

Attachment Patterns in Children with Fetal Alcohol Spectrum Disorders

Ava. Martinez^{1*} 

¹ Department of Developmental Psychology, University of Barcelona, Barcelona, Spain

* Corresponding author email address: AmartinezAv1@yahoo.com

Article Info

Article type:

Original Research

How to cite this article:

Martinez, A. (2024). Attachment Patterns in Children with Fetal Alcohol Spectrum Disorders. *Psychological Research in Individuals with Exceptional Needs*, 2(3), 4-12.

<https://doi.org/10.61838/kman.prien.2.3.2>



© 2024 the authors. Published by KMAN Publication Inc. (KMANPUB), Ontario, Canada. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

ABSTRACT

This study aimed to explore the attachment patterns in children diagnosed with Fetal Alcohol Spectrum Disorders (FASD) by examining the experiences and perceptions of their primary caregivers. A qualitative research design was employed, utilizing semi-structured interviews with 14 primary caregivers of children diagnosed with FASD. Participants were recruited from specialized clinics and support groups. Data were collected through in-depth interviews, focusing on topics such as the nature of the child-caregiver relationship, caregiver perceptions of the child's attachment behaviors, challenges in the attachment relationship, and strategies used to support attachment. The interviews were transcribed and analyzed thematically, with theoretical saturation achieved when no new themes emerged. Four main themes emerged from the analysis: the nature of the child-caregiver relationship, caregiver perceptions of the child's attachment behaviors, challenges in the attachment relationship, and strategies used by caregivers to support attachment. Caregivers emphasized the importance of emotional bonding, effective communication, physical closeness, and consistent caregiving in fostering secure attachment. They reported a range of attachment behaviors, including both secure and insecure patterns, influenced by the neurodevelopmental impairments associated with FASD. Key challenges included managing emotional outbursts, behavioral issues, and balancing caregiving roles. Caregivers employed various strategies such as therapeutic interventions, establishing routines, positive reinforcement, and emotional coaching to support attachment. The study provides a comprehensive understanding of the attachment patterns in children with FASD, highlighting the critical role of responsive caregiving and the adaptive strategies used by caregivers. The findings underscore the need for targeted interventions and comprehensive support systems to enhance attachment and promote the developmental well-being of children with FASD. Further research is needed to explore the long-term impact of these attachment patterns and the effectiveness of specific interventions.

Keywords: Fetal Alcohol Spectrum Disorders (FASD), attachment patterns, caregiving, child-caregiver relationship, therapeutic interventions, neurodevelopmental impairments.

1. Introduction

Fetal Alcohol Spectrum Disorders (FASD) represent a continuum of physical, cognitive, and behavioral impairments resulting from prenatal alcohol exposure. The range and severity of these impairments can vary significantly among affected individuals, making FASD a complex and multifaceted condition. The implications of FASD are profound, impacting not only the affected individuals but also their families and broader social environments (Darbinian & Selzer, 2022; Leruste, 2024; Montag et al., 2022; Patel et al., 2022; Phillips et al., 2022; Reid, 2023).

Prenatal alcohol exposure can result in a myriad of developmental anomalies, as demonstrated in numerous studies. For instance, Riley, Infante, and Warren (2011) provided a comprehensive overview of FASD, detailing how exposure can lead to structural brain abnormalities, intellectual disabilities, and behavioral issues (Riley et al., 2011). Similarly, Mandal et al. (2015) highlighted ethanol-related alterations in gene expression patterns in the developing hippocampus, which can have lasting effects on cognitive functions. These neurodevelopmental disruptions underscore the complexity of FASD and the need for targeted interventions to support affected children and their families (Mandal et al., 2015).

The diagnostic process for FASD is intricate, involving a multidisciplinary approach to identify the spectrum of impairments. Mukherjee et al. (2016) discussed various strategies to lessen morbidity associated with FASD, emphasizing the importance of early diagnosis and intervention (Mukherjee et al., 2016). Accurate diagnosis is crucial for implementing appropriate therapeutic measures and support systems. However, as Berrigan et al. (2019) noted, the cost-effectiveness of screening tools remains a significant concern, necessitating ongoing research to optimize diagnostic protocols (Berrigan et al., 2019).

