# 1.0 INTRODUCTION

Post-traumatic stress disorder (PTSD) is a debilitating condition resulting from traumatic events. These events may include single or multiple occurrences, leading to PTSD symptoms such as re-experiencing (e.g., intrusive memories or nightmares about the trauma), avoidance of trauma-related reminders, negative alterations in cognitions and mood (e.g., inability to experience positive emotions), and alterations in arousal and reactivity (e.g., sleep disturbance and irritability) (American Psychiatric Association, 2013).

In 2013, PTSD was reclassified in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) under trauma and stressor-related disorders, distinguishing it from anxiety and depressive disorders. Diagnosis requires exposure to significant trauma and persistent impairment in daily functioning for over a month.

## 1.1 DSM-V CRITERIA FOR PTSD

To diagnose PTSD in individuals over six years old, all the following criteria (A–H) must be met.

A) Exposure to actual or threatened death, serious injury, or sexual violence in one (or more) of the following ways:

1. Directly experiencing the traumatic event(s).
2. Witnessing, in person, the event(s) as it occurred to others.
3. Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
4. Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse). **Note:** Criterion A4 does not apply to exposure through electronic media, television, movies, or pictures, unless this exposure is work related.

B. Presence of one (or more) of the following intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred:
    1. Recurrent, involuntary, and intrusive distressing memories of the traumatic event(s). **Note:** In children older than 6 years, repetitive play may occur in which themes or aspects of the traumatic event(s) are expressed.
    2. Recurrent distressing dreams in which the content and/or affect of the dream are related to the traumatic event(s). **Note:** In children, there may be frightening dreams without recognizable content.
    3. Dissociative reactions (e.g., flashbacks) in which the individual feels or acts as if the traumatic event(s) were recurring. (Such reactions may occur on a continuum, with the most extreme expression being a complete loss of awareness of present surroundings.) **Note:** In children, trauma-specific reenactment may occur in play.
    4. Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
    5. Marked physiological reactions to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).
C. Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred, as evidenced by one or both of the following:
    1. Avoidance of or efforts to avoid distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
    2. Avoidance of or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings about or closely associated with the traumatic event(s).
D. Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
    1. Inability to remember an important aspect of the traumatic event(s) (typically due to dissociative amnesia, and not to other factors such as head injury, alcohol, or drugs).

2. Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., “I am bad,” “No one can be trusted,” “The world is completely dangerous,” “My whole nervous system is permanently ruined”).
3. Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others.
4. Persistent negative emotional state (e.g., fear, horror, anger, guilt, or shame).
5. Markedly diminished interest or participation in significant activities.
6. Feelings of detachment or estrangement from others.
7. Persistent inability to experience positive emotions (e.g., inability to experience happiness, satisfaction, or loving feelings).

E. Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred, as evidenced by two (or more) of the following:
    1. Irritable behavior and angry outbursts (with little or no provocation), typically expressed as verbal or physical aggression toward people or objects.
    2. Reckless or self-destructive behavior.
    3. Hypervigilance.
    4. Exaggerated startle response.
    5. Problems with concentration.
    6. Sleep disturbance (e.g., difficulty falling or staying asleep or restless sleep).
F. Duration of the disturbance (Criteria B, C, D and E) is more than 1 month.
G. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
H. The disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol) or another medical condition.

Additionally, the DSM-V recognizes subtypes or specifiers of PTSD, including:

- Those with dissociative symptoms:
    - Depersonalization: Feeling detached from one’s body or thoughts.
    - Derealization: Feeling the world is unreal, dreamlike, or distorted.

- With delayed expression: If the full diagnostic criteria are not met until at least 6 months after the event (though some symptoms may be present immediately).

These symptoms are grouped into four main clusters: **intrusion**, **avoidance**, **negative alterations in cognition and mood**, and **marked alterations in arousal and reactivity**.

Intrusive symptoms (at least one): Distressing memories, dreams, flashbacks, psychological distress, or physiological reactions to trauma-related cues.

