

VOLUME 17

Issue 1& 2

2024

Teens



Official Journal of
Child Development
Centre on Child &
Adolescent Care
and Development

Teens

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Editorial

Attention Deficit Hyperactivity Disorder (ADHD) is widely conceptualized as a childhood neurodevelopmental condition, yet its impact extends well beyond the affected child to the family system, particularly parents who assume primary caregiving responsibilities. Among them, mothers frequently shoulder the emotional, behavioral, and practical demands of care, especially in sociocultural contexts where caregiving roles are strongly gendered. Despite extensive evidence documenting elevated stress, anxiety, and psychological burden among parents of children with ADHD, caregiver mental health continues to receive limited attention within routine ADHD management, particularly in low- and middle-income countries such as India.

The consequences of unmanaged parental stress extend beyond caregiver mental health. Elevated stress levels influence parenting practices, emotional responsiveness, and the consistency of behavior management strategies. This, in turn, affects the child's emotional regulation and behavioral outcomes, reinforcing a bidirectional cycle in which child symptoms and caregiver distress exacerbate one another. Addressing parental stress is therefore not only a matter of caregiver well-being but a critical component of effective ADHD management.

Despite growing recognition of these interconnections, ADHD care models particularly in low- and middle-income countries remain predominantly child-centric. Pharmacological and behavioral interventions for children are often prioritized, while caregiver mental health is treated as secondary or left to informal coping mechanisms. This gap reflects broader systemic challenges, including limited workforce capacity, low mental health literacy, and the absence of structured caregiver-support frameworks within pediatric and developmental services.

Evidence from psychological and behavioral sciences suggests that stress-management approaches incorporating psychoeducation, relaxation techniques, mindfulness practices, cognitive restructuring, and peer support can strengthen coping skills and emotional regulation among caregivers. Such interventions are especially relevant in ADHD, where sustained parental engagement and consistent caregiving practices are essential for long-term outcomes. Importantly, caregiver-focused interventions need not be resource-intensive; when designed thoughtfully, they can be brief, culturally adaptable, and feasibly integrated into existing service delivery platforms.

A shift toward family-centered ADHD care is urgently needed. Routine assessment of caregiver stress, normalization of parental emotional challenges, and the availability of structured psychosocial support should become integral to developmental and pediatric services. Recognizing parents as partners in care and as individuals with their own mental health needs represents a critical step toward more humane, effective, and sustainable ADHD management.

Ultimately, supporting the mental health of parents is not ancillary to treating ADHD; it is foundational. By acknowledging and addressing parental stress, healthcare systems can foster healthier families and create environments in which children with ADHD are better positioned to thrive.

Dr Deepa Bhaskaran
Director-in-charge

Perceived Parenting Style and Emotional, Behavioural Problems among Adolescents attending Tertiary Care Centre in Kerala.

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Adolescence is the transitional phase between childhood and adulthood where, children undergo numerous physical and psychological changes, including challenges related to moral development, as well as bodily, mental, emotional, and social issues. Globally, the World Health Organization estimates that 10–20% of adolescents experience mental health conditions, yet these often remain undiagnosed and untreated. Parenting style, defined as a constellation of attitudes and behaviours expressed by parents that influence the emotional climate of parent-child interactions, plays a crucial role in shaping adolescents' psychological well-being. This study aimed to assess the Perceived parenting style and Emotional, Behavioural Problems among adolescents attending Tertiary Care Centre in Kerala. This hospital-based cross-sectional study was conducted at the Child Development Centre, Government Medical College, Thiruvananthapuram; which included 127 adolescents between the age group of 11–16 years, selected by consecutive sampling. Perceived Parenting Style was assessed using Perceived Parenting Style Scale (PPSS) and Emotional and Behavioural difficulties were assessed using the Strengths and Difficulties Questionnaire SDQ. Majority of the study participants perceived their parents to

follow moderate levels of authoritative (68.5%), authoritarian (69.3%), and permissive (65.4%) parenting styles. Regarding emotional and behavioural problems, 94.5% adolescents showed high need for emotional and behavioural support and 5.5% showed some need for emotional and behavioural support. These findings highlight the need for holistic interventions focusing on emotional support, mental health awareness in schools, counselling services, peer group engagement, and parenting guidance.

Keywords:- Parenting, Adolescents, Emotional Problems, Behaviour.

Introduction

Adolescence is a critical developmental and transitional stage marked by significant psychological, emotional, and social transformations that occurs between childhood and adulthood, typically ranging from 11 to 19 years of age (1). It is a period marked by rapid physical growth, hormonal changes, and significant cognitive, emotional, and social development. During this period, adolescents strive for identity formation, autonomy, and peer affiliation, often leading to increased vulnerability to emotional and behavioural disturbances (2). Globally, the World Health Organization estimates that 10–20% of adolescents

experience mental health conditions, yet these often remain undiagnosed and untreated (3). Parenting style, defined as a constellation of attitudes and behaviours expressed by parents that influence the emotional climate of parent-child interactions, plays a crucial role in shaping adolescents' psychological well-being (4). A growing body of research highlights the role of the family environment particularly parenting style in influencing adolescent mental health outcomes. Perceived parenting refers to how children and adolescents interpret their parents' behaviors, attitudes, and interactions (4-5). Baumrind's typology of parenting styles namely authoritative, authoritarian, permissive, and neglectful has been widely studied in relation to child and adolescent outcomes (6). Authoritative, authoritarian, permissive, and neglectful parenting styles each create distinct emotional climates that shape adolescent development (5). Authoritative parenting, marked by warmth and firm but reasonable control, is consistently linked to positive outcomes such as high self-esteem, good social skills, and strong academic performance (5-8). Authoritarian parenting, which emphasizes strict rules and obedience with little emotional support, is associated with higher levels of anxiety, low self-confidence, and behavioural problems (7). Permissive parenting, characterized by high warmth but low control and boundaries, may lead to poor self-regulation, academic difficulties, and conflict with authority figures. Neglectful parenting, marked by low responsiveness and low supervision, poses the greatest risk, often resulting in emotional distress, behavioural issues, and

poor social adjustment. Together, these styles highlight how the balance of warmth and control in parenting plays a crucial role in shaping adolescents' emotional and behavioural outcomes (5-8). This study aims to examine how adolescents interpret parenting behaviours and how these perceptions relate to their emotional and behavioural difficulties. Understanding these associations within a culturally specific context is essential for early identification of at-risk adolescents. The findings can help guide parent-focused interventions and strengthen mental health support strategies for young people.

