THE DEVELOPMENT OF EXERCISE PROGRAM WITH FAMILY INVOLVEMENT ON SELF STIMULATING BEHAVIOR OF STUDENT WITH AUTISTIC

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Abstract

This study aimed to (1) develop an exercise program with family participation to reduce self-stimulatory behaviors in children with autism, and (2) evaluate the effects of the program after implementation. The sample consisted of 46 parents of children with autism. The instruments used in this research were: (1) a parent satisfaction questionnaire, and (2) a structured behavioral observation form. Descriptive statistics including frequency, percentage, and mean were used, along with inferential statistics such as independent samples t-test and one-way ANOVA. Results showed high parental satisfaction and a notable reduction in self-stimulatory behaviors in children after participation. Families reported ease in applying the program at home. No significant difference in satisfaction was found between male and female parents, but a significant difference was found among different age groups. The study recommends improving clarity of the program and developing user-friendly materials to support long-term behavioral outcomes.

Keywords: parental satisfaction, exercise program, children with autism, family involvement

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Introduction

Autistic Disorder (Autism) is a developmental disorder in children that affects social skills, language, communication, and behavior, typically presenting symptoms before the age of three. Although this disorder has been recognized for over 60 years, its precise cause remains unknown (Department of Mental Health, 2019). This condition is classified under Pervasive Developmental Disorders (PDDs) and has been increasingly recognized globally. In 2016, the prevalence rate was reported as 1 in 68, with a higher occurrence in males, approximately 3-4 times more than females (The Economist, 2016). Key characteristics of children with autism include deficits in social interactions, delayed language development, and repetitive, inflexible behaviors (American Psychiatric Association, 2022). Children with autism often exhibit self-stimulatory behaviors, such as rocking, spinning, or hand-flapping, which impact their learning and social adaptation. The continuation of such repetitive behaviors limits their opportunities to learn new things and adversely affects their gross and fine motor skills, academic skills, and social interactions (Goodwin, 2006). Additionally, autism has a significant impact on families, affecting both mental health and family relationships, with over 50% of parents of children with autism experiencing high levels of stress (Rajanukul Institute, 2020).

There are several approaches to reducing self-stimulatory behaviors, such as medication, sensory integration therapy, and exercise. Exercise has been proven to reduce repetitive and inappropriate behaviors in children with autism (Goodwin, 2006; Howlin, 1994; Hutt, 1968). Family involvement plays a crucial role in promoting development and reducing undesirable behaviors in children with autism. Research by Roberts et al. (2011) found that children with autism who received group-based care with family involvement showed better functional development and behavior than those who did not receive family-inclusive care. Thus, actively involving families in treatment is a highly effective approach. In the context of Thailand, the increasing number of autistic children in inclusive schools has created a significant burden on both personnel and the education system, particularly in managing self-stimulatory behaviors that disrupt teaching and learning (Benja Chonlatarn, 2005). According to a study by the Department of Mental Health (2019), the number of autistic students in

inclusive schools has been steadily increasing, highlighting the need for the development of effective and sustainable care approaches.

A review of recent literature reveals that structured exercise programs focusing on movement activities can effectively reduce repetitive behaviors and promote social interaction in children with autism (Liu et al., 2020). However, recent research indicates that while many interventions continue to focus directly on the child, the practical role of family involvement remains underexplored and underutilized (DePape & Lindsay, 2021).Therefore, this study aims to assess the satisfaction of parents of children with autism regarding family-inclusive exercise programs, with the hope that the findings will lead to the development of therapeutic approaches tailored to the Thai family context, increasing the opportunities for sustainable developmental support for children with autism and effectively reducing the mental health impacts on families.

Research Objectives

1. To develop an exercise program involving family participation to address self-stimulatory behaviors in children with autism.

2. To evaluate the self-stimulatory behaviors after the implementation of the exercise program.

Research Framework

The framework for this study is based on the ideas of Goodman & Scott (2012), along with Schepp's (1995) concept of family involvement in child care. The approach encourages family participation in organizing activities to promote positive and effective behaviors. Through various processes and activities, children learn appropriate behaviors. It is evident that when children with autism receive reinforcement of good behaviors using Skinner’s (1953) operant conditioning, the behaviors they engage in diminish. This process and activity flow is shown in Figure 1.