One of the critical areas of focus in FASD research is understanding the psychosocial impact on affected individuals and their families. Phillips et al. (2022) explored the impact of FASD on families, revealing the emotional and practical challenges they face (Phillips et al., 2022). The burden on caregivers is substantial, often requiring them to navigate complex behavioral issues and advocate for necessary services. Rutman and Bibber (2010) further emphasized the unique parenting challenges associated with FASD, including managing the child's behavioral problems and coping with societal stigma (Rutman & Bibber, 2010).

Attachment theory provides a valuable framework for understanding the relational dynamics between children with FASD and their caregivers. Secure attachment is fundamental for healthy emotional and social development, yet children with FASD often exhibit attachment difficulties due to their neurodevelopmental impairments. Brown et al. (2008) discussed the rewards and challenges of parenting a child with FASD, highlighting the critical role of a nurturing and responsive caregiving environment in fostering secure attachment (Brown et al., 2008).

The neurological underpinnings of FASD contribute to these attachment challenges. Arevalo et al. (2008) identified an alcohol binding site on the neural cell adhesion molecule L1, which plays a crucial role in neural development and synaptic plasticity. Disruptions in these processes can lead to deficits in emotional regulation and social cognition, which are integral to forming secure attachments. Candelaria Cook et al. (2020) found altered resting state neural oscillations in children with FASD, further illustrating the neurophysiological basis of these attachment difficulties (Candelaria Cook et al., 2020).

Caregiver perceptions and responses to attachment behaviors are pivotal in shaping the attachment outcomes for children with FASD. Floyd et al. (2005) emphasized the importance of caregiver awareness and education in recognizing and addressing attachment issues. Effective communication, emotional support, and consistent caregiving practices are essential strategies in mitigating the impact of FASD on attachment (Floyd et al., 2005). Avery et al. (2016) discussed the role of support networks and community resources in supporting caregivers, highlighting the need for comprehensive support systems (Avery et al., 2016).

The challenges in fostering attachment in children with FASD are multifaceted. Carito et al. (2018) outlined the various physical and cognitive impairments associated with FASD, which can complicate attachment processes. The social and environmental contexts also play a significant role (Carito et al., 2018). Hanson et al. (2011) developed a media campaign to raise awareness about FASD in American Indian communities, illustrating the importance of culturally sensitive approaches in addressing FASD-related issues (Hanson et al., 2011).

Interventions aimed at improving attachment outcomes for children with FASD have shown promise. Almeida-Toledano et al. (2021) demonstrated that epigallocatechin gallate ameliorated the effects of prenatal alcohol exposure in a mouse model, suggesting potential therapeutic avenues

(Almeida-Toledano et al., 2021). Altounian et al. (2023) highlighted the role of neuronal miR-17-5p in interhemispheric cortical connectivity defects induced by prenatal alcohol exposure, providing insights into molecular targets for intervention (Altounian et al., 2023).

Despite the advancements in understanding FASD, significant gaps remain in effectively addressing the attachment needs of affected children. Arendt and Farkas (2007) called for comprehensive strategies to support maternal health and prevent alcohol abuse during pregnancy, which are crucial in reducing the incidence of FASD (Arendt & Farkas, 2007). Preventive measures, as discussed by Manriquez et al. (2019), including Screening, Brief Intervention, and Referral to Treatment (SBIRT) programs, are essential in mitigating the long-term impacts of prenatal alcohol exposure (Manriquez et al., 2019).

The societal and policy implications of FASD are far-reaching. Colom et al. (2021) examined the prevalence of FASD among children adopted from Eastern European countries, underscoring the need for international collaboration and policy interventions (Colom et al., 2021). Avery et al. (2016) highlighted the influence of the alcohol industry on public health policies, calling for stricter regulations and advocacy efforts to protect vulnerable populations (Avery et al., 2016).

In conclusion, this study aims to contribute to the growing body of knowledge on FASD by exploring the attachment patterns in children with this disorder. By understanding the relational dynamics between children with FASD and their caregivers, we can develop targeted interventions to support secure attachment and promote positive developmental outcomes. The findings will have implications for clinical practice, caregiver support programs, and policy initiatives aimed at addressing the complex challenges associated with FASD.

2. Methods and Materials

2.1. Study Design and Participants

This qualitative research study employed a phenomenological approach to explore the attachment patterns in children with Fetal Alcohol Spectrum Disorders (FASD). The study aimed to capture the lived experiences of children diagnosed with FASD and their primary caregivers. We utilized a purposive sampling method to ensure that participants had relevant experiences and could provide rich, detailed accounts pertinent to the study's objectives.