Materials and Methods

This hospital-based cross-sectional study was conducted over ten months at the Child Development Centre (CDC), Government Medical College, Thiruvananthapuram. The study included adolescents aged 11–16 years who were able to read and comprehend the questionnaires, while non-Keralites and those with conditions such as visual or hearing impairment, speech and language disorders, autism spectrum disorder, or intellectual disability were excluded, along with adolescents or parents who did not provide assent or consent. The sample size of 166 was determined based on a prevalence of 42.2% and an absolute precision of 8.4% reported in a Karnataka study (9). The participants were recruited through consecutive sampling. Data were collected using a structured socio-demographic proforma, the Perceived Parenting Style Scale (PPSS), and the Strengths and Difficulties Questionnaire

(SDQ). The PPSS, a 30-item, 5-point Likert scale standardized for the Indian population, measures three parenting styles: authoritative, authoritarian, and permissive, each scored independently with established reliability and validity (10). Emotional and behavioural problems were assessed using the SDQ, a 25-item tool covering emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behaviour, with total difficulties categorized as normal, borderline, or abnormal based on internationally established cutoffs (11). After obtaining ethical approval, informed consent from parents, and assent from adolescents, the questionnaires were administered individually, with each item read aloud to ensure comprehension. Confidentiality, anonymity, and psychological safety were strictly maintained, and any adolescent showing distress was referred for support. Data were analysed using SPSS Version 25, with descriptive statistics used to summarize socio-demographic features, perceived parenting styles, and emotional-behavioural difficulties, while Chi-square tests were applied to examine associations between parenting styles and SDQ outcomes, using a 95% confidence level and a significance threshold of $p < 0.05$.

Results

The final sample consisted of a total of 127 adolescents aged 11 to 16 years. Among the 127 adolescents, a majority were males (72.4%), and females constituted 27.6%. More than half (55.1%) of the sample belonged to Above Poverty Line (APL)

families, while 44.9% were from Below Poverty Line (BPL) backgrounds. About 79 (62.2%) were attending government schools and the remaining 48 (37.8%) were enrolled in private schools. Most mothers had education up to the intermediate/diploma level (34; 26.8%), followed by high school (30; 23.6%) and mid-school (23; 18.1%), while 10 were graduates/postgraduates, 14 were professionals, and one was illiterate. The majority of fathers had mid-school education (52; 40.9%), followed by high school (30; 23.6%) and intermediate/post-high school (14; 11%), while a smaller proportion held graduate/postgraduate (6; 4.7%) or professional (5; 3.9%) qualifications. Most mothers were unemployed (79; 62.2%), while others were professionals (15; 11.8%), semi-professionals (14; 11%), or skilled workers (7; 5.5%); in contrast, most fathers were skilled workers (51; 40.2%), followed by professionals (24; 18.9%) and semi-skilled workers (19; 15%). Majority of participants belonged to extended families 62 (48.8%), and 61 (48%) were from nuclear families, and only 4 (3.1%) belonged to joint families. (Table 1)

Table 1:-Sociodemographic details of study participants (N=127)

Sociodemographic variables	n(%)
Gender	
Male	92(72.4)
Female	35(27.6)
Socioeconomic Status	
APL	70(55.1)
BPL	57(44.9)
Type of School	
Government School	79(62.2)
Private School	48(37.8)
Education of mother	
Illiterate	1(0.8)
Primary to High School	54(42.5)
Diploma	34(26.8)
Graduation and above	38(29.9)
Education of father	
Illiterate	1(0.8)
Primary to High School	83(65.3)
Diploma	14(11.02)
Graduation and above	29(22.8)
Occupation of mother	
Employed	79(62.2)
Unemployed	48(37.7)
Occupation of Father	
Employed	4(3.1)
Unemployed	123(96.8)
Type of family	
Nuclear	61(48)
Extended	62(48.8)
Joint	4(3.1)

Assessment of Perceived Parenting Style among the Study Participants

Authoritative Parenting was reported by 68.5% of the participants (n = 87) as being practiced to a moderate extent. This style is typically characterized by warmth, responsiveness, and reasonable discipline. It is generally linked with positive developmental outcomes in adolescents. Authoritarian Parenting was perceived at a similar level, with 69.3% (n = 88) of adolescents identifying their parents as moderately authoritarian. This style is more rigid, with strict rules and less open dialogue, potentially contributing to stress or emotional suppression in children.

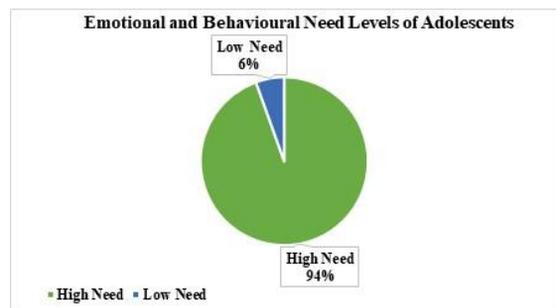
Permissive Parenting, known for its leniency and lack of firm boundaries, was perceived by 65.4% (n = 83) of the participants to be practiced to a moderate level. (Ref Table 2)

Table 2:-Perceived Parenting Style among Adolescents

Perceived Parenting Styles	n(%)
Authoritative	87(68.5)
Authoritarian	88(69.3)
Permissive	83(65.4)

Assessment of Behavioural and Emotional Problems among adolescents
 The majority of adolescents (120; 94.5%) had a high need for emotional and behavioural support, while only a few (7; 5.5%) had some need. (Ref Figure 1)

Figure 1:-Emotional and Behavioural Need Levels of Adolescents



Although adolescents perceived varying parenting styles, none of the styles had a statistically significant association with their emotional and behavioural difficulties

in this particular sample. Furthermore, no statistically significant difference was found in perceived parenting style scores between adolescents with "high need" and "some need" for emotional and behavioral support.

Discussion

The present study explored the sociodemographic characteristics, perceived parenting styles, and emotional and behavioral needs of adolescents aged 11–16 years. A notable finding of this study was that the majority of participants exhibited a high need for emotional and behavioral support. This is consistent with emerging evidence indicating increasing psychological vulnerabilities among adolescents, particularly in settings where academic stress, familial expectations, and social transitions are prominent. The elevated need for support among nearly all participants (94.5%) suggests that emotional and behavioral concerns may be more pervasive than commonly assumed, emphasizing the importance of regular mental health screening within school and community settings.

In terms of parenting, authoritative, authoritarian, and permissive styles were all perceived to be practiced at moderate levels. Authoritative parenting typically associated with positive developmental outcomes was not predominant to a high degree but only to a moderate extent among most adolescents. Similar moderate levels were observed for authoritarian and permissive styles. This pattern may reflect culturally blended parenting practices wherein parents simultaneously exhibit warmth, control,

and leniency depending on situational demands. In many Indian families, such mixed or transitional parenting styles are commonly observed as parents negotiate between traditional expectations and modern child-rearing influences.

However, the current study did not find a statistically significant association between parenting styles and adolescents' emotional and behavioral difficulties. These findings are consistent with several previous studies which also reported no or weak associations between perceived parenting style and emotional-behavioural difficulties. A study by Sharma et al. concluded that external factors like peer influence, media exposure, and school environment also impact emotional issues, not just parenting (12). A 2020 study by Kumar and Singh also reported no significant correlation between parenting style and behavioural difficulties among adolescents in a tertiary care setup, emphasizing the complexity of behavioural development and the need to look beyond parenting alone (13). Similarly, Lamborn et al. noted that while authoritative parenting is generally associated with better adolescent adjustment, the effects vary widely across settings and are often moderated by contextual factors such as school climate, community support, and individual resilience (7).

