6.0 RESULTS

6.1 STUDY 1: DEVELOPMENT OF TYM

We conducted an ancient and systematic review of scientific literature related to PTSD to generate a list of Yogic practices that can manage PTSD symptoms.

Ancient Literature Review: PTSD, also known as soldier's heart, shell shock, battle fatigue or war neurosis, has roots stretching back to earlier centuries (Loughran, 2017). PTSD is the collection of symptoms that plague some survivors of traumatic events, including nightmares, flashbacks, depression, and hyper-vigilance**.** When tracing back Indian literature with descriptions of PTSD symptoms, researchers found that the great Indian *Maharṣi Vālmīki* gave the earliest account describing PTSD symptoms around 5,000 years back in the *Rāmāyana.* However, he did not explicitly describe it as PTSD syndrome or any other disorder. In *Rāmāyana, Marici* a cousin brother of *Rāvaṇa* was described to be having symptoms of hyperarousal, re-experiencing and avoidance behavior, as characteristics of anxiety or PTSD after being hurt by Lord *Rāma* arrow (Sheth, Gandhi, & Vankar, 2010). In yoga philosophy, pain is a universal experience of all beings. Pain differs from suffering, which is often underlying mental health issues. The Yoga Sutras of *Maharṣi Patañjali* guide the practitioner through how to overcome the causes of suffering (e.g. the *klēśa*). There are five *klēśa,* or sources to suffering; ignorance (*avidyā*), ego-centeredness (*āsmitā*), attachment (*rāga*), hatred (dvēṣa), and fear of death (*abhinivēśā) (Iyengar., 1993)*. Of which *āsmitā, abhinivēśā* and *dvēṣa* are observed to be heightened in patients with PTSD, which results in self-centeredness, fear, hypervigilance, nightmares, flashbacks, anxiety, and avoidance projection in the mind. *Asmitā* leads to excess speed of thought in the mind that manifests as high *rajas* (one of three attributes of the mind: *sattva, rajas,* and *tamas*). *Rajas* (overactivity of the mind) creates a split in the *āsmitā,* from which *dvēṣa* (resistance to compulsion or avoidance in this context) arises, conflicts with each other, and finally results in *abhinivēśā* (fear). The *abhinivēśā* one's ability to perceive things the way they are, resulting in Avidya (Chronic confusion). Avidya leads to development and strengthening of *Viparyaya vṛtti*. *Viparyaya* is the state of mind in which a false projection is veiled on a true object, which can be observed in terms of PTSD, intrusive thoughts, hypervigilance, and flashbacks. Further, *Viparyaya vṛtti* fuels *āsmitā*

of the individual, thus continuing the chain of cycle. The *vṛtti* (bundle of thoughts) fall into five varieties, of which some are painful (*klēśa*) and others are pleasurable *(aklēśa*). The concept of *viparyaya* incorrect knowledge, *vikalpa*–fantasy or imagination and *smṛti* recollection or traumetic memory may be considered under the purview of PTSD. The procedures included would be focused on conventional text, which does not include precise symptom-based practice guidelines. Yoga is a science that aims for liberation rather than therapy. As a result, the module's portion would be selected based on a comparison of the mental and physical benefits of various yoga activities to the symptoms of PTSD.

The examination of ancient yoga practical texts revealed a total of seven *kriyas*, 16 *āsanas*, nine *prāṇāyāmas*, 14 *mudras & bandhas* (Table 1,2,3 & 4). Additionally, insights from fundamental texts provided coping strategies for dealing with traumatic memories, such as *cittaprasad*-cultivation of positive attitude. The findings also highlighted aspects of *astangayoga* path, *kriya yoga* path, *abhyasa*, and *vairagya*, among others. *Haṭha Pradīpikā, Gheraṇḍa Saṁhitā, Śiva Saṁhitā, Vasiṣṭha Saṁhitā, Yoga Vāsiṣṭha, Pātañjala Yoga Sūtra, and Bhagavad Gītā* were some of the yogic texts that explained a few *kriyas, āsanas* and *prāṇāyāma*, as well as counseling techniques, that could help with PTSD symptoms. The theoretical principles could be applied to yoga practice to alleviate the clinical features of PTSD, which were studied, either directly or indirectly. The list of practices included was based on traditional texts; those did not give exact symptom-based guidelines for practice. Hence, the components of the module were selected by approximating the description of the mental and physical benefits of specific yoga practices within the symptoms of PTSD.

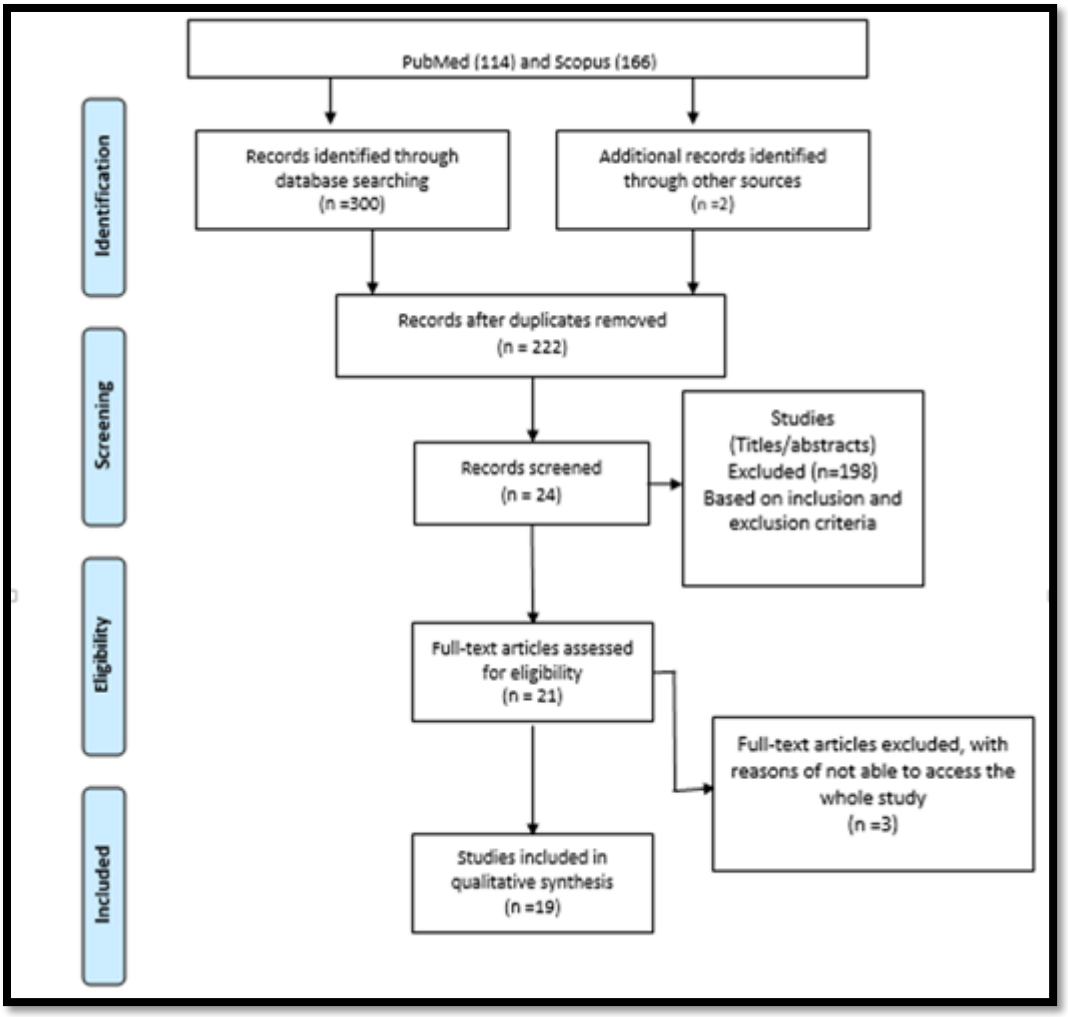
Scientific Literature Review: The systematic evaluation included 19 studies that met our study's eligibility criteria. A comprehensive overview of the RCTs (Table 8) and their respective interventions have been provided (Figure 3).

