

Feeding Intervention using Social Stories for children with ASD

Malayalam (FISSA-M)

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JULY, 2024

CERTIFICATE

This is to certify that this dissertation entitled “**Feeding Intervention using Social Stories for Children with ASD in Malayalam (FISSA-M)**” is a bonafide work submitted in part fulfillment for the degree of Masters in Science (Speech-Language Pathology) of the student Registration Number P01II22S123029. This has been carried out under the guidance of the faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

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This is to certify that the dissertation entitled “**Feeding Intervention using Social Stories for Children with ASD in Malayalam(FISSA-M)**” is the result of my own study under the guidance of Ms. Sindhusa Chandran, Assistant Professor of Speech Sciences, Department of Speech-Language Sciences, All India Institute of Speech & Hearing, Mysuru, has not been submitted earlier to any other University for another Diploma or Degree award.

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DEDICATED TO

ACHAN AND AMMA

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CHAPTER I

INTRODUCTION

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by deficits in social communication, restricted social interaction, and repetitive behavior (APA, 2013). The prevalence of ASD worldwide is noted to increase over a decade. According to a recent systematic review (Zeidan et al., 2022) on the global prevalence of ASD, the median prevalence was 65/10000 compared to 62/10000 in a previous systematic review study (Elsabbagh et al., 2012). Maenner et al. (2020) estimated a prevalence rate of 1 in 54 children with ASD in the US within the age of 8 years, and among those, 4.3 males for every female diagnosed with ASD. According to an Indian study conducted by Arora (2018), 125 children aged 2 to 6 and 80 children aged 6 to 9 were diagnosed with ASD in five states in northern and western India. According to the report, one out of every 89 children in India has ASD.

According to DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition), Autism spectrum disorder (ASD) is defined by a persistent deficit in social communication and social interaction across multiple contexts, such as social reciprocity, nonverbal communicative behaviors used for social interaction, and relationship development and maintenance, comprehension skills. In addition to social communication impairments, ASD is diagnosed when there are confined, repetitive patterns of behavior, interest, or activities. These can appear as stereotyped or repeated bodily motions, the use of objects, or speech. Restricted or uncommon fixated interest with abnormal intensity or focus is also common, as is hyper- or hypo-reactivity to sensory input or unusual interest in sensory parts of the surroundings. Moreover, Children with

ASD face much more significant feeding difficulties than neurotypically developing peers.

Feeding issues in children with ASD

Feeding patterns and nutritional intake in early childhood significantly impact growth, cognitive development, and overall health. Proper nutrition supports normal brain development, immunological function, and physical growth. Conversely, inadequate or incorrect diet can lead to growth stalling, developmental delays, and increased susceptibility to infections (Dewey, K.G,2000).

According to Chatoor (2009), feeding problems in children with ASD encompass a variety of issues, such as food rejection, selective eating, and disruptive mealtime behaviors, which can result in poor nutrition, growth problems, and psychosocial stress for both the child and the family. Feeding challenges are common in children with ASD, affecting their nutritional intake, growth, and overall well-being. Research has shown that approximately 62% (range: 30–84%) of children with ASD present with feeding difficulties, including an increased likelihood of unhealthy eating habits, greater food selectivity, and associated mealtime-related behavioral issues. Children with ASD are frequently found to have feeding-related sensory difficulties, such as hypersensitivity or hyposensitivity to food (Miller et al., 2007).

The most frequently occurring feeding issues in children with ASD are picky eating and food avoidance (Mascola et. al, 2010). These children have sensory issues, such as increased responses to tastes, textures, odors, and visual appearances of food (Filipek, 2000). These sensory difficulties can cause food aversion and preferences, contributing to picky eating behaviors. In addition, children with ASD may have inflexible routines and preferences, making it difficult to accept new food or endure

changes in mealtime routines. These concerns can lead to dietary deficiencies, such as a lack of critical vitamins and minerals required for growth and development, which can influence physical health and cognitive performance (Hyman et. al, 2014). Studies have also found that children with ASD have other feeding and eating issues like compulsive eating, a fear of trying new meals, and a preference for a particular food presentation (Baraskewich, 2021).

Moreover, Children with ASD have sensory integration disorder, which impacts a wide range of eating areas, such as visual characteristics, food sensation in the mouth, movement, and taste (Schwartz, 2003). Marshall et.al (2014) reviewed 44 research articles on feeding challenges in children with ASD. They reported that constricted dietary diversity, food neophobia, food denial, a restricted diet based on textures, and a tendency toward being overweight were the most common feeding difficulties in these children.

In addition to sensory issues, children with ASD are also prone to behavioral issues such as crying and leaving the table during meals. William et al. (2013) inferred that the frequently occurring behavioral issues are food refusal, crying, and leaving the table, which are often linked to sensory sensitivities, rigid routines, and communication difficulties associated with ASD.

Understanding these sensory difficulties is critical for designing successful feeding strategies to help children with ASD and interventions to help children with ASD increase their food acceptance and nutritional intake.

Assessment of Feeding issues in Children with ASD

Being cognizant of the child's signs and symptoms, the underlying cause of the symptom, an assessment of the child's functional abilities, the impact of the disorder on the child and their caregiver/ family, and planning and executing the best management strategy to ensure safe feeding are all integral part of the rehabilitation process. Because feeding disorders are interdisciplinary, they necessitate the collaboration of a team of professionals. The rehabilitation success is determined by the appropriate assessment and management services provided to a child's feeding and quality of life. It is critical to identify the type of feeding disorders and their impact on children and understand the changes in quality of life before and after rehabilitation. Appropriate intervention improves the child's social interaction, learning, and mental health.

Feeding-related issues in children with ASD often go unnoticed or unassessed during evaluations, ultimately contributing to health-related issues and parental stress. Thus, the assessment and management of these feeding issues are crucial for the well-being of the child and the family. Assessment procedures to evaluate feeding issues in ASD include clinical interviews and observations to understand mealtime behaviors, the use of standardized tools like the Brief Autism Mealtime Behavior Inventory (BAMBI) and Behavioral Pediatric Feeding Assessment Scale (BPFAS) for assessing specific challenges, nutritional evaluations to determine dietary intake and growth patterns, sensory assessments to identify sensory triggers, behavioral analyses. These approaches seek to completely examine and address feeding concerns in children with ASD, promoting appropriate eating habits and nutritional well-being.

Following assessment, intervention for feeding issues in children with ASD involves personalized strategies tailored to the child's specific needs. These strategies

are tailored to the child's specific needs, such as sensory integration therapy to desensitize sensitivities, behavioral interventions using Applied Behavior Analysis (ABA) to address mealtime behavior, parent education, environmental modification, nutritional counseling to create balanced meal plans, speech therapy for feeding and speech-language-communication difficulties. Various techniques are used in feeding intervention, such as stimulus fading, extinction, video modeling, and parent education programs.

Although various approaches cater to children with ASD with feeding issues, preparing the child for feeding therapy is very essential. However, children with ASD experience difficulty in tolerating new situations, especially in situations where expectations are unpredictable or ambiguous. Such situations can precipitate fight, flight, or fright response. Thus, preparing the child for what should be expected during the social scenario, including feeding, is important. The preparation or training in a non-threatening environment helps reduce anxiety and increase the child's cooperation before entering the therapeutic setting. One preparation technique designed for children with ASD is social stories (Gray & Garand, 1993).

Social stories are simple, tailored short stories that help children with ASD learn social settings by describing proper conduct, expectations, and answers. These short stories were developed by Carol Gray (1991) to highlight certain steps using relevant social skills in the form of short text and pictures. According to Wright and McCathren (2012), the SS helps children accurately grasp social information in their environment. SS is one of the effective approaches and has gained recognition for solving feeding-related challenges in children with sensory processing disorder and ASD. When intervention for feeding issues is planned and coordinated, it will improve the child's nutritional intake, feeding habits, and overall quality of life.

Need for the study

According to the National Autistic Society (2015), social stories are brief descriptions of situations, events, or activities that provide detailed information about what to expect and why. Literature has evidenced the use of SS in improving many types of behavior, including appropriate social engagement (Ozdemir, 2008; Samuel & Stansfield, 2012), prosocial behavior (Daniella, 2004), on-task behavior (Vandermeer et al., 2015), adaptive behavior (Kuoch & Mirenda, 2003), and overall social skills (Ahmed, 2014) among children and adolescents with ASD. ASD feeding interventions are less prioritized compared to communication goals. Their feeding skills are required to be identified early and remediated early. Most techniques utilized now rely on behavioral approaches to reduce feeding difficulties. There is less research evidence available on the sensory aspects of feeding difficulties. One strategy that appears beneficial to sensory aspects of feeding problems is SS. Studies have provided insight into the positive effects of SS in addressing a significant change in children with ASD.

Social stories can help individuals with ASD develop social and self-help skills, understand how to behave in different situations, cope with changes in routine and stress, and provide positive feedback (The National Autistic Society, 2013). Although SS was a broad initiative designed to navigate general social interactions, the principles and techniques were later applied to feeding skills as literature has reported the effectiveness of SS in improving mealtime skills (Rebecca et al., 2003) and self-management of eating behavior (Adel & Abdulla, 2012) in children with ASD.

According to a 2021 study published in the Indian Journal of Pediatrics, ASD is predicted to affect approximately one out of every 68 children in India.

The prevalence of feeding problems in India was 61% (Crasta. et.al 2014). However, there are no studies currently available on the use of SS in Indian scenarios to intervene in feeding-related skills. Due to multi-diverse eating habits, culture, languages, traditions, and practices, SS developed in other countries cannot be directly applied in the Indian setup. With the fivefold increase in feeding issues in children with ASD compared to typical children (Smile et al., 2021), intervention in communication skills along with feeding needs to be prioritized to avoid a predisposition to nutritional inadequacy. Hence, there is a need to develop and study the effectiveness of SS on children with ASD in the Indian context.

AIM and OBJECTIVES

The aim of the study is development and validation of Feeding Intervention using Social Stories for children with ASD in Malayalam (FISSA-M)

The objectives of the study are as follows

1. To develop Feeding Intervention using Social Stories for children with ASD in Malayalam (FISSA-M).
2. To validate FISSA-M in children with feeding issues associated with ASD.

CHAPTER II

REVIEW OF LITERATURE

Feeding issues that are common among children with autism spectrum disorder (ASD) are characterized by food selectivity, refusal, and disruptive mealtime behaviors. Various treatments for feeding are offered for children with ASD, including medical, counseling, psychotherapy, and diet management. Eating or feeding issues are frequently evident in early childhood, even before the identification of autism-related disorders (Emond. et al.,2010). Raising a child with ASD presents a variety of complications for many caregivers, most notably being the feeding issues. Effective ASD management requires a comprehensive approach that includes early intervention, individualized education plans, sensory integration, speech and language therapy, behavioral therapies, social skills training, medical management, family support, transition planning, and collaborative coordination among caregivers and professionals.

Management of feeding issues in children with ASD

Effective management of feeding problems in children with ASD is critical and has been explored through various interventions, including behavioral therapies, sensory integration techniques, and parent-mediated approaches. SLPs implement appropriate feeding intervention strategies to generalize specific feeding skills in various contexts. Various parent-implemented intervention strategies were escaped extinction, fading, stimulus control, and differential reinforcement (Richardet al.,2023). Feeding intervention includes both behavioral and sensory intervention.

Sensory interventions for children with ASD who have feeding issues focus on engaging them in sensory play with different textures, gradually exposing them to new foods, starting with preferred textures and then introducing new ones. Creating a calm

and distraction-free eating environment, incorporating oral motor exercises and a personalized sensory diet, is essential. Mouth desensitization techniques and experimenting with different textures can also help children become more comfortable with various foods.

Behavioral interventions for children with ASD who have feeding issues include techniques such as food chaining to introduce new foods gradually, desensitization to reduce anxiety around new foods, establishing a consistent mealtime routine, using visual supports like schedules, modeling appropriate eating behaviors, and positive reinforcement for trying new foods.

ESCAPE EXTINCTION

Escape extinction is a term used to describe procedures that prevent the child from escaping the feeding situations. Ahern et al. (1996) and Hoch. et al. (1994), recommended holding the spoon at the child's lips or gently applying pressure to the jaw to open the mouth. Extinction is frequently used with differential reinforcement to promote the use of acceptable actions and discourage the use of improper ones.

DIFFERENTIAL REINFORCEMENT OF ALTERNATIVE BEHAVIOR

(DRA)

DRA involves providing the child access to preferred stimuli in exchange for desirable behaviors, such as accepting or swallowing food bites. Preferred food or drinks were consistently used as positive reinforcers in the DRA studies, either alone or in combination with social praise (Brown et al., 2002; Cooper et al., 1999; Ridordan et. al, 1984) Patel. et al. (2013) evaluate the efficiency of two differential reinforcements with extinction to treat food refusal. The targeted

behavior improved for all three subjects when escape extinction was added to the differential reinforcement procedure. Two children maintained their status when escape extinction was eliminated from the therapy package.

