



VITAL

Pilot Study

Reducing Caregiver Stress:

Effect of Vital Neuro Neuroguided™
Meditation Protocol on Caregivers of
Children with Autism

Abstract

Caregiving, whether for a relative, a friend or professionally, results in physical, social, psychological and financial strains on the caregiver. Caring for children with autistic spectrum disorders (ASDs) is especially hard because of the children's difficult behaviors. To give caregivers stress relief without visiting a counselor, Vital Neuro developed a personalized mobile cloud-based meditation protocol based on an operant conditioning electro-encephalography intervention. Thirteen mothers of children with ASDs were recruited to test the intervention and saw statistically significant improvements in stress, anxiety and depression. Sleep also improved. More extensive testing is warranted on a greater number of caregivers.

Introduction

It is estimated that more than 350 million people worldwide depend upon a family member or close friend to take care of them. This type of informal caregiving relies on the caregiver to aid in activities of daily living (ADLs) for people who may have one of more than 300 possible diagnoses. As people live longer, diseases of aging, such as chronic illnesses, dementia and mental health problems, require that family members and professional caregivers provide care to the patients. Children, too, may require caregiving because of developmental or genetic diseases, such as physical disability, spina bifida, Down syndrome, bipolar disorder, ASDs, Rett syndrome, cerebral palsy, epilepsy, spinal muscular atrophy and many others.

Whether the caregivers are family members or professionals, they all are subject to stress, which comprises not just the physical burden upon the caregiver, but the psychological, social and financial burdens.

ASD is a wide-ranging category of pervasive developmental disorders characterized by severe deficits in social interaction and communication, stereotypic and repetitive behaviors, extremely limited range of interests and activities, and difficulties in verbal and non-verbal communication. Families of children with ASDs experience many difficulties (i.e., dealing with the needs and demands of a child who struggles to communicate and coping with societal pressures, and financial and time burdens). These difficulties have been reported to increase parents' stress, anxiety, depression, guilt, low self-esteem, frustration and feelings of inadequacy.

The World Health Organization conservatively estimates that worldwide, 1 of 160 children suffers from ASD. As increasing numbers of young children are being diagnosed with ASDs and are being diagnosed at younger ages, continued study of factors and interventions that contribute to parenting stress is needed to help families adapt to the challenges of caring for affected children.

The Study

Our study examined the impact of use of the Vital Neuroguided™ Meditation Protocol, a mobile, cloud-based operant conditioning electro-encephalography intervention, on the stressed mothers of children with ASDs. This treatment uses a neurobiofeedback method that rewards brain wave changes that affect behavior in a positive manner. It is carried out via a Vital Neuro brain sensing headphone connected to a mobile app. The 15-minute session is based on the brain wave responses of the subject as he or she enters a deeper relaxation/meditative state in response to audio rewards.

Our hypothesis was that use of the Vital Neuroguided Meditation Protocol would decrease measurable levels of stress, anxiety and depression and improve sleep.

We recruited 13 mothers of children with ASDs for a two-week treatment program. Subjects were given standard psychological tests for stress, anxiety, depression and sleep (Depression Anxiety Stress Scale, Perceived Stress Scale-14, Patient Stress Questionnaire and Pittsburgh Sleep Quality Index) both before and after treatment intervention.

Results

After daily 15-minute treatments, subjects showed statistically significant decreases in depression, anxiety and stress. The subjects' sleep also improved, but not to a level of statistical significance. **Figure 1** indicates the changes seen in the subjects' stress, depression and anxiety levels.

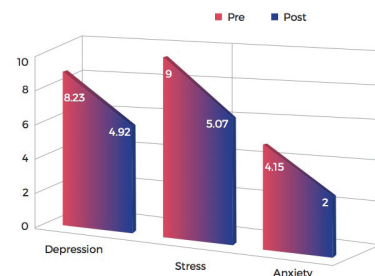
Figure 2 shows improvement in total perceived stress in the subjects after the Vital Neuro intervention.

In addition, the results (not shown here) suggest that the intervention had an impact on parents of children with ASDs' amount and quality of sleep. Specifically, our results suggest that when parents of children with ASDs participate in this intervention, their levels of sleep quality and amount of sleep increase.

The Depression Anxiety Stress Scale 21 (DASS-21)

FIGURE 1

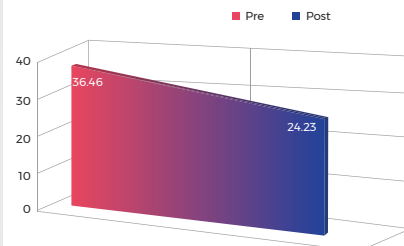
- The DASS-21 assesses the negative emotional states of depression, anxiety and tension or stress over the past week.
- A paired-samples t-test was conducted to test the hypothesis that pre-intervention depression levels ($M=9.00$, $SD=4.45$) and post-intervention levels of depression ($M=5.08$, $SD=2.56$) were different.
- Depression, stress, and anxiety all showed a statistically significant decrease ($t(12)=5.14$, $p<.001$).



The Perceived Stress Scale 14 (PSS-14)

FIGURE 2

- The PSS-14 is a self-reported questionnaire that was designed to measure "the degree to which individuals appraise situations in their lives as stressful."
- To test the hypothesis that pre-intervention anxiety levels ($M=36.46$, $SD=10.28$) and post-intervention anxiety levels ($M=24.23$, $SD=7.19$) were different, a paired-samples t-test was performed.
- Stress levels showed a statistically significant decrease ($t(12)=10.85$, $p<.001$).



350 MILLION+

people worldwide rely on a caregiver who is subject to stress

Next Steps

There are more than 350 million people worldwide who rely on a caregiver and these individuals are all subject to caregiver stress. Given the encouraging outcomes of this pilot, ongoing studies within this particular group and other caregiver populations are recommended with a larger number of subjects and longer period of training. In addition, controlled studies can be designed and implemented to look at the efficacy of the intervention when compared to sham feedback, music only, neurofeedback only,

or other interventions. The utility of this intervention can be extended and tested in patients and caregivers, organizations, hospitals, nursing homes or senior centers, which may take part in larger trials. Upon the validation of our preliminary results in larger trials and within various caregiver populations, the outcome can be adapted for use in larger worldwide sectors that may benefit from Vital Neuro's Neuroguided™ meditation and other protocols.