CHAPTER 7

DISCUSSION

7.0 DISCUSSION

7.1 SUMMARY

To the best of our knowledge, this is the first randomized control trial on caregivers (CGs) of children with neurodevelopment disorders (NDDs). The present study aimed to compare the effect of canons of expression (CE) embedded in Indian Aesthetic Dance and yoga in the management of psychological burden through Zarit Burden Scale (ZBS), Depression, Anxiety, Stress Scale, (DASS-21) Revised Caregivers Appraisal Scale (RCAS), World Health Organization Quality of Life (QHOQOL-BREF). Further this study was aimed to assess whether parameters of Electro Photonic Image (EPI) can be used for the analytical purpose of the baseline health status of CGs and to measure the immediate effect of CE/IAD and yoga intervention compared to the control group.

The percentage change in the post scores of ZBS, DASS-21, RCAS, WHOQOL (BREF), and EPI of CE/IAD and yoga were statistically significant compared to pre scores. Similarly, the between-group comparison showed CE/IAD and yoga group had significantly better improvement in all the parameters compared to the control group which suggests that CE/IAD and yoga could be a feasible, non-pharmacological, and easy to practice intact, and cost-effective in self-regulation of emotion among CGs of children with NDDs.

7.2 MECHANISM

A possible mechanism explored in the study is hereunder.

7.2.1 Effect of CE/IAD on psychological and behavioral intervention parameters for CGs of children with NDDs.

The dance intervention encompasses the combination of coordinated movement strategies, exercise (Lossing et al., 2017)), musical arrangements and cognitive benefits, and have been used as a therapy for varieties of diseases across the world (Lapum & Bar, 2016; McNeely et

al., 2015; Sivvas et al., 2015a). This study findings show the CE/IAD intervention marked with creative movements (*Āṅgika)* has mediated in a reduction of perceived stress (Vetter et al., 2011) similar to the result of the pilot study on Salsa dance intervention on informal Mexican CGs (Fernández Sánchez et al., 2020). The practice of CE for eight weeks showed a marked decrease in psychological distress in terms of burden, stress, depression, anxiety, that suggests, the caregivers could able to manage their feelings effectively without being much stressed (Harris, de Rosnay, M. & Pons, 2016). It is noted that with consistent practice, gray matter volume increases, particularly anterior and medial cingulated cortex, left medial frontal gyrus, and limbic system, which is engaged in the storage and retrieval process (Todd & Lee, 2015). These areas are indeed crucial in dance. Through a mental process such as reasoning, rationalizing, labeling our experiences that happen in the prefrontal cortex, humans have a unique ability to govern and channelize their inherent emotions (Hariri et al., 2000). These improvements in the CGs may be due to canons of expression, which is embedded in '*Rasa theory,'* propagated by the treatise called *'Nātyaśāstra'* (Ghosh, 2012). It brings a holistic view of the human entity and explains the emotional experience, addressing social conditions, and possible resilience views (Jain, 2009).

Neuro-imaging studies have shown the changes in brain morphometry following physical movement in dance over six months for ninety minutes of practice each day (Petruzzi et al., 2013b). The intervention of dance improves physical activeness and self-rated quality (Duberg et al., 2013). The activation coefficient (AC), an objective parameter of the EPI instrument to measure the level of psychological stress is concurrent with the findings by non-EPI scales of previous studies that, repeated physical movements in dance (Fernández Sánchez et al., 2020) are associated with improvement in mental functioning by enhancing the coordination in different parts of the body and mind (Ray et al., 2001). This coordination brings a positive effect on CGs in reducing emotional pressure (Fernández Sánchez et al., 2020).

Compared to the subjects of the control group, CE intervention showed a significant (31%) reduction of stress (AC) that indicates that the dance supported by music could facilitate the hippocampus to inhibit defensive behaviors by modifying cortisol level in response to the psychological burden (Chanda & Levitin, 2013). *Āṅgika′* (physical movements) and '*sāttvika′* (expression by intense feeling) embedded in CE elaborated in *Nāṭyaśāstra* include body awareness techniques, rhythmic action with musical accompaniment, non-verbal, and verbal expression of emotions, relaxation methods (often with imagery), improvisation, and the use of symbolic. Metaphoric communication in movement mediates in overall quality of life, stress management, and perceived stress, pain management, reduction of anxiety, depression as measured by depression, anxiety, and stress scale (DASS-21) (Sharon W. Goodill, 2018). The study findings suggest reduced fatigue, increases in the sense of vitality, and energy, body awareness, and body image, social support, and the recognition of the need for support, self-efficacy, and improved self-care, meaning-making, and increases in resilience, and the installation of hope as measured with RCAS and WHOQOL (BREF) (Sharon W. Goodill, 2018).