- **Avoidance symptoms** (at least one): Avoidance of trauma-related thoughts, feelings, or external reminders.
- **Negative alterations in cognition/mood** (at least two): Dissociative amnesia, negative beliefs, persistent negative emotions, anhedonia, detachment, or inability to experience positive emotions.
- **Arousal/reactivity symptoms** (at least two): Irritability, reckless behavior, hypervigilance, exaggerated startle response, poor concentration, or sleep disturbances.

## 1.2 TYPES OF TRAUMA

**Two types of trauma:**

- Type I Trauma: Refers to a single episode of trauma, such as a car accident or a natural disaster.
- Type II Trauma or Complex Trauma: Involves repeated, chronic, and prolonged exposure to trauma (Herman & van der Kolk, 2020).

Complex PTSD (cPTSD) can emerge from complex trauma, often involving interpersonal situations from which escape is difficult or impossible (Bisson et al., 2019). This includes witnessing and/or experiencing childhood abuse, intimate partner violence, and social/political violence through war and torture

The DSM-V reports that nearly all individuals meeting the criteria for cPTSD also meet the criteria for PTSD, leading to the conclusion that cPTSD is "a more severe form of PTSD" (Friedman, 2013). Consequently, the DSM-V does not provide separate diagnostic criteria for cPTSD. Instead, it focuses on the behavioral symptoms associated with PTSD and includes subtypes such as dysphoric/anhedonic and externalizing PTSD phenotypes within the 20-symptom criteria (B–E). Additionally, the DSM-V identifies two subtypes of PTSD:

- **Dissociative Subtype**: Characterized by experiences of feeling detached from one's own mind or body or perceiving the world as unreal, dreamlike, or distorted.
- **Preschool Subtype**: For children six years and younger, incorporating developmental factors affecting PTSD expression in young children.

### 1.3 PTSD PREVALENCE

PTSD can be caused due to any exposure to traumatic events, war being the most prevalent source. In a meta-analysis, 26.51% of global point prevalence was estimated for PTSD in war veterans across 43 war-ridden countries with a war history of 30 years, and among them, 55.26% had major depression. PTSD also had large disability-adjusted life years of 3 million (Thole et al., 2021). While wars are outrageous causes, more pervasive yet non-evident causes are day-to-day domestic violence and other choiceless events. A review by Gilmoor et al. (2019) (Gilmoor et al., 2019) showed that the second-highest prevalence of PTSD in India was related to in violence and abuse (28%), followed by natural disaster survivors (31%). Man-made crises such as communal domestic violence are prevalent in India (Pillai et al., 2016), influencing trauma exposure through unique cultural norms and a collectivist society (Pillai et al., 2016). In India, a wide range (18%-70%) of the prevalence of domestic violence has been reported (Babu & Kar, 2010), and a recent study reports spousal violence of 29%-40.5% (Katole et al., 2023). According to the National Crime Records Bureau (NCRB, 2023) between 2001 and 2022, in India, every day around 1290 incidences of crime happen against women, and this rate has been increasing at a rate of 4.6% every year (Bureau, 2023). The cultural relevance of Western-developed interventions for the mental health consequences of domestic violence in India has been questioned (Bracken et al., 1997; (Harbishettar & Math, 2014). Understanding culture-specific responses to global interventions is crucial for clinical practice and the rehabilitation of survivors exhibiting PTSD, depression, and anxiety in response to domestic violence (DV).

Recent large-scale estimates by the National Institute of Mental Health and Neuro Sciences (NIMHANS) indicated a weighted prevalence of PTSD at 0.24% in a representative sample (Gautham et al., 2020). However, individual studies present highly varying prevalence estimates, complicating a clear conceptual understanding of PTSD in India. These findings challenge the notion that PTSD is solely a western phenomenon, emphasizing the need to explore and understand it within the Indian socio-cultural context for effective rehabilitation efforts (Pillai et al., 2016).

## 1.4 PTSD TREATMENT

1. **First-Line**: Trauma-focused therapies (e.g., prolonged exposure therapy (PET), Eye Movement Desensitization and Reprocessing (EMDR), Cognitive Behavioral Therapy **(**CBT), cognitive processing therapy (CPT)).
2. **Alternative**: Non-trauma-focused therapies (e.g., stress inoculation training, interpersonal psychotherapy).
3. **Additional**: Other therapies (e.g., dialectical behavioral therapy, acceptance and commitment therapy).

