

CHAPTER 3
REVIEW OF SCIENTIFIC
LITERATURE

3.0 REVIEW OF SCIENTIFIC LITERATURE

In chapter 1, we presented a brief discussion on neurodevelopment disorder (NDDs), the role of caregivers (CGs) in caring such children, factors contributing CGs' subjective burden, the importance of emotion regulation in CGs, and aspects of emotion dysregulation paving the way for various psychological, and psychophysical ailments.

In continuation, this chapter elaborates CGs' problems and available coping strategies based on the review of non-Indian and Indian studies, and limitations with those strategies. Further investigation on the previous Indian and non-Indian studies on creative dance movements and yoga therapies on various disorders are explored using different clinical and subjective tools to measure a range of psychological factors, and limitations in the methodology adopted by those studies. This chapter discusses these aspects of hereunder. This search provided the fact that the application of canons of expression based on the traditional scripture *Nāṭyaśāstra* is not explored adequately as a therapeutic application with scientific evidence in the healthcare arena even though several theory-based articles and essays are published. At the same time, no study of yoga intervention found on the CGs of children with NDDs.

INTRODUCTION

Informal CGs in a family are the primary support in managing children with neurodevelopment disorders (NDDs). Positive mental health and emotional resilience of informal caregiver influences in caring such children. A study has marked that oral health and behavior of caregivers will have a high impact on children; importantly, positive behavior, self-efficacy, and attitude of CGs provide improved oral health and behavior of children (Wilson et al., 2016).

Intensive care for children with NDDs is pre-occupied with financial, psychological, and medical problems (Singh et al., 2014). Additionally, CGs of children with learning and multiple disabilities need more help compared to caregivers of other disabilities (Tan, 2017). Studies have shown that CGs are more likely to experience chronically stressful conditions (Cordova-Marks et

al., 2019) such as depression (Tiwari & John, 2017), anxiety, and poor physical health (Cordova-Marks et al., 2019) that can be unsafe to the caregiver's health. These conditions have a positive correlation with burden scores (Hu et al., 2018), and the burden has a negative association with the quality of life (Srivastava et al., 2016). CGs with low resilience and experiencing a high burden have an association with dysregulated emotions and a sense of self-efficacy (Séoud & Ducharme, 2015). Further, uncontrolled mental agitations prompting more physical exertion results in muscle strain, skeletal injury, and chronic illnesses (Pinquart & Sorensen, 2007). Furthermore, the physical burden emerging from the behavioral variation of a mentally ill family member affects the family relation, employment, daily routine, social activities, leisure, social isolation, and monetary aspects (Lavelle et al., 2014; Smith et al., 2010).

Study findings point out that negative physical health consequences of the informal CGs' have a stronger relationship with a higher level of stress hormones, antibodies, and medication used than non-caregivers (Vitaliano et al., 2003). A recent report suggests that informal CGs are equally suffering as a patient at a clinical level of anxiety, depression, sleep disturbances, and fatigue (Milbury et al., 2018; Petruzzi et al., 2013a). In response to prolonged poor physical and mental health, the act of care giving ends in psychiatric illness, physical illness, physical and psychiatric morbidity (Rumpold et al., 2017), and even death (Schulz et al., 1990, 1995; Tiukinhoy & Rochester, 2006).

3.1 Indian caregivers

Even in Indian society where the family is the backbone support system, informal CGs have not got sufficient attention (Lukhmana S, Bhasin S K, Chhabra P, 2015). In understanding CGs problems, few cross-sectional studies are reported in India on depression (Bhat et al., 2018), quality of life (Srivastava et al., 2016), psychological and medical problems (Singh et al., 2014), major stress (Bhattacharjee et al., 2012), and stigma (Mukherjee & Mukhopadhyay, 2018) which affirmed prevalence of all the above-said factors in CGs irrespective of their income level (Saito et al., 2018). With men's flight and/or separation due to the disabled child, spouses, daughters-in-

law are overburdened in the Indian family setup (Ugargol & Bailey, 2018). An integrative review noted that interventions with social, economic, cultural, religious, spiritual, and traditional knowledge would help Indian CGs in alleviating psychological burden with care perspectives until end-of-life (Ramasamy Venkatasalu et al., 2018).

3.1.1 Program for caregivers

There are different treatment modalities such as supportive therapy, cognitive-behavioral therapy (O'Toole et al., 2017), interpersonal therapy, family/couple therapy (Mutamba et al., 2018), and several other complementary and alternative medicine interventions for informal CGs (Lamotte et al., 2017; Martin & Candow, 2019). The high level of resilience is correlated to good emotional and physical status in CGs (Cordova-Marks et al., 2019). A few studies have reported that a yoga program is a safe, feasible, acceptable, and subjectively useful for the physical and mental health of informal caregivers (Milbury et al., 2018, 2019).

