Erectile Dysfunction and Ejaculatory Dysfunction in Covid-19 Recovered Patient: Temporary or Persistent?

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Purpose: Examine the prevalence of erectile dysfunction and ejaculatory dysfunction among COVID-19 recovered patients and whether this condition improved over time. The retrospective study of 50 male patients who have recovered from COVID-19 infection previously hospitalized in dr. H Abdul Moeloek General Hospital between March 2020 – March 2021.

Materials and Methods: All of these patients were evaluated in terms of erectile and ejaculation function via phone interview. The International Index of Erectile Function 5 (IIEF-5) and Male sexual health questionnaire ejaculatory dysfunction (MHSQ-EJD) were used to assess the erectile function and ejaculatory dysfunction. Statistical analysis was performed to evaluate whether there was a difference between IIEF-5 & MHSQ-EJD scores within 6 months, 6 to 12 months, and >24 months after COVID-19 infection.

Results: The prevalence of ED was 70% and EJD was 2 % during 0-6 months after COVID-19 infection. Mean age and BMI were 50.4 ± 8.5 years and 23.6 ± 1.6 kg/m^2 respectively. There are 26 patients (52%) had an educational background lower than bachelor's degree and 24 patients (48%) had an educational background of bachelor's degree or higher. It was reported that 4 patients (8%) had Diabetes Mellitus and 12 patients (24%) had Hypertension. Most were active smokers (74%) and 2 patients (4%) had reported as active alcohol drinkers. There was a statistically significant IIEF-5 scores difference between three periods of time (p <0,001).

Conclusion: The prevalence of Erectile Dysfunction was high in COVID-19 recovered patients. There was a temporary erectile dysfunction and ejaculatory dysfunction among COVID-19 patients.

Keywords: COVID-19; ejaculatory dysfunction; erectile dysfunction; prevalence; temporary

INTRODUCTION

Coronavirus disease 2019 (COVID-19) was discovered in China in December 2019 and has subsequently spread to the rest of the world[1]. According to the World Health Organization global report, as of 4 October 2023, there have been more than 770 million confirmed cases of COVID-19, including more than 6.9 deaths[2]. The respiratory system is the main manifestation, but extrapulmonary manifestations of COVID-19 virus infection can also be found, including symptoms in the reproductive system. Studies show that the COVID-19 virus has the ability to enter cells by binding to angiotensin-converting enzyme-2 (ACE-2) receptors. This ability will have a negative impact on reproductive health because the ACE-2 receptors are highly expressed in the reproductive organs[3,4]. The real-time reverse transcriptase-PCR (RT-PCR) is considered the gold standard for the detection of some viruses and it is characterized by rapid detection, high sensitivity, and specificity[5].

Erectile dysfunction is defined as the inability to achieve and maintain an erection sufficient to permit satisfactory sexual intercourse[6]. Psychogenic, neurogenic, hormonal, vasculogenic, drug-induced, systemic disease and aging are common causes of erectile dysfunction. It may result from a single or a combination of these factors[7]. The high prevalence of erectile dysfunction has been demonstrated by many epidemiological studies in the world. The global prevalence of erectile dysfunction is 13.1 – 71.2% with the highest prevalence found in Europe, Asia, and Oceania[8]. A survey from five Asian countries (Hong Kong, Malaysia, Philippines, Singapore, and Thailand) aged from 50 years to 80 years old showed the prevalence of erectile dysfunction is 63%[9]. In Indonesia, The latest study showed that the prevalence of erectile dysfunction was 35.6% (22.3% mild, 13.7% mild to moderate, 3.1% moderate, and 0.8% severe)[10]. Some studies that were conducted during the pandemic showed a higher prevalence of Erectile dysfunction in COVID-19 patients. Patients with COVID-19 were 3.3 times more likely to have erectile dysfunction, particularly during the third month of recovery from COVID-19[11,12,13].

