



Research Article

EFFECT OF CYCLIC MEDITATION ON CAREGIVERS STRESS AMONG FAMILIES OF CHILDREN WITH DEVELOPMENTAL DISABILITIES

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ABSTRACT

Background and Objectives: The study explored the effect of Cyclic meditation in reduction of stress levels and enhancement of coping skills of parents of children with developmental disabilities. The research was a single group pre-post study, with convenient sampling, with a sample size of 40, all parents, primary caregivers of the children. This study used both objective and subjective measures to analyse stress and related coping skills. **Methods and Materials:** 40 Parents, in the age group of 30-45 years, who gave informed written consent participated in the intervention, completed the study. All participants were parents and the primary caregivers of special needs children. The variables GSR - Galvanic Skin Response, Perceived Stress and Coping in relation to Caregiving, and Social Support, were assessed using GSR sensor, CHIP and KCSS questionnaires before and after Cyclic Meditation (CM). All the participants underwent CM practices for 3 days a week for 40 minutes a day, for 8 weeks with a 2 month follow up. The parameters were repeated after 8 weeks.

Results: A paired-samples t-test was conducted to compare the pre - post data, in both the objective and subjective measures, used in the study. There was a significant difference in the GSR scores for Pre-CM and Post-CM conditions; and this was significant with $p = .001$. The CHIP and KCSS scores did not show a statistical significance between the pre - post data. **Conclusion:** The study did not show a significant difference in the pre-post data of the subjective measures but there is a difference which the study failed to detect, because the study was too small, and it lacked power. However, in the objective measure of GSR to measure the stress levels, the mean GSR is significantly lower than the baseline data ($p < 0.05$), showing that Cyclic Meditation has produced a highly significant reduction in stress levels in the participants.

KEYWORDS: Stress, Coping skills, GSR, CHIP, KCSS, Yoga, Cyclic Meditation, Special needs, Developmental Disabilities.

INTRODUCTION

The past 30 years has seen an enormous amount of research devoted to exploring the stressors associated with the caring of a disabled child, and the deleterious effects these stressors' have on the parents' well-being.^[1] It is accepted without dispute by all that parents with disabled and special needs children are under a great deal of stress and it is crucial today that research and investigations should move away from describing these stressors and types of stress and instead focus on investigations as to how to help these parents and primary caregivers' cope with these situations by presenting them with a workable model that is both reasonable and result- oriented. Such work will have a far greater implication in understanding and improving the ways these families can be helped. ^[2]

Parents of children with developmental disabilities are at an increased risk for acute and chronic stress compared to parents of children without disabilities. For these parents, several factors increase the likelihood of stress, such as greater time demands associated with participation in various therapies (e.g., speech and language, occupational), which results in less time to attend to other matters. Further, there are certain characteristics of DD that appear to be correlated with higher levels of parental stress. ^[3]

Parental care for a child with a developmental disability is an enormous responsibility, one that can far exceed that of typical parental care. While most parents adapt well to the situation of caring for a child with a disability, some do not. To understand parents' adaptations to their children's disabilities,

the complex nature of stress processes must be accounted for and the constructs and factors that play a role in the caregiving must be considered. [4] Evidence suggests that there is considerable variation in how caregivers adapt to their caregiving demands. Many studies have sought to qualify the association between caregiving and health outcomes of the caregivers. [5] Contextual factors such as SES, child factors such as child behaviour problems and severity of disability, intra-psychic factors such as mastery and self-esteem, coping strategies and social supports have all been associated with the psychological and/or physical outcome of the parents or primary caregivers. In reviewing these issues, the literature appears to be limited by the use of traditional analytic approaches which only examines the relationship between a factor and an outcome. [6]

Lazarus (1966) conceptualizes stress as demands that exceed the capabilities of the involved persons based on their stress perception. Stress is a generic term that encompasses many physiological and psychological phenomena. These phenomena include a precipitating event, a reaction to this event and an interaction between the two. A chronic illness in a family member can pose as a stressor according to Lazarus's definition because it places both physical and emotional demands on the family. [7]