Similarly, creative movement in dance interventions showed fostering resilience and mental health scores of CGs (Fernández-Lansac et al., 2012). Therefore, the present study aimed to assess the psychological health such as burden, stress, anxiety and depression, caregiver's appraisal, and overall quality of life in caregivers of children with NDDs following psychological and behavioral interventions i.e., canons of expression and yoga which is later compared to control group.

Table 5 and 6 in the following pages provides a bird's view of non-Indian and Indian studies with various interventions given to CGs, methods used, result achieved and self-comment on the limitations of the study indicating further research required in that area.

Table 5. Review of non-Indian studies of various interventions on caregivers.

Some terms: CGs = Caregivers; QOL= Quality of life; intvsn-intervention; deprsn-depression.

Author (Year)	Type of Intvsn	Method	Result	Comment
(Aithal et al., 2019)	Dance movement psychotherapy	One group dance and the other waitlist control group	Integrative approach to DMP may be effective on parental stress, depression,	Recruitment and random allocation to be found difficult.
(Danucalov et al., 2017)	yoga and compassion meditation program	One group-yoga and meditation, and the other waitlist control group.	The intvsn group showed statistically significant improvement in QOL, attention, vitality, & self-compassion.	Active intvsn groups are suggested rather than a waitlist control group.
(Sklenarova et al., 2015)	Drama program-pilot study	One group focused on dance, rhythm, and songs. Another group focused on storytelling.	Drama, culture, song, dance, and storytelling, strengthen the CGs in their profession.	Individual screening for caregiver-tailored intvsn.
(Donorfio et al., 2010)	Support, Educational Literature, and Creative Movement	16 primary CGs for their frail mothers.	Overall improvement noticed in five mental health variables: irritability, depression, anxiety, stress, and concentration	A longitudinal study with larger samples warranted.
(Sklenarova et al., 2015)	FOCUS, a Family Intvsn. (Family involvement, Optimistic attitude, Coping effectiveness.	Two hundred patients with CGs' undergone intvsn with a longitudinal randomized clinical trial.	Significant decrease in the negative appraisal of caregiving from baseline to three-months found. But this didn't sustain from baseline to six months — no other significant difference in uncertainty, hopelessness, and coping between intvsn and control group.	Sustainability is required.
(Donorfio et al., 2010)	Supportive Intvsns	406 spouse CGs of Alzheimer's disease patients, randomized into intvsn and control groups.	The intvsn showed better results than the control group and resulted in sustained for a longer period.	Just geriatric deprsn deprsn[2] scale administered, but more effective and evidence-based intvsn commanded.

Table 6: Review of Indian studies of various interventions on caregivers.

Some terms: CGs = Caregivers, ZBS=Zarit Burden Scale, QOL=Quality Of Life; OCBS =Oberst Caregiving Burden Scale, CSI=Caregivers Strain Index, CES-D=Epidemiological Studies Depression Scale; Dprsn-depression.

Author (Year)	Type of Intvtn	Method	Result	Comment
(Mehta et al., 2018)	RCT iSupport -an online self-help program	CGs of iSupport group received an online program with an explanation relating to dementia, the control group received e-booklet with similar content	iSupport -an online self-help program used with tools such as ZBS, Dprsn & Anxiety symptom, QOL.	Should be tried on a larger population
(Mukherjee & Mukhopadhyay, 2018)	a cross-sectional study on stigma on CGs from the hospital.	200 CGs of people with mental illness in the psychiatry outpatient dept. were participated.	Healthcare providers can play a pivotal role in addressing stigma on CGs.	The study needed to be done on a larger scale.
(Bhat et al., 2018)	cross-sectional study	41 parents participated; CES-Dtool used to measure depression,	A significant negative association was found between parental depression and child's health.	CES-D scale found to be less time-consuming in measuring the depression level of CGs.
(Mital et al., 2017)	a cross-sectional analytical descriptive study on CGs	CGs of chronically medically ill and psychiatrically ill patients	CGs burden scale used.	Socio-demographic details needed to generalize intvtn.
(Jagannathan et al., 2012)	10 days yoga program	30 CGs of inpatients with Schizophrenia were given yoga therapy for 10 days	Validation of the yoga program for caregivers of Schizophrenia.	Findings are highly indicative.
(Bhattacharjee et al., 2012)	population based study	111CGs stroke survivors participated.	CG factors found to be responsible for major stress were long caregiving hours.	Practical training with nursing skill and counseling sessions were warranted.