Lyrics with spiritual meaning embedded can buffer against stressful conditions (Mascaro & Rosen, 2006). With verbalization of feelings, the words can mediate the regularization of emotions (Harris, P.L, de Rosnay, M. & Pons, 2016). *Vācikābhianaya* (expression through dialogues, songs, themes, and lyrics), a part of CE could have helped to express themselves in a supportive environment and understanding the positive message in the song adopted (P. A. Rocha et al., 2017) and could have influenced the well-being (Ransom, 2015). Lyrics, through the medium of music, have been an effective way to deliver messages and communicate with the masses. Listening to music with meaning-filled lyrics can influence the emotion to attain mindfulness and well-being (Duberg et al., 2013). Listening to music of

intense emotion stimulates pleasure seeking areas of the brain equal to the stimulation by sex, psychoactive drugs, food and money. The studies found music decreasing plasm concentration of cortisol and epinephrine by listening to music (Gangrade, 2012). There is a positive correlation between decreased corticosteroid production and immunity by listening to music (Rider et al., 1985). It is hard to say whether music or language secure first place so much so that they go together, says Steven Mithen, 2006 in his review '*The singing Netherlandal,* who goes into more in-depth details on the origin of music, language, mind, and body. Mori & Iwanaga, 2014 describe the difficulty of measuring lyrics separately from the music. More self-understanding through lyrics can bring clarity to who we are and how we make decisions, which help to achieve higher well-being (Campbell, 1990).

In the current study, at the time of miming, most of the participants could depict various incidents of their life. Some of them went into episodes of the deep emotions and broke while explaining. They were given time to outburst all the hidden negative emotions so that they felt themselves a bit light to get dance intervention infused. The miming part of intervention protocol has helped the participants of the dance group to express their hidden negative emotions in terms of words and created awareness and motivation towards regularization of emotions (Dunphy & Hens, 2018) which is depicted through the reduced psychological burden, anxiety, depression which is inversely associated with improved physical condition. psychological, social, and spiritual domains in quality of life and CGs appraisal indicated reduced CGs burden, enhanced CGs satisfaction, CGs mastery, and increased CGs impact.

The Indian thoughts on emotional discourse deal with poetic, dramaturgical, and aesthetic experiences, which has a particular approach towards the psychology of emotions (Misra & Castillo, 2004). The positive emotions, satisfaction, and coping sources are the elements of happiness help people to build lasting resources and desirable outcomes in many

domains (Cohn et al., 2009). About 93% of the participants of CE/ IAD groups have self-expressed their happiness that they are infused with fresh energy, positive thinking, better sleep, and even healed physical pain. Significant improvement in the quality of life and caregiver's appraisal reaffirms the effectivity of dance and yoga interventions on emotional draining. Twenty-four sessions of dance intervention with instrumental music adopted in the study to practice dance steps, other music tracks on nature, and spiritual lyrics might have laid a good background for the practice of facial expressions to express participants' emotions efficiently with involvement. 100% of the participants expressed contentment for participating in the study, which promoted self-motivation, and the regular practice could help self-revelation.

7.2.2 Effect of yoga on psychological and behavioral intervention parameters of CGs of children with NDDs.

The study result suggests that the physical movement in yoga is associated with improvement in mental functioning by enhancing the coordination in different parts of the body and mind (Ray et al., 2001). The yoga practices are embedded with physical movements and regulated breathing, which helps to direct mindful awareness on self and channelize energy levels in different parts of the body (Collins, 1998). The practice of yoga for eight weeks has shown evidence that yoga intervention may help restore HPA balance. Human circuitry systems clustered with the hippocampus, amygdala, and areas of the prefrontal cortex together participate in physiological and behavioral stress processes (Ross & Thomas, 2010). In the light of cognition, experience, and behavior, the brain and the autonomic, cardiovascular, and immune systems via neural and endocrine mechanisms communicate with a bidirectional pattern to create stress. The repeated use of the technique in emotional brain training helps to prolong the psychological stress by changing the allostatic neural circuit (Hariri et al., 2000).

The study findings are concurrent with the fact that yoga intervention with a cluster of *āsana* (yogic postures), *Prāṇāyāma* (yogic breathing), *dhyāna* (meditation), is beneficial in the treatment of stress, anxiety, depression, stress-related medical illnesses, pain, sleep and well-being (Gotink et al., 2018) in CGs (Lopez et al., 2018b). The yoga intervention with the practice of meditation of the current study showed benefit at physical, psychological, social and spiritual domains of quality of life in CGs that is associated with neurobiological changes in brain areas related to maintaining attention, such as the prefrontal and anterior cingulate cortex (Milbury et al., 2018; Danucalov et al., 2017).

