

Assessment of Significance of Yoga on Quality of Life in Asthmatic Patients

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Abstract

Background: In this review article, we will discuss recent publications on asthma and review studies that have reported on different yoga practices, including the prevalence, risk factors, prevention, mechanisms, diagnosis, and treatment of asthma. The impact of combinations of yogic practices on bronchial asthma has been studied, but these yoga modules are often too lengthy for comfortable long-term practice, resulting in high dropouts. It is common for people to return to conventional medicine despite improvement. This study tested a shorter and easier yoga routine to improve asthma conditions.

Objective: To systematically evaluate yoga's effectiveness and safety in reducing asthma symptoms.

Material and Methods: The study conducted a thorough search on various electronic search engines such as MEDLINE, PubMed, Embase, Cochrane, Google Scholar, ResearchGate, Clinical Key, and Academia to find relevant literature. The study focused on adult patients suffering from mild to moderate asthma, aged between 18 and 60 years. The patients were divided randomly into two groups, the Yoga Group, and the Control Group, based on Global Initiative for Asthma (GINA) guidelines. The study aimed to measure the impact of yoga on various outcomes, including pulmonary function tests (FeV1, FVC, FeV1/FVC, and peak expiratory flow rate), health-related quality of life, and asthma control tests. The study used the ACT asthma control test and AQOL Asthma Quality of Life Questionnaire to measure the outcomes on days 0 and 60. The study applied a fixed-effect model to calculate the significance of statistical heterogeneity.

Results: Participants in the "Yoga group" showed significant improvements in all subdomains of ACT and AQOL in the second month compared to the "control group." The pulmonary function of participants in the yoga group also showed steady and progressive improvement, with statistical significance observed in the first second of forced expiratory volume (FEV1) after eight weeks, as well as peak expiratory flow rate (PEFR) after two, four, and eight weeks, when compared to their baseline values. Additionally, the total AQOL score and sub-domains improved more than the minimal important difference. The frequency of rescue medication use decreased significantly in both groups, but the decrease was achieved earlier and was more pronounced in the yoga group than in the control group.

Conclusion: "The Yoga group" got significantly better improvement in asthma quality of life scores & asthma control test than "the control group." Thus, Yoga can be used as an adjuvant therapy in asthma management.

Keywords: Yoga; asthma; Peak expiratory flow rate; Forced expiratory volume; Quality of life

Introduction

Asthma is a chronic non-communicable disease that leads to the inflammation of the airways in the lungs, causing them to narrow. People with asthma experience respiratory symptoms like wheezing, chest tightness, cough, and shortness of breath, which can vary in intensity and frequency. Different types of asthma have been identified, including allergic, non-allergic, late-onset, and asthma with persistent airflow limitation. The prevalence of asthma ranges from 1 to 18% globally, and it poses a significant economic burden on society [1,2].

According to the Global Initiative for Asthma (GINA), bronchial asthma is a condition that affects the airways causing respiratory symptoms such as shortness of breath, chest tightness, wheezing, and coughing. These symptoms can vary in intensity and may cause variable out-breath limitation [3]. Asthma exacerbation, which can result in shortness of breath and breathing difficulties, may also cause acute levels of emotional distress. This distress can manifest as panic during an attack, anxiety anticipating the next exacerbation, and depression due to conventional treatments not

improving the underlying condition, making treatment ongoing [4,5]. According to a systematic analysis of the Global Burden of Disease published in The Lancet in 2020, around 262 million individuals were diagnosed with asthma worldwide in 2019 [6]. Additionally, the analysis found that 455,000 people died from asthma that year. The World Health Organization (WHO) reports that most of these deaths occur in low- and lower-middle-income countries. This is due to the challenges these countries face with underdiagnosis and lack of asthma treatment [7]. The AAFA reports that nearly 26 million people in the U.S. have asthma. This number includes around 21 million adults ages 18 or older and around 4 million children under 18. Black adults are the most likely population group to have asthma in the U.S. Female adults are more likely to have asthma than male adults - around 9.7% compared with 6.2%. Conversely, male children are more likely to have asthma than female children - around 7.3% compared with 5.6%.