The high prevalence of emotional and behavioural difficulties in this study sample may be attributed to stressful life events, such as academic pressure, family conflict, digital exposure, or underlying medical conditions, especially given the hospital-based context. Furthermore, the perceived

parenting style may not always reflect the actual parenting behaviours or the consistency in parental responses, which can influence adolescent outcomes. This may be attributed to the high proportion of adolescents with elevated emotional and behavioral needs under the influence of broader systemic or environmental stressors such as academic pressure, socio-economic constraints, or peer influences potentially overshadowing the role of parenting alone. Also the relatively homogeneous distribution of moderate parenting style perceptions across the sample could reduce variability, limiting the ability to detect significant associations. The subjective perceptions of parenting by adolescents may not fully capture parental behavior, which may be more complex than standardized scales could convey.

Additionally, sociodemographic factors such as gender distribution, school type, parental education, and occupational status may also interact with adolescent mental health outcomes. As in this study a large proportion of mothers were unemployed, and many fathers were skilled or semi-skilled workers, suggesting potential socio-economic stressors that could impact adolescents independently of parenting approaches. Family structure showed nearly equal representation of nuclear and extended families, yet neither family type nor parental characteristics demonstrated a measurable impact on perceived parenting or adolescent emotional needs. This may indicate that support systems within families regardless of structure play a compensatory role, or

that emotional challenges of adolescents stem from multiple interacting influences outside the home environment.

Conclusion

Despite its valuable findings, this study had limitations, including a modest sample size, single-centre setting, and reliance solely on adolescent self-reports without parental input. These factors limit the generalizability of the results and may introduce subjectivity or reporting bias. Nonetheless, the study provides meaningful insights into the role of perceived parenting in adolescent psychological health within a clinical context. Overall, the findings underscore the multifactorial nature of adolescent emotional and behavioral health, where parenting style is only one of many contributing factors. While parenting continues to play a vital role in shaping adolescent well-being, this study highlights the need for a more comprehensive approach that considers social, educational, environmental, and psychological factors. These findings point to the urgent need for targeted psychological support and early intervention programs in adolescent healthcare settings. Future studies employing longitudinal designs, larger sample sizes, and multi-informant assessments including parents, teachers, and clinicians will help clarify the complex pathways influencing adolescent mental health.

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Maternal Postnatal Attachment and its association with Postpartum depression and stress among mothers attending New Born follow up clinic in a Tertiary Care Centre.

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The postpartum period involves significant physical, emotional, and psychological changes for mothers, and these shifts can influence the early mother–infant bond. This study assessed maternal postnatal attachment along with the prevalence of postpartum depression and stress, and examined how these factors relate to one another. Ninety postpartum mothers participated in a cross-sectional survey using the Maternal Postnatal Attachment Scale, the Edinburgh Postnatal Depression Scale, and the Maternal Postpartum Stress Scale, in addition to providing sociodemographic and neonatal information. The mean Maternal Postnatal Attachment score was 87.26 ± 4.22 , while possible depression was identified in 13.3% of participants. Mothers reported mild to moderate stress levels, with infant-care demands contributing most to their stress. Maternal attachment showed a negative correlation with both depression and stress, and mothers living in nuclear families demonstrated higher attachment levels. The findings suggest that postpartum depression and stress adversely affect maternal attachment, underscoring the importance of early detection and routine screening to promote healthy mother–infant bonding.

Keywords: Postpartum depression, stress,

mothers, newborn

Introduction

The postpartum period is a critical phase marked by profound physical, emotional, and psychological adjustments that can influence a mother's wellbeing and her interactions with her infant (1). Maternal postnatal attachment plays a central role in shaping the infant's socio-emotional development (2). Rooted in Bowlby's attachment theory, this bond is understood as an early, biologically driven relationship in which the baby develops trust based on the mother's availability and responsiveness, and on how the infant perceives and interprets maternal behaviours (3). Maternal attachment begins during pregnancy, strengthens after birth, and supports a woman's transition into the maternal role (4-5). Postpartum depression (PPD), a clinical form of depression occurring after childbirth, can disrupt this developmental pathway (1). Women experiencing PPD may face symptoms such as persistent sadness, low energy, altered sleep and appetite patterns, anxiety, and frequent crying spells. Stress, an inevitable component of modern life further complicates maternal wellbeing (1, 6, 7). It arises when the demands placed on an individual exceed their coping capacity, and for mothers,

stress can be experienced both during pregnancy (prenatal stress) and after delivery (postpartum stress) (8-9). Globally, postpartum depression and maternal stress pose significant risks to both mothers and their infants (10). These conditions can impair maternal–infant bonding and adversely influence infant physical, cognitive, and socio-emotional development, with potential long-term consequences (11). Mothers of high-risk new-borns, particularly those attending follow-up clinics, may be especially vulnerable to elevated stress, depressive symptoms, and attachment difficulties (10-12). Given these concerns, the present study aims to explore the relationship between maternal postnatal attachment, postpartum depression, and postpartum stress.

Materials and Methods

This hospital-based cross-sectional study was conducted at the newborn follow up clinic of Child Development Centre (CDC), Thiruvananthapuram. A total of 90 mothers within 12 weeks postpartum were recruited through consecutive sampling. Women who were not willing to participate or had a history of prior psychological treatment were excluded. The sample size was determined using the mean and standard deviation of postnatal attachment scores reported in a previous study (12). Consecutive sampling ensured that all eligible postpartum women attending the CDC during the study period and meeting the inclusion criteria were invited to participate. Maternal attachment was measured using the

Maternal Postnatal Attachment Scale (MPAS), depressive symptoms using the Edinburgh Postnatal Depression Scale (EPDS), and postpartum stress using the Maternal Postpartum Stress Scale (MPSS). Sociodemographic, maternal, and neonatal characteristics were collected through a structured questionnaire. Data were subsequently analyzed using SPSS version 25 to examine associations and correlations among maternal attachment, depression, stress, and selected background variables.

Results

Maternal Attachment

The mean Maternal Postnatal Attachment Scale (MPAS) score was 87.26 \pm 4.22, suggesting high attachment.

Depressive Symptoms

Edinburgh Postnatal Depression Scale (EPDS) Scores

Based on EPDS screening, the majority of participants were not likely to be depressed. A total of 78 mothers (86.7%) scored \leq 11, indicating no significant likelihood of postpartum depression. In contrast, 12 mothers (13.3%) scored \geq 12, suggesting possible postpartum depression. Overall, 13.3% of the sample demonstrated depressive symptoms warranting further evaluation. (Table 1)

**Table 1-
Edinburgh Postnatal Depression Scale –
Score Category (N=90)**

EPDS Score category	Frequency	Percentage
≤ 11 – Not likely depressed	78	86.7 %
≥ 12 – Possible depression	12	13.3 %

Postpartum Stress

Maternal Postpartum Stress Scale (MPSS) Scores

The overall MPSS scores among the participants ranged from 0 to 63, with a mean score of 11.21 (SD = 11.34), indicating mild to moderate stress levels. Among the subscales, *Personal Needs and Fatigue* showed a mean score of 3.84 (SD = 4.95), with scores ranging from 0 to 22. The *Infant Nurturing* subscale had a mean score of 5.84 (SD = 5.81), with a score range of 0 to 26. The *Body Changes and Sexuality* subscale demonstrated the lowest mean score, at 1.53 (SD = 2.99), with scores ranging from 0 to 19. These findings suggest that stress related to infant care was more prominent than stress related to personal needs or body image and sexuality in the early postpartum period. (Table 2)

Table 2: Maternal Postpartum Stress Scale (MPSS) and Subscale Scores

MPSS	N	Minimum	Maximum	Mean	SD
Overall Score	90	0	63.0	11.21	11.33
Subscales					
Personal needs and fatigue	90	0	22.0	3.84	4.94
Infant Nurturing	90	0	26.0	5.84	5.81
Body Changes and Sexuality	90	0	19.0	1.53	2.98

Association between Maternal Postnatal Attachment and Postpartum Depression

A significant negative correlation was observed between maternal postnatal attachment and postpartum depressive symptoms. EPDS scores showed a

moderate, inverse association with MPAS scores ($r = -0.378$, $p < 0.01$). This indicates that higher levels of postpartum depression were associated with lower maternal attachment. Conversely, higher maternal attachment scores were linked to fewer depressive symptoms.