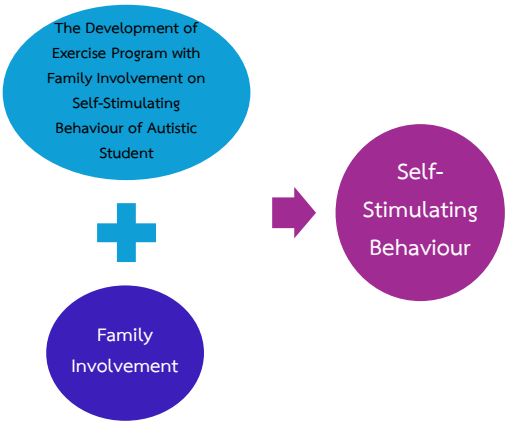

Figure 1 The framework

Materials and Methods

This study employed a quasi-experimental design, specifically the one-group pretest-posttest design, to examine the effects of a family-inclusive exercise program on reducing self-stimulatory behaviors in children with autism.

This quantitative research involved 46 parents of children with autism who had provided care for at least 6 months. and have not been diagnosed with any psychiatric disorders. The sampling method was purposive, based on caregiving experience.

The sampling method employed is purposive sampling, based on the criterion of continuous caregiving experience with children with autism. Data collection involved distributing questionnaires to parents and observing the behaviors and environment of the participants without actively engaging in their activities.

Research Instruments

1. Family-Inclusive Exercise Program: Developed by the researcher in consultation with occupational therapy experts. The program consisted of simple physical activities designed for children and parents to engage in together at home and school.

2. Structured Observation Form: Designed to assess five domains of self-stimulatory behavior, including hand-flapping, spinning, rocking, repetitive speech, and object fixation.

3. Parental Satisfaction Questionnaire: A Likert-scale instrument developed by the researcher based on literature review, assessing satisfaction levels regarding the exercise program

Research Instruments: Parental Satisfaction Questionnaire – developed based on literature and reviewed by three experts. The item-objective congruence (IOC) ranged from 0.67 to 1.00. The reliability coefficient (Cronbach's alpha) was 0.87. Structured Observation Form designed to assess self-stimulatory behaviors in five areas. The observation rubric was used by the researcher during program activities.

Development of the Exercise Program (Phase 1)

The researcher designed the program based on literature and expert input. The five activities were: Relationship building and communication Shared goal setting with professionals Structured school-based exercises (5 mins warm-up, 20 mins activity, 5 mins cool-down, 5 days/week, 3 weeks) Home-based implementation with manuals Telephone follow-ups: It included:

Activity 1: Building trust through play and communication.

Activity 2: Setting mutual goals with families and experts.

Activity 3: School-based exercises (5 mins warm-up, 20 mins exercise, 5 mins cool-down; 5 days/week, 3 weeks).

Activity 4: Home-based exercises guided by a manual.

Activity 5: Telephone follow-ups to reinforce engagement.

Program Testing (Phase 2)

The program's effectiveness was evaluated through pre-post data collection. Data were collected via questionnaire and observations during the program, including follow-ups.

Data Collection Procedure

Pre-implementation: Briefing, consent, initial observation, and questionnaire distribution.

During implementation: Researcher used observation forms; parents participated in activities and kept logs.

Post-implementation: Questionnaire and behavioral evaluation repeated.

Data Analysis

Descriptive statistics (mean, percentage, standard deviation) were used to summarize participant characteristics and satisfaction scores. Inferential statistics, including t-tests and one-way ANOVA, were used to assess differences in behavioral outcomes based on participant demographics. Statistical significance was set at $p < 0.05$.

Research Ethics

This study was approved by the Human Research Ethics Committee All participants provided written informed consent. Confidentiality and the right to withdraw were assured throughout the study.