STIMULUS FADING

Stimulus fading refers to systematic changes in the stimuli, which in the case of food refusal is the food. According to one study (Kerwin et al., 1995), offering less food on a spoon increases the likelihood of a child accepting a bite. Another study done by Mueller. et.al (2004) blended favorite and unfamiliar foods for stimulus fading. In this trial, foods were combined at the percentage of 10% novel/ 90% favored and 20% novel/ 80% preferred. The results demonstrated that eating the blended foods enhanced the possibility that novel foods would eventually be consumed without being mixed.

SYSTEMATIC DESENSITIZATION

Systematic desensitization, a kind of behavioral therapy used for some phobia and other anxiety disorders, is comparable to food therapy. Treatment entails exposing the child gradually and methodically to the stimulus that caused fear(food), teaching and practicing coping mechanisms, monitoring the child's tolerance development, and maintaining engagement. Lastly, acceptance without negative reactions is required so that the targeted food eventually becomes a staple of the child's diet. Graduated exposure might start with one of two hierarchy types: introducing foods by Fraker. et al. (2007), bring the meal closer, for example, tolerating its existence on the table, smelling it, touching it, chewing it, and then swallowing it.

VIDEO MODELLING

In video modelling, an adult or peer model demonstrates the desired behavior. The participant sees the video and tries to mimic the behavior immediately or soon after (Haring, et al 1987). In a home-based program, Allen (2009) examined the impact of video modeling on improving food acceptance with a four-year-old child with PDD and mild food selectivity. No other research has been published that has explicitly looked at how video modelling affects feeding issues with children who have ASD.

MEAL

The MEAL Plan handbook has therapist scripts for the dietary and behavioral aspects. Introduction to feeding issues in ASD, behavior monitoring during mealtimes, nutrition planning, meal structuring, and strategies to encourage acceptable conduct during mealtimes were all covered in the first sessions. The feeding intervention implementation, modification of mealtime relationships, incorporation of new food, and tactics for introducing new foods are covered in sessions four through seven. The last few sessions are on program review, when to introduce new foods, how to generalize treatment gains, and an overview of the most important components. A parent workbook containing worksheets and summaries of the subject covered in sessions is also included in the treatment materials to help parents grasp the material and help with homework implementation. In order to motivate parents to apply skills taught during sessions, such as gathering information on children's mealtime behaviors, role-playing is included. A graduate pursuing a master's degree in psychology supported the psychologist who led each session. Session 2 and 7 were co-led by a dietician. Each session began with a review of the homework assignment for ten to

fifteen minutes in order to gauge completion and provide participants a chance to ask any questions.

One of the most often studied intervention options for children with ASD is the use of visual strategies and supports, which have been encouraged. Extensive intervention programs, such as Picture Exchange Communication Systems (PECS), Treatment and Education of Autistic and Related Communication Handicapped Children (TEACHH), and the integration of visual strategies in computer-based instruction programs and other augmentative and alternative forms of communication, such as speech generating devices.

Some studies reported caregiver training in feeding intervention. Cerchiari (2023) conducted a pilot study based on the efficacy of Global Intensive Feeding Therapy (GIFT) on children with ASD. Based on the ideas of neuroplasticity, the GIFT program is customized, meaning that each child's requirements and challenges are considered. Following a clinical evaluation, the parents and a speech-language pathologist provide the child with 30 therapy sessions three times a day for two weeks (breakfast, lunch, and morning snacks). Parents support their feeding and swallowing skills generalization by learning specific procedures at home. The goal of the intense therapy phase is to lessen dysfunctional behavior while improving the patient's ability to swallow and feed himself. The goals of GIFT are to promote desensitization, increase the range of foods to choose from (both in terms of quantity and variety), decrease inappropriate mealtime behaviors, and promote the growth of suitable chewing and swallowing skills. A sample of 11 youngsters aged 3 to 8 years participated in the 6-month study. When chewing abilities were evaluated using the Karaduman Chewing Performance Scale (KCPS), it was shown that 82% of the sample had trouble moving

the tongue laterally, effectively reducing food into small pieces, forming boluses, and moving the food to the oropharynx. Following GIFT, there was a very noticeable increase in the ability to chew. A substantial difference was discovered while comparing the reduction in dysfunctional mealtime behavior before and after the rehabilitation program using BAMBI. The number of eating sessions increases, and learning is more broadly applied when the caregiver incorporates rehabilitative procedures into the daily routine practice of eating. The involvement of caregivers in rehabilitation treatment is a critical component of good outcomes.

Various studies have explored the effectiveness of different training methods to address feeding problems in children with ASD. Studies (Johnson et al., 2015, 2019; Sharp et al., 2014; Saurez & Bush, 2020) worked on a training manual that blended didactic instruction with a variety of training methods such as role-play, homework, video vignettes, modeling, coaching, and feedback. They concluded that caregiver-led intervention showed improvement in acceptance of food and eating behavior in children with ASD. They reported improved quality of life and reduced caregiver stress to some extent. The two most commonly used training methods were verbal instruction and oral/written feedback.

Sharp et al. (2019) analyzed the efficacy and feasibility of Managing Aversion and Limited Variety (MEAL) PLAN and PEP (Parent Education Program). MEAL is a structured intervention that combines behavioral interventions and nutritional education. The study analyzed moderate food selectivity in 38 children with ASD. MEAL Plan of a 16-week randomized controlled trial, over 12 weeks, some 90-minute group sessions were delivered, booster sessions were organized after 12 weeks, and post-treatment outcomes were measured after 20 weeks. PEP was modified for 10 sessions delivered

to parents. MEAL Plan parent satisfaction rating was used for post-intervention. The results revealed that the plan shows high reliability and satisfaction among parents who are dealing with children with ASD.

Approaches for feeding are most commonly focused on direct parent interventions or telehealth interventions. The traditional intervention mainly focused on behavioral approaches, which were systemic desensitization and operant conditioning. Marshall et.al (2014) systematically reviewed treatment efficacy in children with ASD to reduce feeding difficulties. They focused on the studies that used an operant conditioning style treatment approach, in which the child was prompted to act, and the result showed an improvement in desirable behavior and a decrease in undesirable behavior.

One of the recent approaches for the acceptance /familiarization of food is by using sensory education sessions (Mustonen & Tuorilla, 2010), the successful rate of this intervention is most commonly seen in older children who comprehend the terminologies. Additionally, intervention such as 'Color Me Healthy' is also a common strategy in children with ASD, which increases food consumption using physical games (Witt & Dunn, 2012).

Literature has revealed various approaches that an SLP uses to support children with ASD with feeding issues. However, these approaches are used in conjunction with food in the clinical or home setting. Preparing the child regarding the feeding scenario is crucial in feeding intervention. Preparing the child before the introduction of real food in a non-threatening environment will help reduce his or her anxiety and increase the child's cooperation before entering the therapeutic setting. One such preparation

technique designed especially for children with ASD is use of social stories (Gray & Garand, 1993).

Social stories (SS) are conceptualized by Carol Gray in the early 1990s that are employed as an intervention to improve various social and behavioral outcomes in children with ASD. SS are personalized narratives with simple visual illustrations and text to explain what to expect in a social situation. SS is used in children with ASD to understand skills in social situations. These brief, personalized stories offer assistance in new and sometimes perplexing social situations (Gray, 1993). The rationale behind SS is to provide children with ASD with practice so that he/she is ready for real-life situations including feeding.

Research shows that SS has a positive effect on the behavioral outcomes of children with ASD. SS can be mediated by parents or the child himself/herself. Carol Gray (2000) explained the use of SS in a variety of ways, including explaining routines or changes in routines, (b) describing social situations in a way that is non-intimidating, (c) teaching academic skills, (d) teaching social skills (e) training adaptive skills, and (f) dealing with challenging behaviors, including emotional expression, aggression, or obsessive behavior (Gray, 2000). SS also improve the targeted goal by providing appropriate visual cues because of their low cost and accessibility, as well as their ability to address parent's support needs, such as managing challenging behavior; these interventions are widely used (Derguy et al., 2015; Wahman et al., 2019). Numerous SS for children with ASD is developed to improve social and communication behaviors.

Scattone et al. (2002) introduced SS in school-going children where the problem behaviors were noted. This study included three children with ASD in US. Participants were between 7 and 15 years old, capable of communicating speech, and members of

self-contained special education classrooms. Kenny, a 7-year-old child, whose goal behavior was tipping his chair backward or sideways, occasionally resulting in him falling to the floor. Participant 2 was John, a 15-year-old boy who engaged in frequently disrupted behavior, such as looking inappropriately at females during recess. Howard, a 7-year-old, shouts frequently. During the intervention, the teacher presented the SS to each participant individually. During the first introduction of the intervention, the teacher read the SS and assessed understanding by asking a preset series of questions. A daily checklist was employed to ensure treatment integrity. Overall, the individual reduced the disruptive behavior by the use of SS.

Adams et al. (2004) studied the effectiveness of SS on a 7-year-old male to decrease falling, screaming, crying, and hitting behaviors. The experiment was divided into four sections, each containing 12 homework sessions. The baseline phase of the study involved identifying the most common and distracting irritation behaviors during homework time; in the second phase, the SS intervention was utilized to address the behavior identified in Phase 1. The third phase has shown the withdrawal of the SS intervention. In the fourth phase, SS was reused. The child with ASD was motivated to engage in behavior that alleviates the target behavior. This study suggests that SS interventions can effectively reduce incorrect social behaviors. While the targeted behaviors were not completely eliminated, their frequency of recurrence decreased significantly. This study found that addressing several behaviors within an SS can be effective. Using one tale instead of four to address several behaviors appears more efficient and effective.

Chan and O'Reilly (2008) used an SS rehabilitation package with two children with ASD, which included reading stories, completing comprehension questions, and

story-based staging activities. Each session started with the youngster reading a story. The researcher offered three comprehension questions, such as ‘How should I respond to my teacher’s questions?’ If a participant did not respond to a question, they were directed to read the text that contained the answer. During staging, the researcher verbally described the scenario and expected behavior. Verbal cues were employed when participants did not provide expected answers. The study found that both participants experienced an increase in suitable social behavior (e.g., raising hands before asking a question and appropriate social initiation) and a decrease in incorrect social behavior (e.g., inappropriate social initiation and vocalization), with the benefits lasting 10 months. The authors suggest that this intervention can be effective in inclusive classrooms and does not require extensive supervision of children’s conduct.

Kuoch and Mirenda (2003) built SS based on each participant’s demands, using them as the lead character to create an appropriate and alternative behavior model to the problematic one. The study included three children with autism, Andrew, Henry, and Neil, ages 3, 5, and 6. Inappropriate behavior included aggression, screaming, and crying. During the intervention, the mediator read a SS tailored to the individual immediately before the behavior occurred. The intervention dramatically reduced problem behaviors, which remained stable for up to two weeks following withdrawal.

However, seldom studies are reported on social stories related to feeding issues in children with ASD. A study by Bledsoe et al. (2003) used SS to improve the mealtime skills of an adolescent with Asperger syndrome. The participant was a 13-year-old male. The study was based on the observation during lunch time and found a number of eating-related issues, such as talking loudly while eating, spilling food and drink on the table and his clothes, failing to wipe food from his face, and not clearing his plate after

he finished eating. The participant's parent also mentioned that they avoided dining in public because they were concerned about their son's eating habits. The participant would become agitated and bounce up and down, expressing his dissatisfaction aggressively after spilling food or drink on his clothes. The SS focused on two eating-related behaviors. The study was conducted in 4 phases; for the duration of the first baseline, stability was achieved for both behaviors. The SS was read to the participant every day for five days straight before lunch by the senior author during the first intervention period. Phase 3 consisted of a five-day return to baseline. The SS was reintroduced for four days during phase 4. The results showed improvement in positive behavior (mouth wiping) and undesirable behavior (spilling food). The study also mentioned that improvement in mouth wiping and spilling food occurred rapidly. The study highlighted that SS reduced feeding problems and increased social interaction and language skills.

The study conducted by Mostafa et al. (2012) assesses how an SS taught a youngster with ASD to control her eating habits and avoid choking. The participant in the study displayed a few unpleasant, syndrome-related traits during casual observation during mealtime (Ledford & Gast, 2006), such as sensory-based eating issues and food refusal. The fundamental problem assessed was overeating when she was not being monitored unless reminded to take tiny mouthfuls. She choked on too much food in her mouth since she could not chew it. She always had an adult (instructor) there to help her manage how much food she was eating. This adult would either take away the food from the plate or block it with her hand to prevent her from grabbing more. An SS was created in compliance with Gray's standards. Every day before lunch, the youngster was read the social story by the investigator. The intervention was conducted over a 14 days period to find out if the intended behavior will spread. The Teacher's rating scale

was used to assess the pre-post-follow-up impact of the social storytelling intervention strategy on the target child's habits. The social story successfully altered eating habits, according to the findings.

The importance of SS and ASD cultural and linguistic validation in Indian contexts necessitates their development and validation in Indian languages. Thus, the current study focuses on developing SS in Malayalam for clinical use in children with feeding issues associated with ASD.