Association between Maternal Postnatal Attachment and Postpartum Stress

Maternal postnatal attachment was significantly negatively correlated with postpartum stress. MPAS scores showed a moderate inverse relationship with MPSS scores ($r = -0.383$, $p < 0.01$), indicating that higher maternal attachment was associated with lower levels of postpartum stress. Conversely, mothers experiencing higher postpartum stress tended to report lower attachment to their infants. The mean MPAS score was significantly higher among mothers from nuclear families (89.39 ± 3.57) compared to those from extended/joint families (86.53 ± 4.38). An independent t-test revealed that this difference was statistically significant ($t = 2.921$, $df = 88$, $p = 0.004$), suggesting that maternal postnatal attachment was greater in nuclear family settings. Infant complications such as respiratory distress, jaundice and low birth weight were common but did not significantly alter attachment scores. (Table 3)

Table 3: Maternal Postnatal Attachment with Type of Family

Family type	N	Mean ± SD	T	df	p-value
Nuclear family	23	89.39 ± 3.57	2.921	88	0.004
Extended/ Joint family	67	86.53 ± 4.38			

Discussion

The findings of the study indicate that both postpartum depression and stress are linked to lower maternal attachment or postpartum depression and stress negatively influence postnatal attachment. This study found generally high maternal postnatal attachment (MPAS mean = 87.26 ± 4.22) among mothers within 12 weeks postpartum. Postpartum depressive symptoms were present in 13.3% of participants and showed a moderate negative correlation with attachment ($r = -0.378$, $p < 0.01$), consistent with evidence that depression can reduce maternal responsiveness and bonding (1-3). Similarly, postpartum stress was inversely associated with attachment ($r = -0.383$, $p < 0.01$), with stress related to infant care being most prominent.

Family structure also influenced attachment: mothers in nuclear families had higher MPAS scores (89.39 ± 3.57) than those in extended/joint families (86.53 ± 4.38 , $p = 0.004$), possibly reflecting greater autonomy and uninterrupted bonding opportunities in nuclear settings. Infant complications, including respiratory distress, jaundice, and low birth weight, did not significantly affect attachment, suggesting resilience of maternal bonding when adequate support is available.

Mothers experiencing emotional distress may struggle with sensitive and responsive caregiving. The emotional demands of caring for newborns especially those with complications may intensify stress and interfere with bonding. The strong negative correlations mirror earlier research on maternal mental health's

impact on early caregiving behaviors. The findings align with existing research highlighting the vulnerability of mothers caring for high-risk infants (6-10). However, single-centre, cross-sectional design and reliance on self-reported measures in this study may limit generalizability. Yet the findings emphasize the importance of screening for maternal depression and stress and providing early psychosocial support to enhance mother-infant attachment. Future longitudinal studies are needed to explore the dynamics of attachment and maternal mental health over time.

Conclusion

Elevated postpartum depression and stress are associated with lower levels of maternal attachment. Early identification and intervention targeting maternal mental health are essential to promote optimal mother-infant bonding and developmental outcomes. Strengthening family support and improving psychological screening in newborn follow-up clinics may mitigate risks and promote healthier bonding.

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Effectiveness of a Six-Month Early Intervention Package on the Development Outcome of At-Risk Babies Recruited at One Year

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Early intervention during infancy is crucial for improving developmental outcomes among children identified as at-risk due to perinatal or neonatal complications. This study aimed to evaluate the effectiveness of a structured six-month early intervention package on developmental outcomes of at-risk infants recruited at one year of age. The study adopted a comparative interventional design. Ninety-six children were enrolled and assigned to either an intervention group (n=48), which received a structured early intervention package, or a control group (n=48), which continued routine care without additional intervention. Developmental outcomes at 18 months were assessed using the Denver Developmental Screening Test II (DDST-II) and the Bayley Scales of Infant and Toddler Development (Bayley-III). Only post-intervention assessments were conducted. Results demonstrated significantly higher composite scores across all Bayley-III domains in the intervention group compared to controls. Cognitive scores were higher among the intervention group (M=108.44, SD=8.33) relative to controls (M=104.48, SD=9.96; $p=0.037$). Language scores showed marked improvement in the intervention group (M=111.90, SD=10.03) compared with controls (M=103.06, SD=9.98;

$p<0.001$). Motor development also improved significantly (M=114.10 vs. 106.10; $p<0.001$). The social-emotional domain exhibited the greatest difference, with the intervention group scoring substantially higher (M=131.04 vs. 109.06; $p<0.001$). Adaptive behaviour outcomes similarly favoured the intervention group (M=83.63 vs. 67.90; $p<0.001$). Overall, the six-month early intervention package had a significant positive impact on cognitive, motor, language, social-emotional, and adaptive development. These findings underscore the value of structured early interventions in enhancing developmental trajectories among at-risk infants.

Keywords:- At-Risk Babies, Intervention, Developmental screening

Introduction

The first year of life represents a critical window for brain development, characterized by rapid neuronal growth, heightened plasticity, and strong responsiveness to environmental input. During this period, infants acquire foundational skills across cognitive, motor, linguistic, socio-emotional, and adaptive domains (1). Any disruption in this trajectory can result in developmental delays with long-term consequences for health, learning, and functional

independence (1). High-risk infants—such as those born prematurely, with low birth weight, or exposed to perinatal complications—constitute a particularly vulnerable group (2). These infants are more susceptible to morbidities during infancy, as well as long-term impairments including sensory deficits, cognitive delay, motor dysfunction, and challenges in social communication and emotional regulation (1-3). Early identification and intervention are therefore essential to prevent the progression of developmental difficulties and to promote optimal child outcomes (4). Early intervention refers to a broad set of structured, goal-directed, and developmentally supportive activities designed to enhance a young child's emerging competencies (5-6). It aims to facilitate health and wellbeing, strengthen developmental skills, minimize delays, and prevent deterioration in functional ability (6). Because neuronal plasticity is maximal during the first three years of life, timely intervention offers the greatest opportunity for developmental gains (5). Interventions during infancy are known to positively influence cognitive, motor, linguistic, life skill, and socio-emotional outcomes by providing enriched sensory-motor experiences, responsive interactions, and therapeutic stimulation (7-8). Evidence from international studies has demonstrated that early therapeutic programs can significantly improve cognitive and motor outcomes in preterm and at-risk infants, particularly when delivered as coordinated, multimodal packages involving caregivers (9). Despite strong global evidence, gaps remain in understanding the impact of intervention

packages initiated at one year of age; a transitional period marked by rapid advancements in mobility, communication, and social engagement. In many low-resource settings, including India, structured follow-up after NICU discharge often declines after infancy, and subtle developmental delays may go unrecognized. This results in missed opportunities for timely referral and support. Moreover, culturally relevant and resource-feasible intervention models suited for primary and tertiary care settings are limited.