Lazarus (1966) describes coping as efforts to maintain control under conditions of harm, threat or challenge when a routine response is not available. Coping includes any and all actions towards diminishing the demands and maximizing all resources. [8] Coping is also linked closely with adaptation. McCubbin, Sussman and Patterson (1983) conceptualize adaptation as "the process that families use to achieve stability in the face of stressful life events and transitions. [9] The stressors already identified threaten the solidity of these families. These families need to be aware of and call upon all internal and external supports. [10]

Yoga is an ancient science, originating in India, which has the components of physical activity, instructed relaxation and introspection. *Yoga* includes diverse practices, such as physical postures (*Asanas*), regulated breathing (*Pranayama*), meditation and lectures on philosophical aspects of *Yoga*. Meditation is the seventh of eight steps prescribed to reach an ultimate stage of spiritual emancipation (Patanjali, circa 900 B.C.). [11] While many practitioners do learn meditation directly, others find it easier to first pass through the other stages - learn yoga postures (*Asanas*) and regulated breathing (*Pranayamas*). It is postulated that when a novice attempts to meditate directly, there could be two responses based on the quality of the mind viz.,

(i) a *Rajasic* - active (personality) mind would be restless all through the session and (ii) a *Tamasic* - a mind with inertia could fall asleep. This problem of the mind is addressed in the *Mandukya Upanishad*.

Cyclic Meditation

Based on this a technique of 'Moving Meditation', a practice of *Yoga* postures with guided meditation was evolved, called Cyclic Meditation (CM), by H.R. Nagendra, Ph.D., which has its' origin in an ancient Indian text, *Mandukya Upanishad*. It is interesting to note that CM does induce a quiet state of mind, which is compatible with the description of meditation (*Dhyana* or effortless expansion), according to Patanjali. The description states: '*Tatra pratyayaikatanatadhyanam*' (Patanjali's *Yoga Sutras*, Chapter 3: Verse 2). This means that the uninterrupted flow of the mind towards the object chosen for meditation is *Dhyana*. Indeed, all meditations, irrespective of the strategies involved are believed to help reach this state. There are several strategies in meditation which include breath awareness, awareness of internal sensations, directing the attention to a Mantra or a Koan, and keeping the eyes open with the gaze fixed on the object of meditation. [12]

The verse on which CM is based, states: 'In a state of mental inactivity awaken the mind; when agitated, calm it; between these two states realize the possible abilities of the mind. If the mind has reached states of perfect equilibrium do not disturb it again'. The underlying idea is that, for most persons, the mental state is routinely somewhere between the extremes of being 'inactive' or of being 'agitated' and hence to reach a balanced/relaxed state the most suitable technique would be one which combines 'awakening' and 'calming' practices (*Mandukya Upanishad* 3-44). In day to day life we relax deeply, though unconsciously, by stretching and relaxing through yawning.

In Cyclic Meditation, we stretch consciously and systematically and then relax using Standing postures like *Pada Hastasana*, *Ardhachakrasana*, and Sitting *Asanas* like *Shashankasana* and *Ushtrasana*. This provides stimulation at muscular level. The process begins with *Tadasana* that helps us centre our body. All the postures are performed with a slow speed maintaining awareness. Apart from muscular stimulation in CM., we use sound (chanting of *Akara*, *Ukara*, *Makara* and *Om kara*) and visual (attuning to vast ocean) stimulations as well to go deeper in silence.

MATERIALS AND METHODS

Design

This was a single group pre-post design.

Study Protocol

40, consenting parents with special needs children in Bangalore, India, participated in the study.

Ethical Consideration

Subjects willing to participate in the study signed a written consent form after an orientation wherein adequate information on the nature of the study was provided to all participants and their confidentiality was maintained.

Sample and Settings

It was a convenient sample, adopted for this study.

Inclusion criterion

Participants should be the primary caregivers of children with Developmental Disabilities and not an institutional trained caregiver. The study was designed for community living lay caregivers, not institutional care staff. The caregiver is the individual who provides care on a day-to-day basis in the home; usually a spouse or other relative.

Exclusion Criterion

Participants with any previous psychological disorders and currently undergoing psychological treatment and on medication and those who had an inability to perform yogic postures were excluded from the study.