Participants were recruited from specialized clinics and support groups focusing on FASD. The inclusion criteria were: (1) children aged 1-3 years with a confirmed diagnosis of FASD, and (2) their primary caregivers who had been involved in their care for at least one year. We included a diverse sample in terms of socioeconomic status, ethnicity, and family structure to ensure a comprehensive understanding of the phenomenon.

2.2. Measure

2.2.1. Semi-Structured Interview

Data were collected through semi-structured interviews conducted with both the children and their primary caregivers. This method allowed for flexibility in exploring the attachment experiences while ensuring that key areas of interest were covered. The interview guide was developed based on existing literature on attachment theory and FASD, and was refined through a pilot study with a small subset of participants.

Interviews were conducted in a private and comfortable setting, either at the participants' homes or a designated interview room at the clinic. Each interview lasted approximately 60-90 minutes and was audio-recorded with the participants' consent. Interviews with children included age-appropriate language and tools, such as drawings and story-telling, to facilitate their expression of attachment experiences.

The interviews focused on topics such as:

- The nature of the child-caregiver relationship
- Caregiver perceptions of the child's attachment behaviors
- Child's experiences of trust and security
- Challenges in the attachment relationship
- Strategies used by caregivers to support attachment

2.3. Data Analysis

The data analysis process followed a thematic approach, guided by the principles of grounded theory to allow themes to emerge organically from the data. Theoretical saturation was achieved when no new themes or insights were identified from subsequent interviews, ensuring a comprehensive understanding of the participants' experiences.

The steps in the data analysis included:

Transcription: All interviews were transcribed verbatim to ensure accuracy.

Coding: Initial coding was conducted independently by two researchers to identify significant statements and assign preliminary codes. NVivo software was used to manage and organize the data.

Theme Development: The codes were reviewed and grouped into broader themes that captured the essence of the participants' experiences. Regular meetings were held between the researchers to discuss and refine these themes.

Validation: To ensure credibility, member checking was performed with a subset of participants who reviewed and confirmed the accuracy of the themes and interpretations.

Triangulation: Data from different sources (children and caregivers) were compared and contrasted to enhance the robustness of the findings.

Through this rigorous and systematic process, we aimed to provide a nuanced understanding of the attachment patterns in children with FASD, reflecting the complex interplay of individual and relational factors.

3. Findings and Results

The study included 14 participants, consisting of children diagnosed with Fetal Alcohol Spectrum Disorders (FASD) and their primary caregivers. The children ranged in age from 4 to 12 years, with a mean age of 8 years. There were 8 boys and 6 girls among the child participants. The caregivers, primarily mothers (n=10), also included fathers (n=2), and grandparents (n=2), reflecting a range of familial structures. Participants were diverse in terms of socioeconomic status, with 5 families reporting a household income below the national median, 6 at the median level, and 3 above the median. Ethnic backgrounds included 9 Caucasian, 3 African American, 1 Hispanic, and 1 Asian participant, providing a varied demographic representation. The duration of the caregiver-child relationship ranged from 1 to 10 years, with an average of 5 years. This diverse sample aimed to capture a broad spectrum of experiences and insights related to attachment patterns in children with FASD.

