID binds to the angiotensin-converting enzyme 2 that is also expressed throughout vascular endothelial cells, resulting in potential endothelial dysfunction, which is thought to be responsible for the development and/or progression in ED [7]. While endothelial dysfunction plays an important pathogenesis in ED development in patients with a history of COVID, in some cases, male hypogonadism can occur with COVID infection too. The presence of a hyper-inflammatory state commonly observed during COVID infection is related to the over-expression of various pro-inflammatory cytokines such as TNF- $\alpha$  (Tumour Necrosis Factor), IL-6 (interleukins) and IL-1 $\beta$ , which indirectly can cause male hypogonadism [8]. Some studies showed that COVID can also alter testicular functions with a reduction in testosterone production, thereby contributing to male sexual dysfunction [8]. Furthermore, the adverse psychosocial impact of the COVID pandemic also negatively affects the social dynamics and sexual relationships between partners and sexual function [6]. Hence, it is important to institute an integrated multidisciplinary measure to address patients who developed COVID-induced ED.

The COVID pandemic is truly unique in its impact despite advances in modern medicine. Since data linking COVID and ED is heterogenous, only an association can be determined,

instead of causality since an appropriate adjustment for confounding variables is necessary to establish a causal link [4, 6, 9]. Given that the exact long-term effects of COVID are yet to be determined on epidemiological linkage data, especially in the current environment where the pandemic remains a serious healthcare issue in many countries [4]. Prospectively collected data from longitudinal studies are necessary to evaluate the longer-term impact of ED diagnosis in the context of COVID [10]. Future directions should be expanded to assess the clinical efficacy of various ED treatments in men with COVID versus non-COVID, discerning those with psychogenic versus organic causes of ED secondary to COVID, and well-designed clinical trials to investigate the pathophysiologic mechanisms responsible for COVID-related ED.

**AVAILABILITY OF DATA AND MATERIALS**

Not applicable.

**AUTHOR CONTRIBUTIONS**

EC—designed the research study; supervision. EC and BN—performed the research; analyzed the data; wrote the manuscript and provided final approval.

**ETHICS APPROVAL AND CONSENT TO PARTICIPATE**

Not applicable.

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## CONFLICT OF INTEREST

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