

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

Neurodevelopment Disorders

Neurodevelopment Disorders (NDDs) are a heterogeneous collection of psychiatric and clinical conditions that encompass 1) vision impairment (VI) 2) epilepsy 3) Neuromotor impairment including cerebral palsy (NMI-CP), 4) hearing impairment (HI), 5) speech and language disorders/ Asperger syndrome 6) autism spectrum disorders (ASDs includes autism, childhood disintegrative disorder) (WHO, 2013), and 7) intellectual disability (ID). Two additional NDDs are 8) attention deficit hyperactivity disorder [ADHD] and 9) learning disorders [LDs]) (Stein et al., 2020). NDDs are marked by lifelong condition characterized by significant impairment in cognitive and adaptive development due to abnormalities in the brain structure or function (Shea, 2012, Shobana & Saravanan, 2014). Moreover, NDDs can co-occur and have a heritable component (Meekums et al., 2015 ; Weder et al., 2014). Besides, varying in severities, NDDs in childhood, and adolescence disturbs the child, demanding extended attention, care, and support from the family (Ambikile & Outwater, 2012).

Some of the disorders overlap, children in epilepsy, ASD occurs in 22%, ADHD in 33%, and behavioral and emotional problems 30-50%. It is studies that, more than 80% of birth occur in low and middle income countries, the epidemiological data on NDD is based from developed countries ((Bitta et al., 2018).

Global prevalence of NDDs

As an available latest data of 2016, globally, around 62 million people were estimated to have autistic spectrum disorder. Among them, around 18 million had Autism (13 million males and 5 million females), and 44 million, Asperger syndrome and other spectrum disorders. The prevalence of Asperger syndrome and other autistic spectrum disorders (not including autism) typically ranges from 0.5 to 0.8% across counties. This is higher than the typical prevalence of Autism.

Furthermore, it is estimated that around 63 million have ADHD. Nearly 70% of them are males (44 million verses 19 million females). The prevalence of this disorder ranges from 0.5 to 2 % of the population across the countries. Also, it is estimated that 115 million had an intellectual disability disorder. Nearly 56% of this were male (65 million) and 44%, female (50 million) (.).

Prevalence of NDDs in India

The prevalence of developmental or behavioral disabilities India: 2-<6 years- ranges between 2.9% and 18.7% for any of nine NDDs mentioned above and in the 6–9-year-old children from 6.5% to 18.5%. About one-fifth of these children had two or more NDDs (Arora et al., 2018).

Definition of caregiver

A caregiver is defined as a family member, friends or relatives, who have been living with the child with NDDs, intimately involved in his/her activities of daily living, health care, and social interaction for more than a year (Mital et al., 2017). There are many types of paid caregivers (CGs), such as doctors, nurses, and other health care professionals. But, informal CGs such as siblings, adult children, and spouses, are the primary source of care irrespective of the time and energy they invest (Holley & Mast, 2009). Being a first-degree CG, parents' attitude plays a significant role, and there is a correlation with their psychological well-being. Their adverse reaction such as rejection, pessimism about future, aggression, avoidance, irrational belief in a child's disability, hostility taxes even socially high themselves, their child (Lakhan & Sharma, 2010).

Factors relating to caregivers' Burden

Though interest in the study of caregivers dates back to the 1950s (Brunnhuber et al., 2007), more studies are throwing light on various aspects of caregivers' problems and burden. The effect of stressors on family members caring for an ill person in the family is referred to as

‘caregiver’s burden’ (Lavelle et al., 2014). The caregiver’s burden is a multi-dimensional phenomenon mirroring the consequences of caring for an impaired family member in terms of physical, psycho-emotional, social, and financial aspects (Mital et al., 2017). Some researches distinguish caregivers' burden as ‘*objective*’ the physical burden after the behavioral variation of the mentally ill, which affects family relation, employment, and health as a social effect (Flyckt et al., 2015). It also interrupts the daily routine, social activities, leisure, social isolation, and financial problems (Bradt, Joke, 2010). The ‘*subjective*’ burden refers to the emotional effect on CGs such as reduced morale, increased strain, anxiety, depression, fear, sadness, anger, guilt, loss, stigma, and rejection which is considerably more in the caregivers of people with ASD to affect maternal well-being significantly (Philippon et al., 1977) often instigate to drug abuse, suicide threats and violent behavior (Rashda Saif Niazi, Shabana Basheer, Fareed A. Minhas, 2005).

