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Yoga and Quality of Life in Pulmonary Tuberculosis Patients During COVID-19 and Post-COVID-19: A Narrative Review

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Abstract: COVID-19 is a new pandemic that causes severe respiratory and enormous mental sickness, ultimately resulting to diminished quality of life in both patients and the general population. Since Yoga is a kind of mind-body therapy, it may be used to treat mental illness and improve patients’ quality of life (QOL). The purpose of this review is to assemble the data on the relationship between Yoga and QOL for people with pulmonary tuberculosis and COVID-19. After searching PubMed and Google Scholar, we found a small number of publications that met our inclusion criteria and decided to focus on them. To get these findings, we used a technique called narrative synthesis. We found 156 articles on Yoga and COVID-19 after doing an electronic search, however, after applying the field tag, that number was decreased to 39. The inclusion criteria then used this information to pick up the final group of 8 articles. In all, 26 articles were chosen from the 543 that were obtained using Boolean operators between COVID-19 and QOL. Health-Related Quality of Life may be low among people with PTB and COVID-19, according to a meta-analysis of research. Since yoga has been shown to enhance respiratory problems and mental health, it has the potential to play an important role in reducing the negative effects of the PTB and COVID-19 pandemic on patients’ quality of life in terms of their health. As a result, Yoga has the potential to be an effective technique in the treatment, prevention, and rehabilitation of both COVID-19 and pulmonary tuberculosis.

Keywords: Yoga; COVID-19; Tuberculosis; Quality of Life; Pulmonary Tuberculosis; Post-COVID-19


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Introduction

COVID-19, or the newly discovered Coronavirus illness, is the world’s worst viral disease. COVID-19 wreaked havoc on the global population by rapidly spreading and producing an exponential increase in the number of new cases. The World Health Organization estimates that there have been 480,170,572 confirmed cases of COVID-19, with 6,124,396 fatalities. The great stress on mental health and therefore on quality of life (QOL) (Nobari et al., 2021; WHO Global Tuberculosis report 2019) has been brought about by lockdown, social isolation, economic crisis, unemployment, loss of one or both parents and relatives, and financial strain on the patients.

*Mycobacterium tuberculosis* is the bacterium responsible for pulmonary TB and was expected to cause 1.5 million deaths globally by 2020 (Central TB Division report). It has infected one-fourth of the world’s population and, of those infected, between 10 and 15 per cent will develop active TB at some point in their lives. In 2018, India was responsible for 27 Lakh new cases of tuberculosis, or 27% of the global total (India TB Report, 2020; Tuberculosis WF, 2021). Positive outcomes have been achieved with the NTEP (New National Tuberculosis Elimination Programme). The elimination of tuberculosis by 2025 is a lofty goal, and getting there will require overcoming obstacles including finding effective treatments, dealing with patients’ mental health, and enhancing their ability to breathe (Aggarwal et al., 2013). Patients with tuberculosis will suffer from a low QOL and extreme levels of stress, anxiety, and depression (Pachi et al., 2013).

There is a synergistic relationship between the spread of COVID-19 and pulmonary tuberculosis, which makes it more difficult to isolate the two diseases (Dass et al., 2022). COVID-19 is a new pandemic that causes terrible respiratory and enormous mental disease, ultimately resulting to lower quality of life in patients, whereas TB has been around for millennia and is responsible for the majority of fatalities in the globe (Cramer et al., 2017). Patients with pulmonary tuberculosis who were affected by the COVID-19 pandemic report low QOL and decreased medication taking as a result of the pandemic. Since Yoga is a kind of mind-body therapy, it may aid in the reduction of mental health problems and the enhancement of quality of life for patients. This review aims at collating available evidence on Yoga and QOL in Pulmonary Tuberculosis during COVID-19.