This study seeks to address these gaps by evaluating the effectiveness of a six-month structured early intervention package for at-risk infants recruited at one year of age. By comparing developmental outcomes between an intervention group and a control group, the study aims to generate robust evidence on the value of timely, structured developmental support during this critical stage. Findings from this study have the potential to inform clinical practice, strengthen child development services, and support national guidelines in early childhood intervention.

Objectives of the Study:

1. To assess the developmental outcomes of at-risk children in terms of gross motor, fine motor, speech and language, and personal-social domains using DDST-II.
2. To develop an intervention package focusing on gross motor, fine motor, speech and language, socio-emotional, life skill, and cognitive skills.

3. To compare the developmental outcomes between the intervention and control groups at 1.5 years using the Bayley Scales of Infant and Toddler Development

Materials and Methods

The study adopted a comparative interventional design. The study was conducted at the Child Development Centre (CDC) Medical College Campus, Thiruvananthapuram, over ten months. Ethical approval was obtained from the Institutional Ethics Committee. The study included 96 at-risk babies aged one year attending the At-Risk Baby Clinic of CDC. Inclusion criteria encompassed infants identified with perinatal or neonatal risk factors. Babies whose parents declined consent to participate were excluded from the study. Participants were recruited consecutively and alternately assigned to intervention (n=48) and control (n=48) groups. The intervention group received a structured six-month early intervention package focusing on gross motor, fine motor, language, socio-emotional, cognitive, and life-skill stimulation, combined with parent training and monthly follow-ups. The control group continued with routine care. Developmental progress was evaluated using Denver Developmental Screening Test-II (DDST-II) and Bayley Scales of Infant and Toddler Development, Third Edition (BSID-III). At baseline (12 months), eligible infants were identified and enrolled. After six months, at 18 months of age, both groups underwent post-assessment using DDST-II and BSID-III. Socio-demographic data were collected via structured parental interviews. Data were analyzed using SPSS

software. Descriptive statistics summarized demographic characteristics. Independent t-tests compared mean BSID scores between groups and chi-square tests examined categorical outcomes. A p-value <0.05 was considered statistically significant.

Results

A total of 96 at-risk infants participated in the study, with 48 children each in the intervention and control groups. The study population consisted of 51 males (53.1%) and 45 females (46.9%). The mean paternal age was 34.75 ± 4.48 years, and the mean maternal age was 29.27 ± 4.08 years. Most participants belonged to the Below Poverty Line (BPL) category (62.5%) and were residents of rural areas (77.1%). A large proportion of mothers were homemakers (81.3%), while 39.6% of fathers were employed as skilled workers. Educational levels among parents were moderate to high, with 43.8% of mothers and 28.1% of fathers being graduates. Family structure analysis showed that 61.5% of participants lived in extended families, and 96.9% were born to non-consanguineous parents. Anthropometric data indicated that the infants were within normal limits for age. The mean weight was 9.46 ± 1.10 kg, mean height 77.76 ± 2.66 cm, and mean head circumference 45.23 ± 1.63 cm. No statistically significant differences were observed between the intervention and control groups for baseline sociodemographic or growth parameters, confirming their comparability before intervention.

Developmental Screening Using DDST-II

Developmental screening at 18 months using the Denver Developmental Screening Test-II (DDST-II) provided an overview of children's performance in four domains—gross motor, fine motor-adaptive, language, and personal-social skills. Among all participants, 84.4% of children were classified as normal, while 15.6% were in the suspect category. Domain-wise analysis showed that gross motor skills were most preserved, whereas language delay was observed in a small subset of the control group. In the intervention group, 97.9% of children exhibited normal milestones in all four domains, compared to 70.8% in the control group. This difference was statistically significant ($p < 0.05$), suggesting that early intervention facilitated faster acquisition of age-appropriate developmental skills. (Table 1)

Table 1- Developmental Screening Using DDST-II among the study participants (N=96)

DDST-II Interpretation	Frequency	Percentage (%)
Normal	81	84.4
Suspect	15	15.6

Developmental Assessment Using BSID-III

The core evaluation of this study focused on the Bayley Scales of Infant and Toddler Development–III (BSID-III), which provided detailed composite scores across five developmental domains: cognitive, language, motor, social-emotional, and adaptive behavior. Children in the intervention group demonstrated consistently higher mean composite scores across all domains than those in the control group. The differences were statistically significant in each domain, highlighting the robust effect of the six-month intervention. The most prominent gain was observed in the social-emotional domain, with an average difference of nearly 22 points between groups ($p < 0.001$), followed by significant improvements in adaptive behavior (+15.7 points; $p < 0.001$). Improvements in language and motor development were also marked, showing mean differences of 8.8 and 8.0 points, respectively (both $p < 0.001$). Even the cognitive domain, which often develops more gradually, showed a statistically significant rise of approximately 4 points in the intervention group ($p = 0.037$).

Table 2- Developmental Assessment Using BSID-III

Developmental Domains	Control (Mean \pm SD)	Intervention (Mean \pm SD)	t	df	p-value	95% CI of Difference
Cognitive	104.48 \pm 9.96	108.44 \pm 8.33	-2.11	94	0.037*	(-7.68, -0.24)
Language	103.06 \pm 9.98	111.90 \pm 10.03	-4.32	94	<0.001**	(-12.89, -4.78)
Motor	106.10 \pm 10.58	114.10 \pm 9.38	-3.92	94	<0.001**	(-12.05, -3.95)
Socio-emotional	109.06 \pm 17.06	131.04 \pm 14.07	-6.88	94	<0.001**	(-28.32, -15.64)
Adaptive behaviour	67.90 \pm 3.41	83.63 \pm 5.61	-16.59	77.56	<0.001**	(-17.62, -13.84)

Discussion

The present study examined the impact of a six-month early intervention package on developmental outcomes among at-risk infants recruited at one year of age. Overall, the intervention group exhibited greater improvements than the control group across all developmental domains assessed namely Adaptive, Language, Motor, Social-Emotional, and Cognitive. The most substantial gains occurred in language and motor development, followed by social-emotional and adaptive skills, indicating that structured developmental support during early infancy can meaningfully accelerate the acquisition of foundational abilities among vulnerable children.

These findings are consistent with previous research demonstrating the benefits of early intervention for children with developmental risks or delays (5-12). Prior work by Guralnick and others has shown that structured developmental support enhances communication, adaptive behaviour, and cognitive outcomes (6-8). Similar to results from the Infant Health and Development Program, the present study suggests that high-quality, early stimulation can positively influence cognitive trajectories (7). The strong language and motor improvements observed also mirror earlier studies reporting that targeted and developmentally appropriate activities delivered during infancy can shift neurodevelopmental pathways (11-12). In contrast, studies that implemented intervention after the first year of life have sometimes reported smaller or inconsistent effects, supporting the view

that the timing of intervention is critical(7,10). Early recruitment in this study likely allowed children to benefit from a sensitive developmental period characterized by heightened neural plasticity.