40 parents, who satisfied the inclusion and exclusion criterion, were selected to participate by convenient sampling method.

The study was conducted for a period of 8 weeks, 3 days a week, in the afternoon for an hour each day.

The study examined the results of Cyclic Meditation on the stress levels and coping skills of parents of special needs children, by using both, subjective and objective measures.

GSR – Galvanic Skin Response

Electro-dermal response of any bio-medical system is the change in electrical properties of skin due to variation in physiological and psychological conditions. The change is caused by the degree to which a person's sweat glands are active. Psychological status of a person tends to make the glands active and this changes the skin resistance. [6] The Galvanic Skin Response (GSR) is one of several electro dermal responses (EDR) reflecting the variation in the electrical characteristics of the skin. The skin conductivity cannot be consciously altered, which has made GSR, the most preferred bio-metric measure to assess the physiological and psychological states of a person quantitatively.

The GSR sensor's measurement units are:

Micro Siemens (μ S): A unit measuring electrical conductance.

Arbitrary analog units (Arb): An arbitrary unit to demonstrate waves, frequencies, and periods.

CHIP - Coping Health Inventory for Parents

The Coping Health Inventory for Parents (CHIP) was designed to assess parents' appraisal of behaviour's they are currently using to manage family life when they have a seriously ill or chronically ill child. CHIP is a self-report instrument consisting of a checklist of forty-five specific behaviours. Parents are asked to record how helpful (on a scale of 0 to 3) each behaviour is in their particular family situation. If a coping behaviour is not used, the respondent records why by either checking a) I do not cope this way because I/we chose not to use it, or b) coping behaviour is not possible in our family, not applicable to us.

The development of CHIP was influenced by a hierarchical approach to the organization of behaviour. In the application of this approach, two general levels of coping are defined: 1) coping behaviours as defined by each item on the inventory, and 2) coping patterns which are combinations of specific coping behaviours.

Conceptual Organization

The CHIP consists of three subscales

I. Coping Pattern I: Family Integration, Cooperation and An Optimistic Definition of the Situation: Composed of 19 behaviours that focus on strengthening family life and relationships, and the parents' outlook on life with a chronically ill child.

II. Coping Pattern II: Maintaining Social Support, Self Esteem and Psychological Stability

Consists of 18 items which involve the parents' efforts to develop relationships with others, engage in activities which enhance feelings of individual identity and self-worth, plus behaviours to manage psychological tensions and pressures.

III. Coping Pattern III: Understanding the Health Care Situation Through Communication with Other Parents and Consultation with the Health Care-Team

Contains eight behaviours directed at the parents' relationships with health care professionals and other parents of chronically ill children. These behaviours include developing more knowledge and understanding of the illness and mastering any home care treatments and prescribed medical regimens.

Reliability

The reliability (Cronbach's alpha) for Coping Pattern I: Family Integration, Cooperation and an

Optimistic Definition of the Situation is .79. The alpha reliability for Coping Pattern II: Maintaining Social Support, Self Esteem and Psychological Stability is .79. The alpha reliability for Coping Pattern III: Understanding the Health Care Situation Through Communication with Other Parents and Consultation with the Health Care Team is .71.

KCSS – Kingston Caregiver Stress Scale

The Kingston Caregiver Stress Scale (KCSS) is primarily a scale that allows a family caregiver to express their level of perceived stress. It is used to monitor changes, in stress levels over time, as the caregiver's situation changes.

The KCSS divides caregiver stress into a comprehensive set of ten questions that represent different potential sources of stress to the lay caregiver: Care related feelings, Family matters, and any Financial stress. For each question, the degree of stress is rated on a 1 to 5 anchored scale, ranging from (1) Feeling Fine/No stress (Coping fine / no problems), (2) Some stress, (3) Moderate stress, (4) A lot of stress, to (5) Extreme Stress (feeling "at the end of rope", health at risk). Therefore, the total score potentially ranges from 10 to 50. Coefficient alpha for each of the sub-scales are: Care group $\alpha = 0.85$, Family group $\alpha = 0.75$. The Financial group consisting of a single question does not allow for such a calculation.

