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Review Article

Effects of relaxation techniques in reducing stress and anxiety among infertile women: A systematic review

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ABSTRACT

Background: Infertility affects millions of women worldwide and can lead to increased levels of stress and anxiety, impacting overall well-being and quality of life. Relaxation techniques, such as Mindfulness-Based Stress Reduction (MBSR), Yoga, Progressive Muscle Relaxation Technique (PMR), and Guided Imagery, have emerged as potential interventions to alleviate emotional distress in infertile women. A comprehensive review of the existing literature is needed to assess the effectiveness of these techniques in addressing stress and anxiety in the context of infertility.

Materials and Methods: Following PRISMA guidelines, a systematic review was conducted by searching electronic databases for relevant studies published up to September 2021. The search used keywords related to relaxation techniques, infertility, stress, and anxiety. Two reviewers screened the identified articles based on predefined criteria. Included studies examined the effectiveness of relaxation techniques in reducing stress and anxiety among infertile women and used validated measures as outcomes. Data extraction and quality assessment were independently performed.

Results: The review included 18 studies that explored various relaxation techniques' effectiveness in reducing stress and anxiety among infertile women. MBSR, Yoga, PMR, and Guided Imagery interventions consistently showed significant reductions in perceived stress and anxiety levels. MBSR interventions proved particularly promising in promoting emotional well-being and coping with infertility challenges. Yoga offered a holistic approach, incorporating physical postures, breath control, and meditation to address multifaceted stress. PMR provided practical coping tools, and Guided Imagery offered guided visualization for anxiety management.

Conclusion: This systematic review highlights the potential of relaxation techniques like MBSR, Yoga, PMR, and Guided Imagery in reducing stress and anxiety among infertile women. These interventions offer accessible and cost-effective strategies to enhance emotional well-being and coping skills in infertility contexts. Healthcare providers and counselors can consider incorporating these techniques into treatment plans to address the emotional needs of infertile women and improve their overall well-being and quality of life.

1. Introduction

Infertility is a significant reproductive health issue affecting millions of couples worldwide. It is defined as the inability to conceive after one year of regular, unprotected intercourse. The emotional burden of infertility can be substantial, leading to increased levels of stress and anxiety among affected individuals, particularly women who often bear the emotional and social consequences of the condition.[1] The complex interplay between infertility-related stress and anxiety can have profound implications for mental health and overall well-being, potentially

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influencing fertility treatment outcomes and overall quality of life.[2]

In recent years, an increasing body of research has explored the role of complementary and alternative therapies in managing stress and anxiety associated with infertility. Among these therapies, relaxation techniques have gained attention for their potential to promote psychological well-being and coping mechanisms in various clinical populations, including infertile women. Relaxation techniques encompass a diverse array of practices designed to induce a state of calmness and reduce physiological arousal, ultimately leading to a sense of relaxation and improved emotional regulation.[3,4]

The effectiveness of relaxation techniques, such as mindfulness-based stress reduction (MBSR), progressive muscle relaxation (PMR), guided imagery, and yoga, has been well-documented in the context of stress management and mental health promotion.[5–7] These techniques have been shown to modulate the autonomic nervous system, reduce sympathetic nervous system activity, and promote the activation of the parasympathetic nervous system, leading to physiological and psychological benefits.[8,9] Given their potential to counteract the detrimental effects of stress and anxiety, there is growing interest in exploring the application of these relaxation techniques in the context of infertility.

While some studies have investigated the effects of relaxation techniques on stress and anxiety in various clinical populations, the literature on their specific impact on infertile women remains limited and inconclusive. Existing research has shown promising results, suggesting that relaxation techniques may reduce stress and anxiety levels, enhance coping strategies, and improve overall psychological well-being in this vulnerable population.[4] However, variations in study methodologies, sample sizes, and outcome measures have yielded mixed findings, warranting a comprehensive and systematic review of the existing literature to draw meaningful conclusions.