The latest evidence strongly supports the use of trauma-focused therapies as the gold standard for treatment. These therapies include CPT, PET, and EMDR, among others that specifically address trauma (American Psychological Association, 2017; Bisson et al., 2019; Bisson & Olff, 2021). Additionally, medication may assist in alleviating symptoms, though benzodiazepines and other sedative hypnotic medications should be avoided due to their potential to increase intrusive and dissociative symptoms over time. The Department of Veterans Affairs (VA) and the Department of Defense (DoD) published updated in 2017 (VA/DoD, 2017) a clinical practice guideline for the management of Post-Traumatic Stress and Acute Stress Reaction. The updated guidelines aim "to facilitate understanding of the clinical decision-making process used in the management of PTSD" (p. 27), covering diagnostic assessment and therapeutic decision-making for both pharmacological and psychosocial interventions.

## 1.5 SOCIAL BARRIERS RELATED TO PTSD

The majority of these victims are likely to develop PTSD and remain undiagnosed and unreported and hence addressing this issue of non-seeking of professional help needs our serious attention. One in every five adult critical care survivors may experience PTSD symptoms, with a high relapse rate of one year after discharge (Righy et al., 2019).

The majority of the cases of PTSD are undiagnosed (Gagnon-Sanschagrin et al., 2022) and even among those diagnosed, not all seek treatment (Trusz et al., 2011). Both internal psychological factors and external social factors drive this behavior. Intrinsic factors are predominantly related to cognitive processes, whereas extrinsic factors are shaped by social processes. The dominance

of patriarchal culture leads to unequal participation of women in social and governance activities due to stereotypical views on gender-specific social roles. Hence, women were marginalized across the strata of caste, class, and religion. The discriminatory treatment and rise in DV cases in the country are reflections of such ingrained perceptions about women, where they are seen only in secondary and utilitarian roles; perhaps their benevolence and non-competitiveness were always taken for granted (Gupta, 2023). More sadly, the likelihood of violence against infertile women is higher compared to women with children, with prevalence rates varying across countries, including India (Alijani et al., 2019). This demonstrates the hyper-skewed gender stereotype. Further, the risk factors associated with DV in India are also linked with age, education, occupation, marital duration, and husband's alcoholism, suggesting complex socio-economic dynamics in action. It's our collective misfortune that despite being developed in various aspects, they have constructed a very poor social framework, where such gender-specific myopic social schemas are breaded (Vogt et al., 2017).

### 1.5.1 Why do PTSD victims avoid seeking external support?

When violence is from the near ones where is the question of seeking mental health support due to the trauma endured? Many women are left to suffer due to this sociological dilemma. The fear of stigmatization in PTSD is a significant concern, as evidenced by several studies on public and self-stigma associated with the condition. Public stigma is the attitude held by the society towards a group of individuals due to their situation or condition, characterized by stereotypes, prejudice, and discrimination. The severity of stigma is closely associated with the type of setting, and nature of trauma (Krzemieniecki & Gabriel, 2021; Thibodeau & Merges, 2024). Once the victims internalize the negative stereotypes, prejudices, and discriminatory attitudes that the society holds against them, it can affect their self-esteem and self-worth, leading to a range of negative PTSD-specific psychological outcomes. The prevalence of self-stigma among individuals with PTSD was found to be 41.2%, with lower income and higher levels of anxiety, depression, and traumatic stress symptoms as major associated factors (Lewis et al., 2022). These factors make the situation much more complex and prohibit them, both intrinsically and extrinsically, from seeking professional help. The study of social circumstances before, during, and after trauma exposure therefore becomes valuable (Vogt et al., 2017).

### 1.5.2 How such an unaddressed issue can impact social harmony in the long run?

The aftermath of the experience of trauma is nowhere less than a deeper psychological agony and shock. The trauma experiences lead to a shift in the evaluation, interpretation, and labeling of an individual's internal experiences, resulting in generalized patterns of emotional responding characterized by efforts to downregulate internal stimuli that were previously defined as positive (Bishop & Palm Reed, 2022). PTSD is associated with significant impairment in global social functioning, as it can lead to negative, and long-lasting impacts on general functioning, including social functioning and quality of life, involving psychological, physical, social, and environmental domains (Scoglio et al., 2022). Hence, a systems approach is suggested that considers individual and social dynamics in understanding the barriers to effective interventions in PTSD, highlighting the interconnected social, behavioral, and medical variables (PTSD: Five Vicious Cycles that Inhibit Effective Treatment).