Further, A comparative study between the mothers of adolescent and young children with Down syndrome and autism, mothers of ASD have shown a higher level of pessimism, depressive symptoms, negative attitude, and distant relationship to mark a significant predictor of psychological problems (Abbeduto et al., 2004). Signs of depression is marked with caregivers’ exhaustion of entire energy, frequent cry, and tendency to get angry easily leading to undeterred negative emotions (Mashau, Netshandama, & Mudau, 2016).



Image 1: Sample of inner emotions of caregivers

WHAT IS EMOTION AND HOW DOES IT MATTER?

Emotion plays a crucial role in organizing our daily life. From the earliest philosophers to present-day thinkers, 'emotion' is the center of debate and discussions concerning neuroscience and psychological aspects (Konstantin, Orlov & Madappa, 2005). In human functioning, though it constitutes a basic aspect, defining and categorizing it is an intense intellectual challenge though it plays a critical role in evaluating consciousness and the operation of all mental processes (Izard, 2009). Emotions are related to the activity of the parasympathetic division of the autonomic nervous system resulting in changes in the overall conduct of the body (Polushin, 2009, K Korotkov et al., 2009) Expression of emotion may be verbal or non-verbal. Verbalized words mediate the feeling and regulation of emotions. Plutchik (1982) describes emotion in terms of (a) subjective medium; (b) behavioral medium; and (c) function medium. Plutchik's model is based on an emotion wheel made up of four pairs of opposites: joy and sadness, acceptance and disgust, fear and anger, and surprise and anticipation.

Variables of Emotion are as follows: Emotional intensity, emotional variety, negative/positive feelings. Based on theoretical preferences, concepts of emotion have preferences over its several components, but the degree of emotion both in quantity and intensity are purely personal experiences apart from thoughts or behaviors. Researchers have shown that Emotional states tend towards dominance on the visceral changes and their intense activation accompanied by strong feelings (Moloney et al., 2016). Folk psychology exhibits a view that 'emotion' makes or breaks a relationship and leads one's life towards peace or turmoil.

The 'volcano theory' being the basic theory of emotion, enumerates, 'emotions are feelings' unless discharged or burst out (in case of negative), accumulation thereby impairs an individual's cognitive, reasoning, and functioning ability. In humans, joy, sorrow, hope, happiness, anger, shame, guilt, and fear are fundamental experiences in mundane life. Emotions of love, peace, contentment, and compassion are the natural state of our souls. To move into deeper levels of

consciousness and grace, alignment with these principles is a must (Sibia & Misra, 2011). Image 1 shows few sub-samples of emotions.

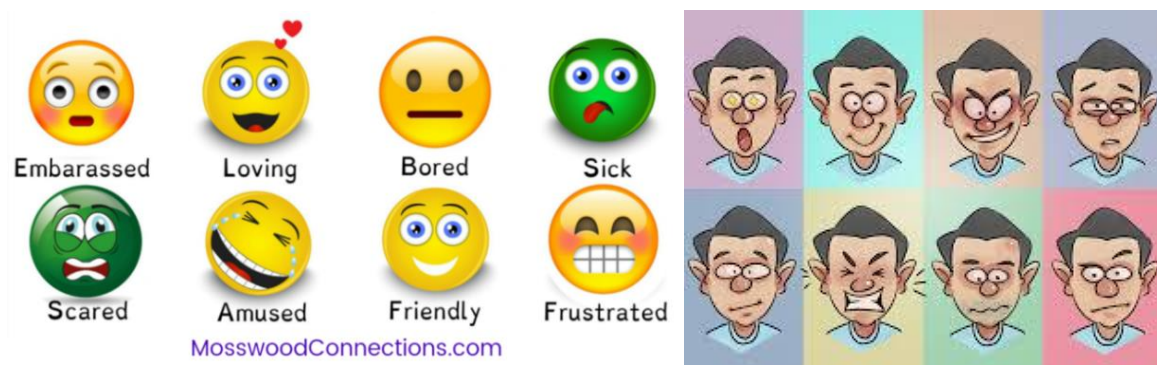


Image 2: Sample of various emotions.