(1) Our systematic evaluation comprised 19 RCTs in total. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart (figure 3). Ninety-four duplicate articles were deleted from the 280 papers reviewed from Google Scholar, SCOPUS, and PubMed.

There were 196 articles; based on the inclusion and exclusion criteria, they were excluded. The full text of the 24 papers was reviewed, leaving us with 19 articles that were eligible for our study.

Table 8 intervention details of included RCTs

Figure 3: PRISMA flowchart. PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analysis



Among the 19 RCTs studies (Table-7), 40 varieties of yoga practices were identified, namely: nine *shithilikarana vyayama* (yoga joint loosening practices), one *suryanamaskar* (sun salutations), 18 *āsanas* (postures), seven *prāṇāyāma* (breathing practices), and five relaxation techniques. The majority of these practices are present in practical *haṭha Yōga* texts. 68% of the RCTs did not

explicitly specify the list of practices employed in their respective interventions. 42% of RCTs developed a yoga module without undergoing content validation by experts (Table 8). Among the studies reviewed (Mathersul et al., 2022; Bayley et al., 2022; Schulz-Heik et al., 2022; and Seppala et al., 2014), none utilized *Shithalikarana Vyayama.* Additionally, while these studies included various practices, they did not specify which ones. Our module incorporated five specific *Shithalikarana Vyayama* exercises based on expert recommendations.

In contrast, only one study (Quiñones et al., 2015) included *Surya Namaskara.* Experts suggested adding *Surya Namaskara* to the PTSD module due to its potential physical and mental health benefits. It is believed to reduce stress and anxiety by improving endocrine gland function, enhancing blood flow, and relaxing nerve cells or chakras. Furthermore, it helps calm the mind, improve concentration, and incorporates deep breathing in sync with the solar cycle.

Only two did not incorporate the *āsana* component in their yoga interventions for PTSD (Seppala et al., 2014; Carter et al., 2013). Among these, two studies used and specified the names of the *āsanas* in their modules (Quiñones et al., 2015; Nguyen-Feng et al., 2020). However, the remaining studies did not provide a list of the *āsanas* used in their interventions. Which is very difficult to replicate such interventions.

Among the mentioned studies, four studies did not include the *prāṇāyāma* component in their interventions (Kelly et al., 2021, Zaccari et al., 2022, Van der Kolk et al., 2014 Reinhardt et al.,2018). In contrast, five studies incorporated *prāṇāyāma* practices but did not specify the exact techniques used (Martin et al., 2015, Reddy et al.,2014, Mitchell et al., 2014, Dick et al., 2014, Huberty et al., 2020). The remaining studies clearly outlined the *prāṇāyāma* practices provided to participants with PTSD. In this TYM we included five varieties of *prāṇāyāma* techniques which are very beneficial to PTSD. The voluntary changes in breathing have also been correlated with changes in negative emotional states involved in PTSD and breathing may improve the balance and resilience of the stress response system.

Table 7: Identification of list practices form RCT

S. No	Reference	Type of traumatic population	Style of yoga	Intervention Development Information	Yoga Session Frequency and Duration	*Shithalikarana Vyayama*	*Āsanas*	*Prāṇāyāma*	Meditation/ Relaxation	Counselling
1	(Seppälä et al., 2014)	Military Veterans	Sudharshana kriya Yoga (SKY)	Adopted (Brown & Gerbarg, 2005)	7*180 min/week Duration is one week The dose is 21 hours	No	No	Ujjai, bhastrika & sky breathing	No	Yes
2	(Carter et al., 2013)	Military Veteran	SKY	Developed	22 hours of yoga over 5 days, 2-month group follow-up with weekly 1-class and next 4 months only 1 class per month	Yes, but NS	No	Ujjai, btrika & sky breathing	No	Yes
3	(Schulz-Heik et al., 2022)	Veterans	SKY	Adopted (Mathersul et al., 2019)	2*60 min/ Week & initial 5 days 3 hrs of workshop and duration of 5.5 weeks and overall dose is 25 hours	No	Yes, but NS	Ujjai, bhastrika & sky breathing	Guided meditation	Yes
4	(Bayley et al., 2022)	Veterans	SKY	Adopted (Mathersul et al., 2019)	2*60 min/ Week & initial 5 days 3 hrs of workshop and duration of 5.5 weeks and overall dose is 25 hours	No	Yes, but NS	Ujjai, bhastrika & sky breathing	Guided meditation	Yes
5	(Mathersul et al., 2022)	Veterans	SKY	Adopted(Mathersul et al., 2019)	2*60 min/ Week & initial 5 days 3 hrs of workshop and duration of 5.5 weeks and overall dose is 25 hours	No	Yes, but NS	Ujjai, bhastrika & sky breathing	Guided meditation	Yes
6	(Reinhardt et al., 2018)	Military Veterans	Kripalu yoga (KY)	Adopted(Johnston et al., 2015)	2*90 min/ week Duration is 10 weeks, and dose is 30 hours with daily 15 min home self-practice	Yes, but NS	Yes, but NS	No	Deep relaxation	No
7	(Martin et al., 2015)	Women of civilian	KY	Developed	1*75 min/week, Duration in 12 weeks, and Dose is 15 hrs	Yes, but NS	Yes, but NS	Yes, but NS	Yes, but NS	No
8	(Reddy et al., 2014)	Women of civilians and Veterans	KY	Adopted(Mitchell et al., 2014)	1*75 min/week, Duration in 12 weeks, and Dose is 15 hrs	Yes, but NS	Yes, but NS	Yes, but NS	Yes, but NS	No