The intervention of yoga improves physical activity and self-rated quality (McCall et al., 2013). Further, these improvements in psychological health and energy level reflects good quality of life, as reported in the present study. About 87.5% of yoga participants expressed the sessions enjoyably, and they were feeling better energy than before and able to incorporate a healthy sleep pattern. Some of them had a proper menstrual cycle within a few days after joining the yoga sessions depicted by the organ balance scale. These changes are in concomitant with previous studies on yoga and dance using self-reported measures (Hartfiel et al., 2011; Li & Goldsmith, 2012; K. K. F. Rocha et al., 2012; West et al., 2004) such as reduced CGs burden, demand, enhanced CGs satisfaction, mastery and impact of revised CGs appraisal scale (RCAS) (Ang, 2020). Significant improvement in the quality of life and caregiver's appraisal reaffirms the effectivity of dance and yoga interventions on emotional draining.

In a survey of 966 caregivers with a hypothesis that, highly educated caregivers exhibit a low level of a physical and mental burden than caregivers with little education, 50% of all caregivers expressed physical strain, and 71% showed psychological burden. Though we could not assess the burden based on the education level, personal observation of participant CGs were similar to the previous study findings that highly educated caregivers had increased odds of a psychological burden compared to caregivers with low education levels even after

adjustments with health parameters (Schnitzer et al., 2017). These findings point out that self-revelation or self-understanding does not have a proportional relationship to education.

7.2.3 Effect of CE / IAD and yoga on the specific variables measures by EPI parameters

The communication energy (C) measured by EPI in the study showed a regulation of energy in the level in the organ systems, namely, cardiovascular, respiratory, endocrine, musculoskeletal, digestive, nervous, and immune systems in both the intervention groups compared to control group. C indicates total amount of energy that is available for the organ system, while entropy (E) is an indication of amount of coherence of the energy. Coherence and entropy are inversely related; this means less the entropy, more the coherence and vice versa. Illustrative Concerning energy, a score of more than 6 indicates hyperactivity caused by an imbalance in the organ systems. After the intervention, scores of energy is reduced by 23%, in the dance group that might be the indication of the balanced respiratory function.

The 18% changes found in the cardiovascular systems of the dance group are concurrent with the findings of the earlier studies that the consistent practice of dance help enhanced vital respiratory capacity of the respiratory system. And FEV1values suggesting the relationship of dance with pulmonary functions of the cardiovascular system (Surekha, R., Archana, R., & Vijayalakshmi, 2018). The regulated energy in the respiratory and cardiovascular system shows the diaphragmatic stretching practiced in yoga improves respiratory and abdominal cavity expansion (Yamamoto-Morimoto et al., 2019), and breath control and concentration might clear the blockages in the energy channels (also called *nadis*) of the body to balance the energy system of the body (Mathad et al., 2017). Additionally, deep breathing (*pranayama)* mechanism assists in the reduction of blood pressure, which tends to reduce sympathetic activity and restores baroreceptor sensitivity in the cardiovascular system

(Manchanda, 2014). Just 75 minutes of yoga intervention showed an enhanced energy level of 18% in the cardiovascular system.

Furthermore, the study scores showed the enhanced energy level of the endocrine system of intervention groups (20% and 18% of dance and yoga, respectively) compared to the control group at -0.1%. This effect is similar to the earlier studies, which mention that dance and yoga can modulate the concentration of happy hormones namely, serotonin and dopamine neurohormones by stabilizing the sympathetic nervous system (Jeong et al., 2005) (Govindaraj et al., 2016) towards regulating mood and social behavior. Further, the balanced energy of dance (with -22%) and yoga (-15%) level of the musculoskeletal system is concurrent to the fact that dance and yoga improve the volume of the postcentral gyrus and, somatosensory fibers end in this area which conveys information from proprioceptive organs such as neuromuscular spindles, joint, and sinew receptors felicitating musculoskeletal system (Rehfeld et al., 2018; Ahmadi et al., 2010).

Similarly, the digestive system of both the intervention groups of the study showed a regulated energy score in dance (26%) and yoga (-24%). In contrast, the control group showed reduced energy of 0.5% with sitting and doing regular activities. It may be because dance and yoga can regulate the weight and body fat and can even control diabetes mellitus by negating the property like glycosylated hemoglobin (AIC) (Sivvas et al., 2015b) (K. Yang, 2007).

Further, it is found that, the central nervous system tends to create new pattern of neurons spontaneously during the new learning and memory (Gage, 2000), and large-amplitude theta oscillation (4-10Hz) dominate the hippocampal-entorhinal cortex system (Cebolla & Cheron, 2019). These neurons, being natured with plasticity, could help the CGs on managing stressful situations even after the intervention period, as reflected in the nervous system (Gage, 2000). The study results concurred with the earlier findings with enhanced energy of dance group by 20% and yoga group by 16% compared to the control group at -6%.

Like other body systems, the energy level of the immune system of intervention groups concurred with earlier studies that dance and yoga can strengthen the immune system by way of muscular action and physiological processes (Hanna, 1995) (Govindaraj et al., 2016). Even a change of 0.5 Joules in the result is considered a significant effect to make the intervention eligible for regular practice (Narayanan et al., 2018). In this study, the dance group showed 18% and yoga group 19% of enhanced energy to immune systems compared to the control group at 5%.