Results

Phase 1: Program Development

The family-inclusive exercise program was developed based on a review of relevant literature and consultations with experts in occupational therapy and special education. The development process followed five key stages:

1. Building Relationships and Communication: Designed to enhance trust between children and families through play and emotional connection.
2. Shared Goal Setting: Families collaborated with professionals to set realistic exercise goals tailored to each child's abilities.
3. School-Based Exercise Activities: Included 5-minute warm-ups, 20-minute structured activities, and 5-minute cool-downs. Conducted 5 days/week for 3 weeks.
4. Home-Based Implementation: Families received manuals and guidance to implement exercises at home.
5. Telephone Follow-Ups: Provided ongoing support and encouraged adherence to the program.

This structured program ensured continuity between school and home environments, empowering families to support behavioral development effectively. This study consists of Five Activity, outlined as follows:

Activity 1: Building Relationships to Foster Trust Between Children with Autism and Their Families

This initial activity emphasized play and emotional connection. After three weeks of implementation: Mean score for behavior change related to family relationship was 4.34 (SD. = 0.77), indicating a very high level. The data analysis revealed that relationship-building is a crucial step in reducing self-stimulatory behaviors in children with autism. Families participating in the program reported that children with autism often exhibit repetitive behaviors such as hand-flapping, rocking, or staring at objects for extended periods, which are often a result of stress and anxiety.

Establishing a positive relationship between the child and the family helps foster trust and readiness for engaging in exercise activities. Close interaction, such as playing together, using positive language, and expressing warmth emotionally, contributes to this process. Moreover, the use of appropriate communication techniques, such as body language, eye contact, and visual symbols, helps the child better understand what the family is trying to communicate, thus making the child feel safe and significantly reducing repetitive behaviors.

Activity 2: Setting Goals for Family-Inclusive Exercise Activities

Families set personalized goals for their children in collaboration with nurses or special educators.Mean score for observed positive behavioral change was 4.27 (SD. = 0.76) – rated very high. Setting shared goals between the family and experts, such as nurses or special education teachers, ensures that the exercise activities have a clear direction and are appropriate to the child's capabilities. The families received training on various activities, such as walking, jump rope, and yoga, and participated in return demonstrations to confirm their understanding. Observations showed that families who actively engaged in the program were more successful in encouraging their children to participate, resulting in a noticeable reduction in self-stimulatory behaviors.

Activity 3: Implementing Exercise Activities with Children with Autism at School

The exercise program consisted of three main activities: a 5-minute warm-up, a 20-minute goal-oriented exercise session, and a 5-minute relaxation period. The activities alternated between leaders and included repeating various exercises in sequence, totaling 30 minutes per session. The program ran five days a week for three weeks, totaling 8 hours. The results Mean score for routine adaptation improved significantly: 4.41 (SD. = 0.82) – highest among all domains indicated that consistent participation in these activities significantly reduced the repetitive behaviors of children with autism.

Activity 4: Implementing Exercise Activities with Children with Autism at Home by Families

Families received a manuals and guidance for using the exercise activities with children with autism and were able to carry out the activities at home continuously.

The use of the manual helped increase the understanding and confidence of the families in conducting activities with the children, The results Mean score for Communication technique score: 4.26 (SD. = 0.73) – very high. leading to a reduction in repetitive behaviors and strengthening family relationships.

Activity 5: Telephone Follow-Up and Encouragement for Families to Use Exercise Activities at Home

Follow-up through telephone Ongoing weekly phone calls reinforced program adherence. reminders showed that families who received continuous support were more likely to consistently implement the exercise activities at home. The results Mean score for social interaction a mean score of 3.83 (SD. = 0.69), rated high. Children displayed a reduction in repetitive behaviors and showed improvements in both physical and emotional development.

In conclusion, the research findings demonstrate that a systematically implemented exercise program involving family participation can effectively reduce self-stimulatory behaviors in children with autism while also enhancing positive family relationships.

Phase 2: Program Effectiveness Evaluation

To evaluate the program's impact on self-stimulatory behaviors, a pre-post design was used.