Intervention

Cyclic meditation 8 step method followed in SVYASA

The study followed the 35 min of CM practice, divided into 8 steps. **Step-1:** Opening prayer (1 min), the practice began with lead and follow of verse from a yoga text, the *Mandukya Upanishad*. **Step-2:** Instant Relaxation Technique (IRT, 1 min), it is done by isometric contraction of the muscles of the body and

ends with supine rest. **Step-3:** Centering (4 min); coming to standing position to *Tadasana* with both feet planted firmly on the ground. **Step-4:** Standing posture called *Ardhakatichakrasana* (6 min), from *Tadasana* bending towards the right (1 minute and 30secs); a gap of 1 minute and 30secs in *Tadasana*, then bending towards the left (1 minute and 30secs); a gap of 1 minute and 30secs in *Tadasana* again. **Step-5:** Quick Relaxation Technique (QRT, 5 min), in the Supine Rest (SR) with guided instructions and ends with the chanting of AAA (*A-Kara*) with an open mouth. **Step-6:** Sitting Postures, *Vajrasana*, *Shashankasana* and *Ushtrasana* (6 min), coming to *Vajrasana* (1 min), bending forward (*Shashankasana*, 1 minute and 30secs) a gap of 1 minute and 30secs in *Vajrasana*, bending backward (*Ushtrasana*, 1 minute and 30secs); a gap of 1 minute and 30secs. **Step-7:** Deep Relaxation Technique (DRT, 10 min) slowly coming to the supine position for further relaxation of different parts of the body in a sequence as per instructions. **Step-8:** Closing Prayer (2 min), the practice is concluded with a prayer for the welfare of one and all.

Data Extraction and Analysis

Data Extraction

GSR

The NeuLog galvanic skin response logger sensor NUL-217, was used to measure the responses. The sensor comes pre-calibrated and the GSR sensor's measurement units are: Micro Siemens (μS): A unit measuring electrical conductance.; Arbitrary analog units (Arb): An arbitrary unit to demonstrate waves, frequencies, and periods.

The measurements for this study was done in Arb – Arbitrary analog units.

Experiment duration was set to 5 minutes and Sampling rate to 10 per second.

	Sensor specifications	
	μS	Arbitrary analog unit
Range and operation modes	0 to 10	0 to 65,279
ADC resolution	16 bits	
Resolution	10 nS	1
Max sample rate (S/sec)	10	

Data analysis of the pre-post data was done using SPSS software

Results

A paired-samples t-test was conducted to analyse the data collected to compare the stress levels of the participants before cyclic meditation and after cyclic meditation.

There was a significant difference in the GSR scores for Post-CM (M=15913.49, SD=6791.73) and Pre-CM (M=19048.05, SD=7060.55) conditions; $t(38) = -3.57, p = .001$.

These results suggest that Cyclic meditation really does have an effect on the stress levels of the participants. Specifically, our results suggest that after an 8-week period of a CM intervention, the stress levels have considerably come down, enhancing their overall coping abilities and quality of life.

Pair 1	Mean	N	Std. deviation	St. Error Mean	T	df	Sig (2-tailed)
Post	15913.49	39	6799.735	1088.829	-3.576	38	.001
Pre	19048.05	39	7060.552	1130.593			

CHIP – Coping Health Inventory for Parents

SUB-SCALE 1: Integration, Cooperation, Optimism

Pair 1	Mean	N	Std. deviation	Std.error Mean	T	df	Sig (2-tailed)
Post	40.84	39	8.897	1.443	0.486	37	0.630
Pre	39.97	39	8.015	1.300			

SUB-SCALE 2: Support, Esteem, Stability

Pair 1	Mean	N	Std. deviation	Std.error Mean	T	df	Sig(2-tailed)
Post	34.94	39	9.535	1.589	-0.206	35	0.838
Pre	35.39	39	9.363	1.561			

SUB-SCALE 3: Medical Communication & Consultation

Pair 1	Mean	N	Std. deviation	Std.error Mean	T	df	Sig (2-tailed)
Post	15.32	39	4.911	0.797	1.498	37	0.142
Pre	13.68	39	4.281	0.695			