CHAPTER III

METHOD

Ethical consideration: This study was conducted at the AIISH in Mysuru, following approval of “Ethical guideline for Bio-Behavioral Research including Human Subjects” (Basavaraj & Venkatesh, 2009). Caregivers of the participants received detailed explanations about the study procedures, and utmost care was taken to guarantee the participants' details were safe and confidential.

The current study aimed to develop a “Feeding Intervention using SS for children with ASD in Malayalam (FISSA-M)” and validate the same on children with ASD. The objectives were investigated in three phases of the study.

Phase 1: Identification of the five most frequent feeding issues in native Malayalam children with ASD

Phase 2: Development of Feeding Intervention using social story for children with ASD in Malayalam(FISSA-M)

Phase 2: Validation of FISSA-M in children with ASD

Participants:

Five children with feeding issues secondary to ASD in the age group 3-8 years were enrolled based on the inclusion and exclusion criteria of the study. They were enrolled in the CSD unit, and Department of Special Education and did not undergo any feeding therapy prior to the study.

Participant selection criteria

Inclusion criteria

- The minimum educational qualification of the parents was tenth grade.
- Malayalam was the native language of the primary caregiver.
- The parent/ caregiver of the child with ASD who spends more time, especially during meal time was enrolled.
- All the children were diagnosed as having ASD by an SLP and a Clinical psychologist at the facility.

Exclusion criteria

- Parents of children with any other associated problems such as cerebral palsy, intellectual disorder (IQ beyond borderline score), or seizure disorder were not included in this study

Procedure

The study as mentioned, was carried out in 3 phases: the first phase was administered using BAMBI-M in children with ASD to investigate the most common feeding issues, the second phase developed SS using the guidelines for developing SS defined by Gray and Garand (1993), further updated by Gray (2010), and the phase 3 assessed the validity of the tool on children with ASD.

PHASE 1: Identification of the five most frequent feeding issues in children with ASD

The Brief Autism Mealtime Behavior Inventory in Malayalam (BAMBI-M, Kripa & Sindhusa, in press) was administered to 10 native Malayalam-speaking

parents of children with ASD. BAMBI-M is a parental-rated questionnaire to determine the feeding problems in children with ASD. 20 statements were provided to the parents, and they rated their response on a 5-point Likert scale. The participants were enrolled from the Department of Special Education and CSD, AIISH, after obtaining their informed consent.

PHASE 2: Development of Feeding Intervention using Social Stories for children with ASD in Malayalam (FISSA-M)

Five SS was developed to address the aforementioned five most frequent feeding issues in children with ASD according to Gray's (2010) guidelines. The guidelines were adapted according to the culture and the needs of the children with ASD.

The developed SS consisted of a cover page with the title (FISSA-M), followed by individual titles of each story, an introduction to targeted feeding problems, and general instruction for parents/ caregivers of children with ASD. The stories were developed according to Gray's (2010) guidelines from a third-person perspective. The stories were developed and further modified based on the guide's instructions. Then, scenes were generated based on the stories. Illustrations were planned according to the stories. The stories were well illustrated and drawn by a professional artist (Graphic artist, Kerala Kaumudi Communications Pvt Ltd) and culturally relevant to the native Malayalam population. The artist was instructed to sketch based on the information about different scenes from the story, and face-to-face discussions were also conducted. The illustrations were modified multiple times until the appropriate representation was conveyed. The titles were devised after the stories were finally

completed. The stories were created using Microsoft PowerPoint presentations. Each slide contained three or four sentences, but no more than four. The text used for the story illustrations was receptive to two-three-year-old children. FISSA-M was finally made in flipbook format.

Content validity: The developed FISSA-M was validated for content by five native Malayalam-speaking SLPs with a minimum of 3 years of experience in the field of swallowing disorders. A feedback rating questionnaire adapted from MANAT-K (Goswami et al., 2011) was used. Five questions from Gray's (2010) guidelines for creating SS were also added to the questionnaire. The SLP was asked to rate the answers on a five-point rating scale as 'Very Poor,' 'Poor,' 'Fair,' 'Good,' and 'Excellent.' The story was rated on the language used, domain targeted, clarity, picture stimuli, and its ethical acceptability and visibility of the text. Feedback was obtained and >80% agreement across the judges was considered.

Field testing: Field testing was conducted by providing the developed tool FISSA-M to five parents of children with feeding issues secondary to ASD, and they were asked to confirm the suitability and appropriateness of the material such as the language used, domain targeted, clarity, picture stimuli, and visibility of the text.

PHASE 3: Validation of the newly developed tool FISSA-M

The developed SS were validated for clinical use in children with feeding issues secondary to ASD.

Procedure

a. Pre-intervention assessment:

All the participants were assessed using an Assessment checklist for speech-language skills (ACSLs) to identify the receptive language age; a clinical psychologist calculated mental age. Details of the participants enrolled for the FISSA-M intervention are provided in table 3.1.

Table 3.1

Demographic information on all 5 participants

SL. NO	Name	Age	Mental age	Receptive language age
1)	ABC	4 years	3 year 9 months	3.7-4.0 years
2)	XYZ	6 years	5 years 1 month	4.1-4.6 years
3)	ACD	4 years 2 months	3 years 8 months	3.0-3.6 years
4)	BCD	6years 11 months	6 years 3 months	5.1-5.6 years
5)	ADC	4 years 10 months	4 years 5 months	4.1-4.6 years

All the participants were assessed using the BAMBI-M questionnaire before the intervention. The parents of the children self-administered the 20-item tool, and the administration time was approximately 15-20 minutes prior to the intervention. All five parents filled out the consent form for the FISSA-M intervention.

The BAMBI-M questionnaire is provided in Appendix I. Before the intervention, the SS was introduced to one child with ASD to confirm if the story content and images used were appropriate for the children with ASD. The child gazed at the picture for 15-20 minutes and demonstrated interest in the story.

b. Intervention (FISSA-M):

All five children enrolled for feeding therapy were provided 10 sessions of 40 minutes each using FISSA-M. One SS addressing the predominant feeding issue according to BAMBI-M was selected for each participant, as shown in Table 3.2.

Table 3.2

The Feeding problem addressed for the enrolled participants

Participant	SS title	Feeding problem addressed in the child
ABC	Avoid specific texture (‘പുതിയതരം രൂചിയിലൂടെ’)	Avoid fibrous textures (such as Mango)
XYZ	Avoid specific texture (‘പുതിയതരം രൂചിയിലൂടെ’)	Avoid ripe ‘Banana’
ACD	Prefer food being cooked in a specific manner (‘ആഹാരം.. ഇതും കൊള്ളാലോ’)	Did not prefer ladies' fingers fried, however accepted it when cooked in curry/ sambhar.
BCD	Avoid specific food (‘എല്ലാം നമുക്ക് കഴിച്ചു നോക്കാം’)	Avoided eating rice.
ADC	Avoid specific food (‘എല്ലാം നമുക്ക് കഴിച്ചു നോക്കാം’)	Avoided curries.

The procedure for intervention using FISSA-M was carried out as follows:

1. The SS was presented through a laptop (HP laptop intel core i3) for all children except for child 4. The child was given a hardcopy printout of the SS since the child doesn't like gadgets (Laptop and phone).
2. The SS was narrated twice with appropriate suprasegmental cues to aid in better comprehension and attention.
3. The child was asked simple questions to ensure he comprehended the SS, like who is in the picture? What food does the Kichu (a character in the SS) like? Which food is shown in the picture?
4. The techniques used for each child with ASD varied according to the child's symptoms/features.
5. The clinician narrated the SS in the first 20 minutes of the session. After this, real food was introduced, and the target feeding behavior was modeled using verbal praise and appropriate reinforcements to train the problem behaviors.
6. BAMBI-M was re-administered during the intervention period (after the 5th intervention session).
7. The intervention was provided for all the participants for 10 sessions except for child 5 (ADC) Since the participant showed inappropriate behavior.

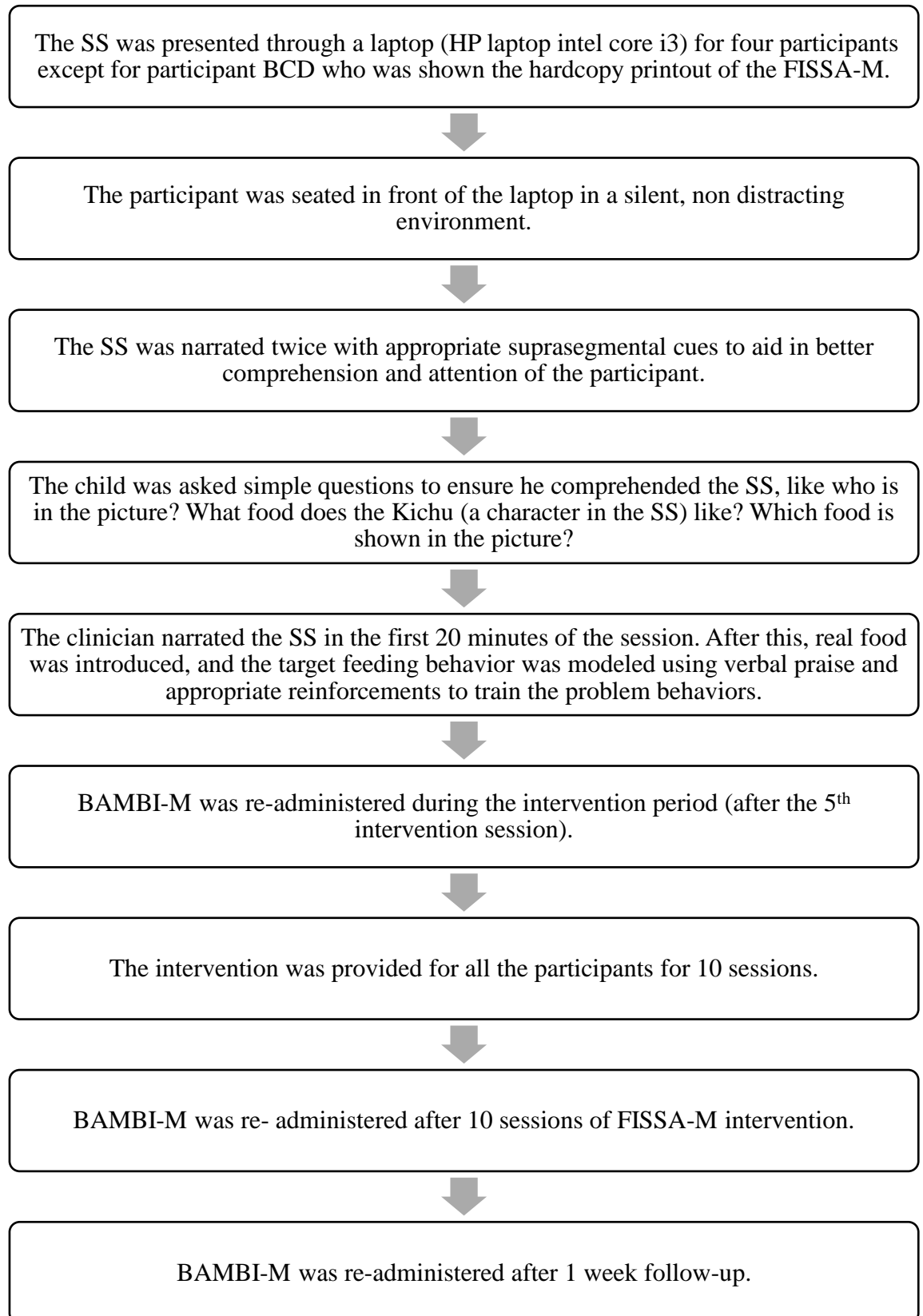
c. Post-therapy and follow-up assessment:

BAMBI-M was again administered after completion of the 10th session of the intervention and after one week of follow-up. Figure 3.1 depicts the step-

by-step procedure used for the FISSA-M intervention

Figure 3.1 *The procedure for intervention using FISSA-M was carried out as*

follows:



CHAPTER IV

RESULTS AND DISCUSSION

The primary aim of the study is the development and validation of Feeding Intervention using SS for children with ASD in Malayalam(FISSA-M). The objectives of the study were to develop Feeding Intervention using Social Stories for children with ASD in Malayalam (FISSA-M) and to validate FISSA-M in children with ASD. These two objectives were investigated in 3 phases. Phase 1 was to identify the most frequent sensory-related feeding issues in children with ASD. Phase 2 includes the development of FISSA-M. Phase 3 consists of the validation of the developed social story.

PHASE 1: Identification of the five most frequent feeding issues in children with ASD

BAMBI-M statements were categorized as sensory, behavioral, and mixed via consultations with an Occupational therapist, Dietician, Speech-Language Pathologist (SLP's), and Clinical Psychologist. Sensory and behavioral aspects were identified in each of the participants. An Excel form was created, and the questionnaire, age, diagnosis, and domain scores were included. The sum of each domain was added, and the highest scores in sensory aspects were used to develop SS. The duration of a child's need for a social story may vary, according to Carol Gray (1995). The ideal duration of the intervention or the participant characteristics to establish a duration of usage has not yet been unclear in the literature. In the present study, 10 sessions for 40 minutes duration were provided to each child for FISSA-M intervention.