The reduced entropy (state of disorder) level showed an immediate effect of interventions (dance group with 27% and yoga 26% ($p<0.001$). Reduced entropy level and coherence of the energy to the organ system are inversely related. It means less entropy specifying more energy (Narayanan et al., 2018).

7.2.4 *Cakra* analysis

All the *cakras* have shown significant differences in values compared to the control group as an immediate effect of CE and yoga. *Mūlādhāra cakra,* associated with organs, namely, adrenal gland, skeleton, backbone, spinal cord, kidney, rectum, takes care of functional manifestations, namely, movement functions, endurance, vital capacity, inner strength, love of living via body fitness. The effect of working with this *cakra* is strengthening immunity, cheerfulness, endurance, decisiveness, optimism, regaining the zest for life (Konstantin Korotkov, 2014). *Mūlādhāra cakra is* located at the mid perineum wherein a nerve structure called Inferior Hypogastric Plexus, and it regulates the activities relating to excretion of urine, stool, fetus, etc. (Joshi, 1986). Value of *Mūlādhāra cakra* in CE group has increased by 25%, and yoga group by 26% ($p<0.001$) and symmetry in dance group improved by 85% and in yoga group 88% compared to previous literature findings. In contrast, the control group showed a reduction of 9% in Value and Symmetry by 1.5%.

Svādhiśṭhāna cakra located below naval region, takes care of physical aspects namely, digestive apparatus, bowels, urogenital system, and spiritual growth, and ability to transform greediness, lust, anger, jealousy, enabling success are the effect from working with this *cakra*. The study result showed 28% of the enhanced value and 93% better symmetry in CE group and 26% better value and 24% symmetry in yoga group compared to pre is consistent with the results of the physical domain in quality of life.

Maṇipūra cakra located at navel region is physically connected with stomach, pancreas, excretory glands, liver, solar plexus and its increased working is associated with enhancement of viability and healing of several diseases, acquisition of longevity and good health, development of management and organizing capabilities, improvement of speech control and an ability to formulate one's ideas (Korotkov, 2014). The study showed an enhanced value of *Maṇipūra cakra* at 24% in CE group with 91% enhanced Symmetry and 30% increased value and 82% Symmetry in the yoga group compared to pre values, whereas the control group showed both Value and Symmetry of 5% enhancement. It may be due to regulated glandular functions associated with the neuro-immune-endocrine network through synergistic transmitters giving chemical feedback as the glandular system is closely associated with the *cakra* system (Pyramid & Aura, 2014).

Further, *Anāhata cakra* takes care of the cardiovascular system, circulation of the blood, lungs, thyroid gland, mammary glands, feelings and emotions control, self-control, wisdom, and inner strength and effect from working with this *cakra* are associated with overcoming obstacles and difficulties, acquiring confidence, an ability to harmonize the surroundings, acquiring power over one's self, development of creative inspiration (Konstantin Korotkov, 2014). The study result of 24% increased value, and 84% increased symmetry in CE group, and 27% increased value and 79% symmetry in yoga group matches with the understanding to the previous study that, emotion has found a track in multiple neural and glandular pathways or transmittal area

(Pyramid & Aura, 2014). (For value and symmetry of rest of the *cakras* are mentioned in Table 16).

Viśuddha cakra works in the spinal cord, throat, neck, esophagus, heart, lungs, and associated with calmness, purity, clearness, melodiousness of voice, ability to spiritual poetry and prophetic gift. Increased value of 21% and symmetry by 62%, in CE group and 47% and 68% in value and symmetry respectively in Yoga group matches with the previous study that *cakras* will enhance values and symmetry to devotional music (Rao, T. I., kushwah, k. k., & Srinivasan, 2014).

Ājñā cakra takes care in the areas of the brain, hypothesis, hypothalamus, head, nervous system, and effect of working with this *cakra* is understanding the essence of things, wisdom, will, etc. (K. Korotkov, 2002). The increased scores of value of *Ājñā cakra* by 26% with symmetry by 80% in CE group and 20% value and 56% symmetry in the yoga group exhibited in the improved quality of life of CGs is concurrent to the statements of the previous study saying that *Ājñā cakra* helps in managing and transmitting of *prāṇā* (energy) pervading human anatomy and physiology (Plexus et al., 2019).

Sahasrāra cakra is associated with the brain, pineal gland, skin, reproduction, hormone balance (K. Korotkov, 2002). Increased value by 25%, symmetry by 85% in CE group, 23% and 75% of value and symmetry in the yoga group indicate the immediate effect of CE and yoga on CGs. Integrated medicine reflects the participation of various sheaths or dimensions of human existence and functioning, namely, physical, mental, and spiritual. These levels can be influenced by music (KG, 2018). Though there was no significant difference, better Symmetry was found in both CE and yoga groups compared to the control group.