3.2 Yoga reviews

Differentiate yoga practices from physical exercises a review article point out that, yoga has some of the distinctive elements such as an emphasis on breath regulation, mindfulness during practice, and importance on the maintenance of postures (Govindaraj et al., 2016 ; Coon et al., 2003). Further yoga has found to be better effective than physical exercises in a variety of health-related outcome measures (Ross & Thomas, 2010). A review with 26 systematic studies, 11 reviews (McCall et al., 2013) evidenced the positive effect of yoga intervention on reducing symptoms in depression (Pilkington et al., 2005), anxiety (Cooper et al., 2007), and pain; though 15 reviews reported unclear results, no study reported adverse effects of yoga (Ross & Thomas, 2010; McCall, 2013). Compared with psychosocial and educational interventions such as counseling, yoga works better in reducing anxiety and stress (Amber W.Li & Carroll-Ann W.Goldsmith, 2012; Dunne et al., 2019), depression and fatigue (Cramer et al., 2017; Woodyard, 2011). Additionally, a general effect of yoga on four leading risk factors of chronic diseases such as body weight, blood pressure, glucose level, and high cholesterol, has been tested to be positive (Yang, 2007). Yoga is actively mediating in glycemic control, lipid levels, and body composition in the management of Diabetes Mellitus 2 (Innes & Selfe, 2016). Four meta-analyses on the chronic headache, neck pain, back pain, fibromyalgia, pelvic pain, irritable bowel syndrome, chronic fatigue syndrome, and somatoform pain disorders indicated good effect and benefits of yoga (Sutar et al., 2016). Cochrane database of systematic reviews has specifically pointed that no therapy is as effective as yoga therapy towards reducing sleep disturbances and fatigue and improving quality of life among the women diagnosed with breast cancer (Cramer et al., 2017). Another review with 55 studies has correlated yoga practice into socio-demographics, psychosocial characteristics, and mental and physical well-being and mentioned that yoga, having psychosocial factors such as coping and mindfulness, widely practiced by women for better subjective health, reduce distress and physical impairment (Park et al., 2015). Further, yoga can be practiced as self-care behavior treatment that

develops a life-long behavioral skill, enhances self-efficacy and self-confidence (Arndt et al., 2012).

Within the category of mind-body medicine, yoga therapy has emerged as a novel alternative medicine and is gaining popularity worldwide (Khalsa, 2004). The importance of yoga denotes the fact that yogic practices improve cardiovascular functions and strengthens the muscular system, facilitates flexibility of the body, and further assists in curing of addictions and enhancing the quality of life and overall well-being (Woodyard, 2011). Yoga has a potential effect on stroke rehabilitation treatment (Lawrence et al., 2017) and gained global recognition in managing asthma effectively (Z.-Y. Yang et al., 2016). In treating Posttraumatic stress disorder (PTSD) in adults, yoga and meditation are emerged as a promising complementary method (Gallegos et al., 2017) and even in reducing inflammations across chronic conditions (Djalilova et al., 2019). In the reduction of depression, Hatha yoga showed a better effect over psychoeducation (Vollbehr et al., 2018). As an alternative and complementary approach, yoga can mediate substantially in reducing the symptoms of Multiple Sclerosis (Thakur et al., 2019) and dementia (Brenes et al., 2019). In the furtherance of research in oncology, yoga is found to be effective in improving the biomarkers of stress, inflammation, and immune function (Danhauer et al., 2019). A survey of older people who practiced yoga for more than 10 years has mentioned that improving mobility and balance yoga boosts fall prevention strategy (Tiedemann et al., 2018). Yoga practiced in the perinatal period has shown a fostering effect in the mental health and well-being of women and infants (Sheffield & Woods-Giscombé, 2016).

There are several Indian and non-Indian experiential studies to date wherein various dimensions of yoga intervention are tested on Caregivers (Table 7 and 8) and also a wide range of diseases, disorders, and multiple components of positive health. (Table 9, and 10 below). These studies explicitly talk on the application of yoga interventions on health indices among healthy individuals; physical health components such as blood pressure, smoking, dental hygiene, quality of life; on executive function and enhancement, executive functions, stress; physical and

respiratory function in healthy inactive middle-aged people; women-related health issues such as Post Traumatic Stress Disorder, premenstrual and menstrual syndrome, thoracic radiotherapy in breast cancer, fibromyalgia, well-being of cancer patients and their caregivers, obesity; anxiety, stress, and well-being relating to student; resilience to stress level among nursing students; quality of life and sleep quality, cardiac function, reduce mobility limitation chronic pain, heart related-chronic obstructive pulmonary disease, Paroxysmal Atrial Fibrillation, outpatient eating disorder, opioid use disorder, type 2 diabetes, Parkinson's disease, rheumatoid Arthritis, Sickle Cell Vaso-Occlusive Crisis, type 2 diabetes; cortisol awakening response, and altered inflammatory marker expression on mind-body health among common population; Digestive system related-irritable bowel syndrome; military veterans with chronic low back pain, arthritis in minority communities etc.