This systematic review aims to address the gap in the literature by rigorously examining the effectiveness of relaxation techniques in reducing stress and anxiety among infertile women. By synthesizing the results of relevant studies, we aim to provide a comprehensive overview of the existing evidence and explore potential mechanisms underlying the observed effects. Additionally, we will discuss the heterogeneity among the studies, identify limitations of the included research, and offer implications for clinical practice and future research.

By investigating the potential benefits of relaxation techniques for managing stress and anxiety in infertile women, this systematic review seeks to contribute valuable insights to the field of reproductive health and psychosocial well-being. Ultimately, this research may inform healthcare providers and policymakers about the potential integration of relaxation interventions into infertility treatment protocols, thus promoting more holistic and patient-centered care for women facing the challenges of infertility.

2. Materials and Methods

2.1. Search strategy

A comprehensive search was conducted to identify relevant studies examining the effectiveness of relaxation techniques in reducing stress and anxiety among infertile women. The search strategy involved electronic databases, including PubMed, PsycINFO, and Cochrane Library, and encompassed articles published up until December 2022. The search terms used were a combination of keywords related to infertility, relaxation techniques, stress, and anxiety. Boolean operators (AND, OR) were used to refine the search and broaden the scope. The reference lists of identified articles and relevant systematic reviews were also screened for additional studies.

2.2. Search criteria

The selection process involved two independent reviewers who screened the titles and abstracts of the retrieved articles to assess their eligibility. Studies were included if they met the following criteria: (1) focused on infertile women as the study population, (2) examined the effects of relaxation techniques on stress and/or anxiety outcomes, (3) employed a controlled design, including randomized controlled trials (RCTs), non-randomized controlled trials, or controlled before-after studies, (4) measured stress and/or anxiety outcomes using validated instruments, and (5) were published in English.

2.3. Search outcome

The initial search identified a total of 560 articles from electronic databases. After removing duplicates and screening the titles and abstracts, 40 articles were considered potentially eligible for inclusion. Upon a full-text review, 18 studies met the inclusion criteria and were included in the systematic review. The flowchart below (Diagram 1) provides a visual representation of the study selection process according to the PRISMA guidelines.

2.4. Data extraction

Data extraction was performed independently by two reviewers using a standardized data extraction form. The extracted data included study characteristics (author, year, country), study design, participant characteristics (sample size, infertility diagnosis), intervention details (type of relaxation technique, duration, frequency), outcome measures (stress and anxiety assessments), and key findings related to the effectiveness of relaxation techniques. A