COVID-19 may cause erectile dysfunction by multiple pathways. One of the pieces of evidence has shown that the virus affects the endothelium in the body. The virus enters the cells through the protein ACE-2 which is described previously. The virus that binds with ACE-2 leads to the rise of angiotensin II because it cannot be converted to angiotensin 1-7, the result of this mechanism is attenuation of Nitric oxide (NO) production (one of the mediators of penile erection), impaired endothelium-dependent vasodilatation, endothelial dysfunction, leading to reduced penile perfusion and cause

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Received January 2024 & Accepted December 2024

Table 1. Demographic characteristics of respondents

Variables	Post COVID-19 patients
Age (mean ± SD)	50.4 ± 8.5
Body mass index, Kg/m^2 (mean ± SD)	23.6 ± 1.6
Education	
Lower than bachelor's degree	26 (52%)
Bachelor's degree and upper	24 (48%)
Medical comorbidities	
Diabetes mellitus	4 (8%)
Hypertension	12 (24%)
Substance use	
Active smoking	37 (74%)
Active alcohol drinking	2 (4%)
IIEF-5 score	
Erectile dysfunction	35 (70%)
Normal	15 (30%)
Ejaculatory dysfunction	
Yes (Premature ejaculation)	2 (4%)
Normal	48 (96%)
Ejaculatory dysfunction after 6-12 months	
Normal	50 (100%)

*Data were shown in counts (%) for categorical variables and mean ± standard deviation (SD) for continuous variables

erectile dysfunction[14-17]. Ejaculatory dysfunction is an abnormality in the male ejaculation process. Types of ejaculatory dysfunction that can occur include premature ejaculation, delayed ejaculation, anejaculation, retrograde ejaculation, painful ejaculation, and anorgasmia. In cases of Covid 19, the most common ejaculation disorder found was premature ejaculation[18].

However, in Indonesia, limited studies have demonstrated the prevalence of erectile and ejaculatory dysfunction in COVID-19 recovered patients and their long-term evaluation. Whether erectile and ejaculatory dysfunction that develops after COVID-19 infection is temporary or persistent. This study aimed to measure the prevalence of erectile and ejaculatory dysfunction among patients with a history of COVID-19 infections and evaluate whether there was an improvement in sexual function among individuals over time.

PATIENTS AND METHODS

Study design

This study was initiated after obtaining approval from the Clinical Research Ethics Committee, Faculty of Medicine, University of Lampung (No. 1913 / UN26.18 / PP.05.02.00 / 2022). This research is a retrospective study.

Study population

This study used total sampling, namely all 50 COVID-19 patients who recovered in Abdul Moeloek General Hospital between March 2020- March 2021. All of these patients were evaluated in terms of erectile and ejaculatory function.

The inclusion criteria are male, aged between 18-60 years old, has been infected and hospitalized because of COVID-19 in the first year of the outbreak (tested positive for a reverse transcriptase-polymerase chain reaction assay using nasopharyngeal swab specimen), married and sexually active. Exclusion criteria are unwillingness to participate in the study, having erectile dysfunction before being infected by COVID-19, patient with a history of cardiopulmonary disease, hyperthyroid disease, COPD, stroke, liver disease, urologic disease, pelvic trauma, psychiatric disease, taking operation or using medication like diuretic thiazide, β-blocker, phosphodiesterase-5 inhibitors/androgen replacement drugs/5-alpha-reductase inhibitors and psychotropic drugs.

Outcome assessment

To evaluate the erectile function of the participants, informed consent and assessment of the questionnaires were obtained via phone interview. Demographic data were obtained, including age, BMI, underlying diseases, as well as alcohol and nicotine use history. Details about COVID-19 vaccination and treatment during hospitalization were extracted. The International Index of Erectile Function 5 (IIEF-5) was used to assess the erectile function. This tool has five questions focusing on Erectile dysfunction and satisfaction with sexual intercourse. Its scores negatively correlated with Erectile dysfunction severity and could be classified into five levels; severe (5-7), moderate (8–11), mild to moderate (12–16), mild (17–21), and no ED (22–25). Male sexual health questionnaire ejaculatory dysfunction (MHSQ-EJD) was used to assess the ejaculatory function.