Pioneer studies on the physiology of mind-body interactions (psychosomatic) date back to the 1930s by Walter Cannon and by Walter Hess in the 1950s. The later work is documented by Holmes and Rahe, well-named psychiatrists, on the considerable relationship between stressful life events and illness. The concept of the mind-body connection is supported by more than 2000 peer-reviewed literature articles in the past 25 years. The cream of concept in mind-body is recognition of mind playing a vital role in the health and inseparable relationship between the mind and the body (Kumar et al., 2016). Figure 1 depicts the pathway of mind and body interaction leading to the body’s physical reaction.



Figure 1: Model depicting the pathway of body and mind interaction

Source: The cornel research program for self-injury and recovery

In a sense, mind-body therapy methods empower the patients with self-help techniques, which in turn associated with developing a sense of control in attitude and belief connected with improved health and longevity (Jacobs, 2001).

Emotion Regulation

Emotion regulation is described as the process in which people modify their emotional reactions, i.e., the coping methods that increase or decrease the intensity of the moment (Thompson, 2008). The process of regulating emotions is involved in four stages, such as internal feeling states. (i.e., the subjective experience of emotion), emotion-related cognitions (e.g., thought reactions to a situation), emotion-related physiological processes (e.g., heart rate, hormonal, or other physiological reactions), emotion-related behavior (e.g., actions or facial expressions related to emotion) (Trevarthen, 2009). Paul Gilbert's evolutionary model proposes that human emotion switches between three systems to manage emotions. Each system is associated with different brain regions and different brain chemistry. An imbalance between the systems or under-development of the soothing system causes distress or dysregulation (Stunt, 2016). Figure 2 illustrates those three systems and the function of each system engaged in emotion regulation.



Figure 2: Functional states of three systems in emotion regulation

Source: (Stunt, 2016)

Importance of Emotion Regulation

Emotion regulation is vital from the perspective of biological, cognitive, developmental, social, personality, clinical, and health psychology (Aldao et al., 2010). Impairment of emotion regulation among women who were exposed to interpersonal violence and suffered from related posttraumatic stress disorder has been shown to adversely affect their caregiving behavior with their young children and, in turn, in the development of emotion regulation among their young children (cDaniel, et al., 2007).

Pathophysiology of emotion dysregulation:

Concerned neural circuitry system of stress reactivity, coping, and recovery processes in the brain include the hippocampus, amygdala, and areas of the prefrontal cortex. Image 2 depicts the main brain areas involved in the process of emotion regulation or dysregulation.