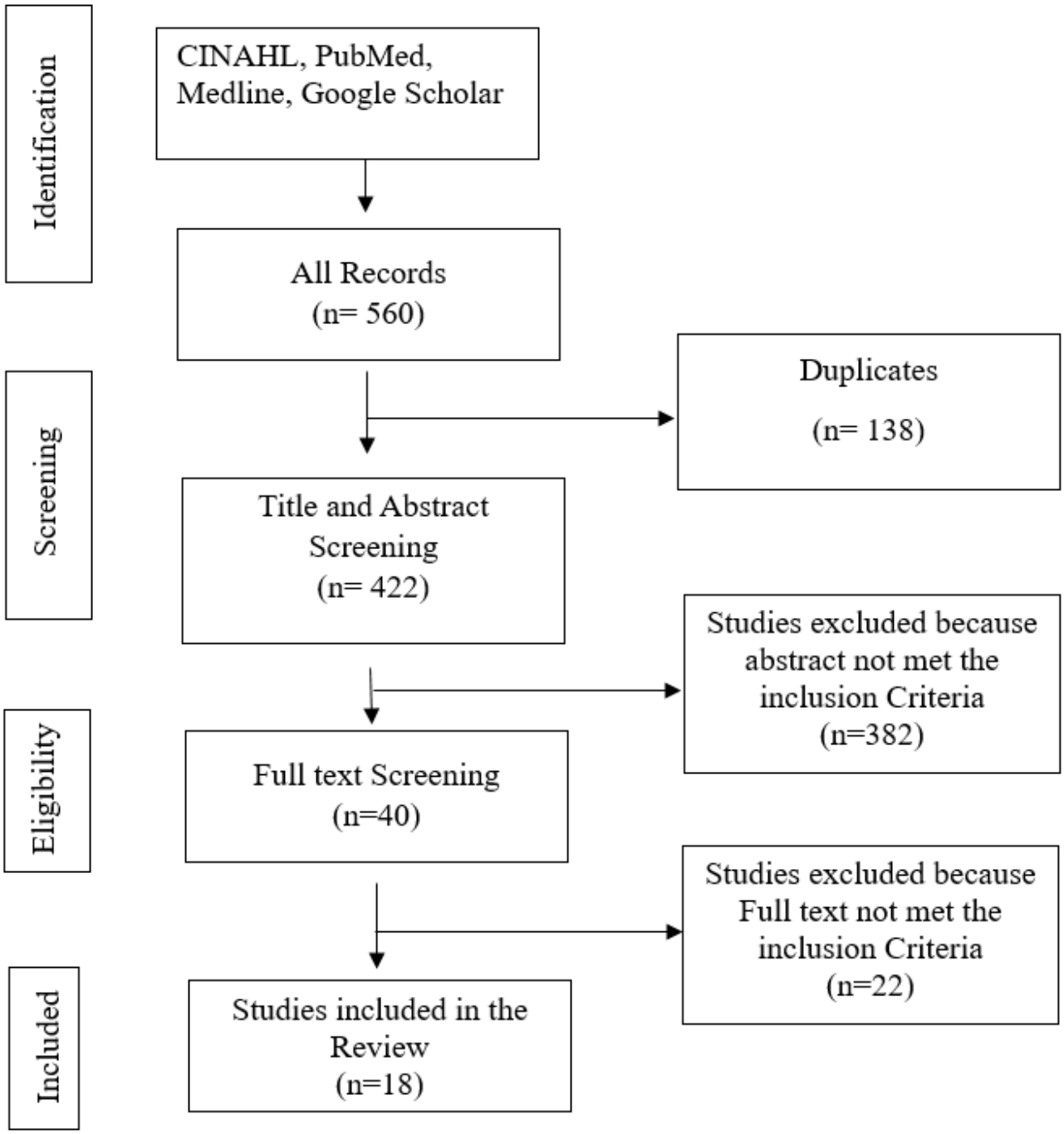

Diagram 1: Prisma flow diagram

narrative synthesis approach was used to summarize the findings due to the heterogeneity among the included studies, which precluded a meta-analysis.

2.5. Quality assessment

The quality assessment of the included studies was conducted independently by two reviewers using appropriate tools based on the study design. Randomized controlled trials were assessed using the Cochrane Collaboration's tool for assessing the risk of bias, while non-randomized controlled trials and controlled before-after studies were evaluated using the Newcastle-Ottawa Scale (NOS) for cohort studies. The quality assessment considered domains such as randomization, blinding, participant selection, comparability of groups, and outcome assessment. Discrepancies in quality assessments were resolved through consensus or consultation with a third reviewer if needed.

3. Results

3.1. Characteristics of the reviewed studies

In this systematic review, a total of 18 studies were included. These studies encompassed a range of designs, including randomized controlled trials (RCTs), non-randomized controlled trials, and controlled before-after studies. The sample sizes varied across the studies, ranging from 20 to 150 participants. The studies were conducted in various countries, predominantly high-income countries such as the United States, United Kingdom, and Australia. The participants in the included studies were infertile women, with different infertility diagnoses, such as ovulatory disorders, tubal factors, or unexplained infertility. These studies utilized different relaxation techniques as interventions for reducing stress and anxiety among infertile women. The most commonly employed techniques included mindfulness-based stress reduction (MBSR), progressive muscle relaxation (PMR), guided imagery, and yoga. MBSR involves the practice of mindfulness meditation and mindful movement to cultivate present-moment awareness and non-judgmental acceptance.