According to the British Lung Foundation, over 8 million people in the U.K. have been diagnosed with asthma, which is about 12% of the population. Although some individuals may have outgrown the condition, 5.4 million currently receive asthma treatment [8,9]. It has been suggested that practicing yoga, which includes physical postures, breathing exercises, meditation, and relaxation, can be beneficial in managing lower respiratory diseases [10]. Yoga has been a part of India's diverse culture for

thousands of years and includes key elements such as pranayama (breathing exercises), asanas (postures), and dhyana (meditation) [11-13]. Over the past ten years, numerous experimental studies have investigated the effects of yoga on the quality of life, asthma control, and pulmonary function tests of asthmatic patients. In 2016, several studies analyzed the impact of mindfulness training (meditation and stretching exercises), yoga, and relaxation/deep breathing on pulmonary function and quality of life in asthmatic patients [14-16]. Later, in 2018-2020, Prem et al. and Sodhi C et al. examined the effects of pranayama and breathing exercises on asthmatic patients' health-related quality of life [17,18]. A few studies have also evaluated the effects of pranayama and breathing exercises on the peak expiratory flow rate (PEFR), pulmonary function tests, and asthma control tests of asthmatic patients [19-22]. Numerous trials have explored yoga's impact on pulmonary function (FeV1, FVC, and PEFR) and quality of life in asthmatic patients [23-26]. Although these studies have provided evidence regarding the beneficial effects of yoga for asthmatic patients, their findings remain inconclusive due to several limitations. These limitations include small sample sizes, poor study quality, allocation bias, selective outcomes reporting, inconsistent results, and other biases. Therefore, it is crucial to overcome these limitations and generate substantial evidence that demonstrates the effect of yoga on asthmatic outcomes [27-29] (Table 1).

Table 1.

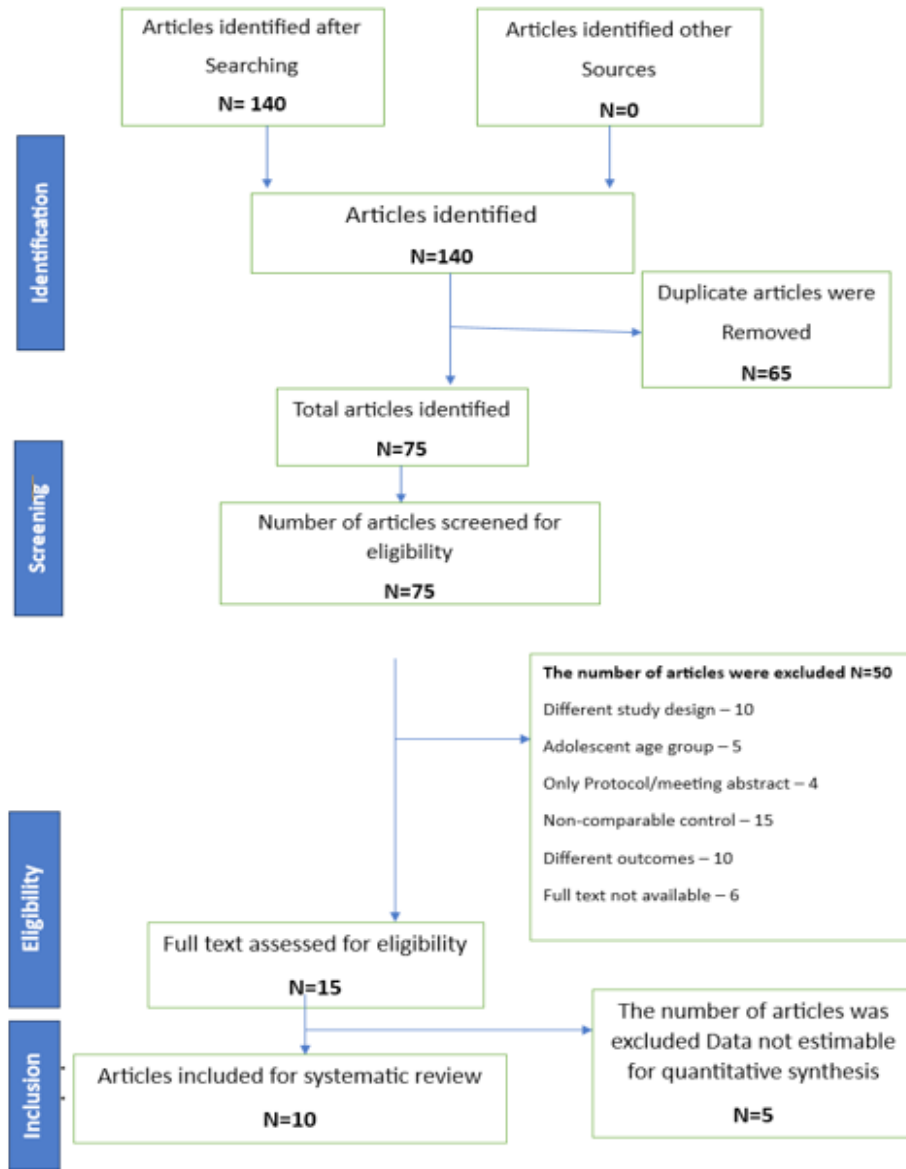
Characteristics of included studies					
Author & Year of the study	Participants Interventions Controls	Study Design	Setting	Intervention	Outcome
Pbert L et al., [14]	42/41	Randomized Controlled Trial	United States	Mindfulness training (Meditation and stretching exercises)	Quality of life, Pulmonary function test, PEFR
Singh S et al., [16]	15/15	Randomized Controlled Trial	India	Yoga (posture, breathing exercise)	Quality of life, Pulmonary function test, PEFR
Sodhi C et al., [18]	60/60	Randomized Controlled Trial	India	Yoga breathing exercises	Quality of life
Bahçecioglu T et al., [24]	56/56	Randomized Controlled Trial	Turkey	Yoga breathing techniques	Asthma Control Test, Quality of life, Pulmonary function test, PEFR
Agnihotri S et al., [27]	125/130	Randomized Controlled Trial	India	Yoga (Asanas, Pranayama, and meditation)	PEFR, quality of life
Erdogan Yüce G et al., [26]	25/25	Randomized Controlled Trial	Turkey	Pranayama	Quality of life, Pulmonary function test, PEFR, Asthma Control Test
Ainsworth B et al., [27]	93/51	Randomized Controlled Trial	United Kingdom	Digital mindfulness program (Meditation and Sleep Made Simple Headspace)	Asthma Control Test, quality of life,
Pushpa K et al., [23]	30/30	Randomized Controlled Trial	India	Yoga (Deep breathing, meditation, and relaxation)	Pulmonary function test, PEFR