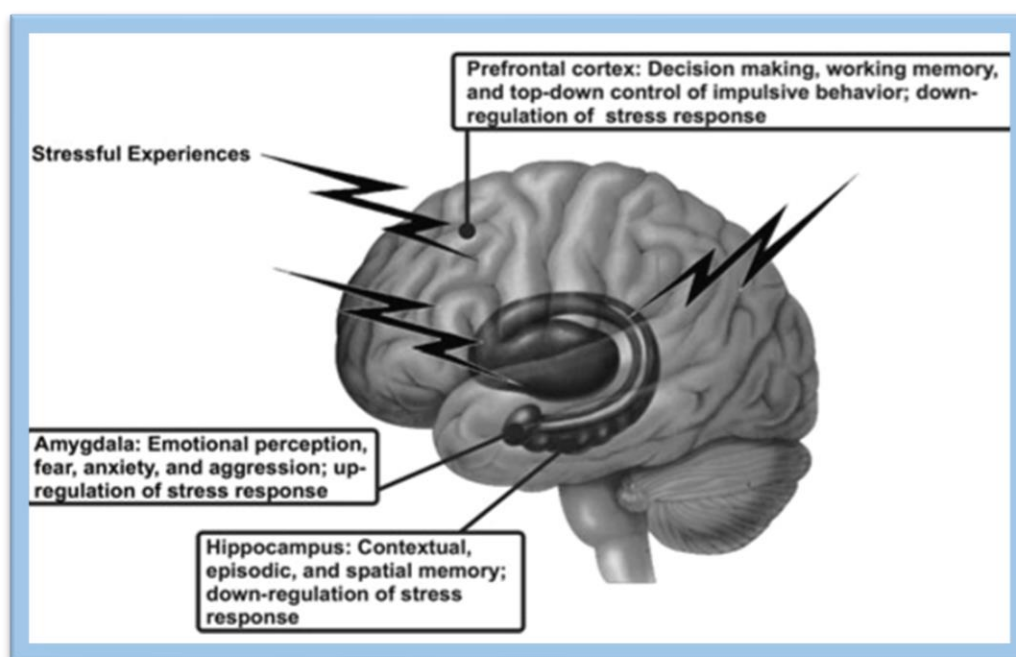


Image 3: Brain parts engaged in the stress responses and emotion dysregulation.

Source: (McEwen & Gianaros, 2010)

These systems together mediate adaptability physiological and behavioral stress processes in the short-term and maladaptive in the long term. The brain has a bidirectional pattern of

communication via neural and endocrine mechanisms underpinning cognition, experience, and behavior (Mcewen & Gianaros, 2010) with the aid of autonomic, cardiovascular, and immune systems. Figure 3 depicts the activities of neurotransmitters and hormones released in Paul Gilbert’s evolutionary model of human emotion between three systems.

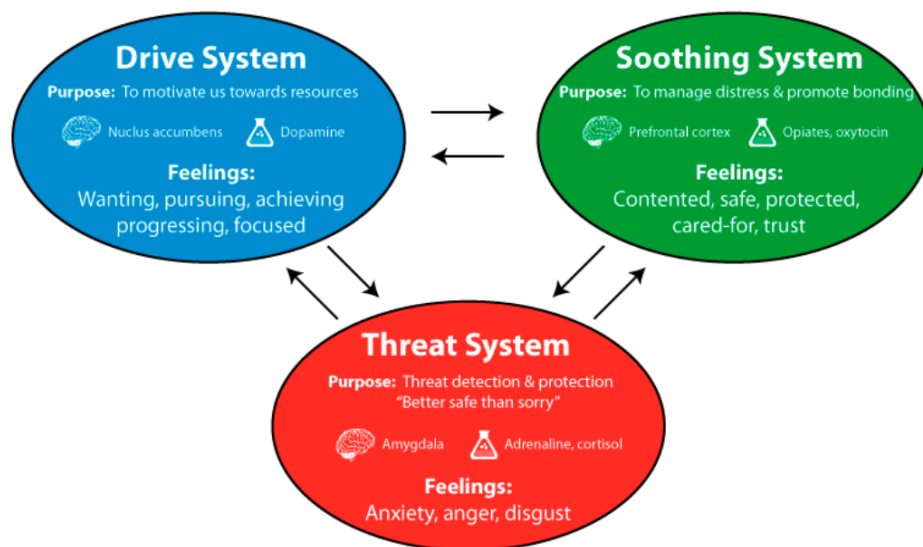


Figure 3: Neurotransmitters and hormones associated with three systems in emotion regulation Source: (Stunt, 2016)

A Neurocognitive pathway of emotion dysregulation explains high anxiety trait in depression. High anxiety traits displayed by an individual with enhanced amygdala reactivity will influence the activity in the hippocampus and prefrontal cortex. Conversely, the prefrontal cortex exerts a weak inhibition of the amygdala function. This profile is linked with an aphasic enhancement of hypothalamus–pituitary–adrenal (HPA) axis activity and, consequently, of glucocorticoid levels (Skelton et al., 2012). Conversely, phasic elevations of glucocorticoids further increase amygdala activation. This pattern of the brain and neuroendocrine interactions is accompanied, in high anxiety trait individuals, by a cognitive pattern of interrelated responses. Image 3 depicts the functions of the amygdala and its role in emotion dysregulation in response to stimuli. When high anxious individuals are exposed to major stressful life events, this vulnerable neurocognitive profile responds with amygdala sensitization (hyper-reactivity to a threat that progressively leads to hyper-activation even under basal conditions) with stronger influence over hippocampal and prefrontal (strongly potentiating or inhibiting) functions. The prefrontal cortex

becomes ineffective to restrain amygdala hyper-reactivity. This pattern of neural dynamics disrupts the functionality of the HPA axis, which eventually shows enhanced glucocorticoid levels under basal conditions (Goosens & Sapolsky, 2007).