Materials and Methods

The PubMed and Google scholar search was carried out using the keywords "Yoga," "COVID-19," "Pulmonary Tuberculosis," "PTB," "Tuberculosis," "TB," "Quality of Life," "QOL," and their synonyms were used for electronic searching. A combination of different keywords used for searching on PubMed was searched for pertinent articles from search terms such as ["Pulmonary Tuberculosis" OR "PTB"], ["Tuberculosis" OR "TB"] ["Yoga" AND "COVID-19"], ["Yoga" AND "Pulmonary Tuberculosis"] AND ["COVID-19" AND "Quality of Life"] among them based on inclusion criterion – (i) Types of articles included were Randomized Control Trials, Clinical trials, Review articles, Systematic Reviews, and meta-analyses, (ii) Full-length free articles with robust methodology in the English language were included, (iii) Field tags used were titles and abstracts, (iv) Last 5 years' articles were picked, and (v) Reference lists of valid articles were searched for studies of similarity. The exclusion criterion is based on – (i) Articles with weak methodology and content, (ii) Case Reports and case series, (iii) Irrelevant topic of our interest. A narrative synthesis criterion was used to obtain the results.

Results and Discussion

After the electronic search, we got 156 articles related to Yoga and COVID-19, and with the field tags, it has reduced to 39 articles. Further on, the inclusion criterion was able to select full-length articles. Between Pulmonary Tuberculosis (PTB) and COVID-19, 71 articles among 8 articles were selected based on their relevance as shown in Figure 1. Using Boolean operators between Pulmonary Tuberculosis, COVID-19, and QOL able to get 543 articles; 25 research studies were picked after removing duplicates and exclusion.
criteria. In the same way, between Yoga and Tuberculosis, we got only one article meeting the criterion. The many research studies were evaluated and found that PTB and COVID-19 patients may have a poor Health-Related Quality of Life.

**Research Evidence in Yoga and COVID-19:**

Research on the effects of yoga on the COVID-19 pandemic found that yoga (including physical postures, Bhramari Pranayama, mindfulness meditation, Sahaj yoga, and laughing therapy) had good impacts on mental health.

During the COVID-19 lockdown, volunteers took part in a randomized Control Trial that demonstrated the effectiveness of Viloma Pranayama in reducing RPE maximum during breath-holding. However, diaphragmatic breathing techniques greatly increase breath-holding duration (Visweswaraiah and Telles, 2004).

The study and practice of Sudarshana kriya include the use of certain breathing patterns and sequences. The autonomic nervous system’s homeostasis is restored, and with it, stress, anxiety, depression, and stress-related disorders, are alleviated. The immune system is boosted, making the body better able to fend against many pathogens. During the COVID-19 epidemic, tele-yoga was shown to be helpful for both cancer patients and their caregivers.

In light of the possibility for future epidemics and pandemics involving novel illnesses, another study shows that yoga and meditation may help students manage with stress and maintain their health. Therefore, yoga will play an essential part in COVID-19 to improve the mental health status and general well-being of both healthy persons and those with illness.

**Research in Yoga and Pulmonary Tuberculosis:**

After two months, patients with PTB in the yoga and breath awareness group demonstrated a significant improvement in symptom ratings (88.1%), weight gain (10.9%), forced vital capacity (FVC) (64.7%), and forced expiratory volume in one second (83.6%) (P <0.001 in all comparisons, Paired t-test). Lower symptom ratings (paired t-test, n=22) were seen in the breath awareness group. It is the only research done on Yoga and PTB in the last 20 years (Dalpati et al., 2022).

The co-infection of COVID-19 and pulmonary tuberculosis increases the likelihood of TB reactivation by influencing the respiratory system and generating acute illnesses through a cytokine-mediated immune response. Early identification of Tuberculosis among COVID-19 needed based on symptoms, CXR, and sputum test is crucial because of the high prevalence of active PTB among SARS-CoV-2 infected patients. For this to be a reality, the health care system must implement the required policies and infrastructure to prevent and treat co-infection. Corona virus-induced immune suppression, although complicating TB diagnosis and therapy, is a tough factor. More randomized controlled trials (RCTs) with high-quality methods and relevant material are urgently needed to address the special syndemic relationship between COVID-19 and PTB. In the highly specialized fields, only case reports indicate really exceptional cases.

**Quality of Life (QOL) in Pulmonary Tuberculosis:**

Due to increased psychological distress and reduced QOL in PTB patients, governmental and non-governmental organizations are now required to address psychological issues in TB therapy. Poor economic, physical, psychological, and environmental factors are only some of the reasons why persons with pulmonary TB have a far worse quality of life than the general population.