Material and Methods

This research article reviews data from randomized controlled trials conducted within the past ten years. It aims to evaluate

how practicing yoga affects the pulmonary function tests, asthma control tests, and overall health-related quality of life of asthmatic patients.

Table 2.



Data sources

Various electronic search engines, including MEDLINE, PubMed, Embase, Cochrane, Google Scholar, ResearchGate, Clinical Key, and Academia were utilized to search for relevant literature. Additionally, the reference lists of eligible articles were screened, and ongoing research studies were requested from corresponding authors. Online published abstracts were also included in the search (Table 2).

Eligibility criteria (PICO framework)

Participants

Inclusion criteria

Patients aged between 18 and 60 with mild to moderate asthma, according to GINA guidelines, were included.

- **Exclusion criteria**

Patients who have any other medical conditions that could affect their ability to perform yoga exercises, such as musculoskeletal disorders, cervical or back pain, arthritis, significant illnesses, and chronic respiratory conditions related to pregnancy, including pulmonary tuberculosis and autoimmune lung disease, as well as patients who have asthma in an exacerbated state, were not included in the study.

Treatment Intervention

The Yoga Group was given a new Yoga module, which was added to their prescribed conventional medication as a supplementary therapy. The daily instruction was administered via pre-recorded audio in a sound-attenuated hall to avoid any instructor bias. However, the instructor was available throughout each session to answer any questions and to help make the practice more precise

where necessary. On the other hand, the Control Group continued taking their prescribed conventional medication without any Yoga practice until the 60-day intervention was over. The physical practices comprised basic breathing exercises and loosening exercises, followed by asanas under four categories: standing, sitting, prone, and supine. Pranayama, kriyas, and meditation based on raja yoga were also included. The classes ended with deep relaxation in Shavasana for about 10 minutes, followed by guided imagery for about 5 minutes. The yoga sessions lasted about an hour during the 2-week training period and an additional 6-week home practice. The compliance level for yoga practice was assured at least 5 days a week. The content of the daily home practice sessions was the same as during the 2-week training: 25 minutes of asanas and pranayama, and 5 minutes of guided relaxation (meditation) (Table 3).