PHASE 2: Development of Feeding Intervention using Social Stories for children with ASD in Malayalam (FISSA-M)

The developed SS was content validated by five SLPs with a minimum experience of five years dealing with feeding issues in children with communication disorders. The questionnaire from the Manual for Adult: Nonfluent aphasia therapy in Kannada (MANAT-K), Goswami et.al (2012), and Carol Gray (2014) Guidelines was adapted for field testing (Appendix II) and the table below provides an overview of the response to the content validation:

Table 4.1

Responses of content validation

SL NO	PARAMETERS	VERY POOR	POOR	FAIR	GOOD	EXCELLENT
1.	Do the stories have a title and introduction that identifies the topic, a body that adds detail, and a conclusion?				✓ ✓ ✓	✓ ✓
2.	Do the stories have a patient, supportive “voice” and vocabulary?				✓ ✓	✓ ✓ ✓
3.	Does the story answer relevant questions (What, Where, Why, Who, When, How)				✓	✓ ✓ ✓ ✓
4.	Is the language used in the story simple?				✓ ✓ ✓ ✓	✓
5.	Are the picture stimuli used in the story of appropriate size?				✓	✓ ✓ ✓ ✓

6.	Are the picture stimuli used in the story appropriate regarding color and dimensions?	✓	✓	✓	✓	✓
7.	Are the stories culturally and ethically acceptable?	✓		✓	✓	✓
8.	Are the texts written recognizable and have adequate font size?	✓	✓	✓	✓	✓
9.	Are the picture stimuli within the visual field of an individual?	✓		✓	✓	✓
10.	Overall, are the stories user-friendly?	✓	✓	✓	✓	✓

All five SLPs rated the FISSA-M stories as ‘Excellent’ and ‘Good’, as seen in Table 4.1. Four of five judges rated the SS ‘Excellent’ in terms of cultural and ethical acceptability, picture stimuli, answering relevant questions, and appropriate visual field. Two out of five judges rated ss as ‘Excellent’ in terms of story title, topic, and body, three out of five rated in terms of patient and supportive voice, three out of five rated in terms of color and dimensions, and two out of five rating in terms of its user-friendly feature.

Three out of five rated the SS ‘Good’ in terms of story title, introduction and conclusion, straightforward language, and user-friendliness. To summarize, the SS received a grade of excellent or good from the judges. Therefore, SS can be used in clinical settings to reduce feeding-related sensory issues. Suggestions provided by the SLPs were accepted, and modifications were made.

The newly developed FISSA-M was field-tested on five parents of children with

feeding issues secondary to ASD. The investigator interviewed parents regarding the acceptability of the tool based on the same items used for content validation. Table 4.2 provides a summary of the findings of the validation question.

Table 4.2

Responses of the parents

SL NO	PARAMETERS	VERY POOR	POOR	FAIR	GOOD	EXCELLENT
1.	Do the stories have a title and introduction that identifies the topic, a body that adds detail, and a conclusion?				✓ ✓ ✓	✓ ✓
2.	Do the stories have a patient, supportive “voice” and vocabulary?				✓ ✓	✓ ✓ ✓
3.	Does the story answer relevant questions (What, Where, Why, Who, When, How)				✓	✓ ✓ ✓ ✓
4.	Is the language used in the story simple?				✓	✓ ✓ ✓ ✓
5.	Are the picture stimuli used in the story of appropriate size?				✓	✓ ✓ ✓ ✓
6.	Are the picture stimuli used in the story appropriate regarding color and dimensions?					✓ ✓ ✓ ✓ ✓
7.	Are the stories culturally and ethically acceptable?					✓ ✓ ✓ ✓ ✓
8.	Are the texts written recognizable and have adequate font size?					✓ ✓ ✓ ✓ ✓

9.	Are the picture stimuli within the visual field of an individual?	✓ ✓ ✓ ✓
		✓
10.	Overall, are the stories user-friendly?	✓ ✓ ✓ ✓
		✓

All five parents rated the SS ‘Excellent’ and ‘Good.’ Five parents rated ‘Excellent’ for color, dimension, cultural and ethical acceptability, font size, picture stimuli, and user-friendliness. Excellent was rated by four out of five parents in terms of language used and answering relevant questions, and three out of five termed ‘Excellent’ in terms of the patient's supportive voice and vocabulary. Three out of five are termed ‘Good’ regarding the story title, introduction, and conclusion. To summarize, SS received parent grading as excellent and good. SS can, therefore, be applied in a therapeutic setting to lessen sensory problems associated with feeding.

PHASE 3: Validation of the newly developed tool FISSA-M

FISSA-M was validated for feeding intervention in 5 children with ASD who presented with specific feeding issues. Given the small sample size of 5 participants in this study, visual analysis and non-parametric tests were employed for data analysis. Since parametric tests depend on assumptions about the data distribution, which are unachievable with a sample size, non-parametric tests were selected instead. Considering the limitations of our investigation, this method guarantees more reliable and understandable outcomes. An experienced statistician in speech and hearing at the facility performed the analysis using SPSS statistical software. According to BAMBI-M, a specific FISSA-M story was used to intervene in each child’s sensory feeding

difficulties. Therefore, it is impossible to indicate improvement in any ability through precise statistics.

Each child with ASD sensory difficulties was intervened with a specific SS of FISSA-M (Table 3.2) because they were all unique, and their statistic varies from individual to individual. Qualitative analysis using graphical representation was appropriate for explaining the study's result. Therefore, bar graphs are considered for clear data visualization and comparing data between pre-mid-post-intervention and follow-up after one week. Bar graphs were generated for the target feeding problem of the BAMBI-M for the child's pre-mid-post-follow-up BAMBI-M scores. In the current study, FISSA-M proved beneficial for four out of the five children; however, there was no discernible improvement for one child. Each child's specific details and improvements in the session are described below.

Child 1

ABC is a 4-year-old child diagnosed with ASD with a receptive age of 3.7-4.0 years. The mother and grandmother were the primary caregivers for the participant. BAMBI-M was administered in the pre-intervention stage, and it was found that avoiding specific textures, especially fibrous textures (statement-20 BAMBI-M), scored the highest. He avoided fruits such as mango and papaya. The child established eye contact for 5 minutes and could sit for 40 minutes.

The intervention was carried out from 28/5/24 to 6/6/24. The story (3), titled in Malayalam: 'പുതിയതരം രുചിയില്ലുടെ' which addressed avoiding the specific texture of FISSA-M was used for feeding intervention. The targeted story was presented in the initial twenty minutes. Real fruits were introduced after the SS. Mangoes were the intended target. Continuous

reinforcement was provided using his favorite animal models. Techniques such as modeling, desensitization, and differential reinforcement of alternative behavior were used.

In the initial two sessions, the child did not look at the social stories and the mango. During the third session, the child responded to the social story on his initiative and named the characters without prompting. The child touched the mango; however, he immediately wiped it off in his shirt. The same response was noted in 4th session as well. After being held and having the mango wiped off the shirt during the 5th session, the child began to carry the mango without assistance from the caregiver. In the 6th session, the child sat in the chair, gazed, and listened to the story until it was finished; the child held the mango after the story for 1 second. The child's mother rubbed the mango pulp on his lip during the 7th session; he wiped it off first, then began tasting it. The same response was noted on both the 8th and 9th sessions. In the 10th session, he put a small piece of pulp into his mouth without assistance and held the mango pieces for around 5 minutes. The child would throw the phone whenever he saw it, so video recording was impossible. The last two sessions were recorded with the phone away from his direct view, but the quality of the footage was poor.

Figure 4.1

Overall score of BAMBI-M in pre-, mid, post-therapy and follow-up of FISSA-M intervention for child 1

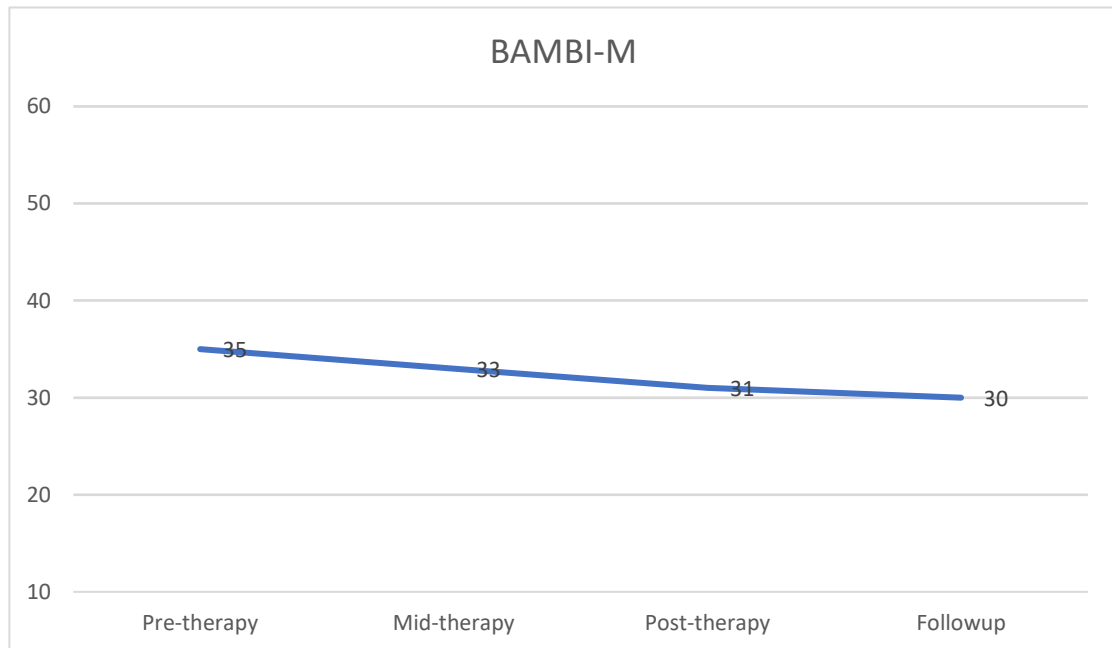


Figure 4.1 reveals the overall BAMBI-M scores across pretherapy, mid, post-therapy, and 1-week post-FISSA-M intervention. BAMBI-M scores reduced from 35 in pretherapy to 33 in mid-therapy and 31 in post-therapy sessions, indicating a reduction in the problem behaviors. The follow-up scores were identical to the post-therapy scores, indicating that the problem behaviors did not increase after the termination of the intervention. However, maintenance of the learned behavior is noted

Figure 4.2

BAMBI-M scores for statement 20 “Avoid specific textures” in pre, mid, post-therapy and follow-up of FISSA-M intervention for child 1

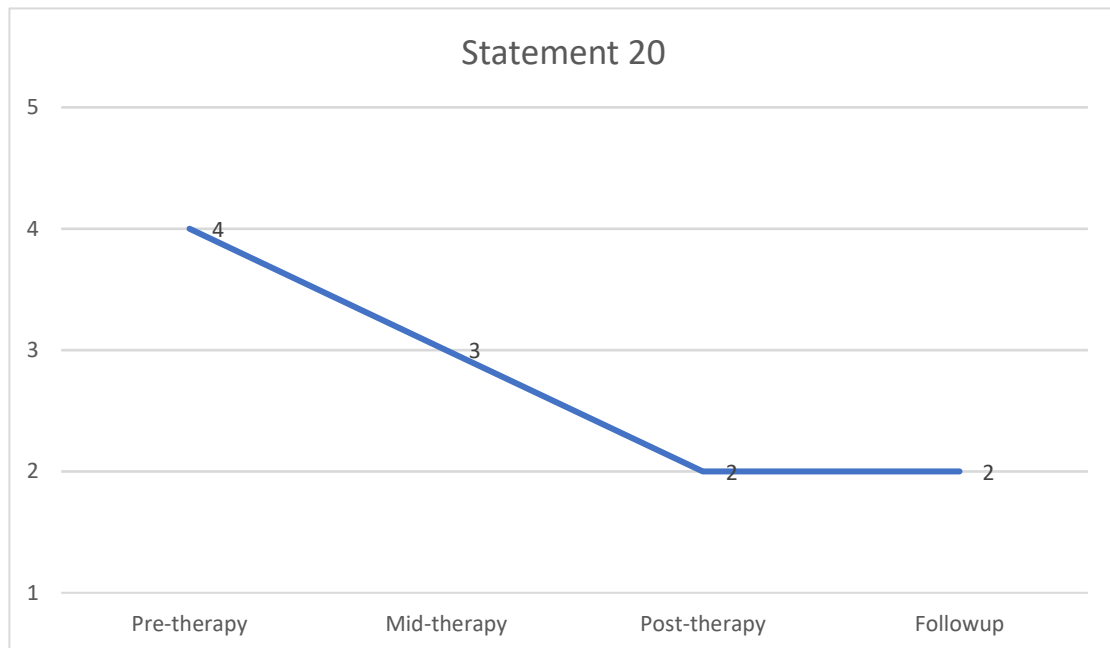


Figure 4.2 shows the child’s improvement from pre-therapy to Follow-up in the targeted feeding problem “Avoids specific food”. The target problem behavior in feeding reduced from a score of 4 in pretherapy to 3 in mid and 2 in post-therapy. Pre-therapy to post-therapy child showed a significant reduction in the problem behavior; however, scores did not increase for Post therapy and Follow-up. This indicated that FISSA-M intervention for the targeted problem, which was reduced from pretherapy to post-therapy, was maintained after one week of FISSA-M intervention for child 1.