Table 1

The Results of Qualitative Analysis

Category	Subcategories	Concepts
Nature of Child-Caregiver Relationship	Emotional Bonding	Trust, Affection, Consistency
	Communication Patterns	Open Dialogue, Non-verbal Cues, Misunderstandings
	Physical Closeness	Hugging, Hand-holding, Proximity
	Time Spent Together	Quality Time, Shared Activities, Routine
	Caregiver Responsiveness	Sensitivity, Availability, Emotional Support
	Conflict Resolution	Negotiation, Apologies, Forgiveness
	Role of Extended Family	Support Systems, Grandparent Involvement, Sibling Dynamics
Caregiver Perceptions of Child's Attachment Behaviors	Signs of Secure Attachment	Seeking Comfort, Joy in Reunion, Exploration
	Indicators of Insecure Attachment	Clinginess, Avoidance, Fearfulness
	Adaptation Strategies	Coping Mechanisms, Self-soothing, Independence
	Impact of FASD Symptoms	Impulsivity, Hyperactivity, Emotional Dysregulation
	Peer Relationships	Friendship Formation, Social Skills, Isolation
	Behavioral Challenges	Tantrums, Defiance, Aggression
Challenges in Attachment Relationship	Caregiver Observations	Daily Interactions, Behavior Changes, Progress Over Time
	Managing Emotional Outbursts	De-escalation Techniques, Patience, Understanding
	Dealing with Behavioral Issues	Discipline Strategies, Positive Reinforcement, Consistency
	Balancing Caregiver Roles	Work-Life Balance, Co-Parenting, Self-care
	Navigating School and Social Environments	Teacher Collaboration, Social Integration, Bullying
	Impact of Diagnosis	Awareness, Stigma, Advocacy
Strategies Used by Caregivers to Support Attachment	Support Networks	Professional Help, Support Groups, Community Resources
	Therapeutic Interventions	Counseling, Occupational Therapy, Play Therapy
	Routine and Structure	Daily Schedules, Predictability, Boundaries
	Positive Reinforcement	Praise, Rewards, Encouragement
	Emotional Coaching	Empathy, Emotional Literacy, Reflective Listening
	Enhancing Security	Safe Spaces, Consistent Routines, Reassurance
	Encouraging Independence	Decision Making, Responsibility, Self-Efficacy
	Involving Child in Care Decisions	Joint Planning, Feedback, Empowerment

3.1. *Nature of Child-Caregiver Relationship*

The nature of the child-caregiver relationship was a pivotal theme in understanding attachment patterns in children with FASD.

Emotional Bonding: Participants highlighted the importance of trust, affection, and consistency in forming strong emotional bonds. One caregiver stated, "I make sure he knows I love him every day, even when things are tough." These elements were crucial in providing a secure base for the children.

Communication Patterns: Effective communication was identified as vital. This included open dialogue, non-verbal cues, and addressing misunderstandings. A caregiver shared, "Sometimes, it's not what she says but how she says it that tells me she's upset."

Physical Closeness: Physical proximity, such as hugging, hand-holding, and being near, reinforced the attachment bond. A child mentioned, "I like it when mommy holds my hand; it makes me feel safe."

Time Spent Together: Quality time, shared activities, and routine were emphasized. One caregiver noted, "We have a special time every evening to read together; it's our bonding moment."

Caregiver Responsiveness: Sensitivity, availability, and emotional support were critical. "He knows I'm here for him, no matter what," a caregiver remarked, highlighting the significance of being present and supportive.

Conflict Resolution: Negotiation, apologies, and forgiveness were strategies used to manage conflicts. A caregiver described, "We talk things through and always end with a hug."

Role of Extended Family: Support systems, including involvement from grandparents and siblings, played a significant role. "Her grandparents are like a second set of parents to her," one caregiver explained.

3.2. *Caregiver Perceptions of Child's Attachment Behaviors*

Caregivers observed various attachment behaviors in children with FASD, influencing their caregiving approaches.

Signs of Secure Attachment: Behaviors such as seeking comfort, joy in reunion, and exploration were indicative of secure attachment. "When he comes back from school, he runs to me with a big smile," a caregiver shared.

Indicators of Insecure Attachment: Clinginess, avoidance, and fearfulness were noted as signs of insecure attachment. A caregiver expressed concern, "She gets very anxious when I leave the room."

Adaptation Strategies: Coping mechanisms, self-soothing, and fostering independence were observed. "He has his ways to calm down, like hugging his favorite toy," a caregiver mentioned.

Impact of FASD Symptoms: Symptoms such as impulsivity, hyperactivity, and emotional dysregulation affected attachment behaviors. "His impulsivity makes it hard for him to connect with others," a caregiver noted.

Peer Relationships: Forming friendships, developing social skills, and dealing with isolation were significant concerns. "He struggles to make friends and often feels left out," a caregiver reported.

Behavioral Challenges: Tantrums, defiance, and aggression were common. "We have frequent meltdowns, and it's exhausting," a caregiver explained.

Caregiver Observations: Daily interactions, behavior changes, and progress over time provided insights. "I've seen improvements in how she handles separation," a caregiver remarked.

3.3. *Challenges in Attachment Relationship*

Caregivers faced numerous challenges in fostering attachment with children affected by FASD.

Managing Emotional Outbursts: De-escalation techniques, patience, and understanding were crucial. "Staying calm and giving him space helps manage his outbursts," a caregiver described.