There are significant knowledge gaps concerning PTB patients’ health-related quality of life (HRQOL), including in the areas of treatment adherence, mental health care integration, social support, and safety (Umesh et al., 2021).
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Author and Publication</th>
<th>Study design</th>
<th>Sample size</th>
<th>Participants</th>
<th>Results</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kulkarni et al. (2021)</td>
<td>Meta-Analysis</td>
<td>NA</td>
<td>Children, youth and adults</td>
<td>The results of the review indicate moderate to positive effects of yoga on the mental health parameters.</td>
<td>Practicing yoga (physical postures, Bhramari Pranayam, mindfulness meditation, sahaj yoga and laughter therapy) can be beneficial to improve psychological health of the people during the COVID-19 pandemic.</td>
</tr>
<tr>
<td>2</td>
<td>Umesh et al. (2021)</td>
<td>Narrative Review</td>
<td>NA</td>
<td>Healthcare workers</td>
<td>The available evidences point towards the potential role of Yoga and Ayurveda in preventing and mitigating the infection through modulating our immune system, strengthening respiratory system, and mental health respectively.</td>
<td>Suggests an urgent need for conducting systematic clinical trials to investigate the add-on efficacy of Yoga and Ayurveda lifestyle interventions with current conventional treatment approaches.</td>
</tr>
<tr>
<td>3</td>
<td>Zope et al. (2021)</td>
<td>Narrative Review</td>
<td>NA</td>
<td>Healthy Volunteers and Patients</td>
<td>Sudharsana Kriya Yoga (SKY) balances the autonomic nervous system and thus can alleviate anxiety, routine stress, depression, stress-related medical disorders, and posttraumatic stress. SKY increase natural host immune system helps to tackle the microbial infections.</td>
<td>Article provides an overview of increases the therapeutic benefits that SKY can offer to the population at large during COVID-19 pandemic.</td>
</tr>
<tr>
<td>4</td>
<td>Dalpati et al. (2022)</td>
<td>Review</td>
<td>NA</td>
<td>Students</td>
<td>Perspectives shared in the review will also bring awareness on how yoga and meditation could boost students’ performance and assist them in maintaining physical and mental wellbeing during stressful conditions such as future epidemics and pandemics with novel infections.</td>
<td>Adding regular yogic practices and other self-improvement routines to students’ academic curriculum and daily practices in co-curricular activities or proficiency programs could help the younger generation take up the day-to-day challenges and stressful situations like lockdowns and pandemics and succeed in their personal and professional life.</td>
</tr>
<tr>
<td>5</td>
<td>Shukla et al. (2020_</td>
<td>RCT</td>
<td>60</td>
<td>Healthy volunteers</td>
<td>Anuloma Viloma Pranayama(AVP) and Deep Breathing Exercises(DBE) decreased Rating of Perceived Exertion (RPE). Kapala Bhati Pranayama(KBE) and pursed-lip breathing(PLB) did not decrease RPE as compared to AVP and DBE. DBE increased BHT more than KBE and PLB interventions.</td>
<td>AVP reduces RPE maximally during breath-holding, whereas DPE increases BHT more.</td>
</tr>
<tr>
<td>6</td>
<td>Snyder et al. (2021)</td>
<td>RCT</td>
<td>14</td>
<td>Female caregivers of Cancer</td>
<td>Out of 7 dyads participating in the parent trial, 1 declined the video-conference</td>
<td>Although in-person interventions are favored by both the study</td>
</tr>
</tbody>
</table>
Patients sessions. Despite challenges in the areas of technology, location, and setting, instruction and personal connection, the overall acceptability was high among patients, caregivers, and instructors.

participants and the interventionists, videoconference sessions were deemed acceptable. All participants had the benefit of a previous in-person experience. In a remote setting the assistance of caregivers seems particularly beneficial to ensure practice safety.

Shah et al. (2022) Review and Meta-Analysis of RCT's 4023 Clinical, Pregnant and Healthy Population Out of 174 they have selected 44 articles Yoga, Meditation and Pranayama has very much effective in lowering IL-6, cortisol, and TNF-α levels in patients, long term practice of Yoga, spanned over 8–12 weeks will have definitive results in COVID-19 patients.