7.3 My perception in the course of this research study

This research process has raised a few questions for which my understanding goes like this:

Question 1: How did this study help caregivers to reap the benefits of dance?

Answer: Many of the participants expressed that they love Indian dances and were eager to learn in childhood, but could not get an opportunity due to several reasons, such as non-cooperation from parents, non-availability of teachers, etc. This study provided them an opportunity not imagined at this point of time or age at all. The study protocol offered a good opportunity for the interested mothers to have some idea of dance and savor it, along with developing a sense of picking positive aspects.

Question 2: Coming to the aspects of dance, people have some pre-determined questions. They are:

a) Dance is meant for those who start learning from childhood.
b) One should be beautiful and rich to learn dance.
c) While the majority of the dancers stop performing at the age of 30-35 due to family responsibilities, reduced fitness, and odd-shape of the physical structure, how can one start be learning dance at that age?

Answer: This study has addressed several points here. During randomization, no one knew which group they could be randomized. Those who wanted the yoga group might have been randomized into dance group. The age group for the study was 25-65 years. In both groups, there were mothers of 65 years old. Most of them were from lower-middle-class and also not very fit. Even then, they could learn the dance moves and shown good result of positive health, which is depicted in the self-rated questionnaires and relative parameters of EPI instrument.

Question 3: Though India is a land of art and culture, and most of the fathers want their child to excel in one or the other art forms, but not yet comfortable with his wife learn dance. What is the experience in the study sample?

Answer: Some of the mothers learned to dance and later informed their family about the fact that they were randomized to dance group. Their enthusiasm in learning, the positive effect, knowledge on Indian aesthetic dance, made the participants win the heart and appreciation at home.

Question 4: Though male society encourages art forms in India extensively, self-discouragement towards learning dance can be seen prominently. Why?

Answer: In Indian family settings, males are the primary member for earning bread. So, they concentrate more on their jobs. Though plenty of litterateurs, musicians can be seen in the male community, performing artistes can be seen only in a few regional dance forms. E.g., Yakshagana, Kathakali, etc.

Question 5: How does this study going to help mundane people and society?

Answer: Just with a few classes of practices, long-listed physical pain of participants vanished as expressed in feedback. The discussion held from the beginning of this chapter clearly shows the neuroplasticity they developed through consistent practice, cultured the way of thinking in them even in adverse situations. The neuroplasticity resulted through positive message embedded in the lyrics used, listening to music, reading literature, chanting *mantrās,* and *ślokās*. It is just like regular walking in the grassland, creating a path.

The following are some testimonies:

1. Before study, I was very negative in thinking. I leant positive thinking through dancing. The technique used in the study is very nice. Gained confidence that, we can also learn dance. It reduced my physical problems also.
2. Through this study, I met my 'self' and would like to meet regularly. This study is a medicine to mothers of special needs. I understood a lot about managing my emotions and accept my child wholeheartedly. This study is very unique.
3. I was in a confused state of mind before study and worried about so many things. The study has made me light and relaxed. Mental pain and burden are

reduced. The study has created interest in life in the mind of parents like us. The technique was very simple. Trainers were very friendly. Very nice study.

4. I was much worried before the study about getting such a child. Had a question that, why it happened to me only? I was stressed. Study made me understand 'we also have internal beauty expressible.' This study showed anyone can learn dance. The technique used relaxes the body and mind. Wish we could have had many number of classes!

5. I am feeling good after this study. I can have control on my body and mind. I can change myself in better way. Before the study, I felt helpless, and hopeless. I was thinking I am the worst person on the earth. But after the study, feeling a life of 'rebirth.' The study gave me positivity and helped us a lot.

6. Initially dance steps seemed difficult. Later it felt easy. Here is so much to learn! The study is very useful for the parents of special need.

7. Yoga slowly started helping in controlling my anger and emotions. I understood that, daily practice of yoga can help us regulating our emotions and relax our body and mind. Satsang answered my questions on handling situations.

8. Very nice experience. Feeling full of positive energy. Able to perform little dance as well. Learning not to feel guilty of what is happening to us.

9. The study was very impressive and motivational. Inspired me a lot to achieve my goals. I learned how to develop positive thoughts in handling the weak situations. The method was very admirable.

10. The study has cultivated good experiences in me. Now I am courageous to take care of my child. I started caring him in a positive way.

Question 6. Can we believe canons of expression are practicable by people as compared to yoga?

Answer: Yoga is already widespread, and everyone has accepted its health benefits irrespective of caste, creed, and religion. However, few people come up for showcase on the stage with extra practices, the rest of the population practice at home and reap the benefit. Likewise, anyone can practice dance but not necessarily become a performing artist. They will know how to draw benefits out of regular practice. This study was meant to teach the self-help technique in self-management of emotions.

Question 7: What is the dimension of *Śānta rasa* in dance and yoga?