Interpretation of the findings suggests several mechanisms underlying the improvements observed. The individualized nature of the intervention enabled targeted stimulation based on each child's developmental profile, allowing gaps to be addressed directly. Caregiver participation also played a key role. By embedding therapeutic strategies into daily routines, caregivers reinforced skills throughout the day, creating more consistent opportunities for practice and learning. The pronounced improvements in language and motor domains may reflect the structure of the program, which included frequent opportunities for verbal interaction, fine motor activities, and gross motor play. These components likely supported the neural systems undergoing rapid development between one and two years of age.

Several strengths enhance the credibility of this study. The prospective design and inclusion of both intervention and control groups allow for direct and meaningful comparisons. The use of standardized developmental assessments ensured objective evaluation across domains. Nonetheless, limitations must be acknowledged. The modest sample size may constrain generalizability, and the six-month follow-up period does not allow conclusions about the long-term stability of the gains. In addition, the use of caregiver-reported measures may

introduce bias related to recall or social desirability. Despite these limitations, the study has important implications for clinical practice and public policy. The findings underscore the value of integrating early developmental screening and timely intervention into routine paediatric care. Early identification of at-risk infants followed by structured, evidence-based intervention could reduce long-term disability and improve school readiness. Policymakers should consider supporting community-based early intervention services, particularly in resource-limited settings where specialist access is limited. The demonstrated impact of a relatively brief intervention suggests that such programs are both feasible and valuable for large-scale public health implementation.

Future research with larger, multi-site cohorts and longer follow-up is needed to determine the durability of gains and to understand how early improvements translate into later academic, social, and behavioural outcomes. Studies isolating which specific components of the intervention drive the most change would support optimization of program design. Economic evaluations will also be important to guide decision-making about widespread adoption of early intervention models.

Conclusion

In conclusion, the study provides compelling evidence that developmental trajectories in at-risk infants can be positively influenced through early, structured, and caregiver-supported intervention. The improvements observed extend beyond measurable test scores,

reflecting enhanced daily functioning, richer interactions with the environment, and more confident social engagement. The period between one and two years of age represents an unparalleled window of opportunity for shaping foundational skills, and interventions delivered during this phase may yield enduring benefits. Broad implementation of similar early intervention programs, supported by ongoing developmental monitoring, has the potential to transform public health approaches to early childhood development and to promote a generation better equipped to thrive cognitively, socially, and emotionally.

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Effectiveness of a Stress management intervention package for mothers of children between 6 to 12 years of age with Attention Deficit Hyperactivity Disorder

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Abstract

Attention Deficit Hyperactivity Disorder (ADHD) places considerable demands on caregivers, particularly mothers, who frequently assume primary responsibility for managing the child's behavioral and emotional challenges. Persistent caregiving stress can adversely impact maternal mental health, parent-child relationships, and the child's developmental trajectory. This study evaluated the effectiveness of a structured stress management intervention designed for mothers of children with ADHD aged 6 to 12 years. A hospital-based experimental study with a control group was conducted at the ADHD Clinic of the Child Development Centre, Government Medical College, Thiruvananthapuram. Seventy eight mothers were selected through consecutive sampling and assigned to intervention (n = 38) or control (n = 38) groups. Stress levels were measured using the Perceived Stress Questionnaire (PSQ), and the intervention group participated in a six-session stress management program over three months, while the control group received routine care. At baseline, most participants experienced moderate to high stress with no significant difference between groups. Post-intervention analysis revealed a significant reduction in PSQ scores in the intervention group (mean difference = 10.71, $p < 0.001$),

whereas the control group showed a slight but significant increase in stress levels (mean difference = -1.66 , $p = 0.001$). Additional comparative analyses further confirmed the effectiveness of the intervention, showing that changes in stress levels over the study period differed significantly between the two groups, with greater improvement in those who received the intervention. No socio-demographic variables were significantly associated with stress scores. The findings demonstrate that a structured stress management program can meaningfully reduce perceived stress among mothers of children with ADHD, underscoring the value of integrating caregiver-focused interventions into routine ADHD care.

Keywords: ADHD, stress management, mothers, perceived stress.

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most commonly diagnosed neurodevelopmental disorders in childhood, with a global prevalence between 5% and 7%. (1) Characterized by persistent patterns of inattention, hyperactivity, and impulsivity, ADHD significantly affects academic performance, emotional regulation, and social functioning (2). Symptoms typically

appear before the age of 12 and are evident across multiple settings, including home and school, for a clinical diagnosis to be established (1, 2). These behavioral challenges ranging from distractibility and forgetfulness to excessive motor activity and impulsive actions often contribute to peer difficulties, learning problems, and emotional distress in affected children (2, 3).

ADHD is diagnosed more often in boys than girls, although this difference may be influenced by referral bias, as girls frequently present primarily with inattentive behaviors that are less disruptive and therefore underrecognized(1,4). Regardless of gender, children with ADHD require substantial supervision, structured routines, and ongoing behavioral management (4). In many Indian households, these responsibilities fall predominantly on mothers, who act as the primary caregivers(5) Consequently, mothers experience considerable demands as they navigate behavioral concerns, academic issues, medical appointments, and the social stigma associated with the disorder(5)

Extensive research has shown that mothers of children with ADHD report significantly higher stress, anxiety, depressive symptoms, and lower parenting satisfaction compared with mothers of typically developing children or those with other chronic conditions (2, 5, 6). The caregiving burden often encompasses managing behavioral outbursts, responding to school complaints, coping with strained family

interactions, and dealing with social judgment (6). Mothers may also face financial strain or reduced career opportunities due to caregiving responsibilities(3,7) These pressures evoke feelings of guilt, frustration, helplessness, and isolation. Importantly, maternal stress is not only detrimental to the caregiver; it adversely affects parenting practices, emotional responsiveness, and the child's behavioral outcomes, reinforcing a cyclical pattern of stress and symptom escalation (3, 7).

Despite this evidence, ADHD management in India continues to be largely child-focused, with treatment plans emphasizing pharmacotherapy and behavioral interventions for children while leaving caregiver mental health inadequately addressed (5). Although Western countries have adopted caregiver-support programs and parent-training models, culturally tailored stress-management programs for Indian mothers remain scarce (5). This gap is particularly concerning in settings where stigma, low mental health literacy, limited access to services, and gendered caregiving expectations compound maternal stress.

Stress-management interventions especially those grounded in cognitive-behavioral and mindfulness principles have shown promise internationally in reducing parental distress, improving coping skills, and enhancing family dynamics(8). These programs typically include psychoeducation, relaxation techniques, cognitive restructuring, problem-solving training, and mindfulness practices (8, 9, 10). Evidence indicates that such structured programs not only reduce

stress but also strengthen parenting confidence, emotional regulation, and the parent–child relationship (8,9,10). However, their application and evaluation within the Indian sociocultural context remain limited. Given this background, there is a clear need for structured, culturally appropriate stress-management interventions to support mothers of children with ADHD in India. Addressing caregiver mental health is essential not only for the mother's well-being but also for optimizing child outcomes and improving the overall effectiveness of ADHD management. The present study aims to fill this gap by developing and evaluating a structured stress-management intervention tailored for mothers of children aged 6–12 years with ADHD, with the goal of reducing perceived stress and strengthening coping mechanisms.