Table 7: Indian studies on yoga intervention on caregivers

Author	Topic	Type of yoga	Sample, study design & Assessment	Session Duration	Variables / Scales	Results	Future Suggestions
Bisht et al., (2019)	Parents of children with retinoblastoma	Yoga-based lifestyle intvsn	86 Single-arm prospective clinical trial, Pre-post	5/wk; 2 wks instructed and 10 wks practice at home	Depression and QOL	Reduced psychological stress and enhanced QOL indicating good neuroplasticity.	Study on large sample suggested.
Gandhi et al., (2019)	CGs of patients- neurological rehabilitation wards	CGs yoga module	34 RCT, data collected 15 th and 29 th day.	35 min/day for 8 days. Continued at home for 3 weeks	Psychological distress and mental well-being.	Improved mental well-being within (P<0.003) and between 9P<0.01). Caregivers' yoga module.	Requirement of arge sample size and blinding.
Chhugani et al., (2018)	CGs of older adults with alzheimer's disease	IAYT	30, RCT, Pre-post	1 h/d, 6 d/wk, for 1 month.	anxiety, depression, stress, and sleep quality	Significant improvement (p<0.001) Blood pressure, heart rate, anxiety, depression, stress, and sleep quality .	Large sample and longer duration warranted.
Jagannathan et al., (2012)	On CGs of schizophrenia patient	Group yoga	29, RCT Pre-post	10 days	Yoga program developed based on reduced burden and improved coping.	Improved health outcomes	Yoga program developed found to be useful.

Table 8: Non-Indian studies on Yoga Intervention on Caregivers

Some terms: CGs-caregivers; RCT-Randomized control trial; dprsn-depression; QOL-quality of life; mins-minutes.

Author	Topic	Type of Yoga	Sample, study design & Assessment	Session Duration	Variables / Scales	Results	Future Suggestions
(M. Lima et al., 2019)	CGs of adolescent-cancer	Hatha	36, RCT Pre-post	35 mins-single session	anxiety, subjective well-being and attention level	Anxiety reduced (p<0.001), enhanced subjective well-being (p<0.001).	Small sample size
(Lopez et al., 2018a)	Cancer patient and Caregiver distress	Group yoga	205, Patient, 77 caregivers, Pre-post of single session	Not mentioned	anxiety, fatigue, well-being, dprsn, appetite, drowsiness, and sleep	Significant improvement in anxiety, depression, fatigue, (p<0.001) well-being (p<0.001). Understanding yoga class content, intensity, and duration can affect outcomes.	Understanding yoga class content, intensity, and duration can affect outcomes.
(Milbury et al., 2019)	Pilot study on Patients Undergoing Thoracic Radiotherapy and their Family Caregivers	Dyadic Yoga Program	26, RCT, Baseline, last day of therapy, 3 months	60 mins session/2-3 times /wk/6wk	QOL, dprsn	Reduced anxiety, , sleep, apatite, drowsiness, depression and enhanced QoL	Stronger methodology and large group required.

Table 9: Indian studies on Yoga intervention on various diseases/disorders

Some terms: PTSD-Post Traumatic Stress Disorder; QOL-Quality of Life; Intvn-intervention; Y-yoga; C-ontrol; dprsn-depression; wk-week.

Author	Topic	Type of Yoga	Sample, study design & Assessment	Session Duration	Variables / Scales	Results	Future Suggestions
(Chattopadhyay et al., 2019)	Women with Chronic PTSD	Yoga	9 Pre-post	1/wk/20 wks and monitored home practice	CAPS and Davidson Trauma Scale for PTSD	Substantial reduction in PTSD after 1 wk assessment	The frequency of yoga sessions and sample size to be increased.
(Lemay et al., 2019)	on students' stress and anxiety levels	Vinyasa flow yoga	17 Pre-post	60/wk	stress levels, anxiety levels, and mindfulness skills	Reduction in stress and anxiety	Large sample size and long duration of follow up to be held.
(Mathad et al., 2017)	Yoga on Nursing students		100 Pre-post	8 wks	Psychological well-being: resilience, compassion, empathy, reduced stress.	Significantly enhanced self-compassion and mindfulness	Objective tools and follow up required.
(Hariprasad et al., 2016)	In elderly	Based on traditional and contemporary yoga programs	120 Single-blind controlled Study with block randomization Pre-post	Daily for 1 month and weekly for 3 months	QoL, Sleep Quality	Seems to improve QOL and Sleep quality	Dropouts to be reduced
(Telles, Verma, et al., 2017)	Reduced Blood Pressure While Increasing	Alternate-Nostril Yoga Breathing	15 3 separate days in 3 separate sessions	Before and after sessions	Blood pressure and the digit vigilance test	Improve performance in the digit vigilance test	Large sample size suggested.