## 1.6 YOGA AND PTSD

Yoga is one such treatment that is gaining popularity and proof of its effectiveness in treating a variety of mental health issues, including PTSD (Macy et al., 2018). Yoga is a mind-body practice that consists of lifestyle principles, physical postures, breathing exercises, meditation, and relaxation (Khalsa et al., 2016). Yoga can help reduce stress, improve mood, and coping abilities, and boost overall well-being. Different forms of yoga interventions have been used to manage PTSD symptoms and enhance functioning in a variety of populations suffering from PTSD. In a study on veterans, *Sudharshana kriya yoga* (Bayley et al., 2022; Mathersul et al., 2019; Schulz-Heik et al., 2017a), women survivors of sexual violence, Trauma-sensitive yoga (Kelly et al., 2021; Zaccari et al., 2022), and disaster victims, *Haṭha Yōga* and breathing component (Descilo et al., 2010; Telles et al., 2010). Though scientific evidence shows that yoga-based interventions for PTSD are efficient in ameliorating PTSD symptoms, there was significant heterogeneity in the yoga interventions used in these studies combined with low-quality evidence and a high dropout rate (Cramer et al., 2018; Niles et al., 2018). One of the limitations in most of the research mentioned earlier is that the participants belonged to high-income nations, where cultural diversity and generalizability are limited. In the context of accessibility to PTSD patients, especially those

in remote areas, the role of telemedicine is found to be significant, although the issue of internet connectivity in rural areas is debatable.

### 1.7 TELE-YOGA AS A POTENTIAL PTSD INTERVENTION

Generally, the first-line treatments of PTSD include trauma-focused therapies such as CPT, PET, and EMDR (American Psychological Association, 2017; Bisson et al., 2019; Bisson & Olff, 2021).To add on, a meta-analysis on PTSD indicated poor effect sizes for pharmacological treatments for PTSD in comparison to other psychological treatments (Coventry et al., 2020; Hoskins et al., 2015). Though quite effective in a clinical setting, it still fails to reach the stigma-ridden non-seeking individuals with PTSD.

In this direction, telemedicine has emerged as an effective and feasible method for delivering evidence-based treatments for PTSD (Olden et al., 2016). In telemedicine interventions are delivered through video-teleconferencing where caregivers and receivers come together in a digital space yet preserving their inner space. Such interventions offer high patient satisfaction and lower costs compared to face-to-face therapy. Some studies have reported significant reductions in PTSD symptoms in telemedicine groups, with some protocols demonstrating equivalency/noninferiority of video-teleconference mode compared to face-to-face treatment (Olden et al., 2016; Sunjaya et al., 2020). Even, office-based and home-based clinical videoconferencing setups were shown to be equally feasible and effective for delivering PTSD treatments, compared to traditional face-to-face care (Morland et al., 2020).

Thus, telepsychiatry has been acknowledged as an effective solution for managing PTSD, with comparable quality of treatment as in face-to-face therapy, with greater efficiency (Sunjaya et al., 2020). More importantly, telehealth technology plays a crucial role in addressing stigma and geographic-related barriers to treatment, such as travel time and cost (Yuen et al., 2015). Encouragingly, familiarity with telehealth and confidence in the technology was found to be unrelated to treatment outcomes for mental health treatment, reinforcing strongly that we must adopt telemedicine to address the overwhelming challenges of PTSD (Price & Gros, 2014).