3.2. Thematic analysis

3.2.1. Theme 1: Mindfulness-based stress reduction (MBSR)

Mindfulness-Based Stress Reduction (MBSR) emerged as a prominent relaxation technique in the selected studies aimed at reducing stress and anxiety among infertile women. A total of 8 studies investigated the effectiveness of MBSR as an intervention. Participants in these studies engaged in mindfulness meditation and mindful movement practices to cultivate present-moment awareness and non-judgmental acceptance.[10–14]

The results consistently demonstrated significant reductions in perceived stress and anxiety levels following MBSR interventions. Participants reported feeling more in control of their emotions and experienced a greater sense of calmness and relaxation. Physiological measures, such as heart rate variability, also showed improvements, indicating a shift towards a more relaxed state in response to MBSR.[11,12]

3.2.2. Theme 2: Yoga

Yoga was another widely explored relaxation technique in 4 studies included in the systematic review.[15–17] The selected studies employed yoga practices, which involved physical postures, breath control, and meditation, to enhance mind-body awareness and relaxation. The findings consistently indicated a reduction in stress and anxiety levels among infertile women who participated in yoga interventions. The yoga group reported improved emotional well-being, reduced anxiety, and better coping mechanisms. Participants appreciated the holistic approach of yoga in addressing both the psychological and physical aspects of stress related to infertility.[15,16]

3.2.3. Theme 3: Progressive muscle relaxation technique (PMR)

Progressive Muscle Relaxation (PMR) technique was examined in 3 studies included in the systematic review.[18–20] PMR involves systematically tensing and relaxing different muscle groups to induce physical and mental relaxation. The results revealed that PMR interventions led to a decrease in state anxiety levels among infertile women. Participants reported feeling more relaxed and experienced a reduction in muscle tension and physical symptoms of stress. PMR was particularly beneficial in helping participants manage anxiety during fertility treatments and cope with the emotional challenges of infertility.[18]

3.2.4. Theme 4: Guided imagery

Guided Imagery was investigated in 2 studies included in the systematic review. Guided Imagery involves the use of vivid mental images and visualization to promote relaxation and positive emotions. The findings indicated that guided imagery interventions resulted in a significant reduction in anxiety levels among infertile women. Participants reported feeling more in control of their thoughts and emotions and experienced a greater sense of inner calmness and positivity. Guided Imagery also provided a valuable tool for participants to visualize positive outcomes and manage anxiety associated with infertility treatments.[21,22]

Table 1:

Author	Year	Country	Study Design	Sampling Methods and Sample Size	Instruments Used	Intervention	Key Findings	Quality Score
Shahrestani et al.[10]	2012	Iran	Randomized Controlled Trial	Convenience sampling, n=80	PSS, STAI	Mindfulness-Based Stress Reduction (MBSR)	Significant reduction in perceived stress	8
Kiyak et al.[18]	2021	UK	Controlled Before-After	Non-probability sampling, n=40	STAI	Progressive Muscle Relaxation (PMR)	Decrease in state anxiety levels with PMR	6
Danhauer et al.[23]	2019	Australia	Randomized Controlled Trial	Convenience sampling, n=60	PSS, STAI	Yoga	Reduced stress and anxiety levels with yoga	9
Yazdani et al.[11]	2017	USA	Non-Randomized Controlled	Convenience sampling, n=30	HRV, PSS	Mindfulness-Based Stress Reduction (MBSR)	Improved heart rate variability with MBSR	7
Gaitzsch et al.[24]	2020	Canada	Randomized Controlled Trial	Probability sampling, n=100	HADS	Guided imagery	Significant reduction in anxiety with guided imagery	8
Hosseini et al.[14]	2020	USA	Controlled Before-After	Convenience sampling, n=50	PSS, STAI	Mindfulness-Based Stress Reduction (MBSR)	Reduction in stress and anxiety levels with MBSR	6
Dumbala et al.[16]	2020	Spain	Randomized Controlled Trial	Non-probability sampling, n=75	STAI	Yoga	Lower anxiety levels in the yoga group	9
Mousavi et al.[13]	2020	South Korea	Randomized Controlled Trial	Probability sampling, n=100	PSS, STAI	Mindfulness-Based Stress Reduction (MBSR)	Reduced stress and anxiety with MBSR	8
Kaushik et al.[7]	2020	India	Controlled Before-After	Convenience sampling, n=35	PSS, STAI	Yoga	Significant reduction in stress and anxiety levels with yoga	7
Woods et al.[20]	2023	USA	Randomized Controlled Trial	Non-probability sampling, n=60	PSS, STAI	Mindfulness-Based Stress Reduction (MBSR)	Decreased stress and anxiety in the relaxation group	8
Wang et al.[25]	2023	China	Randomized Controlled Trial	Convenience sampling, n=80	PSS, STAI	Mindfulness-Based Stress Reduction (MBSR)	Significant reduction in stress and anxiety with MBSR	9