	Performance in a Vigilance Test		Pre-post				
(Patil et al., 2017)	On cardiac function in elderly	Yoga or walking	60 Parallel group RCT, Pre-post	1 hr/day/3 months	ECG, resting heart rate, diastolic time, ventricular ejection time, upstroke time, rate pressure product,	significant improvement in diastolic function, and found more effective than walking in improving cardiac function in elderly	The involvement of the participants has to be observed.
(Kuldeep K. Kushwah et al., 2016)	On stress and health indices of healthy individuals	Cyclic meditation yoga	66, Immediate effect, Pre-post	35 mins	Activation Coefficient, Integral Area left and right and Integral Entropy left and right	reduces stress and improves psychosomatic health indices	Objective parameters to be checked.
(Purohit et al., 2015)	Orphan adolescents	Patanjali yoga	72 RCT, Pre-post	12 wk	Muscle fitness	Improvement in muscle fitness	Orphanages should include yoga
(Kuldeep Kumar Kushwah et al., 2015)	In healthy people	Integrated yoga program	94 Pre-post	4 wks	EPI parameters	EPI outcomes are reproducible	Study with male and female participants may be conducted separately.
(Deo et al., 2015)	Pilot study on healthy individuals	Anapana sati meditation	51 Pre-post	3.3 hours/day /5days	EPI parameters	Reduced entropy indicated relaxed state and reduced disorderliness	Nil
(Lakkireddy et al., 2013)	Yoga on Paroxysmal Atrial Fibrillation	Iyengar yoga	15 Single-centre Pre-mid-post	60 mins twice/wk	QOL, anxiety, dprsn	Yoga helps in reducing anxiety, dprsn and improve QOL	Randomized control study with large samples
(Choudhary & Mishra, 2013)	On premenstrual syndrome	Not mentioned	No mention	90mis/36 5 days	The negative effect, water retention, impaired concentration.	Overcome distress in premenstrual symptoms	Results to be conclusive by further research

Table 10: Non-Indian studies of yoga Intervention on various diseases/disorders.

Some terms: Intvsn - intervention; RCT - Randomized Control Trial; wk - week; HRV - Heart Rate Variability; BMI - Body Mass Index; BP - Blood pressure; PTSD - Post Traumatic Stress Disorder; QOL - Quality of Life; MAAS - Mind Attention Awareness Scale; Dprsn - depression; Wt-weight; COPD - Chronic obstructive pulmonary disease; FEV₁ - is the amount of air you can force from your lungs in one second; 6MWD - test measuring the distance that a patient can quickly walk on a flat, hard surface in a period of 6 minutes; PD - Parkinson's disease; YOMI - combining Yin yoga with psycho education and mindfulness practice; GRP-group.

Author	Topic	Type of yoga	Sample, study design & Assessment	Session Duration	Variables / Scales	Results	Future Suggestions
(Bock et al., 2019)	Yoga for smoking cessation	Iyengar yoga	227 , RCT, 7 th day, 8 th wk, 3 and 6 th months,	2/wk	Cotinine verified	Smoking odds are reduced in light smokers	Modification in therapy
(Braun et al., 2019)	Yoga for dental and dental hygiene	A brief yoga intvsn	132 , Pre-post, Immediate effect after 1 hr of yoga intervention	1 hour	dispositional mindfulness, burnout, perceived stress, and depressive symptoms	Effective for high level of stress.	RCT warranted
(Groessler et al., 2018)	Military veterans with chronic low back pain	Yoga with home practice	150 , Pre-post, Baseline, 6 th wk, 12 th weeks, 6 th month	2/wk/12 wks	Roland-Morris Disability Questionnaire scores	Back pain reduced.	Wider implementation of yoga programs for veterans.