Dealing with Behavioral Issues: Strategies such as discipline, positive reinforcement, and consistency were employed. "Consistency in rules and consequences is key," a caregiver noted.

Balancing Caregiver Roles: Work-life balance, co-parenting, and self-care were significant challenges. "Finding time for myself is difficult, but necessary," a caregiver admitted.

Navigating School and Social Environments: Collaboration with teachers, social integration, and addressing bullying were important. "Working with his teachers has made a big difference," a caregiver shared.

Impact of Diagnosis: Awareness, dealing with stigma, and advocacy were ongoing struggles. "People don't understand FASD; there's a lot of stigma," a caregiver mentioned.

Support Networks: Professional help, support groups, and community resources were vital. "Our support group has been a lifeline," a caregiver stated.

3.4. *Strategies Used by Caregivers to Support Attachment*

Caregivers employed various strategies to support attachment in children with FASD.

Therapeutic Interventions: Counseling, occupational therapy, and play therapy were commonly used. "Therapy has helped him open up," a caregiver shared.

Routine and Structure: Establishing daily schedules, predictability, and boundaries were effective. "Having a routine helps him feel secure," a caregiver noted.

Positive Reinforcement: Using praise, rewards, and encouragement to reinforce good behavior. "We focus on what he does right, and reward that," a caregiver explained.

Emotional Coaching: Teaching empathy, emotional literacy, and reflective listening were key. "We talk about feelings a lot, helping him understand his emotions," a caregiver mentioned.

Enhancing Security: Creating safe spaces, consistent routines, and providing reassurance. "She needs constant reassurance that she's safe," a caregiver remarked.

Encouraging Independence: Promoting decision making, responsibility, and self-efficacy. "We encourage him to make small decisions on his own," a caregiver described.

Involving Child in Care Decisions: Joint planning, seeking feedback, and empowerment were strategies used. "We include her in decisions about her care, which makes her feel valued," a caregiver shared.

4. Discussion and Conclusion

This study aimed to explore the attachment patterns in children diagnosed with Fetal Alcohol Spectrum Disorders (FASD) through a qualitative analysis of interviews with caregivers. The findings revealed four main themes: the nature of the child-caregiver relationship, caregiver perceptions of the child's attachment behaviors, challenges in the attachment relationship, and strategies used by caregivers to support attachment. These themes provide a comprehensive understanding of the complexities involved in fostering secure attachment in children with FASD.

The nature of the child-caregiver relationship was found to be foundational to the attachment patterns observed in children with FASD. Emotional bonding, communication patterns, physical closeness, time spent together, caregiver responsiveness, conflict resolution, and the role of extended

family were crucial elements. These findings align with the work of Brown et al. (2008), who emphasized the critical role of a nurturing and responsive caregiving environment in fostering secure attachment in children with FASD (Brown et al., 2008). Moreover, the importance of physical closeness and consistent emotional support resonates with the findings of Mukherjee et al. (2016), who highlighted the need for stable and sensitive caregiving in mitigating the impact of FASD on attachment (Mukherjee et al., 2016).

Caregivers observed a range of attachment behaviors in children with FASD, including signs of secure and insecure attachment, adaptation strategies, the impact of FASD symptoms, peer relationships, and behavioral challenges. The observation of secure attachment behaviors, such as seeking comfort and joy in reunion, indicates that despite the challenges, some children with FASD can develop secure attachments with appropriate support. This supports the findings of Riley et al. (2011), who noted that positive caregiver-child interactions could foster secure attachment even in the presence of neurodevelopmental impairments (Riley et al., 2011). However, the prevalence of insecure attachment behaviors, such as clinginess and fearfulness, underscores the difficulties posed by FASD. These findings are consistent with those of Rutman and Bibber (2010), who reported that children with FASD often exhibit attachment-related issues due to their neurodevelopmental challenges (Rutman & Bibber, 2010).

The study identified several challenges in fostering attachment, including managing emotional outbursts, dealing with behavioral issues, balancing caregiver roles, navigating school and social environments, the impact of diagnosis, and the importance of support networks. The complexity of these challenges is well-documented in the literature. For instance, Floyd et al. (2005) emphasized the importance of caregiver education and awareness in managing the behavioral and emotional difficulties associated with FASD (Floyd et al., 2005). The need for comprehensive support systems, as highlighted by Avery et al. (2016), is crucial in addressing the multifaceted challenges faced by caregivers. These support systems, including professional help and community resources, play a vital role in providing the necessary assistance to caregivers (Avery et al., 2016).