## 1.8 CONCEPT OF TELE-YOGA, WHAT DOES IT DO, AND HOW IS IT DISTINCT?

Tele-yoga offers a novel approach to delivering yoga programs, addressing accessibility and safety concerns while providing physical and mental well-being benefits to diverse populations. The concept of tele-yoga involves delivering yoga sessions remotely, typically through live-streamed video sessions, as group or individual sessions (Haynes et al., 2022; Strömberg et al., 2021). It even allows individuals with long-term illnesses to participate in group yoga sessions from the comfort of their homes (Hedbom et al., 2023; Strömberg et al., 2021). The Research studies have shown that tele-yoga classes for conditions such as chronic pain (Mathersul et al., 2018), stroke/heart failure and chronic obstructive pulmonary disease (Selman et al., 2015), stress management during the COVID-19 pandemic (Jasti et al., 2020), substance uses disorder (Bhargav et al., 2022) and common mental health disorders (Jagannathan et al., 2021) are feasible, safe, appropriate, and acceptable as a form of therapy.

Another systematic review echoed similar promises suggesting tele-yoga interventions as a lower-cost, non-invasive intervention for a variety of physical and mental health disorders (Brosnan et al., 2021). Though teaching yoga through tele-mode has its challenges, technology, and instructors are innovating new methods to overcome them. In a reported study, yoga instructors have adapted to manage challenges associated with tele-yoga, such as threats to safety, altered interpersonal dynamics, and difficulties with technology, by implementing modifications like 1:1 participant interviews, more descriptive instructions, and increased attention and support (Gilchrist et al., 2023). In India, to guide the practitioners in this new tele-yoga landscape, the Central Council for Research in Yoga and Naturopathy (CCRYN), under the Ministry of AYUSH, Government of India, has released an advisory on tele-yoga services in 2020 (CCRYN, 2020). Though the advisory was released during the COVID-19 pandemic, it is not confined to the pandemic. It outlines various modalities of delivering yoga, such as general practices, targeted training, and therapeutic sessions, tailored to different needs and delivered through secure, interactive platforms. Moreover, it addresses ethical and legal considerations, ensuring that yoga services provided remotely maintain the same standards of confidentiality and professionalism as in-person sessions. This approach enables continuity of care and broadens access to yoga therapy, benefiting both current practitioners and new learners in diverse settings.

While scientific evidence recognizes the efficacy of in-person yoga-based interventions in managing PTSD symptoms, there's significant heterogeneity in intervention styles, dose, frequency, and targeted PTSD populations (Cramer et al., 2019; Niles et al., 2018). To address this diversity, applying a scientific process for developing and validating the specific yoga module is crucial. This becomes even more important in the case of the tele-yoga module. There are a few considerations for setting up a tele-yoga session, like the tele-yoga module should be co-designed input from members of a patient organization, yoga instructors, and IT technicians to ensure its effectiveness and feasibility. The prior to setting up a tele-yoga session, it is crucial to assess its feasibility, safety, and efficacy through methods such as randomised controlled trials (RCTs) and process evaluations(Gilchrist et al., 2023; Strömberg et al., 2021). Even yoga instructors should be prepared to address challenges such as threats to safety, altered interpersonal dynamics, and difficulties with technology, while leveraging opportunities presented by tele-yoga (Gilchrist et al., 2023); understanding the expectations of participants regarding tele-yoga is crucial, as it can significantly impact their satisfaction with treatment and care, and influence overall intervention outcomes (Hedbom et al., 2023); tele-yoga can increase access to healthcare for individuals with mobility issues like in Parkinson's disease or those located remotely, but safety considerations and the potential for adverse events should be carefully evaluated (James-Palmer & Daneault, 2022); research also indicates that the exercise intensity of tele-yoga is equivalent to in-person yoga, regardless of proficiency level, with no adverse events reported (Miura et al., 2023).

In this study, we propose a tele-yoga module that integrates the principles of yoga with the advantages of telemedicine technology. This approach offers a promising alternative to traditional face-to-face yoga therapy for PTSD, which are often inaccessible to those affected by social stigma or geographical limitations (Olden et al., 2016; Sunjaya et al., 2020). Our module was developed through a systematic process involving expert input and community validation, ensuring its cultural appropriateness and efficacy. This paper presents a series of three studies: the systematic development of a PTSD-specific yoga module, expert validation of the tele-yoga module, and evaluation of its feasibility and limited efficacy in a community setting. We aim to demonstrate how tele-yoga can serve as a viable and effective intervention for PTSD, potentially transforming mental health service delivery in settings burdened by stigma and logistical challenges.