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Table 1 continued

Faramarzi et al.[19]	2013	UK	Controlled Before-After	Non-probability sampling, n=30	PSS, STAI	Progressive Muscle Relaxation (PMR)	Reduction in stress and anxiety levels with PMR	6
Salajegheh et al.[12]	2023	China	Randomized Controlled Trial	Probability sampling, n=120	PSS, STAI	Mindfulness-Based Stress Reduction (MBSR)	Improved stress and anxiety levels with MBSR	8
Alirezaei et al.[22]	2022	Spain	Non-Randomized Controlled	Convenience sampling, n=25	HADS	Guided Imagery	Decreased anxiety levels with guided imagery	7
El-Sayed Ibrahim et al.[17]	2021	South Korea	Randomized Controlled Trial	Probability sampling, n=90	PSS, STAI	Yoga	Reduced stress and anxiety in the yoga group	9
Yang et al.[3]	2021	China	Controlled Before-After	Convenience sampling, n=40	PSS, STAI	Progressive Muscle Relaxation (PMR)	Reduction in stress and anxiety levels with PMR	6
Arani et al[26] .	2023	India	Randomized Controlled Trial	Convenience sampling, n=100	PSS, STAI	Mindfulness-Based Stress Reduction (MBSR)	Significant reduction in stress and anxiety with MBSR	9
Muhammad Khir et al.[27]	2024	South Korea	Controlled Before-After	Non-probability sampling, n=50	PSS, STAI	Guided Imagery	Decrease in stress and anxiety levels with guided imagery	7

4. Discussion

The present systematic review aimed to investigate the effectiveness of relaxation techniques in reducing stress and anxiety among infertile women. The findings from the 18 included studies provide valuable insights into the potential of various relaxation interventions to alleviate the psychological burden experienced by women facing infertility. This discussion will explore and interpret the key themes that emerged from the review, consider the implications of the results, discuss the methodological strengths and limitations, and offer recommendations for future research.

4.1. Theme 1: Mindfulness-based stress reduction (MBSR)

The first theme that emerged from the review focused on Mindfulness-Based Stress Reduction (MBSR) interventions. The results consistently demonstrated that MBSR interventions were associated with significant reductions in perceived stress and anxiety levels among infertile women. These findings are consistent with previous research on MBSR, which has shown its efficacy in promoting emotional well-being and reducing stress in various populations.[28] The practice of mindfulness meditation and mindful movement appears to offer a valuable approach to help infertile women cope with the emotional challenges of infertility and fertility treatments.[26] By cultivating present-moment awareness and non-judgmental acceptance, MBSR equips participants with essential skills to navigate the stress and uncertainties associated with infertility.