(Jensen, 2018)	On middle school adolescents	Kripalu Yoga	16 , RCT, audio transcripts	35 min Session, 2/wk/6 months	relaxation, stress-mood, social interaction, self-regulation of behaviour, sleep, substance use, academic performance.	Enhanced skills and behaviours.	Research on staff who are unfamiliar with yoga is suggested.
(Cahn et al., 2017)	On mind-body health: Increased BDNF, Cortisol Awakening Response, and Altered Inflammatory Marker Expression	Yoga, meditation	38 , Pre-post,	2 hrs/day/3 months	psychometric measures, brain-derived neurotrophic factor (BDNF), circadian salivary cortisol levels, and pro- and anti-inflammatory cytokines.	decreases in self-reported anxiety and depression as well as increases in mindfulness.	Assessment of broad panels of biomarkers and global studies with more appropriate control system.
(Greysen et al., 2017)	Adults with Rheumatoid Arthritis	Eight different styles of yoga	17 , Thematic analysis, Telephonic structured interviews and open-ended questions	No specific time bonds	stretching, strengthening, aerobic physical exertion, breathing exercises, meditation, positive verbal statements from the instructor, spirituality, and chanting.	Reduced physical and psychosocial symptoms	Better sample size needed.
(de Manincor et al., 2016)	On dprsn and anxiety, and improving well-being:	Individualised Yoga	101 , RCT, Baseline-Post-6 weeks follow up	6 wks/	Dprsn & anxiety.	Dprsn & anxiety reduced compared to waitlist control group.	Study on potential benefit of anxiety.

(D. Wang & Hagins, 2016)	Perceived benefit-urban school	yoga	Six focus groups, Pre-post	Not mentioned	self-regulation, mindfulness, self-esteem, physical conditioning, academic performance, and stress reduction	Enhanced self-regulation, mindfulness, self-esteem, physical conditioning, academic performance, and stress reduction.	Need uniformity in all focus group.
(Derry et al., 2015)	On cancer survivors	Hatha yoga	200 , RCT, Baseline, 12 wks, 3 months follow up	2/wk/12 wks	psychological distress, fatigue, and sleep quality	Effectively reduce cognitive complaints	Further research on mind-body intvsn promoting cancer-related cognitive problems suggested.
(Prado et al., 2014)	Body balance on young adults	Yoga	34 , Non-RCT, Pre-post	60 min/3/wk/5 months	limit of stability and velocity of oscillation	Postural control can be improved in healthy young adults	Further research vestibular and balance disorders.
(Middleton et al., 2013)	Pilot study on self-care for arthritis in minority communities	Yoga	20 , Convenient sample, Pre-post	8 wks	spiritual growth, health responsibility, interpersonal relations, and stress management	This pilot was undertaken to quantify measures of feasibility and acceptability for evaluating future plans on yoga studies in urban, minority populations with arthritis	Bigger study suggested.

3.3 Creative Art Therapies

Art in healthcare is also known as Art in Medicine, came in to practice in the 1970s (Sherry W Goodill, 2016). Art therapies are emerging effective intervention modalities on various psychiatric disorders such as depression (Boehm et al., 2014), anxiety (Dionigi & Gremigni, 2017), Alzheimer's disease (Chancellor et al., 2014), etc. These intervention modalities use specific non-verbal modes of expression such as painting, sculpting, playing music, drama, or moving, as a source to approach the patient to boost strength (S. C. Koch et al., 2007). Among these, drama, music, and dance movements come under a single cluster.

3.3.1 Drama therapy: Drama techniques and theatre-based models encourage the participant's creativity and expressive ability. It promotes the participants to tell their story, express feeling, set goals, extend the inner experience, and try on new and more fulfilling roles, unexplored so far (Jaaniste et al., 2015). Through the depiction of stories, drama therapy assists in gaining friendliness (Holmwood, 1997); humor involved in it promotes mental acuteness (Sue Jennings, Ann Cattanach, Steve Mitchell, Anna Chesner, 2005), and can reduce stigma by stimulating imagination (Basting, 2009).

3.3.2 Music therapy: Music plays a vital role in capturing and releasing deep feelings (Ahmadi et al., 2010). Extensive studies are carried out on the effectiveness of various kinds of music which induce positive emotions, relax the mind (Bradt, Joke, 2010), by stimulating brain functions which involve movement, speech, emotions, sensory perceptions, and cognition restores after a brain injury (Magee et al., 2017). An experimental study says improvement on group music intervention on demented elderly persons (Lin et al., 2011), reduced depression, anxiety, and relationships in psychiatric patients (Choi et al., 2010), pediatric health care namely, autism spectrum disorder; neuro-rehabilitation; epilepsy; neonatal care; disability; pain, anxiety; mental health; and stress in medical procedures (Stegemann et al., 2019). In reducing anxiety, specific instrumental music has found to be effective (Matney, 2017). In enhancing the efficiency in physical activity, music has

shown fostering effect (Clark et al., 2016). A pilot study mentions that in reducing aggression and enhancing self-esteem, group music has found to be effective (Choi et al., 2010).