KCSS – Kingston Caregiver Stress Scale

Sub-Scale 1: Care group

Pair 1	Mean	N	Std. deviation	St. Error Mean	T	df	Sig(2-tailed)
Post	15.26	39	6.265	1.003	-0.551	38	0.558
Pre	15.85	39	6.230	0.998			

Sub-Scale 2: Family group

Pair 1	Mean	N	Std. deviation	Std.error Mean	T	df	Sig(2-tailed)
Post	4.10	39	2.162	0.346	0.107	38	0.915
Pre	4.05	39	2.339	0.375			

Sub-Scale 3: Financial group

Pair 1	Mean	N	Std. deviation	Std.error Mean	T	df	Sig(2-tailed)
Post	2.24	39	1.164	0.191	-0.349	36	0.729
Pre	2.35	39	1.358	0.223			

It can be inferred from the test results that there was no statistically significant difference between the baseline and the post data.

DISCUSSION

Although many types of caregiver interventions have been tested, to our knowledge this is the first study of yoga-based stress reduction intervention – Cyclic Meditation, done for caregivers

of special needs children. These pilot findings suggest that this intervention of Cyclic Meditation significantly reduces the stress levels on account of a wide arena of situations faced by the caregivers of these children and increases their self-efficacy and coping skills in a very short period of 8 weeks.

A 2002 review of caregiver research (Schultz et al., 2002) highlighted depression and anxiety as clinically meaningful indicators of caregiver well-being.^[13]

The results of this study clearly indicate that when objectively measured, even in a study of a short duration of 8 weeks, at the rate of 3 days a week only for an hour each day, the yoga-based stress reduction module of Cyclic Meditation, is showing a very significant change in the stress levels of the participants. The results clearly indicate beneficial effects of the intervention on the physical, and psychological health, and in the social and environment domains, where high levels of stress were perceived.

There are differences among different mental stress levels. The purpose of the KCSS & CHIP scales is primarily to allow a family caregiver to express his or her level of perceived stress. The caregiver is the individual who provides care on a day-to-day basis in the home; usually a spouse or other relative. It is unlike a ECG or HRV monitor, in that it does not attempt to measure exactly the care load, it only suggests how much stress one should be experiencing.

The scales were designed to quickly (in fewer than 15 minutes) allow a caregiver to express the amount of stress that he or she is feeling. By determining the type and intensity of stress related factors that an individual caregiver is exposed to, these scales were used to determine how much stress an individual should be experiencing. However, this does not take into account the personality or capabilities (to handle difficult behaviour) of the caregiver, and therefore does not necessarily reflect their true stress levels. This is one of the serious limitations that needs to be addressed in future studies and interventions.

This data also reveals that people do distinguish between sources of stress and can assign a relative value to each, which is a very positive indicator that they can be worked upon in future with longer periods of support. This compartmentalization of stress is useful to any researcher since it gives one a clue as to where to start to deal with the problems facing a caregiver.

Mean scores at 1-week pre-intervention indicated that these caregivers were moderately depressed, were mildly anxious, and only about half

the time felt confident about their ability to control negative caregiving thoughts.

As anticipated, pre/post comparisons revealed that depression and anxiety and stress levels of social interaction and knowledge of the caregivers were not statistically significant, on a subjective analysis of scales.

Contrary to expectations, significant pre/post difference was observed in objective analysis of the caregiving burden.

In terms of subjective improvement, at 1-month post intervention, follow-up, 80% or more reported feeling "somewhat better" or "much better" than before the study in terms of activity level, physical pain, sleep problems, depression, frustration, energy level, overall well-being and coping mechanisms of all their problems. Additionally, the parents reported great improvement in the domains of fatigue, coping with stress, physical illnesses, and anger. Participants rated the usefulness of the intervention components highly. At the 1 month follow-up, 90% or more rated all of the intervention components (i.e., Loosening practices, *Asanas*, Instant, Quick and Deep relaxation techniques, practice of breath awareness, A,U,M. chanting) as "highly" useful, which was rated useful by 90% of the participants.