4.2. Theme 2: Yoga

The second theme of the review centered around Yoga interventions for infertile women. The results consistently indicated that Yoga interventions were effective in reducing stress and anxiety levels. This is in line with previous research, which has highlighted the positive impact of Yoga on emotional well-being and stress reduction.[6] The holistic approach of Yoga, integrating physical postures, breath control, and meditation, may address the multifaceted stress experienced by infertile women. The mind-body connection fostered through Yoga practice empowers participants and promotes overall psychological resilience.[15] The findings suggest that Yoga can serve as a valuable adjunctive therapy for infertile women in managing emotional distress and enhancing their quality of life.

4.3. Theme 3: Progressive muscle relaxation technique (PMR)

The third theme explored in the review was the use of Progressive Muscle Relaxation Technique (PMR) as a relaxation intervention. The results consistently demonstrated that PMR interventions led to a decrease in state anxiety levels among infertile women. This finding is supported by previous research on PMR, which has shown its effectiveness in anxiety management and stress reduction.[29] By providing a structured approach to physical and mental relaxation, PMR equips participants with practical tools to cope with the emotional challenges associated with infertility.[20] The ease of implementation and accessibility of PMR make it a feasible and appealing intervention for infertile women seeking to manage their anxiety.

4.4. Theme 4: Guided imagery

The fourth theme focused on Guided Imagery as a relaxation technique for infertile women. The results consistently demonstrated that Guided Imagery interventions were effective in reducing anxiety levels. This finding aligns with previous research on Guided Imagery, which has highlighted its potential in anxiety reduction and improving emotional well-being.[30] By providing participants with a guided and structured visualization process, Guided Imagery offers a safe mental space to manage anxiety and promote relaxation.[24] The findings suggest that Guided Imagery can serve as a valuable tool in the psychological support of infertile women during their fertility journey.

5. Implications of the Results

The results of this systematic review have significant implications for clinical practice and research. Firstly, the findings suggest that relaxation techniques, such as MBSR, Yoga, PMR, and Guided Imagery, can be integrated into infertility counseling and reproductive healthcare settings to provide valuable support to infertile women facing emotional distress. These interventions offer accessible and cost-effective strategies to enhance emotional well-being and coping skills. Secondly, the study results highlight the importance of adopting a holistic approach to infertility care, which considers not only the physical aspects but also the emotional and psychological needs of infertile women.

6. Methodological Strengths and Limitations

The systematic review utilized a rigorous search strategy and inclusion criteria to identify relevant studies. The inclusion of randomized controlled trials, non-randomized controlled trials, and controlled before-after studies adds to the strength and diversity of the evidence. Moreover, the use of standardized instruments to measure stress and anxiety levels enhances the comparability of the findings across studies. However, some limitations should be acknowledged. The majority of the included studies were conducted in high-income countries, limiting the generalizability of the findings to more diverse populations.

Additionally, the variations in study designs, sample sizes, and outcome measures may introduce heterogeneity and impact the overall conclusions.

7. Recommendations for Future Research

To further advance the field, future research should focus on conducting high-quality randomized controlled trials with larger and more diverse samples. Long-term follow-up assessments are essential to explore the sustained effects of relaxation interventions on stress and anxiety levels among infertile women. Furthermore, studies could investigate the potential moderating factors, such as age, infertility diagnosis, and previous fertility treatments, to identify subgroups that may benefit most from specific relaxation techniques.

8. Conclusion

In conclusion, this systematic review provides compelling evidence for the effectiveness of relaxation techniques in reducing stress and anxiety among infertile women. The key themes that emerged from the review, including Mindfulness-Based Stress Reduction (MBSR), Yoga, Progressive Muscle Relaxation Technique (PMR), and Guided Imagery, offer valuable insights into the potential of these interventions as supportive tools in the management of emotional distress related to infertility. The consistent findings of stress and anxiety reduction across various relaxation techniques underscore their potential as accessible and cost-effective adjunctive therapies in infertility counseling and reproductive healthcare settings.

9. Source of Funding

None.

10. Conflict of Interest

None.

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