3.3.3 Dance Movement Therapy (DMT)

Review Articles

Even before the application of Art, dance movement therapy (DMT) is incorporated in the healthcare arena to involve a patient and a clinician in the healthcare setting (Sherry W Goodill, 2016). As defined by the American Dance Therapy Association (ADTA), “Dance Movement (Psycho) therapy is the psychotherapeutic use of movement and dance through which a person can engage creatively in a process to further their emotional, cognitive, physical, and social integration (S. Koch et al., 2014). Dance/movement therapy may include a variety of dance/movement methods and characterized by a goal-oriented, systematic treatment process (Joke Bradt et al., 2015). DMT is used as a paediatric medical approach to support the patient and their family members to express their thought and feelings on their medical experience (Tortora, 2019). It is said that, through muscular action and physiological processes, dance support wellness by strengthening the immune system (Hanna, 1995). A review, including 24 studies, has noted dance promotes physical health (Sivvas et al., 2015b). Cochrane database systematic reviews meta-analysis by Ritter, and Cruz 1998 (Meekums et al., 2015) provides evidence of DMT in the reduction of symptoms of anxiety and depression (Vicky Karkou et al., 2019) (Lossing et al., 2017). It can address the complexity in people with dementia (Vicky Karkou & Meekums, 2017) (Lossing et al., 2017) and also Parkinson's disease (Lossing et al., 2017). Analysis of 41 controlled studies mentions that DMT reduces depression and anxiety and enhances QOL (S. C. Koch et al., 2019). As DMT is a combination of mild physical activity with psychological therapy, it may open up the options within non-pharmaceutical treatment to people with depression, preferring non-medical approaches to treatment and who are unable or do not wish to talk about their problems (Meekums et al., 2015). All studies reviewed were from non-Indian sources with dance and movement related to Western dance as therapy. Table 11: Studies of DMT intervention on Caregivers.

Varieties of intervention on DMT such as Salsa dance, ballet movie adoptive dance, social dance, therapeutic dance, ballroom dance, dance movements on the piano instrument, Agilando dance, African, jazz, contemporary, happy growth DMT are tried for various diseases, disorders and general health components (Table 12). Hardly a few studies are available on the intervention of DMT on CGs of children with NDDs such as ASD, down syndrome. A pilot study is conducted on Salsa dance on CGs of Developmental disorders.

Simultaneously there are review studies that did not find the effect of DMT on body image stress, depression, anxiety, fatigue in cancer patients (Bradt et al., 2015). Another review, including 3 studies with 147 participants, has mentioned no reliable effect of DMT on depression, even though the larger effect has found on social functioning, the result was imprecise, no impact on QOL, and self-esteem (Meekums et al., 2015). But these studies are listed with the following limitations.

3.4 Limitations traced in the study of DMT

- The requirement of a large sample (Fernández Sánchez et al., 2020) (Cherriere et al., 2020) Aithal et al., 2019; McGuire et al., 2019; Adam et al., 2016).
- Studies not having any control group (McGuire et al., 2019; Sandel et al., 2005)
- A longitudinal study is warranted (Alpert et al., 2009)
- The role of music and exercise were not assessed well (Lewis et al., 2016).
- Emotional aspects of dancing and its close association with music were to be incorporated (Kattenstroth et al., 2013).
- The need of intervention with long term effects or sustainability (Hackney & Bennett, 2014).
- Easy steps had to be incorporated (Murrock & Gary, 2010).
- The requirement of the objective instrument (Westheimer et al., 2015)
- Culturally appropriate music was demanded (Murrock & Gary, 2010).

Table 11: Studies of DMT intervention on Caregivers.

Some terms: DMT- Dance Movement Therapy; CGs-caregivers; ASD-autistic spectrum disorders; RCT-randomized control trial;

Author	Topic	Type of dance	Sample, design, assessment	Session Duration	Variables / scales	Results	Future suggestion
(Aithal et al., 2019)	A pilot study on CGs of children with ASD	DM psychotherapy	12 , Pre-post	6 sessions	Parental stress	Effective on the state of well-being.	More samples and RCT suggested.
(McGuire et al., 2019)	Children with down syndrome and CGs- Pilot study	Ballet movies adoptive dance	5 -CGs, One group, Pre-post	60 mins/ 20 wks	Motor function	Improved motor ability	Large sample and control group required.
(Fernández Sánchez et al., 2020)	Pilot study on Family CGs of Children with Developmental Disabilities	Salsa	14 , One group pre-post	60 min/2/wk	Perceived stress	Stress reduced	Study on large sample
(Vetter et al., 2011)	Stress reduction intervention on CGs	Creative movements	16 , Pre-post	1.5 hrs/9 wks	Irritability, anxiety, depression, stress	Improvement in variables	Larger sample required

Table 12: Non-Indian studies on the efficacy of DMT intervention

Some terms: DMT- Dance Movement Therapy; C- Control; RCT- Randomized Control Trial; CGs-Caregivers; PD-Parkinson Disease; BMI- Body mass index; intvn-intervention; DM-dance movement; ASD-autistic spectrum disorder; PTSD-post traumatic stress disorder.