Child 2

XYZ, a 6-year-old male child, was diagnosed with ASD with a receptive age of 4.1-4.6 years. The child shared a home with his mother and father. BAMBI scored high in three sensory-related questions, with the caregiver suggesting that one of the most frequent sensory characteristics was considered. He did not prefer bananas; He cried whenever he sees bananas.

The intervention began on 28/5/24 to 6/6/24. The story (3), titled Avoid specific texture in Malayalam: ‘പുതിയതരം രുചിയിലൂടെ’ (statement-20 BAMBI-M) of FISSA-M, was used. The story was presented in the initial twenty minutes. Real fruit (banana) was introduced after the SS. Techniques such as modeling, desensitization, and differential reinforcement of alternative behavior were used for this participant.

During the first session, the story was introduced to the child. He spent only two seconds looking at it. The child’s perception is primarily auditory rather than visual. He uttered some meaningful words when he heard the story. Every time the child sees a banana on the table, he cries or flees the table. The responses were similar in the 2nd,3rd, and 4th sessions; the child sat on the chair, listened to the story, and turned back after the story finished. In the 5th session, he held the banana and gave it to his mother. Continuous reinforcement was received using his favorite ball and bubbles. In 6th session, he tried holding a banana after the story ended. The child personally attempted to eat the banana during the 7th session, but he gagged twice. In the last three sessions, the child listened to the story, and after the story was completed, he placed the banana in his mouth for 5 seconds without any prompt.

Figure 4.3

Overall score of BAMBI-M in pre, mid, post therapy and follow-up of FISSA-M intervention for child 2

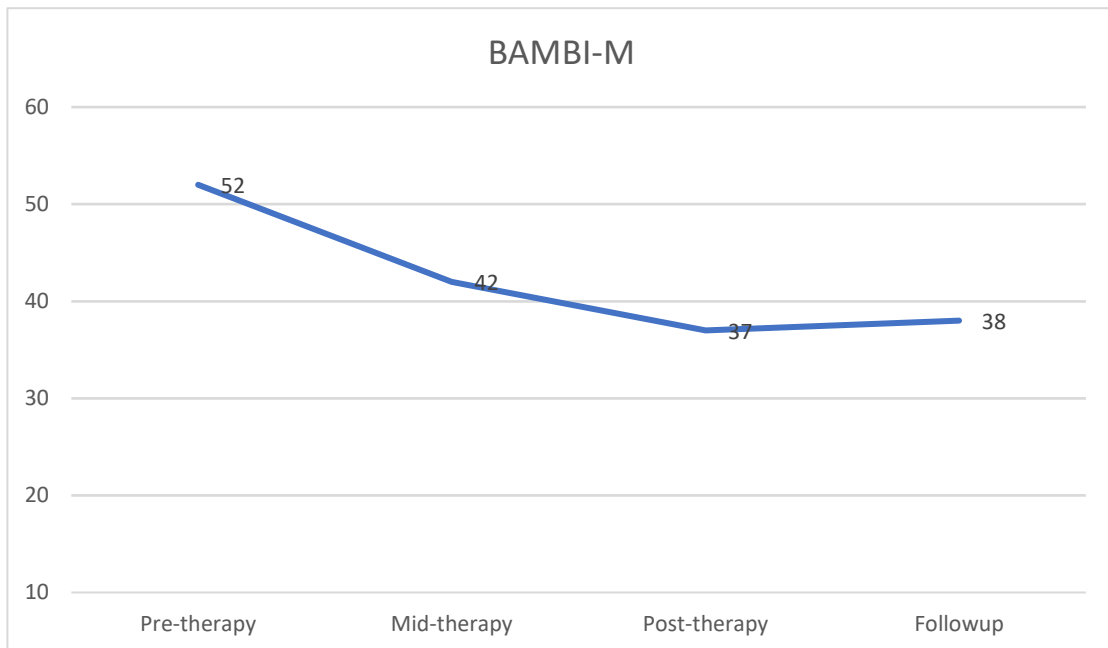


Figure 4.3 depicts the overall score of BAMBI-M, which shows a significant difference from pre-therapy to post-therapy. BAMBI-M scores reduced from 52 in pretherapy to 42 in mid-therapy, indicating a drastic change from pretherapy to mid-therapy. And post-therapy scores were 37, indicating a reduction in the problem behaviors. The follow-up scores were identical to the post-therapy scores, indicating that the problem behaviors did not increase after the termination of the intervention. However, maintenance of the learned behavior is noted.

Figure 4.4

BAMBI-M scores for statement 20 “Avoid specific textures” in pre, mid, post therapy and follow-up of FISSA-M intervention for child 2

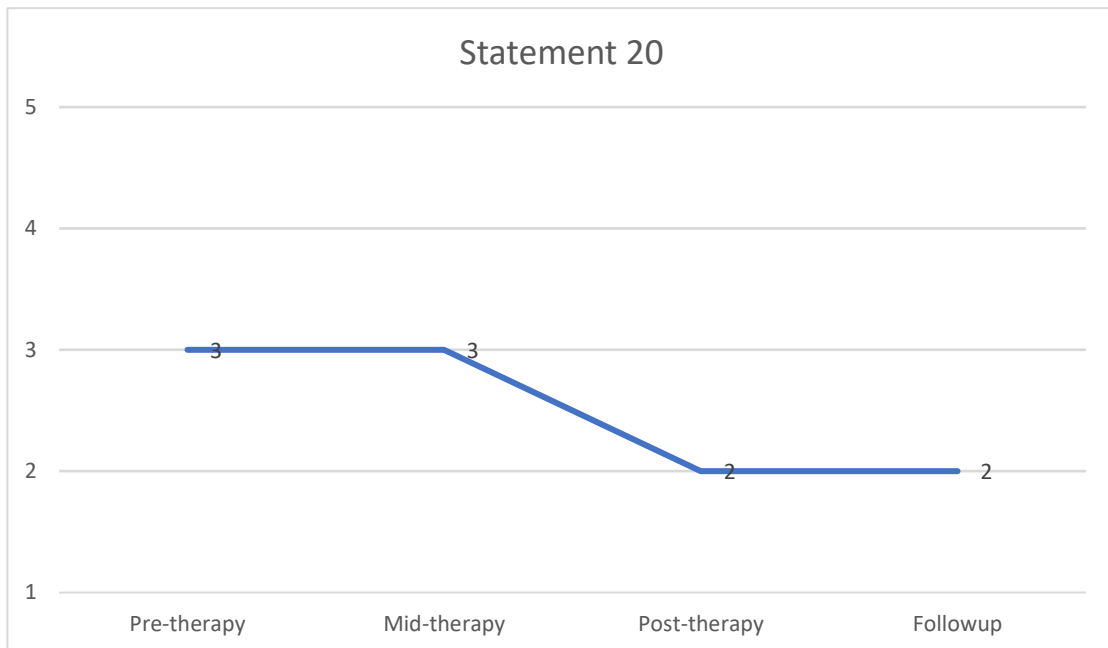


Figure 4.4 depicts the child's improvement from pre-therapy to follow-up. The pre- and mid-therapy scores were the same, 3, indicating that the child required more preparation time before the real food was introduced to him. The post-therapy score of 2 indicated a dip in the problem behavior. Additionally, post-therapy and follow-up scores were the same, indicating that the problem behavior was not increased but was maintained even after the FISSA-M intervention was terminated, indicating its effectiveness. But overall, exhibited a substantial improvement in child 2 using the FISSA-M intervention.

Conclusion for children with ASD: Both children with feeding problems demonstrate a considerable improvement from pre to post-therapy, according to the

scores, even if the stories utilized for children 2 and 3 were similar: ‘**Avoiding specific/particular texture**’. Nonetheless, children 2 and 3 follow-up and post-therapy maintained the learned behavior.

Child 3

ACD, a 4-year- 2-month-old male child diagnosed with mild ASD with a receptive age of 3.0-3.6 years. The child stays with his mother.

The targeted social story was ‘Food being cooked in a specific manner’. He eats ladies' finger curry but avoids ladies' finger fries. The social story concerning the sensory difficulties was presented to the child. The story (1) Prefer food being cooked in a specific manner, story titled in Malayalam: ‘**ഭരണി.. ഇതും കൊള്ളാലോ**’ (statement-18 BAMBI-M) of FISSA-M was used. The intervention was held on 28/5/24 to 7/6/24. Techniques such as modeling, imitation, desensitization, and differential reinforcement of alternative behavior were used.

He is fond of images and stories of FISSA-M, and in just three sessions, he grasped the story. In the 4th, 5th, and 6th sessions, he tried to incorporate the story ideas into practice. He imitated the character of the FISSA-M with the targeted item (Ladies Finger). In the 7th and 8th sessions, he brought the fries into his mouth and spit them out. He ate one piece of lady's finger fries without being asked during the 9th session. The same was followed in the 10th session.

Figure 4.5

Overall score of BAMBI-M in pre, mid, post therapy and follow-up of FISSA-M intervention for child 3

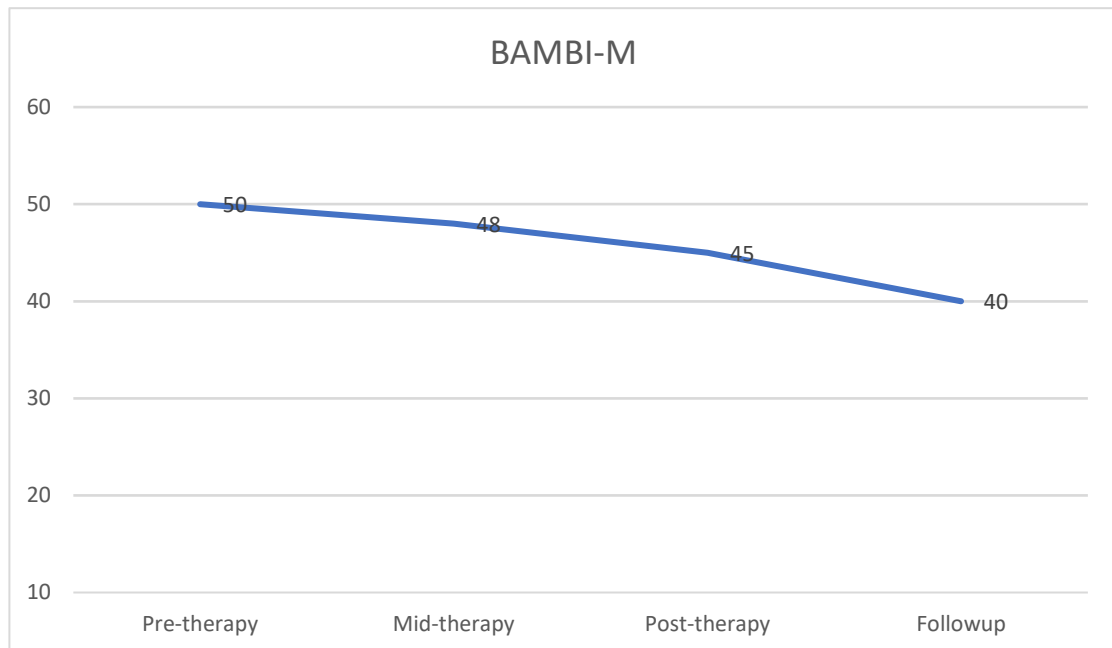


Figure 4.5 displays the pre- and post-therapy ratings steadily decreasing, indicating an improvement from pre- to post-therapy. The BAMBI-M scores reveal that the scores are reduced from 50 to 48 from pretherapy to mid-therapy and 45 for post-therapy. The follow-up score was 40, indicating a reduction in problematic behavior. Other behaviors include moving away from the table before finishing the meal, pushing the food away, and closing the mouth hard when food is introduced. A slight improvement has been seen in Follow-up scores.