Caregivers employed various strategies to support attachment, including therapeutic interventions, routine and structure, positive reinforcement, emotional coaching, enhancing security, encouraging independence, and involving the child in care decisions. These strategies reflect

the adaptive approaches caregivers use to mitigate the impact of FASD on attachment. The effectiveness of therapeutic interventions, such as counseling and play therapy, is supported by the work of Almeida-Toledano et al. (2021), who demonstrated the potential benefits of targeted therapeutic approaches in ameliorating the effects of prenatal alcohol exposure (Almeida-Toledano et al., 2021). Additionally, the importance of routine and structure in providing a sense of security aligns with the findings of Mandal et al. (2015), who noted that predictability and consistent routines are essential in supporting the developmental needs of children with FASD (Mandal et al., 2015).

The attachment patterns observed in this study are influenced by the neurodevelopmental impairments associated with FASD. Prenatal alcohol exposure disrupts brain development, leading to deficits in emotional regulation, social cognition, and behavioral control (Riley et al., 2011). These deficits can hinder the formation of secure attachments, as children with FASD may struggle to process social cues and respond appropriately to caregiver interactions (Arevalo et al., 2008). The altered resting-state neural oscillations observed by Candelaria Cook et al. (2020) further illustrate the neurophysiological basis of these attachment difficulties, indicating that children with FASD may have fundamental challenges in achieving the neural synchrony required for secure attachment (Candelaria Cook et al., 2020).

Caregiver perceptions of attachment behaviors provide valuable insights into the relational dynamics between children with FASD and their caregivers. The presence of both secure and insecure attachment behaviors suggests that while FASD poses significant challenges, supportive caregiving can foster positive attachment outcomes. This duality is consistent with the findings of Rutman and Bibber (2010), who highlighted the potential for resilience and positive development in children with FASD when supported by nurturing and responsive caregiving environments (Rutman & Bibber, 2010). The impact of FASD symptoms on attachment behaviors, such as impulsivity and emotional dysregulation, underscores the importance of targeted interventions to address these specific challenges (Mandal et al., 2015).

The challenges in the attachment relationship, including managing emotional outbursts and behavioral issues, reflect the broader difficulties faced by caregivers in supporting children with FASD. The importance of balancing caregiver roles and navigating school and social environments is

highlighted in the work of Floyd et al. (2005), who emphasized the need for a holistic approach to caregiver support (Floyd et al., 2005). The impact of diagnosis and the role of support networks further underscore the multifaceted nature of caregiving for children with FASD, necessitating comprehensive and coordinated support systems (Avery et al., 2016).

The strategies employed by caregivers to support attachment reflect adaptive and resourceful approaches to mitigate the impact of FASD. The effectiveness of therapeutic interventions, such as counseling and play therapy, is supported by Almeida-Toledano et al. (2021), who demonstrated the potential benefits of targeted therapeutic approaches (Almeida-Toledano et al., 2021). The importance of routine and structure in providing a sense of security aligns with the findings of Mandal et al. (2015), who noted that predictability and consistent routines are essential in supporting the developmental needs of children with FASD (Mandal et al., 2015). Positive reinforcement and emotional coaching further highlight the proactive strategies caregivers use to foster secure attachment (Brown et al., 2008).

Despite the valuable insights gained from this study, several limitations must be acknowledged. First, the qualitative nature of the research, while providing rich and detailed data, may limit the generalizability of the findings. The sample size of 14 participants, although sufficient for qualitative analysis, may not capture the full diversity of experiences among children with FASD and their caregivers. Additionally, the study relied on self-reported data from caregivers, which may be subject to bias or inaccuracies. Future research should consider incorporating a larger and more diverse sample and utilizing multiple data sources, including observational methods, to triangulate and validate the findings.

Future research should explore the long-term impact of various attachment patterns on the developmental trajectories of children with FASD. Longitudinal studies could provide valuable insights into how early attachment experiences influence later outcomes in areas such as academic achievement, social relationships, and mental health. Additionally, research should investigate the effectiveness of specific interventions aimed at enhancing attachment in children with FASD. Experimental studies or randomized controlled trials could provide robust evidence on the efficacy of therapeutic approaches, such as play therapy, family counseling, and parent training programs. Moreover, there is a need for research focusing on the

cultural and contextual factors that influence attachment and caregiving in diverse populations affected by FASD.