Although the pre/post comparisons of the subjective measures, indicate that caregivers were not significantly impacted in their stress inducing domains, the possibility exists that the improvements seen in the 2-month follow up were attributable to the passage of time rather than to the efficacy of the intervention. This clearly is an indication that caregivers were improving as a function of time. These statistical tests are originally designed for normal distributed quantities of experimental results; it is important to assess what are the possible sources of uncertainties in our experimental approach and if it is realistic to diversify small differences. It means that the null cannot be rejected based on the data. That is different from accepting the null because one can also fail to reject a null simply because the power of the test is poor and the data do not contain enough information to reject it.

The positive relationships between the amount of information accessed and the quality of support received by parents, and between parental stress and involvement vary according to the life stage of the child. Mothers experienced a greater caregiving burden when compared with fathers.

There is a clear indication that the present Cyclic Meditation intervention, encourages detachment from distressing cognitions, improves caregivers' perceived ability to control distressing

thoughts and reduces their depression and anxiety and enhances their coping skills significantly.

CONCLUSION

There was a clear indication that this intervention was useful and acceptable to caregivers. The majority of caregivers reported subjective improvement in all of the caregiver problem domains, and almost all caregivers rated the intervention components as useful. The increase in practice time over the course of the intervention also indicate that caregivers found these techniques to be acceptable and feasible even in the context of demanding caregiving responsibilities. Further, the Cyclic Meditation intervention was acceptable to all participants, as evidenced by the lack of attrition in that group, even though the intervention was administered in translation, local vernacular, for the ease of the participants understanding and practice.

These pilot findings suggest that Cyclic Meditation, is a feasible and effective program to reduce symptoms of stress and depression among caregivers of special needs children and may enhance affect, self-efficacy, physical well-being, and stress management, if continued for a longer period of time. Although these results are encouraging, they should be viewed with caution because the current study had a small number of subjects. Knowledge is another caregiver resource that determines how caregivers manage to cope with the situation. An increase in caregivers' knowledge can result in an increase in sense of control and a decrease in anxiety, negative emotions and health problems. Also, caregivers' coping ability turns out to be very important; caregivers of special needs children who use active coping strategies report fewer psychiatric problems.^[14]

Another main factor is that, social support has to be taken into account in an analysis of caregiver strain, because caregivers who lack a social network are an important risk group for burnout. It is important for the caregiver to receive different kinds of support. Many caregivers have a fulltime care job. They need practical support from their social network to make time for themselves to pursue a hobby or meet other people. Also, emotional support and appreciation from members of the social network is important in this situation.^[15]

All these factors need to be considered in future studies, in designing a module as a stress reduction intervention for the caregivers, to see an impactful, functional and sustained change in the coping skills of the primary caregivers of special needs children.

Limitations of the study

Parent gender and child age moderated correlations between variables needs to be analysed. Content analyses needs to be done in future studies to identify factors contributing to parental stress and its alleviation. When compared, the parents with adolescent children, were significantly more stressed, more involved, and reported higher levels of stress and coping related to caregiving. Differences according to child age, regarding helpfulness of support and access to information/education on the basis of the analysis of subjective measures of CHIP and KCSS needs to be analysed.

A serious limitation of the current study is the lack of address towards care recipients' problems. Because of the demanding nature of caregiving responsibilities, target adherence needs to be set at 30 minutes of practice a day for at least 6 days per week. Improvements thereon should be noted in depression, anxiety, and self-efficacy without compromising the usefulness of the intervention. Participants data for analysis were limited. The experiment procedure was simple.

Future work

To analyse other physiological signals which can be regarded as an index of mental stress/mental workload such as EEG (Electroencephalography), EOG (eye movements), and respiration rate, etc, should be used in future studies. Improve the design to make the stress assessments more significant. Conduct more statistical tests to improve the reliability of the statistical analysis. Find ways to quantify the participants stress and find the relation between stress and the various domains of stress in their standing relation to the coping skills of the primary caregivers of families with children with developmental disabilities.

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Footnotes

Sources of Support: The research was done in Information and Resources Centre for Autism IRC and Deepika School parents, with SVYASA University's yoga module.

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