S. No	Reference	Type of traumatic population	Style of yoga	Intervention Development Information	Yoga Session Frequency and Duration	*Shithalikarana Vyayama*	*Āsanas*	*Prāṇāyāma*	Meditation/ Relaxation	Counselling
9	(Mitchell et al., 2014)	Women of civilian and Veterans	KY	Developed	1*75 min/week, Duration in 12 weeks, and Dose is 15 hrs	Yes, but NS	Yes, but NS	Yes, but NS	Yes, but NS	No
10	(Dick et al., 2014)	Women of civilian and Veterans	KY	Adopted (Mitchell et al., 2014)	1*75 min/week, Duration in 12 weeks, and Dose is 15 hrs	Yes, but NS	Yes, but NS	Yes, but NS	Yes, but NS	No
11	(Yi et al., 2022)	Women of Civilian	KY	Developed	2* 45 min/ weeks, duration is 12 weeks and dose is 18 hrs	NS	Yes, but NS	Yes, but NS	NS	No
12	(Jindani et al., 2015)	Civilian community	Kundalini Yoga	Developed	1*90 min/week, duration is 8 weeks dose is 12 hrs, and daily 15 min home practice	Yes, but NS	Yes, but NS	Yes, but NS	Yes, but NS	Yes
13	(van der Kolk Laura et al., 2014)	Women of Civilian	Trauma Sensitive Yoga (TSY)	Adopted	1*60 min/ Week, Duration is 10 weeks and dose is 10 hrs	Yes, but NS	Yes, but NS	No	Yes	No
14	(Emerson & Hopper, 2012)	Military women Veterans / Sexual Trauma	TSY	Adapted (Emerson et al., 2009)	1*60 min/week, Duration is 10 weeks and dose is 10 hrs	Yes, but NS	Yes, but NS	No	Yes	No
15	(Kelly et al., 2021)	Military women veterans/ Sexual trauma	TSY	Adapted (Emerson et al., 2009)	1*60 min/week, Duration is 10 weeks and dose is 10 hrs	Yes, but NS	Yes, but NS	No	Yes	No
16	(Nguyen-Feng et al., 2020)	Civilian Women (Childhood Sexual Trauma)	TSY	Adopted (Emerson & Hopper, 2012)	1*60 min/ Week, Duration is 10 weeks and dose is 10 hrs	Yes, but NS	Yes, but NS	No	Yes (Relaxation)	No
17	(Huberty et al., 2020)	Stillbirth Mothers	*Haṭha Yōga* through pre-recorded video	Developed	1*60 min/Week or 1*150 min/Week, duration is 12 weeks and dose is 12-30 hrs	Yes, but NS	Yes, but NS	Yes, but NS	Yes	No

NS: Not specified

With this analysis, a consistent pattern emerged with the examination of the prescribed frequency and duration of yoga sessions across studies. The sessions occurred between one time intervention (Martin et al., 2015) to seven-time interventions (Seppala et al.,2014) per week. The duration of the interventions ranged from 45 minutes to 180 minutes per session. 53% of the studies reported a 60-minute dose of the intervention per session. Intervention durations varied from a concise one-week intervention (Seppälä et al., 2014) to a more extended 16-week program (Quiñones et al., 2015).

Five studies on *Sudarashana yoga,* five studies on *kripalu* yoga, four studies on trauma-sensitive yoga and the remaining such are *haṭha Yōga, kundalini yoga,* and *stayananda yoga* (see in RCT table 8) were used across the 19 studies.

6.2 STUDY- 2: VALIDATION OF DEVELOPED TYM BY 23 EXPERTS

The content validation of the TYM involved 23 yoga experts from different schools of yoga, including two clinical psychologists, one psychiatrist, and one counselor. These experts also had tele-yoga teaching, mental health, and yoga research expertise. The experts, with an average age of 37.39 (± 5.47) years, demonstrated significant research experience of 7.08 (± 3.32) years and an average online teaching duration of 2.52 years (± 1.62). Eight experts had only in-person teaching experience. The average years of experience in yoga therapy for mental health were 4.56 (±1.16) years (Table-8).

Table 8: Socio-demographic details of experts for validation (n = 23)

S. No	**Variable**	**Mean ± SD**
1	Age	37.39 ± 5.47
2	Gender	Female-8 and male-15
3	Education(years)	20.69 ± 2.56
4	Duration of research experience in yoga field	7.08 ± 3.32
6	Duration of teaching online yoga	2.52 ± 1.62

Thirty yoga practices, each with a CVR calculation exceeding 0.39, were selected for the final TYM (Table 9), with modifications to *yoga nidra* and selected *āsanas*. TYM comprised 30 of the 45 recognized yogic practices, including *shithilikarana vyayama, surya namaskar, 15- āsanas*, five-*Prāṇāyāma*, *yoga nidra* (guided relaxation technique), *trāṭaka*, an eye gazing technique (preferably on a candle flame), and yogic counseling. The 86% of experts recommended an ideal TYM of 48 sessions over 12 weeks, four sessions per week (60 minutes each), and an additional weekly 20–30-minute session for yogic counseling. As per the highest CVR rate hisgh as one, the practices are the more specific practices, and they can be practiced in 30 minutes (Table 10). The experts' consensus on the sequence included an opening prayer, *shithalikarana vyayama, surya namaskara, āsanas, prāṇāyāma, trāṭaka, yoga nidra*, and *yogic* counseling.

Expert insights:

Certain standing *āsana*s may pose contraindications and adverse effects for PTSD patients, including stress or giddiness in poses like *Ardhacakrāsana* and *Pādahastāsana*. Safety concerns arise for older individuals and those with comorbidities like hypertension. Caution is advised for patients experiencing giddiness or musculoskeletal issues, and supervision by a qualified instructor is recommended to ensure safety. Practitioners should be mindful of the limitations of each *Prāṇāyāma* technique and ensure effortless practice to avoid side effects such as heavy headedness. *Bhastrikā* and *Kapālabhātī* may induce undue pressure, especially if performed rapidly, and *ujjāyī* breathing's effect on sympathetic functioning should be clarified for accuracy. It's advisable to perform *bhastrikā* at a slow to moderate pace to prevent overstimulation. Vigorous practices should be avoided, and supervision by a yoga instructor is recommended. In some cases, *bhastrikā* and *kapālabhātī* may be omitted if the patient experiences anxiety.