Analysis of Self-Stimulatory Behavior After Using the Exercise Program

1. General Information of Respondents

From the general information of the respondents, it was found that regarding gender, most respondents were male (54.35%), while females accounted for 45.65%. This indicates a relatively high involvement of men in the caregiving role for autistic children within families. Regarding age, the largest group was aged 30-40 years (56.52%), followed by those under 30 years (23.91%), reflecting that most primary caregivers are working-age individuals. Regarding duration of caring for an autistic child, the majority had been caregiving for 1-3 years (52.17%), while 36.96% had cared for an autistic child for more than 3 years, and only 10.87% had been caring for 6 months - 1 year. This data can be used to guide the design of a support program that aligns with the experiences and needs of caregivers in each group.

Table 1 General information of the survey respondents.

Demographic Information	Number (n = 46)	Percentage (%)
Gender		
- Male	25	54.35%
- Female	21	45.65%
Age (years)		
- Under 30 years	11	23.91%
- 30-40 years	26	56.52%
- 41-50 years	7	15.22%
- Over 50 years	2	4.35%
Duration of Caring for an Autistic Child		
- 6 months - 1 year	5	10.87%
- 1-3 years	24	52.17%
- More than 3 years	17	36.96%

2. Mean and Standard Deviation of Self-Stimulatory Behaviors in Each Area

From mean and standard deviation of self-stimulatory behaviors revealed that, overall, building relationships and using communication techniques had a positive impact on the behavior of autistic children, with an overall mean of 4.22 and a standard deviation of 0.76, indicating a high level. Among the various aspects, the highest mean was in changes in daily routines ($\bar{x}$ = 4.41, SD. = 0.82), which was at the very high level. This demonstrates that adjusting the child's routine had a significant impact on reducing self-stimulatory behaviors. Following that, relationship with family ($\bar{x}$ = 4.34, SD. = 0.77) and positive impact on child's behavior ($\bar{x}$ = 4.27, SD. = 0.76) also rated very high. This reflects that a positive family relationship plays an important role in helping the child control their behavior. Communication techniques ($\bar{x}$ = 4.26, SD. = 0.73) also rated very high, showing that body language, eye contact, and symbols helped children understand and respond better to social situations. Meanwhile, interaction with others ($\bar{x}$ = 3.83, SD. = 0.69) was at a high level, indicating that creating interactions with those around the child is important for the behavior of autistic children.

In summary, the analysis shows that relationship-building, communication techniques, and family support are critical factors in reducing self-stimulatory behavior in autistic children, which should be taken into consideration when developing care approaches and future activities. (Table 2)

Table 2 Mean and standard deviation of self-stimulatory behaviors in Each Area.

Self-Stimulatory Behavior	Mean ($\bar{x}$)	Standard Deviation (SD.)	Response Level
1. Interaction with others	3.83	0.69	High
2. Communication techniques	4.26	0.73	Very High
3. Relationship with family	4.34	0.77	Very High
4. Positive impact on child's behavior	4.27	0.76	Very High
5. Changes in daily routines	4.41	0.82	Very High
Overall Mean	4.22	0.76	High

Remark (Satisfaction Level: 1.00-1.80 = Very Low, 1.81-2.60 = Low, 2.61-3.40 = Moderate, 3.41-4.20 = High, 4.21-5.00 = Very High)

3. Analysis of Differences in Self-Stimulatory Behavior Levels

3.1 Test of Differences in Self-Stimulatory Behavior by Gender (t-test)

From analysis using t-test found no significant difference in the level of self-stimulatory behavior between male and female autistic children (p = 0.312, $p > 0.05$), meaning that the gender of the autistic child does not influence the level of self-stimulatory behavior in this program. (Table 3)

Table 3 Test of differences in self-stimulatory behavior by Gender (t-test).