### Table 2: Pulmonary Tuberculosis (PTB) and COVID-19

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Authors</th>
<th>Study design</th>
<th>Sample size</th>
<th>Participants</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aggarwal et al. (2021)</td>
<td>Systematic review and meta-analysis</td>
<td>236,863</td>
<td>COVID-19 and PTB Patients</td>
<td>Active pulmonary tuberculosis is relatively common among COVID-19 patients.</td>
</tr>
<tr>
<td>3</td>
<td>Singh et al. (2020)</td>
<td>Review</td>
<td>157</td>
<td>TB&amp;COVID-19 Confected patients</td>
<td>Health authorities should made necessary policies &amp; facilities to fight &amp; control against co-infection</td>
</tr>
<tr>
<td>4</td>
<td>Starshinova et al. (2022)</td>
<td>Review</td>
<td>--</td>
<td>M. tuberculosis Bacteria and SARS-CoV-2 Virus</td>
<td>Immune suppression caused by the Corona virus may result in difficulties in the diagnosis and treatment of TB.</td>
</tr>
</tbody>
</table>

### Table 3: Pulmonary Tuberculosis (PTB) and Quality of Life

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Authors</th>
<th>Study design</th>
<th>Sample size</th>
<th>Participants</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Zuo et al. (2022)</td>
<td>RCT</td>
<td>461</td>
<td>PTB Patients</td>
<td>Cognitive Behavioral Therapy can relieve anxiety, and depression symptoms and increase the quality of life in subjects with pulmonary tuberculosis.</td>
</tr>
<tr>
<td>2</td>
<td>Grass et al. (2022)</td>
<td>Pilot study</td>
<td>67</td>
<td>PTB Patients</td>
<td>The outcome of the study provides motivation for further consideration and implementation of a pulmonary rehabilitation programme for patients with PTB.</td>
</tr>
<tr>
<td>3</td>
<td>Xu et al. (2022)</td>
<td>RCT</td>
<td>150</td>
<td>PTB patients</td>
<td>Comprehensive nursing intervention combined with respiratory functional exercises can significantly improve the pulmonary function, self-care ability, and quality of life of patients with pulmonary</td>
</tr>
</tbody>
</table>
Table 4: Research evidence for Quality of Life and COVID-19

