

1. INTRODUCTION

Children with multiple disabilities, particularly those diagnosed with autism spectrum disorder (ASD) and with intellectual disability (ID), represent a uniquely vulnerable population facing profound challenges in various aspects of psychological health. These children often struggle with cognitive delays, behavioural issues, and emotional dysregulation, which can significantly impede their ability to engage in daily activities, form social connections, and to reach developmental milestones.

In a recent study, parents of children with both intellectual and developmental disabilities (IDD) and with ASD reported greater psychological distress compared to those with IDD alone. Specifically, symptoms of hyperactivity, emotional difficulties and conduct problems in children with ASD were significant contributors to this distress (Wolstencroft et al., 2023).

The study indicates that conditions like ASD and with ID exhibit significantly more symptomatology, including anxiety, mania, schizophrenia, stereotypies/tics, self-injurious behaviour, eating disorders, sexual disorders, and impulse control (Cervantes & Matson, 2015). These conditions are also associated with a greater negative impact on family financial and employment burdens (Saunders et al., 2015). Without the necessary services and supports, preferably starting in the earliest years of life, these conditions can result in significant and lifelong impairments (Okoye et al., 2023).

Compounding difficulties of children with developmental disorders often require specialized care beyond standard interventions. Traditional therapeutic interventions, such as behavioural therapy, occupational therapy, speech therapy, and medication are beneficial in meeting the respective functional objectives. The complexity of managing co-occurring conditions like ASD and with ID intensifies these challenges. This study is an attempt to supplement the existing therapies with *yoga* intervention to see if there are any improvement in psychological

areas like cognitive, behavioural, and emotional domains.

Yoga, an ancient mind-body practice, has increasingly been recognized for its potential therapeutic benefits across various population. *Yoga* based interventions on normal preschool children shows significant improvement in their motor abilities like balance, strength, and flexibility (Aleksić Veljković et al., 2021) (Folletto et al., 2016). In few other studies *yoga* interventions like *asana* (postures), *pranayama* (breath regulation), *dharana* (concentration), *dhyana* (meditation) appears to be an effective modality for helping normal children to cope with the stress, anxiety and improvement in self-regulation and emotional regulation (Nanthakumar, 2018) (Rashedi et al., 2021). Among children with ASD with interventions like IYAT (Integrated Approach to Yoga Therapy) and movement based *yoga* has shown significant improvement in their motor skills, while few study involving mindfulness based practices such as MBSR (Mindfulness Based Stress Reduction), MBPBS (Mindfulness Based Positive Behaviour Support) shows improvement in behavioural skills among adults with ID (Radhakrishna et al., 2010) (Reina et al., 2020) (Shanker & Pradhan, 2022) (Singh & Hwang, 2019). However, the body of research is still nascent on *yoga* interventions for multiple disabilities having combination of more than one developmental disorder, often marked by methodological limitations and non-scientific case studies.

Yoga intervention for children with ASD and with ID necessitates modification in *yoga* teaching methodology customized to the individual level and capacity. The *yoga* course plan is designed based on the fundamental principles of *yoga* as rooted in classical text of *Patañjali Yogasūtra* (PYS). The aphorism, *sukham sthiram asanam* (PYS, *pāda* 2, *sūtra* 43) means quality of *āsana* (practice) should meet the criteria of *sukham* (comfort) and *sthiram* (stability) of the practitioner. Another aphorism, *tasya bhūmiṣu viniyogaḥ* (PYS, *pāda* 3, *sūtra* 6) means the practice is always unique and specific to the individuals' capacity and comfort. A common misconception among people around *yoga* is to attain only certain form classically. This might

lead to compromising *sukham* and *sthiram*. All the tools of *yoga* like *asana* (physical postures or form), *pranayama* (breath regulation), and *dhyana* (meditation) were designed to serve certain functional benefits. This purpose can also be achieved through adaptations. Another important reason for practicing *āsana* variations is to encourage attentiveness. The design of a right course plan serves this purpose, yet that is personalized, meets the criteria of function over form and safe, while maintaining the *sukham* and *sthiram* for a practitioner. A course plan also evolves as the practitioner establish themselves in the practice gradually. *Yoga* practices performed with coordination of movement and breath with awareness offers a pathway to better sensory integration and subsequently improve psychological areas such as cognitive, behavioural, and emotional domains. (Desikachar, 1999)

The participation of caregiver in the session along with *yoga* teacher is an important dimension. This helps the participants to build a psychologically safe environment. The caregiver also helps in patterning the movements along with the *yoga* teacher. The design also involves extended intervention in home setting without *yoga* teacher, where the participant continues the practice along with the caregiver during follow-up phase and later.

Children with special needs require personalized intervention. Every child has unique needs and capacity. A traditional group design and aggregate analysis like RCT may not be appropriate for the study of intervention impact on psychological areas. A Single Case Experimental Design (SCED) empirically establishes both internal and external validity even with smaller sample size where the participant serves as their own control. The data generated by continuous assessments across phases contribute to establish the significance of the impact. The baseline phase compared to intervention phases shows the functional relationship (Kratochwill & Levin, 2014) (Lobo et al., 2017). The SCED established functional relationships between the intervention (or independent variable) and the outcomes observed in autistic children or youth (Evans et al., 2012). The significance of impact can be established by

replication of study across participants, psychological domains, and settings.

This study was first of its kind to apply *yoga* intervention on children with multiple disabilities on their psychological skills. The study was a multi-stakeholder study with involvement of experts from field of multi disabilities, clinical psychology, and *yoga*. The genesis of this experiment was a joint effort to test and see any possibilities of benefit that can be derived from *yoga* for children with special needs with multiple developmental disorders. From clinical psychology experts' point of view, the scope of the study was kept simple, limited to the children having ASD and with ID, with mild level of severity and assess the impact on psychological areas using standardized tools - ISAA and BASIC(MR) across sub-domains that do not conflict cross functionally, i.e., cognitive, behavioural and emotional. From *yoga* experts' point of view, the scope was to design an adaptive *yoga* module and an intuitive teaching methodology that suits the capacity of individual participants with such conditions, keeping the foundational principles of *yoga* intact and simplifying the practice to the level of participants and their caregivers, to ensure continuity of practice in post research context. The anticipated indicators of improvement in cognitive domain were for the participants to be able to follow basic *yoga* instructions, under behavioural domain were to have reduced hyper activity, cooperate to complete daily practice and under emotional domain the indicators were improvement in demonstrating certain level of expression and regulation of emotions. We wanted to make this study as a robust experiment, empirically establishing any outcome as it comes. Thus, used SECD with continuous assessments to generate adequate data to support our outcome. Both psychological assessments and *yoga* intervention happened in parallel and the respective observations were blinded from each other till the experiment was over. The empirical significance and the subjective observations to these psychological domains are documented.