Image 4: Functions of the amygdala and its role in emotion dysregulation in response to stimuli. Source: Sciencephoto.com and aprillies.com

The focus on threat and fear results in enhanced negative memories, setting the cognitive processing in a ‘mood-congruent’ bias mode that, together with cognitive deficits of increasing severity, leads to several socio-psycho-physiological alterations that are at the core of depression. The neurocognitive pattern characteristic of high anxious individuals determines the increasing and reverberating nature of these maladaptive neurocognitive processes and sets the path to turn a depression episode into a major depression disorder (Sandi & Richter-Levin, 2009).

Effects of Emotion Dysregulation

Emotion dysregulation is something that happens to an individual who cannot regulate their emotions needed in social condition. Emotion dysregulation in higher intensity or people with less effective regulation is more prone to depression and problem behaviors (Daniel et al., 2007).

A review on 114 papers mentions that difficulties with emotion regulation are associated with mental disorders (Aldao et al., 2010) and incorporated into several models of specific psychopathologies, including borderline personality disorder (Glenn & Klonsky, 2009), major depressive disorder (Nolen-Hoeksema et al., 2008), bipolar disorder (Johnson, 2011), generalized

anxiety disorder (Mennin et al., 2009). Emotional dysregulation is one of the ways influencing anxiety through high temperamental reactivity and family emotional environment (Suveg et al., 2010). Another review article explains subsequent development of Emotion dysregulation leads to multiple forms of psychopathology, including aggression, substance use disorder, and also appears to be a global risk for psychopathology in a non-clinical population (Hofmann et al., 2012). Image 4 shows negative emotions affecting various parts of the body.