Individuals with past traumatic experiences related to fire may respond negatively to *jyotir trāṭaka*, requiring modifications in the practice. The silent nature and darkness of *trāṭaka* may trigger trauma, necessitate specific safety instructions and address fearful thoughts. Prolonged gazing should be avoided to prevent overstimulation or flashbacks. Basic level *trāṭaka* and controlled gaze pressure are recommended. The patient's history should be considered to avoid triggering traumatic events, especially when setting up in complete darkness. Practice should be supervised by a yoga instructor, and individuals with epilepsy may be advised to avoid participation.

Precautions to be taken Experts suggested the following precautions to be taken by the therapist during the intervention:

1. Patience and Attention: Instructors emphasized the importance of patience and giving full attention to teaching and observing participant responses.

2. Simplicity and Sensitivity: They advised making yoga easy for participants, avoiding complex *āsanas*, and focusing on trauma-sensitive approaches, such as gentle yoga and modifications as needed.

3. Experience: Experience in working with mental health patients, especially those with PTSD, was highlighted as crucial for effective instruction.

4. Trauma-Sensitive Training: There was a suggestion for instructors to learn more about trauma-sensitive yoga, including aspects like touch, modifying instructions, and fostering sensitivity to participants' needs.

5. Quality Over Quantity: Instructors recommended prioritizing quality over quantity, conducting sessions at a slow pace, and giving ample time for each practice.

6. Tone and Approach: They advised maintaining a mild, soft, and stable tone during instruction to avoid startling participants and ensure a relaxing experience.

7. Communication and Rapport: Building rapport with participants, clear communication, and addressing doubts and misconceptions at the end of the session were considered essential.

8. Professionalism: Instructors should have a basic understanding of professionalism, maintain appropriate boundaries, and ensure therapy is conducted responsibly without compromising personal space.

9. Knowledge of PTSD: Basic knowledge of PTSD and its management in modern medicine or other medical sciences was suggested as beneficial for instructors.

10. Qualifications: While certain qualifications were mentioned, building a good rapport with patients was deemed most important.

In summary, yoga practices for PTSD patients must be carefully selected, adapted, and supervised to ensure safety and effectiveness, with considerations for individual needs and potential adverse effects. Overall, instructors emphasized the need for patience, simplicity, sensitivity, experience, and professionalism when working with PTSD patients in yoga therapy sessions.

Table 9: Therapeutic Yoga Module (TYM) for PTSD with CVR Scores (N=23)

S. No	Item Name	Expert Ratings (1 / 2 / 3)	CVR	% Rated Essential	Inclusion Status	Time (Min)	Rounds	Remarks
1	Opening Prayer	21 / 2 / 0	0.826	91.30	Included	1	1	-
2	Neck Movement	22 / 1 / 0	0.913	95.62	Included	1	3	-
3	Wrist Joint Rotation	18 / 5 / 0	0.565	78.26	Included	0.5	5	-
4	Both Arm Rotation	12 / 8 / 0	0.304	65.21	Excluded	-	-	-
5	Shoulder Rotation	20 / 3 / 0	0.739	86.95	Included	0.5	5	-
6	Hip Rotation	19 / 4 / 0	0.652	82.60	Included	1	5	-
7	Ankle Rotation	20 / 3 / 0	0.739	86.95	Included	1	5	-
8	Forward-Backward Bending	13 / 6 / 0	0.138	56.52	Excluded	1	5	-
9	*Surya Namaskara (SN)*	17 / 5 / 2	0.478	73.92	Included	5	4–6	Chair SN optional
10	*Śavāsana*	22 / 1 / 0	0.913	95.62	Included	1	1	-
11	*Vṛkṣāsana*	16 / 7 / 0	0.391	69.56	Included	1	1	-
12	*Tṛikoṇāsana*	18 / 4 / 1	0.565	78.26	Included	1	1	-
13	*Vīrabhadrāsana-1*	16 / 6 / 1	0.391	69.56	Included	1	1	-
14	*Vīrabhadrāsana-2*	16 / 6 / 1	0.391	69.56	Excluded	1	1	-
15	*Ardhakati Cakrāsana*	20 / 2 / 1	0.739	86.95	Included	1	1	-
16	*Ardha Cakrāsana*	19 / 3 / 1	0.652	82.60	Excluded	-	-	Part of SN
17	*Pāda Hastāsana*	18 / 5 / 0	0.562	78.26	Excluded	-	-	Part of SN
18	*Padmāsana*	-	-0.043	47.86	Excluded	-	-	-

S. No	Item Name	Expert Ratings (1 / 2 / 3)	CVR	% Rated Essential	Inclusion Status	Time (Min)	Rounds	Remarks
19	*Pārśva Śukhasana*	16 / 6 / 1	0.391	69.56	Included	1	1	-
20	*Gomukhāsana*	17 / 6 / 0	0.478	73.91	Included	1	1	-
21	*Ardha Uṣṭrāsana*	17 / 4 / 2	0.478	73.91	Included	1	1	-
22	*Śaśaṅkāsana*	21 / 2 / 0	0.826	91.30	Excluded	-	-	Part of SN
23	*Vakrāsana*	19 / 4 / 0	0.652	82.60	Included	1	1	-
24	*Ardha Matsyendrāsana*	10 / 11 / 2	-0.13	43.47	Excluded	-	-	-
25	*Paścimottānāsana*	19 / 3 / 1	0.652	82.60	Included	1	1	-
26	*Siṃhagarjāsana*	14 / 7 / 2	0.217	60.86	Excluded	-	-	-
27	*Padottānāsana*	17 / 5 / 1	0.478	73.91	Included	1	1	-
28	*Nāvāsana*	15 / 8 / 0	0.304	63.21	Excluded	-	-	-
29	*Setubandhāsana*	19 / 4 / 0	0.652	82.60	Included	1	1	-
30	*Śarvāṅgāsana*	16 / 6 / 1	0.391	69.56	Excluded	-	-	Difficult to teach online
31	*Matsyāsana*	14 / 8 / 1	0.217	60.86	Excluded	-	-	-
32	*Merudaṇḍāsana*	17 / 6 / 0	0.478	73.91	Included	1	1	-
33	QRT (Quick Relaxation Technique)	23 / 0 / 0	1	100	Included	3	1	-
34	*Makarāsana*	22 / 0 / 1	0.913	95.65	Excluded	-	-	Śavāsana already included
35	*Dhanurāsana*	15 / 8 / 0	0.304	65.21	Excluded	-	-	-