Statistical analysis

Statistical analysis was performed using SPSS software version 26. Descriptive statistics were used to report demographic data. We use the chi-square test with critical values from the chi-square distribution when no more than 20% of the expected counts are less than 5 and all individual expected counts are 1 or greater. In particular, all four expected counts in a 2 × 2 table should be 5 or greater, and if it does not meet the requirements, then Fisher's exact test is used.

Pearson's Chi-square or Fisher's exact test was used to determine the difference among categorical data. The assumptions of the normality of data distribution were checked using the Q-Q plot and and variance homogeneity using the Levene tests. These points are on the 45 degree reference line so they are normally distributed. Data were expressed as mean ± standard deviation or median (25th–75th percentile) values, where applicable. The differences in the IIEF-5 scores were analyzed using the Kruskal-Wallis test.

RESULTS

A total of 50 male patients who have recovered from COVID-19 infection that were previously hospitalized in dr. H Abdul Moeloek General Hospital is eligible for the study. Demographic characteristics of respondents are described in **Table 1**. Mean age and BMI were 50.4 ± 8.5 years and 23.6 ± 1.6 kg/m^2 respectively. There are 26 patients (52%) had an educational background lower than a bachelor's degree and 24 patients (48%) had an educational background bachelor's degree or higher. It was reported that 4 patients (8%) had diabetes mellitus and 12 patients (24%) had hypertension. Most were active smokers and 2 patients (4%) had reported as active alcohol drinkers. The overall prevalence of Erectile dysfunction within 0-6 months after the first COVID-19 positive was 70%. Mild Erectile dysfunction (66%) was most prevalent, followed by mild to moderate (4%). None of the patients had severe Erectile dysfunction. The change in the IIEF-5 score is depicted in **Table 2**. There was a statistically significant difference between the period of IIEF-5 scores (p <0,001). The prevalence of ejaculatory dysfunction (premature ejaculation) was only 4%. During 6–12-month observation, there was no incidence of ejaculatory dysfunction.

Value of CI 95% on IIEF Score 0-6 months was 19.6-

Table 2. Comparison of the IIEF-5 scores in the period

Variable	Time	Mean ± SD	Median (IQR)	Min-Max	Range	95% CI	*P*-Value
IIEF Score	0-6 months	20.26 ± 2.15	20.50 (19-22)	(16-24)	8	(19.6-20.8)	< 0.001
	6-12 months	20.14 ± 1.96	20.00 (18-22)	(16-24)	8	19.5-20.6)	
	>24 months	22.74 ± 1.33	23.00 (22-24)	(20-25)	5	(22.3-23.1)	

*To determine the significance of the difference between IIEF-5 scores of independent group, The Kruskal-Wallis test was used. P values <0,05 were regarded as significance

20.8, IIEF Score 6-12 months was 19.5-20.6, IIEF Score >24 months was 22.3-23.1.

DISCUSSION

Several theories have been mentioned previously that the occurrence of sexual disorders in men due to COVID-19 infection was due to several factors. These factors include impaired pulmonary hemodynamics which causes tissue hypoxia. Endothelial tissue damage, it is known that the penis, testicles, and other reproductive organs are very rich in vascular and endothelial tissue. Decrease blood testosterone levels which causes a decrease in libido. It is also worth mentioning that the extreme psychological load, burden, trauma, suffering, and consequences in COVID-19 patients (due to isolation, social distancing, loss of relatives/friends, difficulties in securing medications, clear economic consequences of lockdown, emotional distress, and mental preoccupation) would undoubtedly affect the sexual health and psychological distress[14-18].