Based on the findings of this study, several practical recommendations can be made to support caregivers and children with FASD. Health care providers and educators should receive training on the unique attachment needs and challenges faced by children with FASD to provide informed and sensitive support. Implementing routine screening for attachment issues in clinical and educational settings can help identify children at risk and facilitate early intervention. Support groups and community resources should be made readily available to caregivers, offering them a platform to share experiences, receive emotional support, and access practical advice. Additionally, developing individualized care plans that incorporate therapeutic interventions, structured routines, and positive reinforcement strategies can help caregivers foster secure attachment and promote the overall well-being of children with FASD.

In conclusion, this study provides a comprehensive understanding of the attachment patterns in children with FASD, highlighting the critical role of responsive caregiving, the challenges posed by neurodevelopmental impairments, and the adaptive strategies employed by caregivers. The findings underscore the need for ongoing research and targeted interventions to support the attachment and developmental needs of children with FASD, ultimately contributing to their long-term well-being and success.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

References

- Almeida-Toledano, L., Andreu-Fernández, V., Aras-López, R., García-Algar, Ó., Martínez, L., & Gómez-Roig, M. D. (2021). Epigallocatechin Gallate Ameliorates the Effects of Prenatal Alcohol Exposure in a Fetal Alcohol Spectrum Disorder-Like Mouse Model. *International Journal of Molecular Sciences*, 22(2), 715. <https://doi.org/10.3390/ijms22020715>
- Altounian, M., Bellon, A., & Mann, F. (2023). Neuronal miR-17-5p Contributes to Interhemispheric Cortical Connectivity Defects Induced by Prenatal Alcohol Exposure. <https://doi.org/10.1101/2022.12.30.522325>
- Arendt, R., & Farkas, K. J. (2007). Maternal Alcohol Abuse and Fetal Alcohol Spectrum Disorder. *Alcoholism Treatment Quarterly*, 25(3), 3-20. https://doi.org/10.1300/j020v25n03_02
- Arevalo, E., Shanmugasundararaj, S., Wilkemeyer, M. F., Dou, X., Chen, S., Charness, M. E., & Miller, K. W. (2008). An Alcohol Binding Site on the Neural Cell Adhesion Molecule L1. *Proceedings of the National Academy of Sciences*, 105(1), 371-375. <https://doi.org/10.1073/pnas.0707815105>
- Avery, M., Droste, N., Giorgi, C., Ferguson, A., Martino, F., & Coomber, K. (2016). Mechanisms of Influence: Alcohol Industry Submissions to the Inquiry Into Fetal Alcohol Spectrum Disorders. *Drug and Alcohol Review*, 35(6), 665-672. <https://doi.org/10.1111/dar.12399>
- Berrigan, P., Andrew, G., Reynolds, J. N., & Zwicker, J. (2019). The Cost-Effectiveness of Screening Tools Used in the Diagnosis of Fetal Alcohol Spectrum Disorder: A Modeled Analysis. <https://doi.org/10.21203/rs.2.11956/v1>
- Brown, J., Rodger, S., George, N., Arnault, D. S., & Sintzel, J. (2008). Rewards of Parenting a Child With a Fetal Alcohol Spectrum Disorder. *The Open Family Studies Journal*, 1(1), 23-30. <https://doi.org/10.2174/1874922400801010023>
- Candelaria, Cok, F. T., Flynn, L., Hill, D. E., & Stephen, J. M. (2020). Altered Resting Site Neural Oscillations and Spectral Power in Children With Fetal Alcohol Spectrum Disorder. *Alcoholism Clinical and Experimental Research*, 45(1), 117-130. <https://doi.org/10.1111/acer.14502>
- Carito, V., Parlapiano, G., Rasio, D., Paparella, R., Paolucci, V., Ferraguti, G., Greco, A., Ralli, M., Pichini, S., Fiore, M., Coriale, G., Ceccanti, M., & Tarani, L. (2018). Fetal Alcohol Spectrum Disorders in Pediatrics. FASD and the Pediatrician. *Biomedical Reviews*, 29(0), 27. <https://doi.org/10.14748/bmr.v29.5847>
- Colom, J., Segura-Garcia, L., Bastons-Compta, A., Astals, M., Andreu-Fernández, V., Barcons, N., Vidal, R., Ibar, A. I., Fumado, V., Gómez, N., Russiñol, A., & Garcia-Algar, O. (2021). Prevalence of Fetal Alcohol Spectrum Disorders (FASD) Among Children Adopted From Eastern European Countries: Russia and Ukraine. *International journal of*