S. No	Item Name	Expert Ratings (1 / 2 / 3)	CVR	% Rated Essential	Inclusion Status	Time (Min)	Rounds	Remarks
36	*Śalabhāsana*	15 / 8 / 0	0.304	65.21	Excluded	-	-	-
37	*Bhujaṅgāsana*	21 / 2 / 0	0.826	91.30	Excluded	-	-	Part of SN
38	*Kapālabhāti Kriya*	16 / 5 / 2	0.391	69.56	Included	2	2 rounds, 20–30 strokes	-
39	*Bhastrikā prāṇāyāma*	17 / 3 / 3	0.478	73.91	Included	2	2 rounds, 10–15 strokes	-
40	*Ujjāyī prāṇāyāma*	19 / 4 / 0	0.652	82.60	Included	2	2 rounds, 6–8 breaths/ min	-
41	*Nāḍiśuddhi prāṇāyāma*	22 / 1 / 0	0.913	95.65	Included	2	12	-
42	*Bhramarī prāṇāyāma*	23 / 0 / 0	1	100	Included	2	8	-
43	*Trāṭaka*	20 / 3 / 0	0.739	86.95	Included	15	1	-
44	DRT (Deep Relaxation Technique)	22 / 1 / 0	0.913	95.65	Included	5	1	-
45	Yogic Counseling	23 / 0 / 0	1	100	Included	20	Weekly	-

Note: Expert Ratings (1 / 2 / 3): 1-Essential/2- Essential but not useful/3-not necessary

6.2.1 Table 10: Full and short versions (selected based on highest CVR rate) of TYM for PTSD

Tele Yoga Module for PTSD	Details	Duration
Prayer	OM chanting	1 min (3 rounds)
Loosening Practices	Neck movements, Shoulder rotations, Spine twisting, Hip rotation, Knee rotation, Ankle rotation	5 min
Surya Namaskara (SN)	A series of 12 postures practiced in a flow	5 min (4 rounds)
*śavāsanam**	Breathing awareness in the supine position	1 min
Asanas	*Vrukṣāsana, Trikoonāsana, Vérabhadräsana-1, Ardhakaṭi cakrāsana, Parsvā sukhāsana,Gōmukhāsanam,Ardhā uṣṭrāsana, Vakrasāsana, Paścimōttānaṁ āsana, Setubhandāsana,Merudandāsana.*	10-15 min (1 round)
śavāsanam	Breathing awareness in the supine position	1 min
Kriyas & Prāṇāyāma	*Kaphalabhāthi kriya, Bhastrika prāṇāyāma,Ujjāyī prāṇāyāma, Nāḍīśuddhi prāṇāyāma**, *Bhrāmarī prāṇāyāma**.	10 min (2 min each practice)
QRT (Quick Relaxation Technique)	Supine position synchronizes the breathing and feelings	3 min (1 round)
*Trāṭaka**	Steady candle flame gazing technique for concentration	15 min
*Yoga Nidra**	Progressive relaxation focuses on the body and mind	5 min
Prayer	3 rounds of *Shanti mantra*	1 min
*Yoga based counseling**	Personal counseling sessions focused on yogic principles	20-30 min weekly once

*These practices are part of a short version of the TYM.

6.3 STUDY 3: FEASIBILITY AND EFFICACY OF THE TELE-YOGA MODULE (TYM)

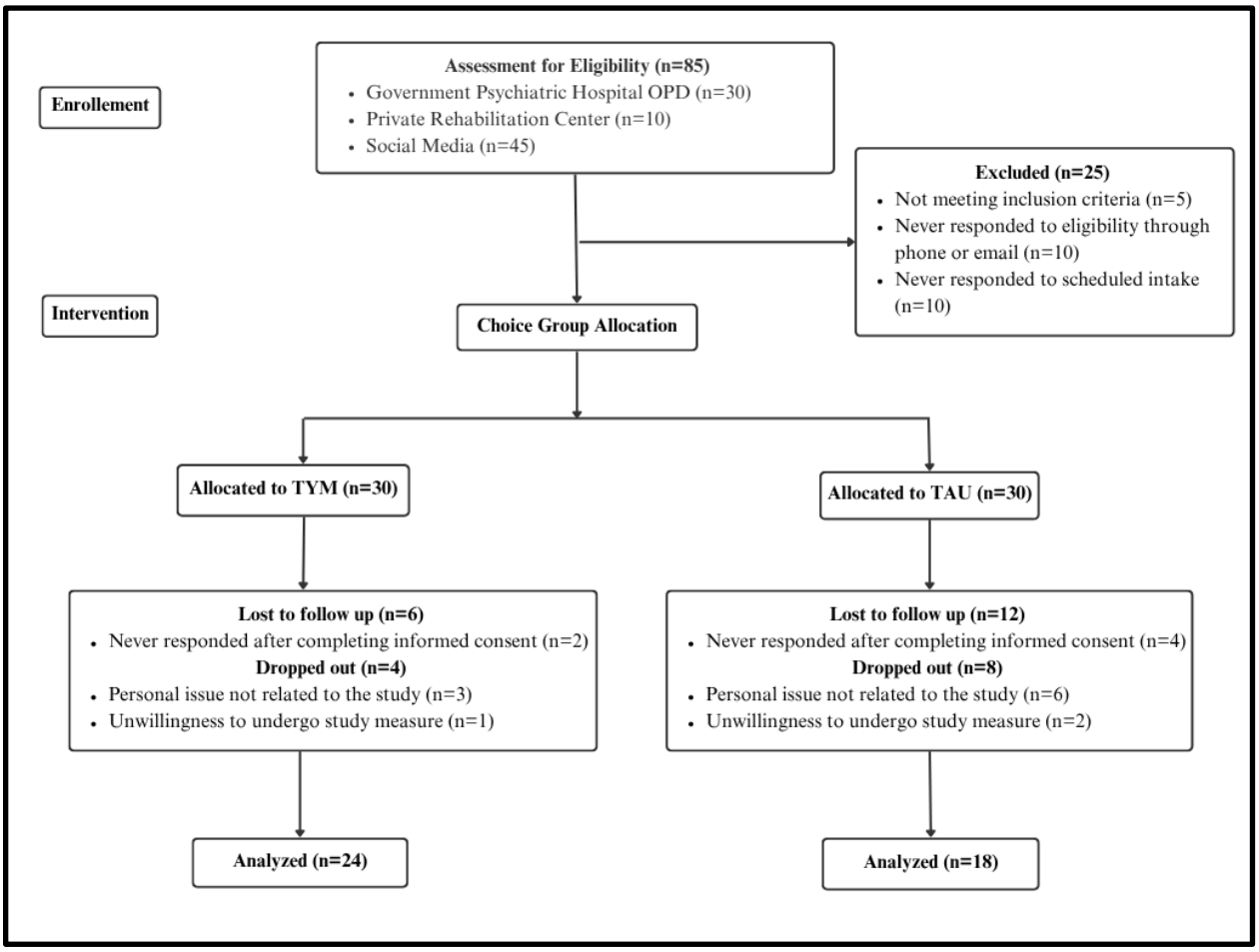
The assessment of the module's feasibility involved the active participation of 60 individuals who were recruited sequentially over 14 months. Their mean age was 34.8 years (±9.5) and there were (49) 81.7% female. The study revealed a mean duration of trauma of 3.4 (±2.3) years. Among the ongoing treatment modalities, the majority of participants (56.7%) had opted for no treatment, followed by 28.3% who were undergoing psychotherapy, and 15% who used medications. The reported prevalence of various traumas revealed that sexual abuse had the highest occurrence at 43.3%, followed by childhood trauma at 20%, accidents at 11.7%, and other events such as deaths and abuse, which accounted for 26% (Table 11).