Table 3: Yoga Module was done by the Yoga Group.

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Sl. No.	Practice	Duration
1	Rhythmic Abdominal Breathing	3 min
2	Vakshasthala Shaktivikasa Vyayama	2 min
3	Yagasanas i. Standing Asanas - (Tadasana, Katichakrasana) ii. Sitting Asanas - (Ushtrasana) iii. Prone Asanas - (Bhujangasana, Marjariasanas) iv. Supine Asanas - (Matsyasana)	10 min
4	Paranayama i. Nadi shodhana ii. Kapalabhati iii. Bhramari	10 min
5	Guided Relaxation	5 min

Details of Components of The Intervention

Rhythmic abdominal breathing: A Yoga breathing practice called Pranayama involves slow, vertical breathing. The practitioner contracts the abdomen while exhaling and expands it while inhaling [30].

Vakshasthala shaktivikasa vyayama: Stand straight with feet together and arms beside body. Inhale, stretch arms backward, expanding chest. Hold and breathe [30,31].

Standing Asanas

Tadasana: Practicing this yoga pose on a regular basis can improve respiratory function and balance the spine, leading to better breathing. When the spine is balanced, the life force, known as prana, can flow easily through all chakras, resulting in overall physical and mental wellness. This pose can also help fix poor posture and activate the upper part of the lungs, making it beneficial for people with bronchial asthma.

Katichakrasana: This exercise aims to rotate the thoracic

spine and stretch the chest muscles, which leads to the expansion of the ribcage, enabling better air exchange in the lungs. This improved breathing helps to remove Kapha from the lungs and channelizes Vata, which can be beneficial for individuals suffering from bronchial asthma.

Sitting Asanas

Ushtrasana: This exercise is designed to help you expand your lungs to their fullest capacity, develop your ribcage, and have a positive impact on your entire respiratory system. By doing this exercise, you can activate your facial tissues, nasal passages, pharynx, lungs, and all respiratory organs and nerves. The expansion of your lungs results in improved ventilation of the alveoli, which is beneficial for your overall respiratory health.

Prone Asanas

Bhujangasana: This exercise is designed to stretch your chest, shoulders, and abdomen while firming your buttocks. It has many benefits, such as stimulating abdominal organs, relieving

stress and fatigue, and ensuring proper heart and lung function. Additionally, this exercise can enhance lung capacity and help treat bronchial asthma.

. **Marjariasanas:** It coordinates breath with movement, releasing tension from the spine and strengthening the lungs.

Supine Asanas

Matsyasana: This exercise involves stretching the muscles between the ribs, known as intercostals, which makes them more functional. It also helps to fill the lungs with air and increase the lung capacity. By opening the larynx, wind box, and trachea (windpipe), it enables deep breathing. This brings balance and normalizes the function of all Vata, making it helpful in treating bronchial asthma [32-39].

Pranayama Practises

➤ **Nadi Shodhana:** - This practice is known to lower heart rate, reduce stress and anxiety, and synchronize the two hemispheres of the brain. It is also believed to purify the subtle energy channels (Nadi) of the body, allowing Prana to flow more easily during Pranayama practice. Additionally, it can clear the respiratory passages and strengthen the lungs.

➤ **Kapalabhati:** - It detoxifies the respiratory system and purifies the blood, increasing oxygen supply to cells.

➤ **Bhramari:** - Concentrating on a humming sound can calm and soothe the mind, relieving mental stress and anxiety. It can also increase pain tolerance, making it helpful in managing bronchial asthma [38-41].

Guided Relaxation: It is a well-researched procedure developed at S-VYASA. To begin, lie down on your back and relax each part of your body, starting from the top of your head and moving downwards to your face, arms, back, chest, abdomen, hips, and legs. While doing so, take deep breaths in and out. Imagine yourself breathing effortlessly, without any resistance. Finally, wiggle your fingers and toes slightly and open your eyes slowly [42].