Gender	Mean ($\bar{x}$)	Standard Deviation (SD.)	t-value	p-value	Test Result
Male	4.18	0.75	1.02	0.312	No significant difference
Female	4.27	0.78	-	-	-

Remark (If p-value ≤ 0.05, there is a statistically significant difference)

3.2 Test of Differences in Self-Stimulatory Behavior by Age Group (ANOVA)

The ANOVA analysis found a statistically significant difference in the level of self-stimulatory behavior by the age of the caregivers (p = 0.043, $p < 0.05$). The group aged 30-40 years had the highest level of self-stimulatory behavior ($\bar{x}$ = 4.31), while the group aged over 50 years had the lowest ($\bar{x}$ = 3.98). This could be due to differences in the ability to participate in activities or varying perspectives at different ages. (Table 4)

Table 4 Test of Differences in Self-Stimulatory Behavior by Age Group (ANOVA).

Age Group (years)	Mean ($\bar{x}$)	Standard Deviation (SD.)	F-value	p-value	Test Result
Under 30 years	4.12	0.74	2.89	0.043	Significant difference
30-40 years	4.31	0.77	-	-	-
41-50 years	4.22	0.75	-	-	-
Over 50 years	3.98	0.72	-	-	-

Remark (If *p-value* < 0.05, there is a statistically significant difference)

4. Parental Satisfaction

High satisfaction was reported with the program's clarity, ease of implementation, and effectiveness. Parents appreciated the support materials and ongoing follow-up.

Conclusion

This study confirmed that a family-inclusive exercise program can effectively support the reduction of self-stimulatory behaviors in children with autism. Through structured collaboration between families and professionals, along with consistent home and school-based implementation, the program promoted emotional bonding, improved communication, and enhanced children's behavioral self-regulation. The involvement of parents as active participants played a critical role in reinforcing positive behaviors and fostering a supportive developmental environment. These findings suggest that integrating families into intervention programs is not only feasible but essential for long-term behavioral improvement in children with autism.

Discussions

The findings of this study revealed that the implementation of a family-inclusive exercise program had a significant effect in reducing self-stimulatory behaviors in children with autism. The highest impact was seen in routine adjustments ($\bar{x}$ = 4.41), followed by improved family relationships ($\bar{x}$ = 4.34) and communication techniques ($\bar{x}$ = 4.26). These findings support the first research objective—to develop an exercise program involving

family participation—and the second objective—to evaluate its effect on reducing self-stimulatory behaviors.

In terms of caregiver characteristics, although the majority of respondents were male (54.35%), statistical analysis showed no significant difference in the effectiveness of the intervention between male and female caregivers ($p > 0.05$). This suggests that gender does not influence the outcome of the program in terms of reducing self-stimulatory behaviors, aligning with findings from Jull & Miranda (2011), who noted that the presence of a structured intervention had greater influence than caregiver demographics**.**

Conversely, a statistically significant difference was found in outcomes based on caregivers' age ($p < 0.05$). Caregivers aged 30–40 years showed the greatest reduction in their children's self-stimulatory behaviors. This may be because working-age adults are generally more active, adaptable, and responsive to structured interventions. They may also possess higher levels of physical and emotional readiness to engage in interactive activities with their children. This result is consistent with Roberts et al. (2011), who found that younger parents showed greater involvement and responsiveness to early intervention programs, leading to better outcomes for children.

The findings also align with the ecological systems theory of Bronfenbrenner (1979), which emphasizes that a child's development is shaped by active interaction with their immediate family environment. When caregivers are equipped with effective communication tools and exercise strategies, they become powerful agents in shaping the child's behavior and reducing undesirable symptoms, such as repetitive or self-stimulatory behaviors.

Furthermore, this study introduces a new dimension by highlighting those structured physical activities**,** when paired with family emotional bonding and follow-up, can produce stronger and quicker behavioral effects than either factor alone. This contrasts with the findings of Schertz et al. (2016), who suggested that interventions without family continuity produced only temporary changes.

In summary, the results indicate that a well-designed, family-inclusive exercise program not only reduces self-stimulatory behaviors but also enhances communication and emotional bonds between child and caregiver. These outcomes reinforce the

significance of integrating family in therapeutic interventions and suggest the need for further long-term studies to sustain and expand these behavioral gains.

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