Author	Topic	Type of dance	Sample, Design, Assessment	Session Duration	Variables / scales	Results	Future suggestion
(Cherriere et al., 2020)	Charcot-Marie-Tooth disease	DMT	9, Pre-post,	8 wks -20 hours	Motor clinical characteristics, muscular force and power, postural control, pain, and cognitive (rhythm task, sustained attention, short term memory) abilities	Beneficial effect on motor and cognitive functions.	Large study to confirm the results of this study.
(Mastrominico et al., 2018)	On adults with ASD	DMT	57, two-factorial between-subject design –RCT, Pre-post	10 wks	Emotional empathy	No substantial improvement in empathy over control group after intervention.	Range of variable relating to ASD to be tested by DMT intvn.
(Anjos & Ferraro, 2018)	On the motor development of children.	Social dance	85, RCT, Baseline, after intvn, 6-	1 hr/2/wk/7 monts	balance, fine motor and overall praxis.	Significant gain in variables	More continuity in intervention suggested

			8months after intv				
Rocha PA et al 2017	Parkinson patients	Therapeutic dance	18 , Discussions – audio recorded, Thematical analysis	1hr/ twice a wk/2 months	QOL and motor symptoms	Improved QOL and motor symptoms	Promote dance for PD
(Rainbow T.H. Ho et al., 2016)	Breast Cancer Undergoing Radiotherapy	body movement and psychotherapy	139 , Pre-post,	16-1.5 hours	perceived stress, anxiety, depression, fatigue, pain, sleep disturbance, and QOL	Improved perceived stress, pain severity, and pain interference	DMT should be suggested for patients impaired by fatigue or pain.
(Rainbow Tin Hung Ho et al., 2015)	On the elderly with early dementia	DMT compared to physical exercise	201, 3-arm RCT with waitlist control design, Baseline, 3, 6 and 12 months	1 hr/2/wk/1 2 wks	neuropsychiatric symptoms, psychosocial well-being, and cognitive and daily functioning. Secondary	Substantial improvement in variables	Systematic experimental design paired with evidence was suggested.
(Lewis et al., 2014)	Parkinson disease and elderly being control	Social dance	37, RCT, Pre-post	10 wks	Mood changes	The improved mood in both the groups but specifically in PD.	Longitudinal study Role of music and exercise to be evaluated, to PD.

(Abreu & Hartley, 2013)	Sedentary patient with Alzheimer's Dementia	Salsa dance	Case report, Pre-post	24 session/ 12 wks	Balance, gait and fall risk	Improved motion, strength, balance, functional mobility, gait distance, and speed.	Investigation of the effects of this form of therapy on different conditions
(Kattenstroth et al., 2013)	6 months DMT enhances postural, sensorimotor and cognitive performance in elderly	Social dance (Agilando)	35, RCT, Pre-post	6 months (1hr/wk)	Lifestyle and general activity level	Dancing activity seems to be a highly appropriate choice	Emotional aspects of dancing and its close association with music to be incorporated.
(Lee et al., 2013)	Pilot study on children with PTSD in Taiwan	Happy Growth DMT.	15, Single group, Pre-post	2 days	Sleeping, afraid to sleep, nightmares, lacked concentration, hypersensitive, over-reactive to stimuli.	Therapeutic issues emphasized.	Larger study suggested
(Murrock & Gary, 2010)	Obesity in African American Women Carolyn	Culturally specific dance	126, Convenience sample, Baseline, 8 and 18 wks	2/wk/8 classes.	body fat and BMI in sedentary	Decreased body fat and BMI sedentary.	The study shall incorporate easy steps. The dance s choreography on culturally appropriate music and shall be taught by someone within the community.

3.5 Need for the current study on Canons of expression and Yoga

The total scenario of research till date as mentioned in the subheading ‘program for CGs’ and Tables 4 and 5, explicitly mentions that despite the existence of 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 to improve recipient, psychological distress is the fact 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 Angika and Sattvika of *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 has a discussion on the scientific review of various conventional interventions, varieties of dance and yoga interventions on caregivers, variables studied, and their limitations. Also dance and yoga interventions on various diseases and disorders are listed to have an understanding of application of dance and yoga as an alternative and complementary therapy parallel to conventional medicine.

Next chapter deals with aim and objectives, and how the current study is justifiable from various angles.