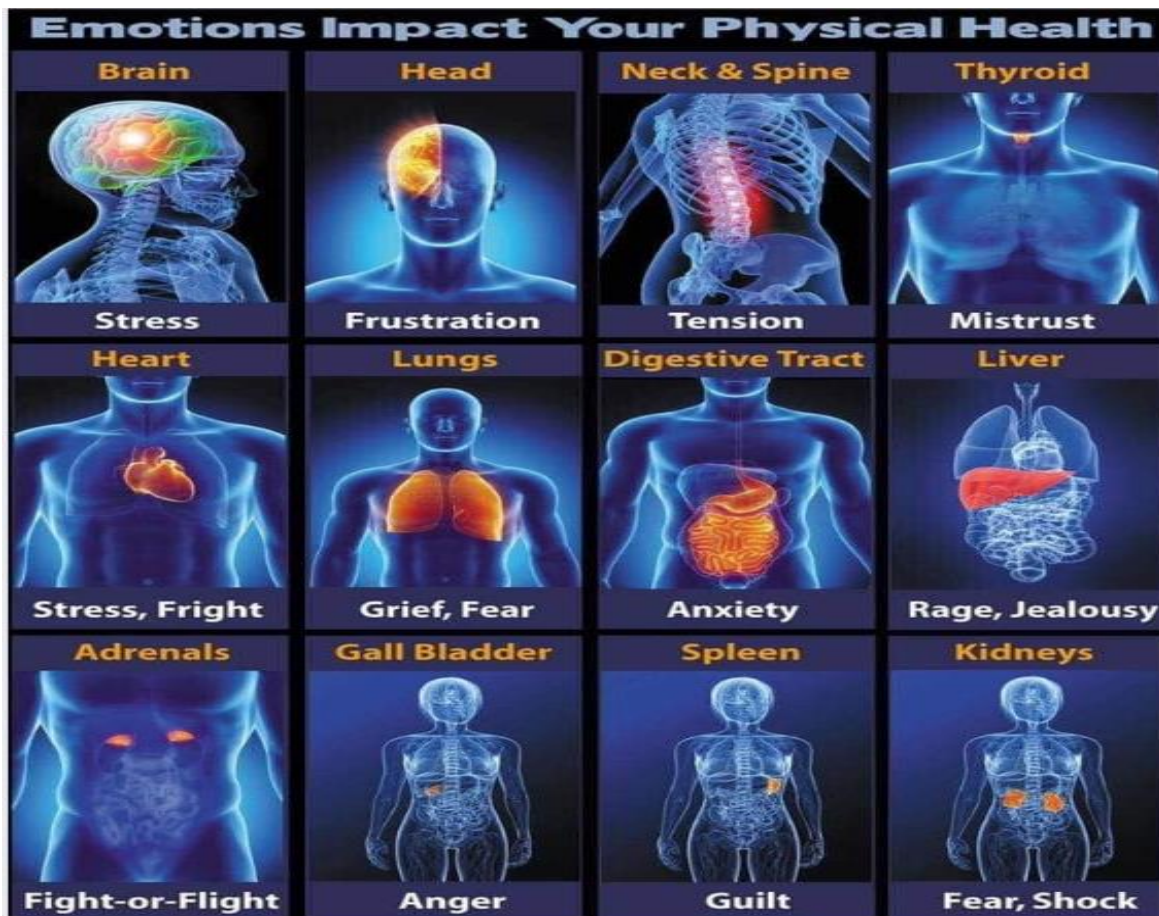


Image 5: Various emotions affecting different parts of the body

Reference: Thornton Streeter

<https://www.facebook.com/groups/energymedicinexchange/permalink/1811686188978839/?sfnsn=wiwspwa&extid=Xe4Hsjr3BvG7teRj>

Figure 4 narrates how maladaptive antecedent and response focused to emotion regulation leads to chronic pain which is the cause for several psychiatric disorders mentioned above.

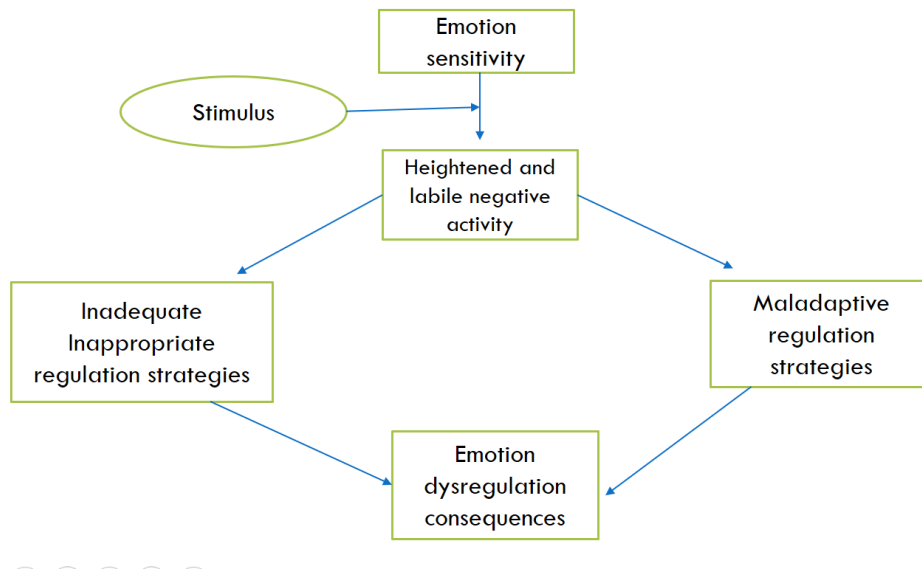


Figure 4: Conditions to emotion regulation leading to chronic pain. Source: sciencedirect.com

CONVENTIONAL MANAGEMENT

Currently, emotion regulation is managed mainly with pharmacological medicines and drugs. Tricyclics/heterocyclic like Amitriptyline, Nortriptyline, or Trazodone have been used for the last few decades. On the other hand, several alternative medicine therapies such as cognitive behavioral therapy, positive therapy, counseling, one-to-one therapy, western dance movement therapy, and interventions such as psychoeducational, supportive, psychotherapy, cognitive-behavioral, massage, healing touch, respite /adult daycare, multi-component, and interventions are in practice for managing psychological distress.