Table 11: Sociodemographic details and trauma history of participants at baseline

S. No	Characteristic	TYM Group	TAU Group	Total	p-value
1	**Age in Years (mean ± SD)**	34.8±9.57	31.5 ±7.01	34.85± 9.4	0.13*
2	**Gender (%n)** Male Female	 6(20%) 24(80%)	 5(16.7%) 25(83.4%)	 11(18.3%) 49(81.7%)	0.74
3	**Marital Status (n%)** Married Unmarried Widow or Divorce	 16(53.3%) 10(33.3%) 4(13.3%)	 10(33.4%) 17(56.6%) 3(1%)	 26(43.4%) 27(45%) 7(11.6%)	0.36
4	**Educational Status (n%)** Undergraduate Postgraduate	 13(43.4%) 17(56.6%)	 15(50%) 15(50%)	 28(46.6%) 32 (53.4%)	0.60
5	**Economic Status (n%)** Low Medium High	 9(30%) 16(53.4%) 5(16.6%)	 14(46.7% 12(40%) 4(13.3%)	 23(38.4%) 28(46.6%) 9(15%)	0.42

S. No	Characteristic	TYM Group	TAU Group	Total	p-value
6	**Type of Trauma (n%)** Sexual abuse Death of loved one Childhood trauma Domestic abuse Surgery Accident Un identified	 14(46.7%) 7(23.4%) 1(3.3% 4(13.4%) 1(3.3%) 0(0%) 3(10%)	 13(43.3%) 3(10%) 1(3.3%) 2(6.6%) 1(3.3%) 6(20%) 3(10%)	 27(45%) 10(16.7%) 2(3.3%) 6(10%) 2(3.3%) 6(10%) 6(10%)	0.23
7	**Duration of Trauma in Years (mean ± SD)**	3.76±2.94	3.08±2.50	3.42±2.32	0.34*
8	**Ongoing Treatment** Counseling Medication No Treatment	 5(16.6%) 7(23.4%) 18(60%)	 7(23.4) 1(3.6%) 22(73%)	 12 (20%) 8(13.4%) 40(66.3%)	0.07
9	**Previously Exposed to Yoga** Yes No	 10(33.4%) 20(66.6%)	 9(30%) 21(70%)	 19(31.6%) 41(68.4%)	0.78

Fig.4: Flow diagram of feasibility study



As part of this study, we also evaluated personality and constitutional types using principles derived from yoga philosophy. The Vedic Personality Inventory (VPI) identified the predominant personality types among participants as *sattva* (40%), followed by *rajas* (32.3%) and *tamas* (31.7%). Similarly, the Ayusoft diagnostic tool was used to determine the participants' *prakṛti*, or Ayurvedic constitution, a key concept in yoga and Ayurvedic medicine for designing lifestyle and health recommendations. The results indicated that the dominant *prakṛti* was *kapha* (41.4%), followed by *vāta* (31.3%) and *pitta* (28.9%). In this study, these two dimensions were used as descriptive variables.

6.4 CORRELATION ACROSS THE *TRIGUṆAS* AND *TRIDOṢA*

A correlation analysis across diagnoses using Ayusoft and VPI was conducted at the baseline for all sixty patients (n=60) to assess any correlations between *doṣa, guṇas*, and diagnosis across all the participants. Our analysis revealed significant negative correlations between *rajas* and *sattva* ($r = -0.905$, $p < 0.001$), between *tamas* and *sattva* ($r = -0.905$, $p < 0.001$), and between *vāta* and *kapha* ($r=-0.85$, $r<0.001$) indicating an inverse relationship. However, we found nonsignificant associations across all other variables.

6.5 RELIABILITY ACROSS ALL THE VARIABLES

These reliability estimates, represented by Cronbach's alpha coefficients and associated confidence intervals, provide insights into the internal consistency and stability of the assessment measures across different groups and time points in the study.

In our study, we assessed the reliability of assessment measures both before and after the intervention. Before the intervention, measures such as PCL-5 ($\alpha =0.78$) and TYTAS ($\alpha =0.95$) demonstrated excellent reliability, while others such as VPI ($\alpha =0.68$), BRS ($\alpha =0.62$), HAM-D ($\alpha =0.58$), and HAM-A ($\alpha =0.65$) showed varying levels of reliability. Following the intervention, measures like PCL-5 ($\alpha =0.58$), HAM-A ($\alpha =0.77$), HAM-D ($\alpha =0.69$), BRS ($\alpha =0.62$), and IPF ($\alpha =0.95$) in the yoga group displayed improvements in reliability to moderate to good levels. Reliability in the control group varied across measures but generally remained consistent. These findings provide insight into the stability and consistency of the assessment measures across different groups and time points in the study (Table 12).