Figure 4.6

BAMBI-M scores for statement 18 “Prefer food cooked in specific manner” in pre, mid, post-therapy and follow-up of FISSA-M intervention for child 3

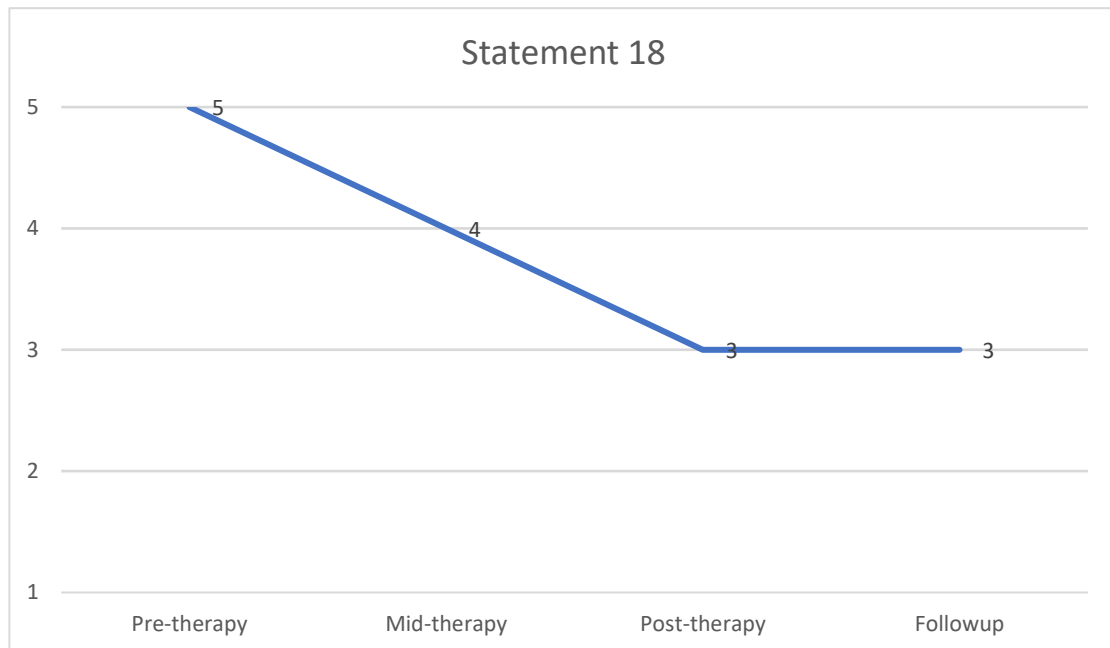


Figure 4.6 The interventions were given to lessen the ‘Preference for food being cooked in a specific manner’. The target problem behavior in feeding reduced from a score of 5 in pretherapy to 4 in mid and 3 in post-therapy. Pre-therapy to post-therapy child showed a significant reduction in the problem behavior; however, scores did not increase for Post therapy and Follow-up. This indicated that FISSA-M intervention for the targeted problem, which was reduced from pretherapy to post therapy, was maintained after one week of FISSA-M intervention for child 3.

The bar graph revealed that pre-mid-post therapy BAMBI scores showed improvement, while post and follow-up showed no change in BAMBI scores, but the

positive skills were improved.

Sansosti and Smith (2006) described SS as a tool to improve children's social behavior with Asperger syndrome, similar to the current study. Their study showed a substantial improvement from pre-therapy to post-therapy, even though there was no evidence of good behavior maintenance over time. The current study also revealed a decrease in the scores of problem behavior from pre- to post-therapy and maintenance of the score in the follow-up.

Child 4

BCD, a 6-year 4-month male child diagnosed with mild ASD with an age range of 5.1-5.6 years. the child stays with his grandparents. BAMBI was administered, and sensory aspects targeted for the intervention were avoiding specific food. The child doesn't like laptops and phones.

The intervention began on 10/6/24 to 21/6/24. The story (5), titled Avoid specific food and in Malayalam: 'എല്ലാം നമുക്ക് കഴിച്ചു നോക്കാം' (statement no. of BAMBI-M-11) of FISSA-M, was used. The printed story was presented in the initial twenty minutes. Modeling, desensitization, and differential reinforcement of alternative behavior techniques were used during the intervention. The child likes stars, rhymes, storybooks, and colors.

The child avoided eating rice; if given rice, the child threw it. He had a fair tolerance for sitting and could make eye contact for at least 15 minutes. He comprehended stories and answered questions related to the story; the child grasped the story within 1 session. After the story narration, he screamed aloud when he was introduced to the food and showed reluctance to look at it. During the second session, the story was progressively shown to the child by first placing food at a slight distance

away and then moving the plate closer. In the 3rd, 4th, and 5th sessions, the child started looking at the rice and holding a small piece of rice. In the 6th session, he didn't respond to the social story and avoided looking at the rice. In the 7th and 8th sessions, the child eventually accepted the rice and took a bite. In the 9th session, the child had a bite of rice without any prompt from the caregiver/ clinician. The child did not respond positively on the 10th session, but the scores indicated significant progress on the follow-up assessment. He ate a handful of rice without any prompt. Audio-video recordings could not be done since the mother did not consent to the recording.

Figure 4.7

Overall score of BAMBI-M in pre, mid, post therapy and follow-up of FISSA-M intervention for child 4

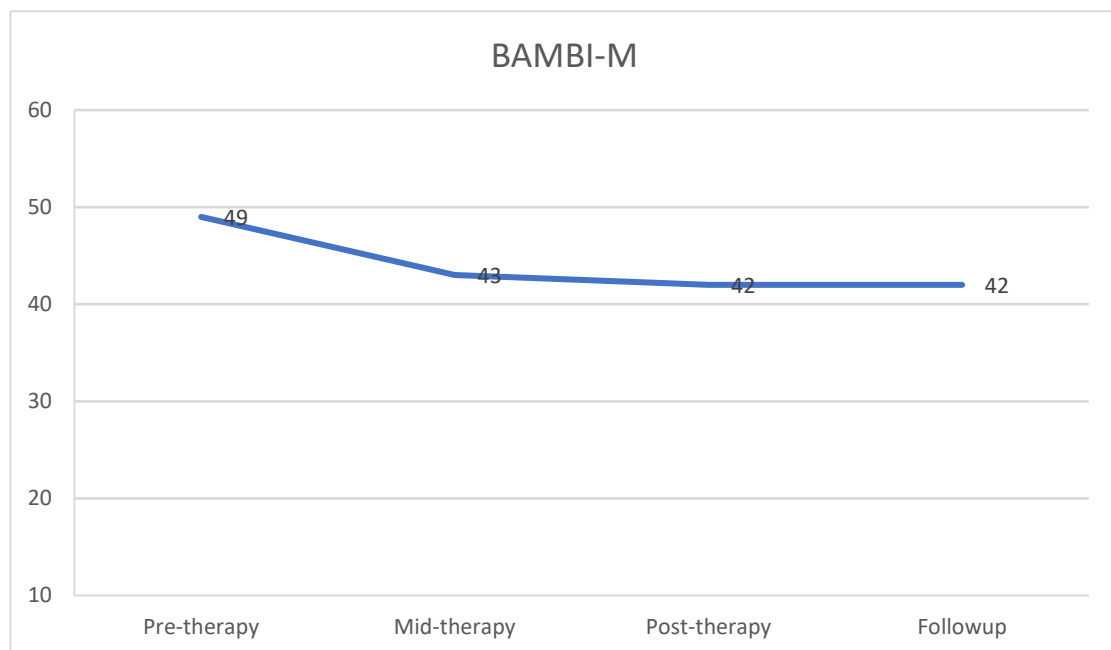


Figure 4.7 demonstrates the overall score of BAMBI-M, which shows a slight difference from pre-therapy to post-therapy. BAMBI-M scores reduced from 49 in pretherapy to 43 in mid-therapy, indicating a drastic change from pretherapy to

mid-therapy. Post-therapy scores were 42, indicating a reduction in the problem behaviors. The follow-up scores were identical to the post-therapy scores, indicating that the problem behaviors did not increase after the termination of the intervention. However, maintenance of the learned behavior is noted.

Figure 4.8

BAMBI-M scores for statement 11 “Avoid specific food” in pre, mid, post-therapy and follow-up of FISSA-M intervention for child 4

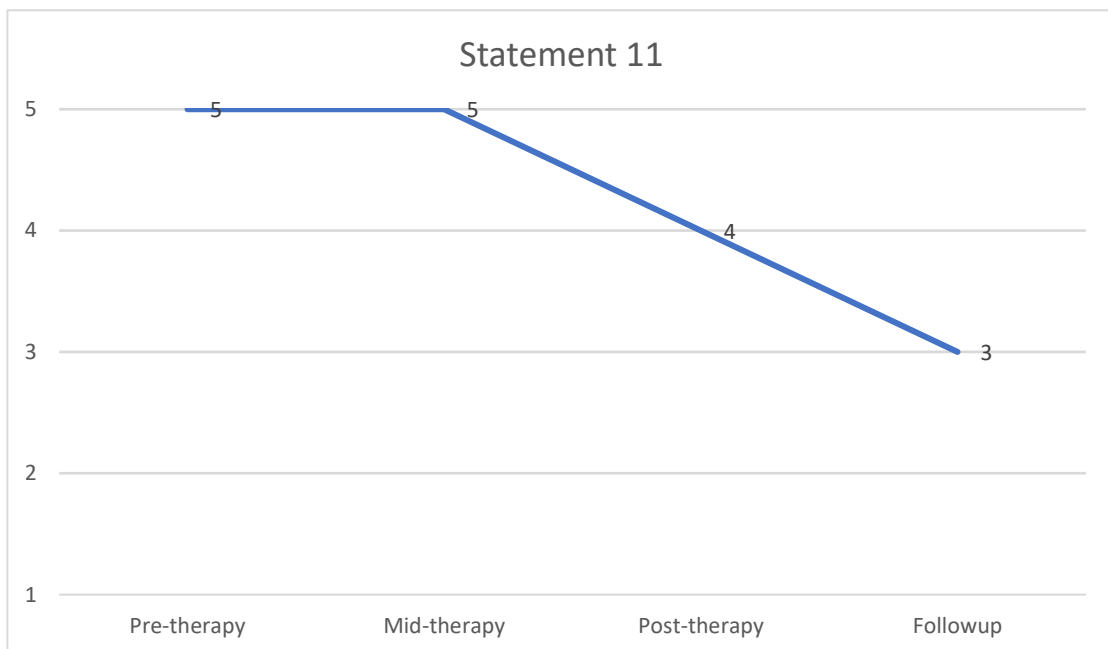


Figure 4.8 reveals the child’s overall improvement from pretherapy to follow-up. The pretherapy and mid-therapy scores were identical, 5 indicating the child’s requirement for preparation before introducing the target food. The scores of the problem behavior were reduced from 5 to 4 in the post-therapy and further in the follow-up assessment, indicating the effectiveness of FISSA-M in reducing the feeding problem.

Child 5

ADC, a 4-year 10-month-old male child diagnosed with ASD with Sensory issues and a receptive age of 4.1-4.6 years, staying with mother and father. According to the BAMBI rating, the child has sensory and behavioral problems. The most frequent sensory issues were addressed based on the BAMBI-M assessment score.

The story titled (5) avoid specific food and in Malayalam: ‘എല്ലാം നമുക്ക് കഴിച്ചു നോക്കാം’ (statement no. of BAMBI-M-11) in FISSA-M was used. The intervention began on 10/6/24 to 18/6/24. The child likes to play with toys (pop-it), modeling, desensitization, and differential reinforcement of alternative behavior techniques used during the intervention.

The child did not prefer curries. In the first two sessions, he sat down, listened to the story, and answered questions about the stories in single words. In the 3rd and 4th sessions, he responded by touching the curry with his finger. The 5th and 6th sessions showed a consistent response by touching the curry. However, during the 7th session, the child started showing inappropriate behaviors such as yanking clothes and slamming the doors that were present previously however, the behavior ceased before the intervention. But after 7th session, the behavior relapsed. The session was terminated because of the unacceptable behavior. Subsequent scores did not reveal any noteworthy variation either.