CANONS OF EXPRESSION IN INDIAN AESTHETIC DANCE AND YOGA FOR EMOTION REGULATION FOR CAREGIVERS

Earlier studies have mentioned that psychopharmacology is the primary treatment modalities for psychiatric and behavioral disorders. But they are associated with metabolic problems such as constipation, weight gain, diabetes, cognitive difficulties such as wakefulness, drowsiness, dyslipidaemias, and cardiovascular and sexual dysfunction. Also, the therapeutic benefit of these medications is often poor (Meyer et al., 2012).

The dance intervention encompasses the combination of coordinated movement strategies, exercise (Lossing et al., 2017)), musical arrangements and cognitive benefits altogether have been used as a therapy for varieties of disorders across the world (Lapum & Bar, 2016; McNeely et al., 2015). Few pilot studies on dance movement therapy and drama therapy to CGs have shown the positive benefit of movements, rhythm, songs, and storytelling, on reducing stress level and strengthen CGs in their profession (Aithal et al., 2019; Donorfio et al., 2010; McGuire et al., 2019). The Indian thoughts of emotion discourse deal with poetic, dramaturgical, and aesthetic experiences, which has a particular approach towards psychology of emotions (Misra & Castillo, 2004). Lyrics being an inseparable part of the canons of expression with spiritual meaning embedded, can buffer against stressful conditions (Mascaro & Rosen, 2006). 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).

The practice of yoga for eight weeks has shown evidence that yoga intervention may help restore HPA balance (Gothe et al., 2016). 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. Yoga is a form of mind-body intervention comprised of adaptation of specific body poses or *āsanas*, breath control, and meditation and it is also a way of life which helps in bringing the harmony at physical, physiological, mental, social and spiritual aspects of the individual (Williams et al., 2005). Other scientific studies reported that yoga improves spasticity, gait, and cognition, functional independence, mental health, depression and QoL (Bisht et al., 2019) among patients with neurological disorders (Meyer et al., 2012). Yoga enhances motor and sensory function, gait, mental flexibility, psychological well-being, and relaxation in individuals (Curtis et al., 2017; Telles et al., 2017).

Previous studies have mentioned that dance and yoga can modulate the concentration of serotonin and dopamine neurohormones by stabilizing the sympathetic nervous system (Govindaraj et al., 2016) towards regulating mood and social behavior.

NEED FOR THE STUDY

The total scenario of research till date explicitly mentions that despite the existence of several alternative medicine therapies psychological distress is prevalent among CGs. Psychological intervention undoubtedly helps the mothers of development disordered children to get transformed from a negative attitude to psychological well-being (Shobana & Saravanan, 2014).

But no scientific study in India has been found to test the emotional regulation mediating canons of expression, which includes canons (standards/principles) of expression *āṅgika'* (physical movements) and *sāttvika* (expression by intense feeling) as described in *Nāṭyaśāstra*, and yoga for self-regulation of emotion during distress and psychological well-being among CGs of children with NDDs. Being an artiste of Indian classical dance and yoga therapist, I was enthusiastic about exploring a study based on the canons of expression and yoga with a module on emotion regulation among CGs of children with NDDs.

CONCLUSION

This chapter provides an overview of the topic of the research presented in this thesis. It mentions the volume of the prevalence of neurodevelopment disorders, CGs' role in dealing with those children, and the factors that cause subjective burden in them. Further, this chapter discusses the 'emotion,' which is the core of the psychological domain, its neurocognitive role in the physiology of mind-body interactions. In continuation, the emergence of theories around the aspects of emotion, causes, and effects of emotion dysregulation, its mediation towards ailments, and finally, the importance of emotion regulation in attaining positive psychological health are noted here. So, understanding these aspects has helped the researcher to explore, the possible therapeutic intervention of dance with a cluster of physical movements and emotion-related elements based on *Nāṭyaśāstra* and related traditional Indian scriptures on the one hand, and the therapeutic application of yoga, on the other hand, which was later compared with the non-intervention group.