Outcome measures

Data extraction

To begin with, relevant research articles were reviewed and a narrative synthesis was prepared, including information about the interventions used, variations in intervention types, and outcomes measured. The data collected was then analyzed based on the specific interventions and outcomes measured, using a random-effect model to compute statistical significance for any heterogeneity. The extracted data was analyzed using mean difference or standardized mean difference for continuous outcomes, and a 95% confidence interval was also calculated.



Figure 1: shows the marked improvements in lung capacity parameters from the initial stage to after 8 weeks in the cases group.

Parameters

The study involved evaluating the pulmonary function tests of stable subjects before and after a 2-month yoga training program. Each subject underwent the tests using a computerized instrument, following a comprehensive demonstration of the instructions. The pulmonary function tests included Forced Vital Capacity (FVC), Forced Expiratory Volume in the first second

(FEV1), the ratio of FEV1/FVC expressed in percentage, and Peak Expiratory Flow Rate (PEFR) measured in liters per second. A total of 4 tests were performed, and the results were analyzed for vitality. After 8 weeks, the outcomes measured included pulmonary function tests such as FEV1, FVC, FEV1/FVC, peak expiratory flow rate, health-related quality of life, and asthma control test. [43,44].



Figure 2: shows the lung capacity parameters from the initial stage to after 8 weeks in the control group.

Results

After 8 weeks, the case group showed significant improvements in FVC, FEV1, FEV1/FVC, and PEFR compared to the control group (Figures 1-3). An analysis was carried out to determine the significance of FVC, FEV1, FEV1/FVC, and PEFR. To establish the difference between the cases and controls, a paired-sample t-test was used, and to evaluate the relationship between cases and controls, Pearson’s correlation was computed. Any p-values less than 0.05 were considered statistically significant. We recruited male and female patients aged 18 to 60 who could perform daily yoga exercises. They had a history of asthma within the past 3-4 years and had been experiencing high levels of symptoms such as coughing and shortness of breath. After undergoing the yoga treatment for two months, the symptoms reduced significantly. In “The Yoga Group,” significant improvements were found in all subdomains of ACT and AQOL after two months compared to the control group.

Discussion

According to the results of this study, both groups showed significant improvement during the two months. However, the “Yoga group” achieved improvement sooner than the “control group.” In the second month, the differences between the groups were highly significant, with better improvements observed in FVC, FEV1, FEV1/FVC, and PEFR, as well as in all subdomains of ACT and AQOL response to environmental stimuli. The total quality of life score also showed better improvement in the “Yoga group.” Asthma is a severe health condition that can lead to death in extreme cases. Several factors can trigger asthma, including family history, occupation, stress, cold weather, bacterial and viral infections, and smoking. These triggers can cause symptoms like coughing, wheezing, and shortness of breath. Recent research has also suggested that certain psychological factors might impact the severity of asthma. However, the mechanisms underlying these psychological factors are not yet fully understood [45]. Regular

practice of yoga is beneficial for achieving complete health. It helps in relaxing the mind, energizing the body, and improving the quality of life of asthmatic patients. A study conducted on a group of asthmatics found that mental relaxation is more effective than muscular relaxation in improving pulmonary function and subjective measures. Yogic practices, including pranayama, have been reported to significantly improve relaxation, positive

attitude toward asthma, and exercise tolerance in asthmatic patients. The study also showed a tendency toward lesser usage of beta-adrenergic inhalers [46]. In a randomized controlled trial, both groups showed a significant improvement in AQLQ and ACT scores. However, the Yoga group showed a greater improvement [47].