Objectives

1. To assess the stress level of mothers of children with ADHD using Perceived Stress Questionnaire
2. To develop a comprehensive intervention package aimed at managing stress in mothers of children with ADHD (aged 6-12 years).
3. To measure the effectiveness of the intervention package in reducing stress levels among these mothers.

Materials and Methods

This hospital-based experimental study was conducted at the Child Development Centre (CDC), Government Medical College, Thiruvananthapuram, a specialized institution providing diagnostic

and therapeutic services for children with neurodevelopmental disorders. The study included mothers of children aged 6–12 years diagnosed with ADHD and receiving services at the centre. Mothers who scored moderate to severe stress on the Perceived Stress Questionnaire (PSQ) and provided written informed consent were included, while those with children having other neurodevelopmental disorders, mothers with diagnosed psychiatric conditions, or those unable to participate were excluded. The study was carried out over ten months following Institutional ethics committee approval. The sample size was calculated using OpenEpi version 3.03 based on findings from a previous intervention study, that reported a mean stress score difference of 2.99 between groups, with a pooled standard deviation of 4.04, with 80% power yielding a required sample of 70(4). A total of 76 mothers of children diagnosed with ADHD were ultimately enrolled using consecutive sampling. To avoid contamination, participants were allocated in two phases. During the first three months, the control group was recruited and followed without intervention, with baseline and three-month PSQ assessments completed. After this, the intervention group was recruited over the subsequent three months and received a structured stress management program comprising six sessions delivered over three months. The sessions included psychoeducation, brain gym, PACE exercises, relaxation and breathing techniques, guided imagery, mindfulness practices, stress-relief physical activities, and group discussions followed by a post

assessment. Control group mothers were subsequently offered the intervention to ensure ethical fairness. Data were collected using a socio-demographic questionnaire and the PSQ, a validated 20-item instrument assessing perceived stress across domains of worries, tension, joy (reverse scored), and demands. Data analysis was performed using SPSS. Descriptive statistics summarized background characteristics and baseline stress levels. Paired t-tests assessed pre-post changes within each group, while independent t-tests compared mean stress score changes between groups. Additional

comparative analyses evaluated differential changes across groups over time. A p-value of <0.05 was considered statistically significant.

Results

A total of 76 mothers of children diagnosed with Attention Deficit Hyperactivity Disorder (ADHD), aged 6 to 12 years, participated in the study. The participants were divided equally into an intervention group and a control group, each comprising 38 mothers. The sociodemographic characteristics of study participants are depicted in Table 1

Table 1:- Sociodemographic details of study participants (N=76)

Variables	n (%)
Socioeconomic status	
Upper Lower	9(11.8)
Lower middle	47(61.8)
Upper Middle	20(26.3)
Religion	
Hindu	51(67.1)
Muslim	20(26.3)
Christian	5(6.6)
Educational status	
Upto High School	28(36.9)
Graduate and above	48(63.1)
Occupation	
Unemployed	50(65.8)
Employed	26(34.2)
Type of Family	
Nuclear	35(46.1)
Extended	35(46.1)
Joint	6(7.9)
Place of Residence	
Rural	57(75.0)
Urban	19(25.0)
Marital Status	
Married	70(92.1)
Separated	6(7.9)

Out of the total 76 mothers included in the study, 43 (56.6%) belonged to the Above Poverty Line (APL) category, while 33 (43.4%) were from the Below Poverty Line (BPL) category. Based on the socio-economic coding, the majority of participants (61.8%) belonged to the lower middle class, followed by 26.3% in the upper middle class, and 11.8% in the upper lower class. About 67.1% were Hindus, followed by Muslims (26.3%) and Christians (6.6%). Out of the total 76 participants, about half of them (51.3%) had a professional or honors-level education. Around 34.2% of the mothers had completed middle school, while 11.8% were graduates or postgraduates. A small proportion (2.6%) had completed only high school. About 65.8% were unemployed. Among those who were employed, 15.8% were skilled workers, 5.3% each were unskilled workers, semi-skilled workers, and clerical/shop owner/farmer, while 1.3% each were semi-professionals and professionals. Among the study participants, an equal proportion (46.1% each) lived in nuclear families and extended families, while 7.9% belonged to joint families. The majority of participants, 75%, were residing in rural areas, while 25% belonged to urban areas. About 7.9% of the mothers were separated.

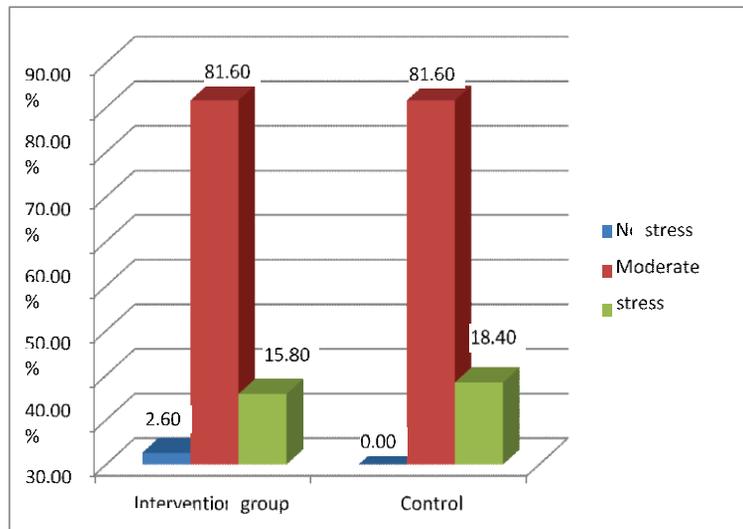
According to Conners' Rating Scale, out of the final 74 valid responses received (data for two participants were missing), majority of children (98.6%) showed significant inattention symptoms, while only one child (1.4%) fell in the normal range. About 54 children (73.0%) had significant hyperactivity symptoms, while 20 children

(27.0%) were within the normal range. Around 44 children (59.5%) had significant learning problems, while 30 children (40.5%) fell within the normal range. About 53 children (71.6%) showed significant executive functioning difficulties, whereas 21 children (28.4%) were within the normal range. About 52 children (70.3%) demonstrated significant aggression, while 22 children (29.7%) were in the normal range. Around 45 children (60.8%) showed significant peer relation difficulties, while 29 children (39.2%) were within the normal range.