Scriptures explicitly have mentioned that, ignorance *(avidyā)* about innate nature of human existence and altimate reality is the reason for all miseries of life. Though *Śānta rasa* is not accepted in list of relishable *rasa* during stage performances, by the earlier authors namely Bharata, Kāḻidāsa, Amarasiṁha, Bhāmaha, and Danḍin, Anandavardhana and Abhinavagupta supported the view of *Śānta rasa* as one of the ninth rasa. As they propagated *śama,* a permanent mental state *(sthāyi bhāva)* of *Śānta rasa* that leads to *Mokśa*. *Śama,* arises from the determinants like *tattvajñāna, vairāgya,* purification of ideas. *The consequents* are restraints, regularity, spiritual contemplation, worship, pity for the creatures etc. Its transitory states are *Nirveda, Smṛti, Dhṛti*, purity in all the *Āśramās,* absense of body movement, horripilation and the like. Absence of sorrow or happiness, nor envy nor pride, and when there is a feeling of tranquility for all the creatures, it is called *Śānta rasa.* This above notion is very much true in the path of yoga to relish *Śānta rasa within.* The path of *Nirveda* which is synonym to *Vairāgya* that is arising out of the experience with the children prone to NDDs might have paved the way to seek higher knowledge to CGs of yoga group.

On the other hand Abhinavagupta's another view looks suitable for dance group of CGs. He argues *rati* which is the determinant of *śṛṅgāra* is the determinant for *Śānta rasa* also. During *Ātmarati,* an aesthetic experience with the Self, make a person detached from outside world and experience a blissful identity with the universe which is free from painful experience.It is the experience of the Self in one of the stages of perfect self-Realization. Such a state of Self,

when presented on the stage and poetry is then universalized, which leads to arousal of mental condition bringing the transcendental bliss among the cultured audiance.

In dance, message conveyed by the songs written by realized people has the capacity to eradicate ignorance *(avidyā).* Music set to particular *rāga* has strength to relax the mind and induce positive emotions by modulating hormones and neurotransmitters. Articulated movements and expression of emotion assist in attaining *Ātmarati,* an aesthetic experience with the Self, make a performer attain and enjoy *Śānta rasa.* In this way, other relishable *rasās* coordinates together to attain *Śānta rasa.*

Question 8: Could the study overcome the limitations of other studies to test the separate effect of song, rhythm, movements, and expression separately mentioned?

Answer: Few western studies have seen the effect of music, movements, rhythm, etc. separately. But, the holistic approach of *Nātyaśāstra,* chapter 6, *śloka* 32 and 33 says, aesthetic pleasure *(rasa)* emerges by the combination of *āṅgika,* and *sāttvika* wherein music and rhythm are inbuilt. Indian aesthetic dance is to be savored with all the elements together, not as a piecemeal.

Question 9: What is the contribution of the researcher to the dance and yoga field through this study?

Answer: Though physical, psychological benefits of dance and yoga detailed in scriptures can be experienced, the scientific community needs both subjective and objective evidence to prove the applicability of this modality to diseases/disorders among mundane people. The scientific exploration of yoga on various disorders is taking place worldwide. Though western movements are widely applied, CE embedded IAD based on traditional scripture is not yet

tested as a complementary and alternative psychological modality on not even few disorders. As an example, crocin pills are tested to reduce fever among masses irrespective of caste, gender, region, or religion, and there was a need for empirical researches on Indian dances based on *Nātyaśāstra* and related scriptures. This study opened up a door for trial of elements of *Nātyaśāstra* on various healthcare domains.

7.4 Flow of canons of expression (CE) in five sheaths of human existence

Śāstra means science. Etymologically, *'śāstra'* means that which regulates or governs the subject in organized or systematic methodology. The *Nāṭyaśāstra* is a scientific understanding of dance, music, and literature; *Yogaśāstra,* scientific knowledge of yoga concerning the human entity. Mode of *Nāṭya* is entertaining like a beautiful river flowing, whereas the practice of yoga can be compared to a stable mountain.

The *Taittirīya upaniṣad* elaborates the five sheaths of human existence to be a) *Annamaya kośa* b) *Prāṇamaya kośa* c) *Manomaya kośa* d) *Vijñānamaya kośa and* e) *Ānandamaya kośā* as discussed in the chapter-2, literary research. Practices are laid down to evoke subtle energy in each *kośa*. Both dance and yoga practices come in the fold of all these five sheaths during training and performance. Yoga takes the practitioner through the experience of *dhāraṇa, dhyāna*, and attain the state of *samādhi*. Dance, practiced by someone, but takes the audience as a whole experience *dhāraṇa, dhyāna*, and *samādhi* depending on the quality of performance and the receiver.