In some Asia countries, erectile and ejaculatory dysfunction and COVID-19 have not been widely studied. During the pandemic, some of the studies focused on the effect of COVID-19 on multiple organs but not on sexual function. In our study, the prevalence of erectile dysfunction was 70%. Our finding was higher than studies from Thailand and Iran which was 64.7% among COVID-19 patients[13,19]. A meta-analysis study in China showed that the overall prevalence of erectile dysfunction was 33% (95% CI 18–47%, I2 = 99.48%) in COVID-19 patients[12]. There may be medical and psychological reasons for the differences in prevalence results in these studies.

The mean age of our study is higher than study from Thailand, (50.4 vs 40.8). The mean age is also higher than meta-analysis studies from China and Iran. The BMI from Thailand and Iran studies were higher compared with our study (23.6 vs 25.6 vs 25.6). This difference could be one of the factors among several related bio-psychological factors that are considered the reason for the difference in the prevalence of erectile dysfunction in COVID-19 patients.

Age, BMI, diabetes mellitus, hypertension, smoking, and drinking alcohol, which are understood as risk factors for erectile dysfunction, were not significantly associated with erectile dysfunction. This may be influenced by the sample in this study.

Another interesting point that we found is the mean difference of the IIEF-5 score between three time periods which is statistically significant ($p < 0{,}001$). The means of IIEF-5 score in the 6-12 month period is lower than the means of IIEF-5 score in the 0-6 month period, but increases in the >24 month period. This shows that although there was a deterioration in the first year after being infected with COVID-19, there was significant improvement after >24 months. The results of this study are in line with the research conducted in Turkey. A total of 125 healthy male healthcare workers were evaluated in terms of erectile function in that study. Four study groups were formed and evaluated. That study concludes that there may be deterioration in erectile function after COVID-19; however, this tends to improve over time, especially from the first year after active infection[18,20]. Unfortunately, the mechanism of this improvement remains unclear. Future studies in organic and psychogenic factors need to be conducted in order to give a clear explanation related to this improvement.

In this study, there are eight patients who still have mild erectile dysfunction even after having recovered from COVID-19 infection for more than 24 months. Among these patients, one patient has Diabetes Mellitus, has hypertension, and is an active smoker. Two of seven patients have Hypertension, and 5 of 7 patients are active smokers. We consider that medical comorbidities, smoking, and age are the factors contributing to this situation.

In our study, two patients experienced premature ejaculation after Covid infection. Patients complain ejaculation is too fast and occurs in under one minute. However, ejaculation returned to normal after 6 months. This further strengthens that COVID-19-related sexual dysfunction in human males is majorly temporary and reversible in nature, and could be naturally auto-resolved without any therapeutic, surgical, and/or psychological interventions and supports[18].

Vaccinated people have shown concern about the effect on fertility. In one study, expression was found to be highest in patients aged 30, which was higher than in patients in their 20s, while it was lowest in patients aged 60. This might indicate that young male patients are at higher risk of testicular damage by COVID-19 than older patients. Another possibility of testicular damage has also been hypothesized which is mediated by secondary immunological inflammatory response, elevated severe viral infection the testicles high load virus in bloodstream leading testicles. This supports testicular infection COVID-19 infection can cause damage to targeted cells and subsequent infertility[21].

Apart from the concern of viral shedding in semen, there are other concerns in infertility clinics on the possibility of the presence of COVID-19 in semen. The potential for viral transmission in assisted reproductive techniques including sperm donation should be clarified as this pandemic seems to be staying for long. In Iran, infertility clinics have been suspended from providing service to new patients. Besides, we need to know about the presence of virus in semen to set standards for protective equipment needed in infertility clinics and laboratories working on semen samples[22].

This study was beneficial in terms of the results that could better represent each individual's psychological status and other medical comorbidities. Future prospective studies will help identify the correlation between

erectile and ejaculatory dysfunction and COVID-19 and its long-term effects.

CONCLUSIONS

It can be concluded that there was a high prevalence of erectile dysfunction in COVID-19 recovered patients, However, the prevalence of ejaculatory dysfunction is low. There is also a temporary erectile and ejaculatory dysfunction among them.

CONFLICT OF INTEREST

The authors report no conflict of interest.

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