Table 12: Pre-intervention Reliability Values

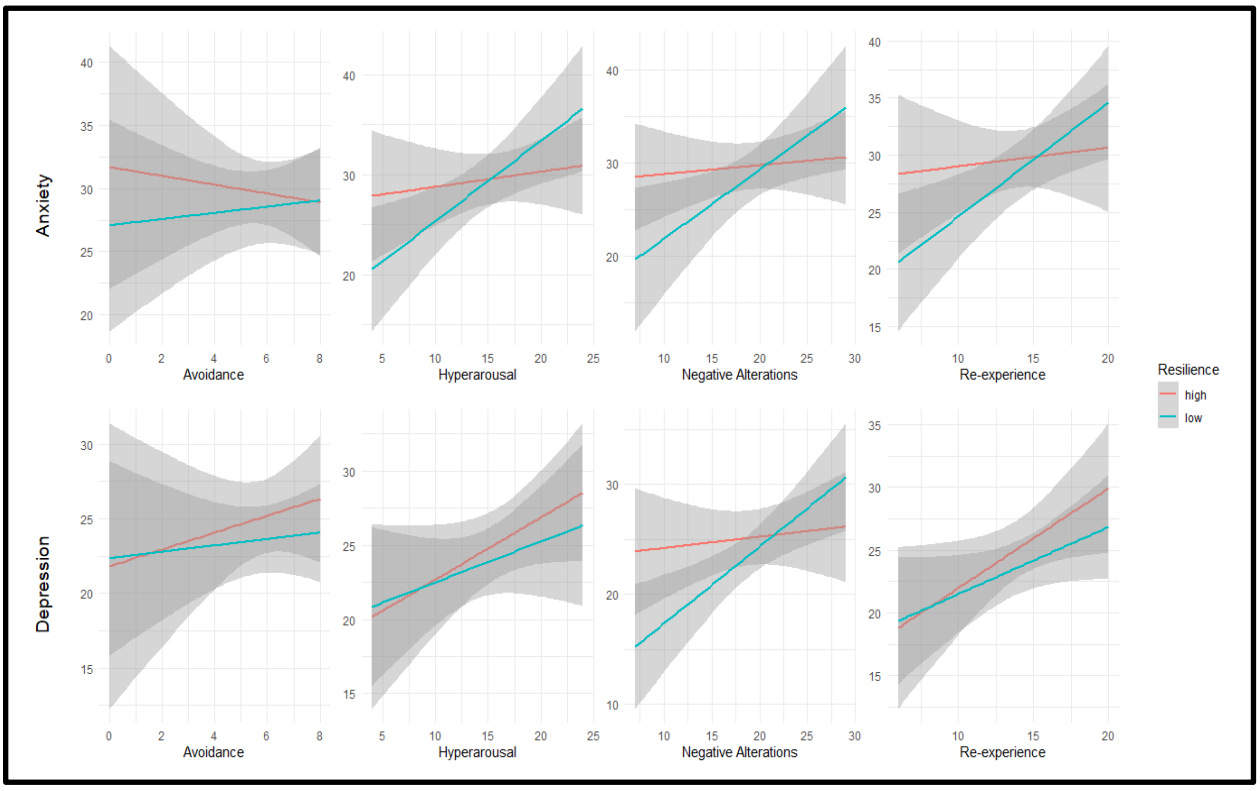
Variable	Sample size	Reliability(α)	95% CI lower to higher	Remarks
PTSD symptoms (PCL-5)	60	0.78	0.712-0.865	Good Reliability
Resilience (B-IRS)	60	0.62	0.45-0.771	Moderate
Psychosocial function(B-IPF)	60	0.65	0.47-0.78	Moderate
Anxiety (HAM-A)	60	0.65	0.518-0.793	Moderate
Depression (HAM-D)	60	0.58	0.246-0.648	Moderate
Vedic Personality Inventory (VPI)	60	0.78	0.67-0.85	Good

6.6 MODERATION RESULTS: THE MODERATING EFFECT OF RESILIENCE BETWEEN HAM-A AND PCL-5 DOMAINS

We tested moderation using a linear regression model, keeping resilience as a moderator variable and PCL-5 domains as the predictor variables and anxiety/ depression as the outcome variables. Through this analysis, we found that resilience significantly moderated the relationship between the PTSD domains and anxiety scores. Partially, for re-experiencing ($b = -1.01$, $S.E = 0.42$, $p < 0.02$), hyperarousal ($b = -0.71$, $S.E = 0.27$, $p < 0.01$), negative alterations ($b = -0.65$, $S.E = 0.26$, $p < 0.01$), and overall PTSD symptoms ($b = -0.45$, $S.E = 0.12$, $p < 0.00$). The interaction effects were found to be statistically significant. However, for the avoidance variable ($b = -0.66$, $S.E = 0.96$, $p > 0.50$), it was not statistically significant.

Similarly, the PTSD domains and depression were significant only in negative alterations ($b = -0.61$, $S.E = 0.22$, $p < 0.01$), while others were not significant, particularly re-experiencing ($b = 0.08$, $S.E = 0.38$, $p > 0.82$), hyperarousal ($b = -0.10$, $S.E = 0.25$, $p < 0.67$), avoidance ($b = 0.40$, $S.E = 0.83$, $p > 0.63$), and overall PTSD symptoms ($b = -0.18$, $S.E = 0.10$, $p > 0.08$).

Figure 5: Moderating effect of resilience between anxiety, depression scores and PTSD symptoms (Resilience was median split)



6.7 DROPOUTS AND POWER ANALYSIS:

In our study, participants who did not provide data at the post-assessment on the PTSD severity scale (PCL-5) were considered dropouts. The overall dropout rate was 30%, with a higher rate in the TAU group (40%) compared to the TYM group (20%). Dropout rates across all variables ranged from 13% to 50%. The chi-square test for dropout counts between the two groups showed no significant difference (χ^2 = 2.85, df = 1, n = 60, p = 0.09). Post-hoc power analysis revealed that the study achieved over 99% power for all variables except for resilience, which had a power of 36.5%. This shows that despite the high dropout rate, there was sufficient power due to high effect sizes. It is interesting to note that there were more dropouts in the TAU group than in the TYM group. This suggests the need to explore possible means to control dropout rates in control groups, which are often due to lack of engagement and perceived immediate benefits. Given the large effect sizes observed, we conducted further exploratory analyses to probe whether these large

effects might be influenced due to potential dropouts. The observed effect sizes were clinically very high. We employed a linear mixed-effects model, which is known for effectively handling missing data without imputation. The Cohen's d effect sizes observed using LME model were PCL-5 (2.00), Avoidance (1.42), Negative Alterations (1.46), Re-Experience (1.62), Hyperarousal (1.59), Psychosocial functioning (-0.9), Resilience (-0.3), Anxiety (1.35), and Depression (1.62), and they were lesser compared to the t test results reported earlier. We also checked for any baseline differences between the dropout and non-dropout groups. We found that dropout group had significantly lower scores on anxiety and depression scales. We speculate, the large dropout could be due to weaker want for therapy due to their lesser severity. However, these uncertainties can be addressed in future RCT studies.