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Authors</th>
<th>Participants</th>
<th>Study design</th>
<th>Sample size</th>
<th>QoL Assessment</th>
<th>Result</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nobari et al. (2021)</td>
<td>Children and adolescents.</td>
<td>Systematic review</td>
<td>3177</td>
<td>Health-Related Quality of life (HRQoL) were extracted from eligible studies.</td>
<td>Finally, six studies fulfilled the inclusion criteria and, therefore, were included in the systematic review.</td>
<td>COVID-19 has a negative impact on the HRQoL of children and/or adolescents.</td>
</tr>
<tr>
<td>2</td>
<td>Malik et al. (2022)</td>
<td>Post-acute COVID-19 syndrome (PCS) patients and intensive care unit (ICU) admitted cases.</td>
<td>Meta-Analysis</td>
<td>4828</td>
<td>Quality of life (EQ-VAS)</td>
<td>Meta-regression analysis showed the poor quality of life was significantly higher among post-COVID-19 patients.</td>
<td>Study concludes that PCS is associated with poor quality of life, persistent symptoms including fatigue, dyspnea, anosmia, sleep disturbances, and worse mental health.</td>
</tr>
<tr>
<td>4</td>
<td>Dorri et al. (2021)</td>
<td>COVID-19 survivors.</td>
<td>Meta-Analysis</td>
<td>Varied 58-44779</td>
<td>A systematic search using key terms COVID-19, PTSD, depression, anxiety, HRQoL, survivors.</td>
<td>The pooled prevalence of PTSD, depression, and anxiety among COVID-19 survivors to pre-COVID-19 time and controls showed reduced HRQoL (RE).</td>
<td>Our systematic review also found evidence of reduced HQoL and limited social role in these survivors.</td>
</tr>
<tr>
<td>5</td>
<td>Ariyo et al. (2021)</td>
<td>Elderly intensive care unit (ICU) survivors.</td>
<td>Meta-Analysis</td>
<td>2536</td>
<td>Assessed quality of life (QoL) in ICU survivors before the COVID-19 pandemic.</td>
<td>Reduced quality of life due to physical health.</td>
<td>Elderly survivors' QoL was significantly worse than younger ICU survivors.</td>
</tr>
<tr>
<td>6</td>
<td>Kandula and Wake (2021)</td>
<td>Among Health Professionals</td>
<td>Review</td>
<td>Varies 170-10516</td>
<td>Assessment of the quality of life (QoL) of health professionals</td>
<td>QoL maintained by specific types of health professionals during critical moments of COVID-19 pandemics.</td>
<td>This study may assist health organization stakeholders in enhancing QoL among health professionals by required provisions.</td>
</tr>
<tr>
<td></td>
<td>Authors</td>
<td>Study Description</td>
<td>Study Design</td>
<td>N</td>
<td>Details</td>
<td>Findings</td>
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<tr>
<td>7</td>
<td>Poudel et al. (2021)</td>
<td>Acute Covid, females, older ages.</td>
<td>Structured Review</td>
<td>1276</td>
<td>Studies used a generic HRQoL assessment tool; five studies used SF-36, five studies used EQ-5D-5L.</td>
<td>After reading full-text, 12 eligible studies were included in this review. Higher impact on HRQoL was reported. The impact of Covid-19 on HRQoL of Acute and Long Covid patients is substantial.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Nandasena et al. (2022)</td>
<td>COVID-19 patients following discharge or recovery.</td>
<td>Systematic Review</td>
<td>4408</td>
<td>The Databases of PubMed, Cochrane Library, and Science Direct were searched.</td>
<td>COVID 19 patients' QOL has been significantly impacted and associated with the low level of QOL. The QOL of the post COVID19 patients was significantly impacted, regardless of the time discharge or recovery.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Kasar and Karaman (2021)</td>
<td>Elderly individual.</td>
<td>Scoping Review</td>
<td></td>
<td>Assessing QoL Resulted in seven studies selected for full reading, including three descriptive and cross-sectional studies.</td>
<td>Recommendations were grouped as evaluating the current state of loneliness and isolation in elderly people QOL negatively impacted.</td>
<td></td>
</tr>
</tbody>
</table>

**Quality of Life (QOL) in COVID-19:**

Children and adolescents with COVID-19 have a worse HRQoL (Shah et al., 2022). According to the findings, those suffering with Post COVID-19 Syndrome (PCS) have a worse quality of life and have chronic symptoms such as tiredness, dyspnea, anosmia, sleep problems, and impaired mental health. More study on PCS patients is required to identify the underlying causes of this symptom and the subsequent decline in quality of life (Dorri et al., 2021).

The varied HRQoL issues experienced by COVID-19 participants were the focus of this investigation. It exemplifies the catastrophic results of the illness. It is very essential because it helps doctors spot the illness earlier and equips them with the knowledge to prevent future outbreaks. The findings provide a foundation for the global creation of a patient-reported HRQoL questionnaire tailored to people with COVID-19 (Zuo et al., 2022).

Many patients who survived COVID-19 may have post-traumatic stress disorder (PTSD), despair, and anxiety beyond the first month of recovery. New data reveals that these survivors have worse HQOL and play a less social role than previously thought.

Subjective QOL outcomes should guide person-centered decision-making in senior ICU patients (Amdal et al., 2021), and it is important to keep an eye on the proportionality of age as a factor of ICU resource allocation.

The quality of life (QoL) of COVID-19 patients has been shown to decline, according to many studies; researchers should take into account the most significantly impacted QoL domains and related variables..

**Conclusion**

Yoga may be an add-on therapy as it improves respiratory conditions and mental health; hence it may play vital role as preventative, curative and rehabilitation role in PTB and COVID-19 pandemic by improving Health-related quality of life.

There is a need for evidence-based research with more emphasis should be given to Randomized Control Trails in Yoga, Pulmonary Tuberculosis and COVID-19 as well as in Post-COVID-19. Yoga can act At the government level further adding the new policies adopting to the new pandemic era required to enhance the quality of life.
References