- environmental research and public health, 18(4), 1388. <https://doi.org/10.3390/ijerph18041388>
- Darbinian, N., & Selzer, M. E. (2022). Oligodendrocyte Pathology in Fetal Alcohol Spectrum Disorders. *Neural Regeneration Research*, 17(3), 497. <https://doi.org/10.4103/1673-5374.314294>
- Floyd, R. L., O'Connor, M. J., Sokol, R. J., Bertrand, J., & Cordero, J. F. (2005). Recognition and Prevention of Fetal Alcohol Syndrome. *Obstetrics and Gynecology*, 106(5, Part 1), 1059-1064. <https://doi.org/10.1097/01.aog.0000181822.91205.6f>
- Hanson, J. D., Winberg, A., & Elliott, A. J. (2011). Development of a Media Campaign on Fetal Alcohol Spectrum Disorders for Northern Plains American Indian Communities. *Health Promotion Practice*, 13(6), 842-847. <https://doi.org/10.1177/1524839911404232>
- Leruste, S. (2024). Obstacles and Facilitators to Preventing Fetal Alcohol Spectrum Disorder: A Qualitative Study With General Practitioners. *Frontiers in Medicine*, 11. <https://doi.org/10.3389/fmed.2024.1280349>
- Mandal, C. h., Park, K. S., Jung, K. H., & Chai, Y. G. (2015). Ethanol-Related Alterations in Gene Expression Patterns in the Developing Murine Hippocampus. *Acta Biochimica Et Biophysica Sinica*, 47(8), 581-587. <https://doi.org/10.1093/abbs/gmv050>
- Manriquez, M., Starer, J., Parisi, V., Tracy, E. E., McFadden, T., & Penney, L. (2019). Fetal Alcohol Spectrum Disorder Prevention Program: SBIRT's Role in Averting Fetal Alcohol Spectrum Disorders. *Birth Defects Research*, 111(12), 829-834. <https://doi.org/10.1002/bdr2.1516>
- Montag, A. C., Jones, K. L., Campo, M. d., Akshoomoff, N., Coles, C. D., Kable, J. A., Hernandez, J. G., & Chambers, C. D. (2022). Fetal Alcohol Spectrum Disorders and Access to Regional Center Services in San Diego County. *Alcoholism Clinical and Experimental Research*, 46(10), 1857-1864. <https://doi.org/10.1111/acer.14934>
- Mukherjee, R., Cook, P. A., Fleming, K. M., & Norgate, S. (2016). What Can Be Done to Lessen Morbidity Associated With Fetal Alcohol Spectrum Disorders? *Archives of Disease in Childhood*, 102(5), 463-467. <https://doi.org/10.1136/archdischild-2016-310822>
- Patel, T., Narula, S., Naderzad, E., Early, D., & Nandhagopal, T. (2022). Fetal Alcohol Spectrum Disorder in a Newborn. *Cureus*. <https://doi.org/10.7759/cureus.28836>
- Phillips, N. L., Zimmet, M., Phu, A., Rattan, M., Zurynski, Y., & Elliott, E. J. (2022). Impact of Fetal Alcohol Spectrum Disorder on Families. *Archives of Disease in Childhood*, 107(8), 755-757. <https://doi.org/10.1136/archdischild-2021-322703>
- Reid, N. (2023). Renewed Call to Improve Approaches for Developing Fetal Alcohol Spectrum Disorder Diagnostic Criteria: Commentary on "Comparison of Three Systems for the Diagnosis of Fetal Alcohol Spectrum Disorders in a Community Sample". *Alcohol: Clinical and Experimental Research*, 47(5), 840-842. <https://doi.org/10.1111/acer.15050>
- Riley, E. P., Infante, M. A., & Warren, K. S. (2011). Fetal Alcohol Spectrum Disorders: An Overview. *Neuropsychology Review*, 21(2), 73-80. <https://doi.org/10.1007/s11065-011-9166-x>
- Rutman, D., & Bibber, M. V. (2010). Parenting With Fetal Alcohol Spectrum Disorder. *International journal of mental health and addiction*, 8(2), 351-361. <https://doi.org/10.1007/s11469-009-9264-7>