I) At *annamaya kośa* (the physical layer) level:

Among *annamaya kośa* practices, a) *āsana* creates awareness in the normal physical posture to which the body is accustomed. Whereas dance practice creates awareness in numerous movement and postures practiced, since the similar moves are frequently used in the dance choreographies. Unless the artiste is well versed with all the movements, he/she can not perform on the stage with ease. b) The second feature of *āsana* is creating flexibility in the body. Whereas, high flexibililty is acquired through the practice of dance moves with various tempos. c) The third feature of *āsana* practice is the adjustment of the internal organ systems with the posture, so that there is no pain or tension. Regular practice of dance movements makes the body adjusted to the internal organs so well that there is no tension or pain, but joy is experienced during the practice and performances. d) The fourth feature is the concentration of the mind in the *āsana* that leads to perfect stillness and relaxation. During the practice of dance, aspirants need to concentrate on several aspects of standard movement enumerated in the scriptures and that helps to enhance the level of concentration to a large extent.

II) At *prāṇamaya kośa* (the layer of *prāṇa*) level:

As explained before, breath is the medium of prānic awareness. Yogic breathing practices involve variations of breath to cleanse the lungs, expansion of lungs, and fill vitality in the body. e.g., *kapālabhāti, bhastrikā, anuloma-viloma*, etc. In dance practice, various rhythms and tempos are used to give beauty, exhibit energy, and to crispness to the performance. These variations of tempos could make internal changes that can be noticed later to practice and performances. Even the *sāttvika abhinaya* has a different breathing pattern for different

characters to play. The consistent, synchronized practice of those characters provides the similar effect of yogic breathing practices such as inner awareness and relaxation.

III) At *manomaya kośa* (the layer of mind) level:

At the level of *manomaya kośa*, *bhajans*, *mantras, ślokās* are practiced to create awareness of various emotion and their cultivation. The practice of concentration and relaxation leads the practitioner towards *dhāraṇa* and *dhyāna,* which paves the way for *samādhi,* a union of *ātmā and paramātma.* However, the practice of canons of expression, being a cluster of different *tālās,* rhythms, indepth understanding on the literatures incorporated, depiction of the same in several variations, and overall coordination develops enormous concentration, memory and an insight into spiritual aspects.

IV) At *vijñānamaya kośa* (a layer of wisdom) level:

Right knowledge or *jñāna* yoga will help the yoga practitioner to discriminate between right and wrong actions. During the choreography of dance to songs, the artiste has to work hard, i.e., a constant search for better alternative steps and expression to bring out the proper content and practice repeatedly. This is called *sādhanā*. In the process, the mind collects the features concerning the image on which the song is structured. It could even happen according to lyrics, rhythm, and certain tempos, which is nothing but '*dhāraṇa.*' After the choreography, deep contemplation, or single-pointed thought towards rendering in a single capture takes place, is called '*dhyāna.*' It is forgetting one's own self. Further, oneness with the role-playing, or transforming self to the character playing is *samādhi.*

But, it is mentioned in *Nāṭyaśāstra* that, the actor on the stage should keep aware of what he is playing. He shall not let him into *samādhi.* So, state of *samādhi* could happen during the practice, but not letting it happen on the stage is a great challenge.

V) *Ānandamaya kośā (*the layer of bliss) level:

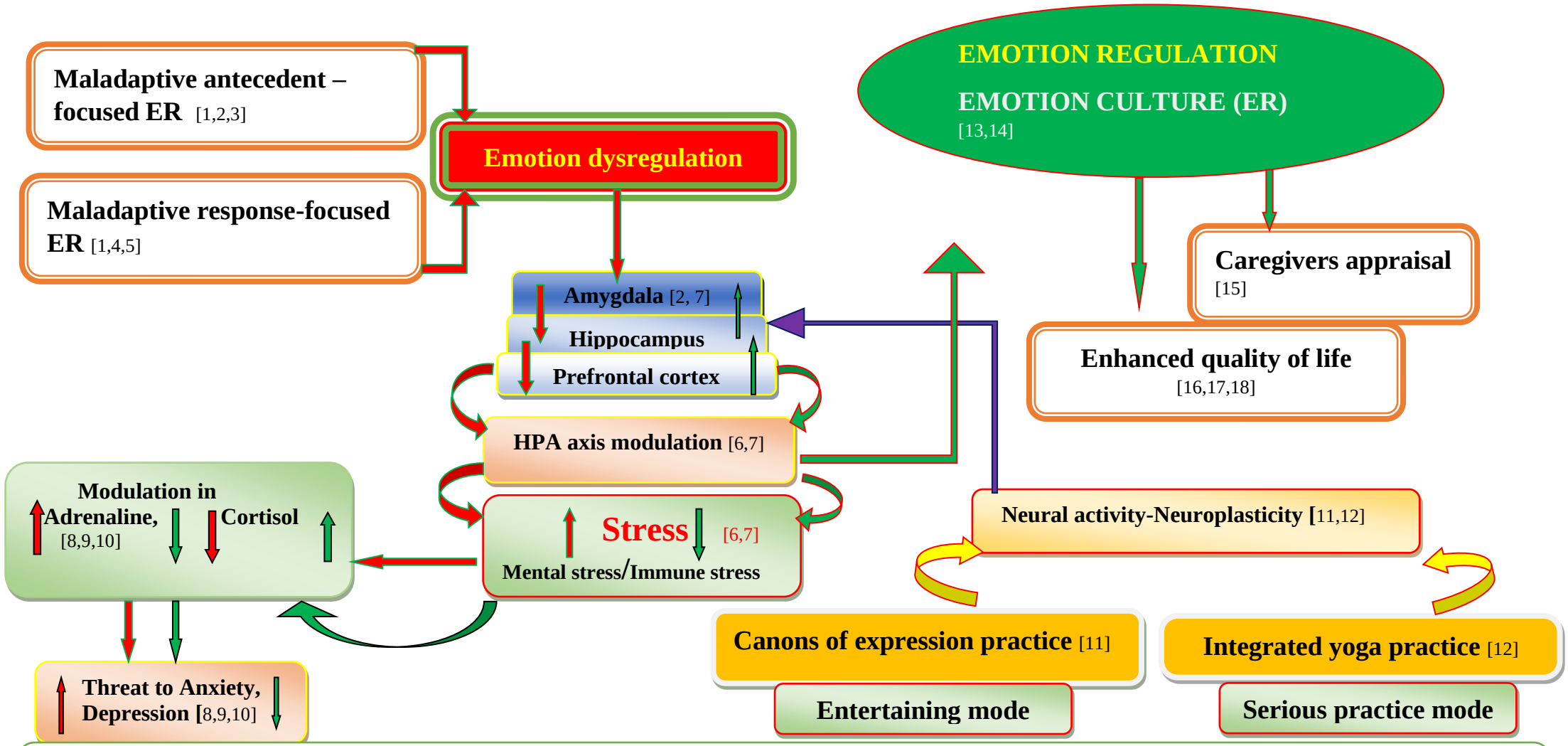
Understanding the meaning of the lyrics, enjoying every word of it, and merging individual consciousness with universal consciousness is *Bhakti* yoga. Dance becomes *bhakti* yoga, when, the artiste has an intense devotion and merges in the character of God/Goddess explained in the lyrics as rightly said in the scripture *Lāsyarañjana*. Finally, all the above-united activities could lead to Self-realization and attaining the bliss.

Conclusion

Ādhi (the root cause) for any disorder is mind. Prolonged *ādhi* have the tendency to create *vyādhi* in the human entity. So, the concept '*ādhijavyādhi'* narrates the mechanism of psychosomatic diseases that it is generated from the mind as postulated by *Yoga Vāsiṣṭa.* Patañjali yoga *sūtra* enumerates the yoga, controling the modifications or thought waves of the mind. Ch. 24(7) of *Nātyaśāstra* says, *sattva* to be '**देहात्मकं भवेत् सत्वम्**!*'(dehātmakam bhavet sattvam)* which means, *sattva* is emerged by the synthesis of body and mind. *Sattva* has a power to conjoin a physical entity with universal entity; outward to inward; gross to subtle. Patañjali Maharśi instructs in yoga *sūtra* (2.33) that, when the mind is disturbed by negative thoughts, suitable counter-measures should be adopted to keep away or remove such obstacles,

especially by the contemplation of the opposite, a namely positive one. A rationale is established that, for the disorders generated from the mind, medicine can also be generated in mind only! Either the yoga or dance practice is a tool to achieve the control over the mind. By the consistent practice of *āṅgika abhinaya* and *sāttvika abhinaya,* which can be a synthesis of *rāja yoga, jñāna yoga, karma yoga,* and *bhakti yoga,* non-desirable *rasas* in the mild form namely, disgust, fear, and anger which are the determinants for psychosomatic disorders, can be replaced with the desirable *rasas* namely, love, comic, compassion, courage, wonder and calmness. Both the interventions namely, CE and Yoga contributes in its own way towards self-regulation of emotion among CGs of children with NDDs

Figure: 14: Summary of mechanism of emotion regulation (ER) mediated by canons of expression and yoga practices.



Sources: 1) Koechlin et al., 2018, 2) Jazaieri et al., 2013, 3) Carpenter & Trull, 2013 4) Carlson et al., 2015, 5) Eftekhari et al., 2009, 6) Stephens & Wand, 2012 , 7) Ressler, 2010 8) Yaribeygi et al., 2017, 9) Goldstein, 2010, 10) Widmer et al., 2005, 11) Teixeira-Machado et al., 2019, 12) Villemure et al., 2015, 13) Van Bodegom et al., 2017, 14) Cardinal et al.. 2002 15) Schmidt et al.. 2010 16) Pocnet et al.. 2017. 17) Meule et al.. 2013. 18) Ciuluvica et al.. 2014