6.8 FEEDBACK FROM PARTICIPANTS

Reported challenges during the practice included lightheadedness, strain on eyes during *trāṭaka*, discomfort, and tiredness during *Kapālabhāti* and *bhastrikā*, along with a slight backache. Additionally, two participants experienced crying spells followed by a sense of relaxation, while another reported an increase in nightmare occurrences. Twelve participants reported feeling better after the yoga session for the rest of the day, while eight reported benefits lasting several hours. Despite these challenges, all participants expressed a willingness to continue practicing online yoga in the future. It's essential to highlight that these discomforts were not considered adverse effects but rather part of the adaptation process to the new practice regimen, and these symptoms were reported to be absent later in the study. Technical issues, such as internet fluctuations and camera angle settings, were also noted during the sessions, with the latter being resolved after 3-5 sessions.

The responses from the sample provide valuable insights into the effectiveness and satisfaction levels of Tele-yoga for individuals with PTSD. Overall, participants expressed a high level of enjoyment and satisfaction with the online classes, with 70% reporting that the practice helped them cope with PTSD symptoms. While some participants found the prescribed duration of self-practice (60 minutes) to be adequate (55%), others felt it was either too much (10%) or too little (5%). The majority of participants expressed satisfaction with both the participation and the instructors of the online Yoga sessions, with 85% strongly agreeing or agreeing. Additionally,

participants reported feeling better after yoga classes, with the positive effects lasting for varying durations (ranging from just an hour to the rest of the week). Suggestions for improvement include incorporating more yoga practices tailored specifically for managing PTSD symptoms and ensuring respectful treatment from yoga teachers. Overall, the responses highlight the potential benefits of Tele-yoga/Online Yoga in supporting individuals with PTSD, while also suggesting areas for further enhancement to optimize its effectiveness (Table 13: Feasibility domine in the study).

6.9 TABLE 13: FEASIBILITY DOMAIN IN THE STUDY

S. No.	Feasibility Domain area of focus	Definition relation with our study	Outcome
1	Acceptability	Participants' response to the yoga intervention.	Dropouts 6(20%), Intent to continue to use -17 (77.27%) and Satisfaction 24 (100%)
2	Demand	The degree to which participants engaged in this yoga intervention. At least two TYM sessions/week and a minimum of 24 sessions throughout the intervention.	Attendance -75 % Home practices through watching pre-recordings -15 (68.2%)
3	Practicality	The extent to which the yoga intervention could be executed within limited resources and time constraints.	a)18(90%) Positive effects on target participants b)2(9.90%) neutral effects on target participants, c) - 0(0%) Nil reported negative effect, d) only 4 (13%) participants said it's too much time-consuming, and remaining participants felt it was very easy with 60 minutes of prescribed time.
4	Implementation	The level of successful delivery of the yoga intervention to study participants.	All 30 items of yogic practices were implemented successfully. The initial few sessions were a little problematic in adjusting the proper camera angle of the laptop/mobile of the participants and after the 5th session onwards it went smoothly without much internet interruption
5	Adaptation	The modification of yoga practices for everyone is based on their capacity and needs.	Modification 3(20%) Postures modified/skipped/adapted in the initial days of implementation of a yoga program for 6 (27.27%) participants.
6	Safety	Prevent the injuries, create a supportive and conducive environment for practicing yoga	There are no injuries reported throughout the program
7	Limited Efficacy Testing	Assessing whether the yoga intervention showed potential for success within the intended population, using a TYM group and TAU group.	Effectiveness of Yoga Intervention for patients with PTSD Effect-size estimation Recommendation: Nineteen out of twenty-two patients (86%) expressed their willingness to recommend the program to others, with twelve of them (54%) already having done so.

6.10 TABLE 14: EVALUATION OF OUTCOME MEASURES: INDEPENDENT SAMPLE-T TEST.

Variables	Assessment Scales	Pre-Mean ±SD	Post-Mean& SD	t value	df	Mean difference (95% CI)	P value	Effect size	Power
PTSD symptoms	**PCL-5 TYMG**	52.76±9.91	29.42±4.79	8.09	40	23.86 (17.91-29.82)	<.001	2.52	100%
	PCL5 TAUG	54.13±10.8	53.28±13.4						
PTSD Sub-Domains	**Re-experience TYMG**	13.24±3.72	7.33±1.41	6.25	40	5.67 (3.83-7.45)	<.001	1.91	99.9%
	Re-experience TAUG	14.74±3.02	13.00±4.15						
	Avoidance TYMG	5.53±2.15	3.95±0.98	5.61	40	2.76 (1.74-3.78)	<.001	1.83	99.9%
	Avoidance TAUG	6.03±1.54	6.72±1.93						
	Negative Alternation TYMG	19.36±5.43	10.34±2.06	5.21	40	7.389 (4.52-10.25)	<.001	1.62	99.3%
	Negative Alternation TAUG	18.60±4.75	17.23±6.56						
	Hyperarousal TYMG	14.93±4.81	7.88±2.63	6.61	40	6.98 (4.84-9.02)	<.001	2.06	99.9%
	Hyperarousal TAUG	14.80±4.84	14.83±4.18						
Psycho-Social Functions	**B-IPF TYMG**	45.04±21.45	61.09±21.95	7.28	37	26.54 (19.16-33.9)	<.001	2.37	99.8%
	B-IPF TAUG	54.70±19.65	56.49±24.15						
Resilience	**B-IRS TYMG**	2.52±0.60	2.70±0.57	-1.66	37	-0.25 (0.546-0.05)	0.105	-0.55	38.3%
	B-IRS TYMG	2.41±0.72	2.41±0.52						
Anxiety	**HAM-A TYMG**	29.03±6.94	17.59±6.06	5.02	37	10.2 (5.96-14.06)	<.001	1.65	99.9%
	HAM-A TAUG	29.13±7.20	27.60±6.09						
Depression	**HAM-D TYMG**	25.73±6.21	16.08±5.13	3.96	37	7.45 (3.63-11.26)	<.001	1.31	99.8%
	HAM-D TAUG	22.70±5.78	25.53±6.56						

TYMG: tele-yoga module group, TAUG: treatment as usual group, PCL: PTSD civilian version-5, HAM-A: Hamilton anxiety, HAM-D: Hamilton Depression, B-IPF: Brief inventory psychosocial function & B-IRS: Briefe inventory resilience scale

Yoga Module development and validation checklist: This module scored 21 out of 23 on the checklist for assessing yoga module quality, indicating the high quality of the module (Katla et. al., 2022).