Figure 4.9

Overall score of BAMBI-M in pre, mid, post therapy and follow-up of FISSA-M intervention for child 5

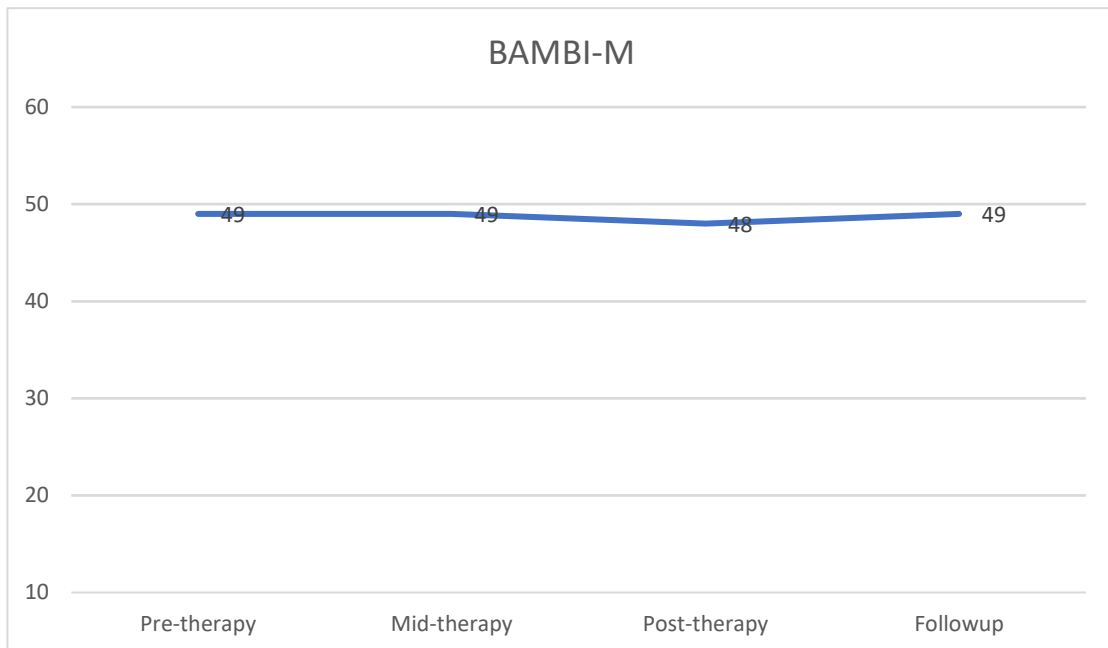


Figure 4.9 The overall BAMBI-M scores reveal no significant improvement from pre-therapy to Follow-up. The BAMBI-M scores reveal that the scores are the same, 49 from pre-therapy to Follow-up. Indicating no positive outcomes from the FISSA-M intervention on child 5.

Figure 4.10

BAMBI-M scores for statement 11 “Avoid specific food” in pre, mid, post-therapy and follow-up of FISSA-M intervention for child 5

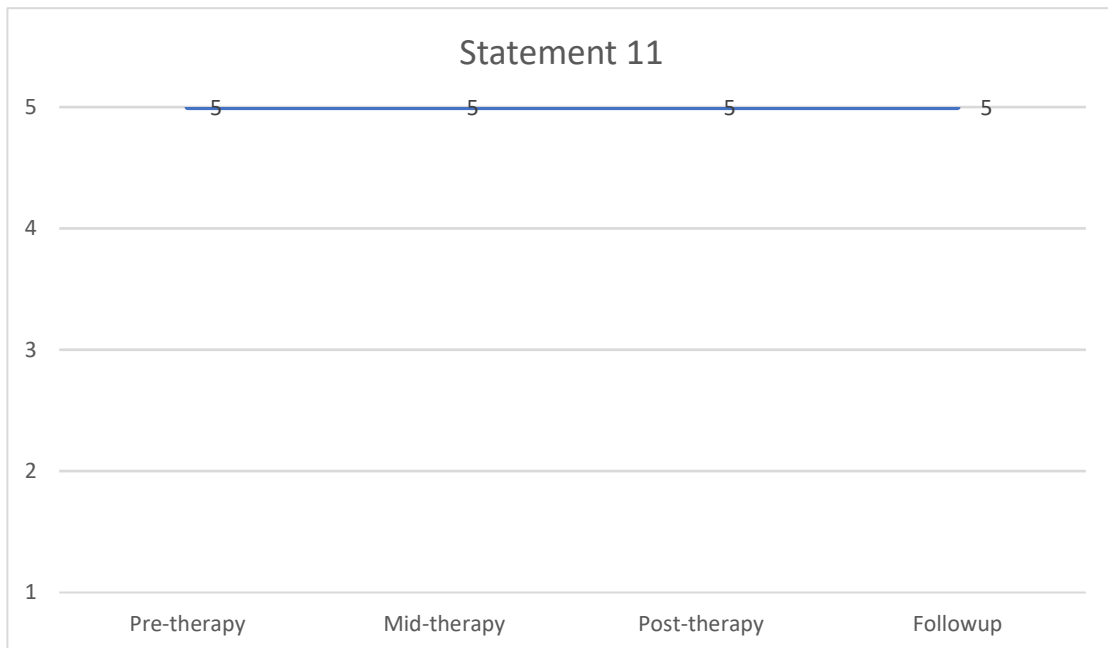


Figure 4.10 showed no change in the BAMBI-M scores of 5 for the targeted problem behavior in FISSA-M intervention throughout the treatment session. The child’s BAMBI-M scores were identical in pre-mid-post therapy and follow-up assessments. There are a few reasons that can be attributed to the ineffectiveness of SS in child 5 (ADC). Firstly, this may be due to other sensory issues, such as wandering the room, making noises, trying to embrace everyone, smashing doors, and rumination behavior. According to the caregiver, he is not receiving sensory integration training (occupational therapy), which would have increased inappropriate sensory behaviors. Secondly, the treatment schedule; the intervention was provided in the afternoon, right after preschool training, which could have induced fatigue and in the child. Lastly, the child comprehended the target SS by the third session. He also repeated the story

narration. The child could have felt monotonous in the session since only ss was used in the intervention. Gray (1995) states that a child's desire for a social tale may last for various lengths. Each child with ASD is unique, and the symptoms/ features exhibited may also vary.

The reduction in BAMBI-M scores from pre-therapy to post-therapy and the maintenance of these scores at follow-up indicates that the FISSA-M intervention effectively addresses feeding problems in children with ASD. The specific strategies, such as modeling, desensitization, and differential reinforcement, likely contributed to these positive outcomes.

These findings align with Sharp et al. (2019) findings, where the author introduced a structure, MEAL, and PEP; these structured interventions can improve feeding behaviors in children with ASD. A similar conducted by Cerchiari (2023), a pilot study based on the efficacy of Global Intensive Feeding Therapy (GIFT) on children with ASD, has also found that desensitization and reinforcement techniques effectively reduce food selectivity and increase acceptance of different food textures. It also suggests that social stories can be a powerful tool in such interventions in combination with practical strategies.

SLPs working with children with ASD can incorporate social stories and reinforcement techniques to address feeding problems. Using real food items and gradual exposure can help children overcome aversions to specific textures and foods.

Statistical Analysis

Following statistical analysis of the data was done:

- Descriptive statistics were carried out to obtain the median and interquartile ranges. The total BAMBI-M scores of pre-mid-post therapy-

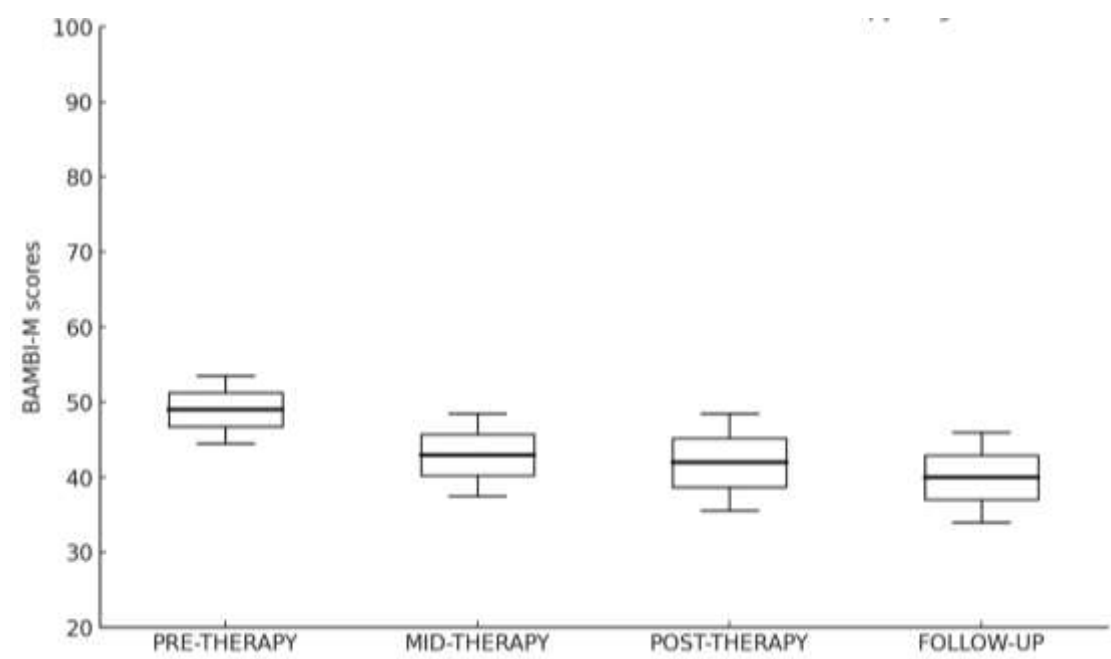
follow-up of all five children with ASD were calculated and analyzed.

- Friedman test was employed to investigate the improvement in treatment over time (pre-mid-follow-up)

Descriptive statistics are revealed in Table 4.11, which depicts the overall scores of BAMBI-M in all 5 children with ASD who underwent treatment (Pre-Mid-Post therapy- Follow-up).

Figure 4.11

Median and Interquartile range for pre-mid-post therapy-follow-up BAMBI-M scores for 5 children with ASD



The figure 4.11 reveals gradual decrease in median BAMBI-M scores of all the participants across the therapy stages, indicating a reduction in the problem feeding behavior. The scores decreased from 49 in pre-therapy to 43 in mid-therapy, suggesting an improvement in BAMBI-M scores. The score remained relatively stable at 42 in post-therapy, indicating continued improvement, and

reduced to 40 in follow-up, indicating sustained improvement even after therapy had concluded. The increase in IQR from pre-therapy to post-therapy suggests a growing score variability reflecting different response rates to FISSA-M intervention among patients. The slight decrease in variability during follow-up suggests that participant outcomes became more uniform over time after the therapy had concluded.

A Friedman test was used to compare BAMBI-M scores across the assessment timelines (pre-, during, post-therapy, and follow-up). The BAMBI-M total scores of pre-mid-post-therapy and follow-up scores for children with ASD who underwent intervention are obtained for comparison.

The Friedman test revealed a significant difference [$\chi^2(3, N=5) = 11.93$, $p = 0.08$] in comparing BAMBI scores of 5 children with ASD across four-time points: pre-therapy, mid-therapy, post-therapy, and follow-up using FISSA-M intervention. Further post hoc pairwise comparison tests were done to identify the significance of specific treatment timelines (Table 4.3).

Table 4.3

Identification of specific differences in the therapy intervention

	Test statistic	Std.Error	Std.Test statistic	P-Value	Adj. Value	P-
Post-therapy- Follow-up	-200	.816	-.245	.806	1.000	
Post-therapy- Mid-therapy	1.500	.816	1.837	.066	.397	
Post-therapy-Pre- therapy	2.300	.816	2.817	.005	.029	
Follow-up-Mid- therapy	1.300	.816	1.592	.111	.668	
Follow-up-Pre- therapy	2.100	.816	2.572	.010	.061	
Mid-therapy-Pre- therapy	.800	.816	.980	.327	1.000	

Table 4.3 shows a significant difference between pre-and post-therapy scores, indicating that the FISSA-M intervention had a measurable impact on the participants. The pre-therapy and follow-up depicted marginal differences. The pretherapy and mid-therapy showed no significant difference.

Feeding Intervention using Social Story in Malayalam (FISSA-M) is the first social story developed in Malayalam to address feeding-related issues. The use of FISSA-M stories in the current study has reduced the behavioral and sensory problems in the participants. Five stories were developed by targeting sensory issues such as avoiding specific food, specific textures, trying new foods, preferring food being cooked in a specific manner, and sweet foods. The stories are validated by SLPs and Parents of children with ASD who has feeding issues.

The purpose of this study was to develop an SS and evaluate the effectiveness of social stories in children with ASD who have feeding-related sensory issues. As per our knowledge, this is the first social story developed in India on sensory-related feeding issues. The majority of studies pertain to improving the social skills of children with ASD, with only a small number focusing on SS in feeding components. The study conducted by Bledsoe, Myles, and Simpson (2003) provided accurate social information about how social stories are increasingly popular for teaching social skills. The study evaluated SS's effectiveness in improving the mealtime skills of an adolescent with Asperger syndrome. The results revealed a rapid improvement in behavior, such as spilling and wiping. The present investigation has yielded similar results in a short intervention period. Four among five children with ASD demonstrated considerable progress in the present study. Effective SS treatments usually show outcomes within the first week, according to Gray and Garand (1993), which also indicates the effectiveness of FISSA-M intervention.

The results of this investigation enhance the understanding of SS efficacy in multiple ways. Initially, this study highlights the possible advantage of employing SS treatment to educate children with ASD on new sensory skills and behavioral skills. In addition, the result of the study replicated the previous study by Kuoch and Mirenda (2003), which demonstrated an immediate reduction in the rate of problem behavior in all three participants when the social story was implemented. This is the first study to focus on the sensory components of eating, with most SS centered on social skills and behavioral intervention.

There are no standardized treatment protocols available in Malayalam for addressing feeding-related problems in children with ASD. The reason for not addressing or implementing a treatment plan in place for children with ASD is the lack of attention given to feeding-related problems. While speech and language or behavioral components are the primary focus of assessment and intervention. Swallowing or feeding factors should also be prioritized.