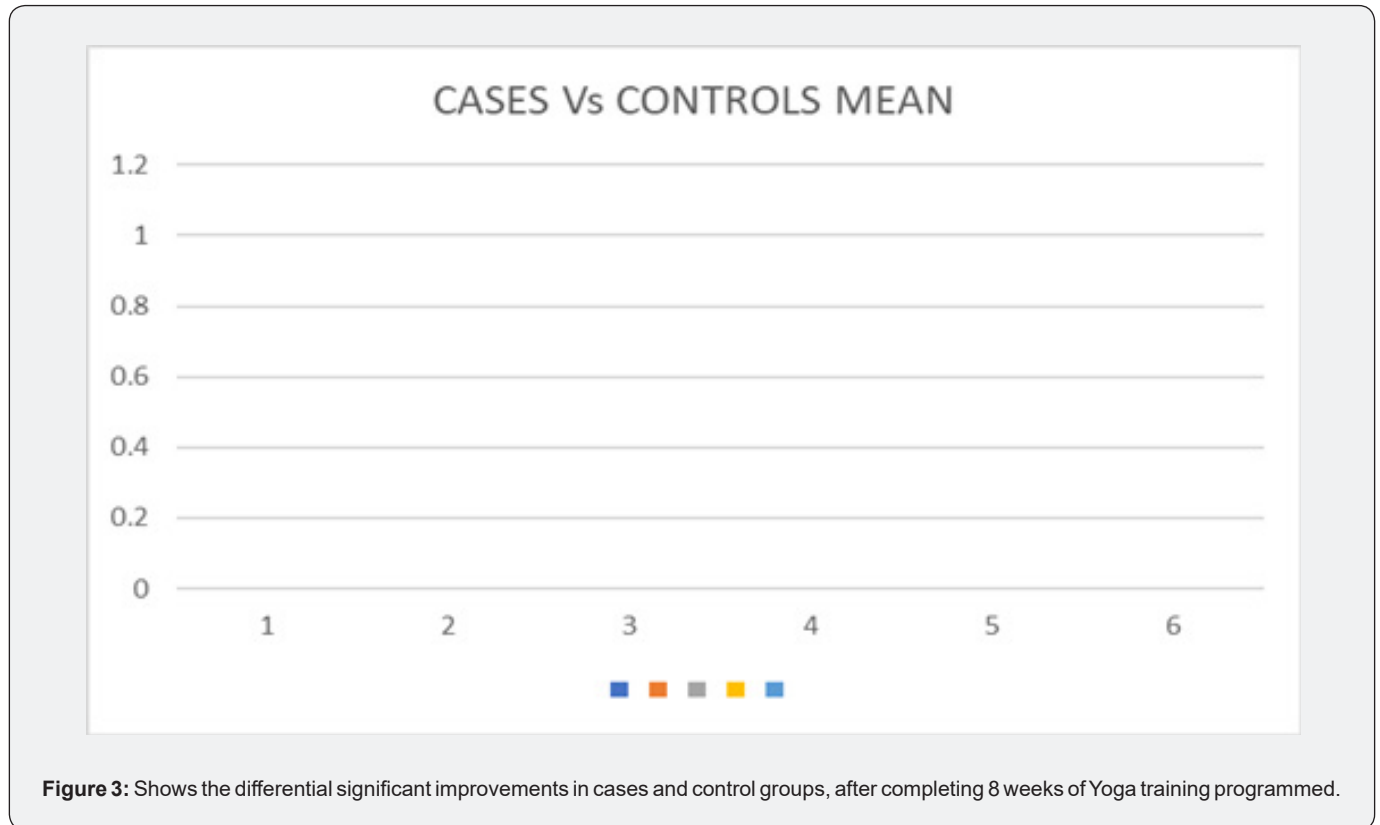


Figure 3: Shows the differential significant improvements in cases and control groups, after completing 8 weeks of Yoga training programmed.

Conclusion

This research article provides evidence that yoga can be used as a complementary therapy for managing mild to moderate asthma in patients. The study contributes to the current knowledge on this topic and highlights that asthmatic patients can benefit from practicing yoga. The results indicate that yoga can significantly improve lung function, including FEV1, FVC, FEV1/FVC, and PEFr, in asthmatic patients. Additionally, practicing yoga can also help to improve asthma symptoms and overall quality of life, including symptoms, activity, emotion, and environmental subdomains. As a complementary therapy, asthmatic patients can be prescribed yoga, which includes meditation, postures, and breathing exercises. The study found that Yogic intervention has a positive impact on the overall quality of life. All subdomains of quality of life, including total scores, showed significant improvement in both groups. However, the Yoga group achieved the improvement earlier, compared to the control group. To sum up, the study suggests that Yoga is an effective tool to enhance the

quality of life and can be used as an adjuvant therapy, along with standard medical treatment, for better outcomes in the treatment of asthma. We conclude that practicing Yoga has a positive effect on asthmatic patients. There were significant improvements in lung function parameters, and patients experienced a reduction in symptoms and medication usage.

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