Pre-intervention stress levels

During the initial assessment, in the intervention group, the majority of mothers (81.6%) reported moderate stress, 15.8% had high stress, and 2.6% reported no stress. In the control group, 81.6% also experienced moderate stress, 18.4% reported high stress, and none reported no stress. Overall, among all 76 participants, 81.6% were in the moderate stress category, 17.1% in the high stress category, and only 1.3% reported no stress. While the proportion of mothers with high stress was slightly higher in the control group (18.4%) compared to the intervention group (15.8%), the difference was not statistically significant ($\chi^2 = 1.050$, $df = 2$, $p = 0.591$). The analysis indicated that there was no significant association between study group and baseline stress level distribution among mothers. Both groups had an identical proportion of moderate stress (81.6%), and only minimal differences in the high-stress and no-stress categories. (Figure 1)

Figure 1:- Pre-intervention stress levels of study participants (N=76)



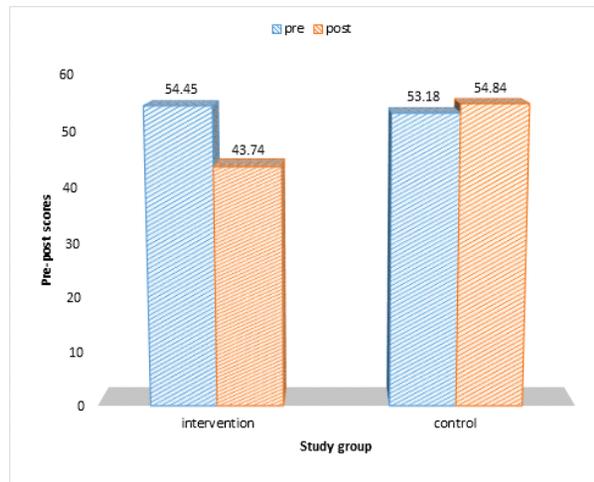
Effectiveness of Intervention

Comparison of pre and post PSQ Scores
 In the intervention group (n = 38), perceived stress levels showed a marked decrease after the intervention period. Pre-intervention scores averaged 54.45 (SD = 5.16), whereas post-intervention scores reduced to 43.74 (SD = 5.54), reflecting a mean reduction of 10.71 (95% CI: 9.16–12.26), which was statistically significant $t(37) = 14.01$, $p < 0.001$. In contrast, the control group (n = 38) exhibited a slight but statistically significant increase in perceived stress between the two assessment points.

Mean scores increased from 53.18 (SD = 6.94) at baseline to 54.84 (SD = 6.68) at three month follow-up without intervention, corresponding to a mean difference of -1.66 (95% CI: -2.63 to -0.68), $t(37) = -3.45$, $p = 0.001$. A strong positive association between pre- and post-assessment scores was observed ($r = 0.906$, $p < 0.001$), indicating that although stress levels shifted over time, participants' relative standing within each group remained *stable*.

Figure 2:-

Comparison of Pre and Post Intervention Perceived stress (PSQ scores) (N=76)



Effect of Stress Management

Intervention

The intervention produced a pronounced reduction in perceived stress among participating mothers. From pre- to post-assessment, the intervention group showed a substantial decrease in PSQ scores (Mean difference = 10.71, SD = 4.71), whereas the control group demonstrated a slight increase (Mean difference = -1.66, SD = 2.96). The difference in change between groups was statistically significant, $t(62.28) = 13.70$, $p < 0.001$, with a mean difference of 12.37 (95% CI: 10.56–14.17). Across measurement points, stress levels shifted significantly overall, $F(1,74) = 100.51$, $p < 0.001$, and this pattern differed markedly by group, as indicated by a strong interaction effect, $F(1,74) = 187.63$, $p < 0.001$. Post-intervention

comparisons further indicated that stress levels were significantly lower in the intervention group relative to the control group, $F(1,74) = 13.68$, $p < 0.001$. No significant associations were observed between stress scores and socio-demographic factors such as maternal education, occupation, income, family structure, or place of residence

Discussion

The present study examined the effectiveness of a structured stress management programme in reducing perceived stress among mothers of children aged 6–12 years diagnosed with ADHD. Consistent with existing literature, baseline findings indicated that the majority of mothers experienced moderate to high levels of stress, reflecting the well-documented emotional and behavioural challenges

associated with caregiving in ADHD (2, 3). These findings are in line with the expectation in randomized controlled trials that baseline characteristics, including psychological measures, should be comparable between groups. This comparability at baseline is essential for attributing any post-intervention differences to the effect of the intervention rather than pre-existing disparities. The results align with previous research, such as Babakhanian et al. (4) and Sarkhel et al. (5) who reported high stress prevalence among mothers of children with ADHD regardless of subgroup, and emphasize the need for targeted caregiver interventions to address this burden.

Following the programme, mothers in the intervention group showed a marked and statistically significant reduction in perceived stress, while those in the control group exhibited a slight but significant increase over time. Between-group differences and time-based analyses further confirmed that the intervention yielded meaningful improvements, with no socio-demographic factors influencing outcomes. This suggests that the intervention is broadly effective across diverse backgrounds, underscoring its potential as a scalable and accessible tool for caregiver support. The substantial reduction in PSQ scores indicates that the stress management intervention was highly effective in alleviating perceived stress among participating mothers. These results are consistent with previous studies which also demonstrated significant stress reduction following structured cognitive-behavioral or mindfulness-based programs

for mothers of children with ADHD (5-10). The results of this study indicate that, in the absence of intervention, perceived stress among mothers increased significantly during the study period, contrasting with the substantial stress reduction observed in the intervention group. These findings substantiate that the intervention group experienced a significantly greater reduction in stress compared to the control group, confirming the effectiveness of the stress management intervention. The findings of the study also highlight the essential role of caregiver-focused interventions in ADHD management. By enhancing coping skills and emotional regulation, structured stress management programmes can contribute to better family functioning and may indirectly support improved behavioural outcomes in children. Given the bidirectional relationship between parental stress and child behaviour, prioritizing maternal well-being can have favourable outcomes on the child's developmental progress.

Despite its strengths, the study has several limitations. The research was conducted within a single developmental centre, which may limit generalizability to other settings or populations. The sample size, though adequate for analysis, was relatively small and restricted to mothers, excluding fathers and other caregivers who may experience stress differently. Factors such as family mental health history, daily stressors, and availability of support systems were not assessed, yet these variables could significantly influence caregiver stress. Additionally, the short duration of data collection prevented evaluation of the long-term sustainability

of the intervention's effects. Future research with larger, multi-centre studies involving diverse caregiver groups would enhance representativeness. Long-term follow-up is necessary to determine whether stress reductions persist over time and whether improved caregiver well-being translates into measurable changes in child behaviour. Incorporating moderating factors such as parenting style, family support structures, and co-occurring child conditions would provide a more precise understanding of intervention effectiveness. Qualitative or mixed-methods approaches could also offer deeper insights into caregiver experiences and perceived benefits of stress management strategies. Collectively our study contributes to the understanding that integrating caregiver-focused interventions into routine ADHD services is essential for holistic, family-centred care. Regular stress screening during child evaluations can facilitate early identification of needs, while collaboration among psychologists, paediatricians, therapists, and educators can enhance support for both caregivers and children. Ensuring programme accessibility in rural and resource-limited areas, alongside ongoing follow-up, can help sustain coping skills and reduce relapse of stress over time.

Conclusion

This study demonstrates the effectiveness of a structured stress management programme in reducing perceived stress among mothers of children with ADHD. The improvements observed were significant and consistent across socio-

demographic groups, demonstrating the programme's broad applicability. Integrating caregiver well-being into standard ADHD care is crucial for promoting healthier family dynamics and supporting better outcomes for children. Future work should focus on long-term evaluation, broader representation, and deeper exploration of contextual factors that shape caregiver stress and intervention impact.

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