This study's impact on the research literature on social story interventions may be even greater because (a) it is the only one that is known to have been implemented in Malayalam children with ASD, (b) it shows how SS can be used to teach an individual with ASD particular sensory aspects of feeding-related issues and (c) it shows how SS can be used and evaluated in a naturalistic context.

CHAPTER V

SUMMARY AND CONCLUSION

The primary intention of the current study is to develop a social story that can contribute to minimizing feeding challenges in Malayalam-speaking children with ASD. SS are individualized narratives that use basic visual graphics and text to convey what to expect in a social setting. Social skills are employed in children with ASD to help them grasp social situations. These brief, individualized stories guide in unfamiliar and sometimes perplexing social situations (Gray, 1993). Literature suggests a scarcity of culturally and ethically acceptable materials to the Indian population. SS are scarcely researched in India, although much research is being conducted in the West. Thus, the newly created SS is genuinely one of its kind for managing feeding concerns in children with ASD.

The development of SS (Appendix-III) was carried out in 3 phases. In phase 1, identification of the five frequent feeding issues in children with ASD, BAMBI-M was divided into sensory and behavioral aspects by suggestion from an Occupational therapist, Clinical psychologist, Speech-language pathologist, and Dietician. The BAMBI-M was administered to 10 native Malayalam-speaking parents of children with ASD, and the total scores were averaged, and the 5 highest sensory scores were taken to develop SS. The statements taken for SS are Avoid trying new foods (statement no 10), Avoid specific food (statement no 11), Prefer sweet food (statement no 17), Prefer food being cooked in a specific manner (statement no 18), Avoid specific textures (statement no 20). In phase 2, social stories were designed according to Carol Gray protocol (2010). In phase 3, field and content validation were done. 5 SLPs and parents validated the content. Following that, the intervention was offered (10 sessions for 40

minutes each) to 5 children with ASD, and the story was tailored to the problematic behavior. Each child's pre-mid-post therapy and follow-up BAMBI-M scores were calculated.

Except for one of the five children with ASD, the data showed an overall improvement from pre- to post-therapy. In a number of children, the target feeding problem was maintained 1-week post-follow-up, indicating the efficacy of FISSA-M. The results demonstrated not only a reduction in sensory feeding issues with the use of FISSA-M but also a reduction in behavioral feeding issues.

To conclude, FISSA-M is a valuable feeding intervention tool for SLPs in planning and intervening in feeding-related issues in a methodical manner. FISSA-M addresses and intervenes sensory aspects of feeding-related issues.

5.1 Limitation of the present study

- Small sample size limits the generalizability of the findings.
- Short duration of the intervention limits understanding of long-term effects.
- Only three stories out of 5 were considered during the intervention.
- No behavioral assessments were conducted before the intervention.

5.2 Clinical implications

- The output of the study resulted in SS intervention (FISSA-M) that can be used effectively in improving feeding-related issues in children with feeding issues secondary to ASD.
- FISSA-M is the only tool currently available in Malayalam that will help in managing ASD-related feeding problems in children.
- FISSA-M social stories will prepare the child for what should be

expected during the social scenario. This preparation helps reduce anxiety and increases the child's cooperation before being provided with real food.

- FISSA-M social stories target sensory feeding issues.
- This tool can also be readily used by parents and caregivers of children with ASD for feeding management.
- FISSA-M is user-friendly since it contains illustrations and can be used as a teletherapy resource.
- FISSA-M can be field tested in other clinical populations, such as those with Intellectual disability and cerebral palsy, for feeding intervention.
- FISSA-M can be adapted to other Indian languages since there are no SS for intervention of feeding skill in other Indian languages.

5.3 Future Directions

- The FISSA-M intervention effectively reduced feeding problems in children with ASD, with improvements maintained at follow-up. The study provides evidence for the practical application of social stories and behavioral techniques in addressing selective eating behaviors. Future research should build on these findings to refine and validate these intervention strategies.
- Further, sensory-related assessment and intervention in children with ASD to be explored for better outcomes.
- Future research should examine the frequency with which participants refer to their SS throughout and after the intervention.
- Further studies of SS in behavioral as well as sensory should be established in the Indian context.

- Future studies should examine the role of SS in group therapeutic settings.
- If the story is applied to a large sample, it will improve the accuracy and reliability and provide greater support for the conclusion found in the current study.

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Appendix I

MALAYALAM VERSION OF BAMBI (BAMBI-M)

കഴിഞ്ഞ ആറു മാസക്കാലത്തെ നിങ്ങളുടെ കുട്ടിയുടെ ഭക്ഷണ ശീലത്തെപ്പറ്റി വിലയിരുത്തുക. താഴെ തന്നിരിക്കുന്ന ലൈക്കർട്ട് സ്കെയിൽ മാനദണ്ഡമാക്കി നിങ്ങളുടെ കുട്ടി എത് തോതിൽ അവ പ്രകടമാക്കുന്നു എന്ന നിരക്ക് അടയാളപ്പെടുത്തുക.

ഒരിക്കലുമില്ല	അപൂർവ്വമായി	ഇടയ്ക്കിടെ
1	2	3
മിക്കപ്പോഴും		എല്ലായ്പ്പോഴും
4		5

താഴെ പറഞ്ഞിരിക്കുന്ന വസ്തുതകളിൽ ഏതെങ്കിലും നിങ്ങൾക്ക് ഒരു പ്രശ്നമായി തോന്നുന്നുവെങ്കിൽ "അതെ" എന്നും ഇല്ലെങ്കിൽ "ഇല്ല" എന്നും വൃത്തം വരച്ചു അടയാളപ്പെടുത്തുക.

- | | | | | | | | |
|--|---|---|---|---|---|-------|------|
| 1. എന്റെ കുട്ടി ഭക്ഷണ സമയത്ത് കരയാറുണ്ട് | 1 | 2 | 3 | 4 | 5 | ഉണ്ട് | ഇല്ല |
| 2. എന്റെ കുട്ടി ഭക്ഷണത്തോട് മുഖംതിരിക്കുന്നു | 1 | 2 | 3 | 4 | 5 | ഉണ്ട് | ഇല്ല |
| 3. എന്റെ കുട്ടി ഭക്ഷണം കഴിച്ചു തീരുന്നതുവരെ തീൻ മേശയ്ക്കരികിൽ തന്നെ ഇരിക്കും | 1 | 2 | 3 | 4 | 5 | ഉണ്ട് | ഇല്ല |
| 4. എന്റെ കുട്ടി കഴിച്ചു കൊണ്ടിരിക്കെ ഭക്ഷണം തുപ്പിക്കളയാറുണ്ട്. | 1 | 2 | 3 | 4 | 5 | ഉണ്ട് | ഇല്ല |
| 5. എന്റെ കുട്ടി ഭക്ഷണ സമയത്ത് ശാഠ്യം പിടിക്കാറുണ്ട് (ചവിട്ടുക, അടിക്കുക, മാന്തുക തുടങ്ങിയവ). | 1 | 2 | 3 | 4 | 5 | ഉണ്ട് | ഇല്ല |
| 6. എന്റെ കുട്ടി ഭക്ഷണ സമയത്ത് സ്വയം | 1 | 2 | 3 | 4 | 5 | ഉണ്ട് | ഇല്ല |

മുറിവേൽപ്പിക്കുന്ന സ്വഭാവ
പ്രവണത
കാണിക്കാറുണ്ട്
(സ്വയം അടിക്കുക, സ്വയം കടിക്കുക
മുതലായവ).

- | | |
|---|----------------------|
| 7. എന്റെ കുട്ടി ഭക്ഷണ സമയത്ത്
തടസ്സം
സൃഷ്ടിക്കാറുണ്ട്
(ഭക്ഷണം/പാത്രങ്ങൾ,
വലിച്ചെറിയുക
തട്ടിക്കയറുക മുതലായവ). | 1 2 3 4 5 ഉണ്ട് ഇല്ല |
| 8. ഭക്ഷണം കൊടുക്കുമ്പോൾ എന്റെ
കുട്ടി വായ മുറുക്കിയടച്ച്
പിടിക്കാറുണ്ട്. | 1 2 3 4 5 ഉണ്ട് ഇല്ല |
| 9. എന്റെ കുട്ടി ഭക്ഷണ ശീലങ്ങളിൽ
വിട്ടുവീഴ്ച
തയ്യാറാണ്. | 1 2 3 4 5 ഉണ്ട് ഇല്ല |
| 10. എന്റെ കുട്ടി പുതിയ ഭക്ഷണങ്ങൾ
കഴിക്കാൻ തയ്യാറാണ്. | 1 2 3 4 5 ഉണ്ട് ഇല്ല |
| 11. എന്റെ കുട്ടി ചില ഭക്ഷണങ്ങളോട്
താൽപര്യം കാണിക്കാറില്ല. അവ
കഴിക്കാനുമാറില്ല. | 1 2 3 4 5 ഉണ്ട് ഇല്ല |
| 12. എന്റെ കുട്ടി ചവച്ചു കഴിക്കാനുള്ള
ഭക്ഷണസാധനങ്ങൾ
ഒഴിവാക്കാറുണ്ട് (മുദുവായ/അരച്ച
ഭക്ഷണങ്ങൾ മാത്രമേ
കഴിക്കാറുള്ളൂ). | 1 2 3 4 5 ഉണ്ട് ഇല്ല |
| 13. എന്റെ കുട്ടി എല്ലാ നേരവും ഒരേ
ഭക്ഷണപദാർത്ഥങ്ങൾ കഴിക്കാൻ
താൽപര്യപ്പെടുന്നു | 1 2 3 4 5 ഉണ്ട് ഇല്ല |
| 14. എന്റെ കുട്ടിക്ക് കുറുമുറു
തരത്തിലുള്ള
ആഹാരങ്ങളോടാണ് താൽപര്യം. | 1 2 3 4 5 ഉണ്ട് ഇല്ല |

15. എന്റെ കുട്ടി വൈവിധ്യമേറിയ
ആഹാര സാധനങ്ങൾ
അംഗീകരിക്കുകയും
താൽപര്യപ്പെടുകയും ചെയ്യുന്നു. 1 2 3 4 5 ഉണ്ട് ഇല്ല
16. ഒരു പ്രത്യേക രീതിയിൽ
ഭക്ഷണം കൊടുക്കുന്നതാണ്
എന്റെ കുട്ടിക്ക് താൽപര്യം. 1 2 3 4 5 ഉണ്ട് ഇല്ല
17. എന്റെ കുട്ടിക്ക് മധുര
പലഹാരങ്ങളോട് മാത്രമേ
താൽപര്യമുള്ളൂ (ഉദാ:മിഠായി,
ജിലേബി മുതലായവ) 1 2 3 4 5 ഉണ്ട് ഇല്ല
18. ഒരു പ്രത്യേക രീതിയിൽ
പാകപ്പെടുത്തിയ
ഭക്ഷണങ്ങളോടാണ് എന്റെ കുട്ടിക്ക്
താൽപര്യം(വറുത്തത്, വേവിച്ചത്,
ചൂടുള്ളത് ..). 1 2 3 4 5 ഉണ്ട് ഇല്ല
19. എന്റെ കുട്ടി ഭക്ഷണം കാണുമ്പോൾ
അത് മണത്ത് നോക്കുന്ന സ്വഭാവം
പ്രകടമാക്കാറുണ്ട്. 1 2 3 4 5 ഉണ്ട് ഇല്ല
20. എന്റെ കുട്ടി ചില ഘടനയിലുള്ള
ഭക്ഷണ
പദാർത്ഥങ്ങൾ ഒഴിവാക്കാറുണ്ട് .
(നന്നവുള്ള /ഒട്ടല്ലുള്ള
ഭക്ഷണപദാർത്ഥങ്ങൾ
ഒഴിവാക്കുക, ചോറും കുറിയും
ഒന്നിച്ചു
തൊടാൻ വിമുഖത കാണിക്കുക
തുടങ്ങിയവ) 1 2 3 4 5 ഉണ്ട് ഇല്ല

Appendix II

Content Validation Questionnaire for FISSA-M

(Adapted from Field testing of Manual for Adult Non-fluent Aphasia Therapy in Kannada (MANAT-K), Goswami S.P, Jayashree C.Shanbal,Navitha U & Samasthitha (2012) and Carol Gray (2014 Guidelines).

Name of the SLP:

SL NO	PARAMETERS	VERY POOR	POOR	FAIR	GOOD	EXCELLENT
1.	Do the stories have a title and introduction that identifies the topic, a body that adds detail, and a conclusion?					
2.	Do the stories have a patient, supportive “voice” and vocabulary?					
3.	Does the story answer relevant questions (What, Where, Why, Who, When, How)					
4.	Is the language used in the story simple?					
5.	Are the picture stimuli used in the story of appropriate size?					
6.	Are the picture stimuli used in the story appropriate regarding color and dimensions?					
7.	Are the stories culturally and ethically acceptable?					
8.	Are the texts written recognizable and have adequate font size?					
9.	Are the picture stimuli within					

	the visual field of an individual?					
10.	Overall, are the stories user-friendly?					