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Comparison of aberrant behavior profiles across different severity levels of autism symptoms among Thai children aged 2-9 years with autistic spectrum disorder

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ABSTRACT

Background: The incidence of autism spectrum disorder (ASD) has been increasing steadily, thus posing a substantial public health concern in Thailand and globally. Individuals with ASD, who frequently experience challenges related to their behavior and emotions, have neurodevelopmental disorders. The Aberrant Behavior Checklist (ABC) represents one available tool for addressing these issues.

Objectives: This study aimed to explore and compare aberrant behavior profiles across different severity levels of autism among Thai children aged 2-9 years with ASD.

Materials and methods: The participants comprised 71 parents and young children with ASD, recruited online, particularly from an online Facebook community of parents from diverse regions of Thailand. A convenience sampling method was employed for selecting the participants. The research tools consisted of 3 parts for collecting data. Demographic data were used for collecting such information about the participants. A Thai version of the Autism Treatment Evaluation Checklist (Thai-ATEC) was utilized to measure autism symptom severity, and the Aberrant Behavior Checklist-Community (ABC-C) Thai Version was used for evaluating behavioral problems from caregiver administration.

Results: A total of 71 ASD participants were identified, of which 5, 15, and 51 displayed mild, moderate, and severe symptoms of ASD, respectively. The mean scores of aberrant behaviors, as assessed by the ABC-C Thai version, showed an increase across all four subscales and the total score in response to the severity levels of ASD symptoms. The study findings, including reported correlations between aberrant behaviors and severity levels of autism symptoms, revealed predominantly high correlation coefficients (rs ranging from 0.27 to 0.93). Furthermore, a positive correlation was identified between the four subscales of the Thai-ATEC assessment and the five subscales of the ABC-C Thai version, highlighting their interrelated nature. For more detailed analysis, the ASD participants were categorized into two groups: a “mild-moderate” group consisting of 20 participants and a “severe” group comprising 51 participants. Subsequently, a comparison was made between the mean scores of the ABC-C subscales and total scores. The results of this comparison demonstrated significant distinction in all five subscales and the total score of the ABC-C Thai version between the “mild-moderate” and “severe” groups of ASD participants. These findings shed light on the notable differences in aberrant behavior profiles between individuals with varying levels of autism symptom severity.

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Conclusion: The aberrant behaviors increased in response to severe symptoms of ASD. This might be useful for clinical purposes, and assessing aberrant behaviors may help understand behavioral problems and severity levels of ASD and tailoring occupational therapy interventions.

Introduction

Autism spectrum disorder (ASD) is currently recognized as a diverse set of neurodevelopmental disorders, exhibiting a range of characteristics, including challenges in social interaction, communication, and the presence of repetitive behaviors.[1] A retrospective cohort study conducted in 2023 used data from a large pediatric primary care network in the United States, and the prevalence of ASD within the cohort was found to be 3.2%. The frequency of ASD was greater in Asian and non-Hispanic black children and children living in neighborhoods with higher socioeconomic risk.[2] Over the past years, the prevalence of ASD has been increasing consistently and emerging as a significant public health concern. Previous research reported that the incidence rate of ASD among Thai children was 6.94 per 10,000 in 2002, and the number of new cases is expected to continue to rise.[3,4]

ASD is a multifaceted condition that manifests with diverse symptoms and varying levels of severity, which varies from child to child. Additionally, there are numerous associated atypical behaviors, including eating patterns, gastrointestinal symptoms, food intolerance, sleep disturbances, epilepsy, and attention deficit hyperactivity disorder.[5] These additional symptoms make clinical diagnosis of ASD more difficult and add to the difficulty of treating them. Clinical traits outlined by the Diagnostic and Statistical Manual of Mental Disorders (DSM)-5 clinical criteria are used to identify ASD symptoms. According to the severity of the impairment, the DSM-5 further categorizes ASD into three levels: levels 1, 2, and 3 require support, significant support, and very substantial support, respectively.[6] Furthermore, challenging, or aberrant behaviors, commonly observed in individuals with ASD, include repetitive actions, self-injurious behaviors, aggression, and hyperactivity. A physician performs comprehensive behavioral examinations to determine the clinical traits associated with ASD.[7] To evaluate the behavioral problems or challenging behaviors displayed by children with ASD, medical professionals use the Aberrant Behavior Checklist (ABC), an evidence-based scale. Agitation/Crying, Irritability, Noncompliance/Hyperactivity, Social Withdrawal/Lethargy, and Stereotypic Behavior are the five dimensions covered by the ABC scale.[8] The prescription of drugs and dosage levels for children with ASD depends on these clinical and behavioral traits.

Early detection of ASD is essential because it enables prompt intervention, which lowers lifelong healthcare expenses. Families, educators, and direct service providers play a crucial role in influencing the lives of individuals with ASD, demonstrating the significant impact of ASD intervention. Occupational therapists are health professionals who contribute by providing insights into present functioning and behavioral issues and subsequently guiding intervention in ASD. However, while the core symptoms of ASD are recognized, a knowledge gap concerning accompanying aberrant symptoms remains, especially within the context of varying levels of symptom severity in the Thai ASD population. This study sought to address this gap through the exploration and comparison of aberrant behavior profiles across different severity levels of autism among Thai children aged 2-9 years. The chosen age range is particularly significant due to its critical developmental window, offering substantial potential for effective early interventions. By bridging the knowledge gap, this study aims to contribute to a more refined understanding of the behavioral challenges associated with different levels of ASD severity, thus enabling more effective and tailored interventions that address specific challenges, facilitate skill development, and enhance these children's overall quality of life.

Materials and methods

Participants and procedures

The research protocol for this study received approval from the Institutional Review Board (IRB) at Mahidol University (MUSSIRB COA No. 2022/011.0202). In this cross-sectional study, anonymous online questionnaires were employed to investigate parental perceptions concerning aberrant behaviors and the severity of autism symptoms in children with ASD. A convenient sampling method was employed for participant selection. Participants initiated the process by expressing their agreement with three screening statements: 1) I am a parent of a child aged between 2 and 9 years; 2) My child has received a diagnosis of autism, ASD, or pervasive developmental disorder not otherwise specified (PDD-NOS); and 3) I affirm that I am at least 18 years old and proficient in reading Thai. Subsequently, only individuals who confirmed agreement with all three screening statements and provided online informed consent were eligible to proceed by responding to the remaining survey sections. A total of 71 parent-child pairs were recruited (Figure 1). The recruitment occurred specifically within an online community on Facebook, which included parents from various regions across Thailand. The demographic characteristics of the children with ASD are presented in Table 1. Their average age was 4.51±1.9 years, comprising 61 boys and ten girls. Most of the children were firstborn. Of the participants, 28 children (39.4%) were not attending school, while 43 (60.6%) were enrolled as students. ASD symptom severity in the participants was classified as mild in 7% of cases (N=5), moderate in 21.1% (N=15), and severe in 71.8% (N=51). Table 2 provides the demographic characteristics of the parents of children with ASD (N=71). The average age of the parents was 35.1±6.5 years, consisting of 20 males and 51 females. Most parents were married, had completed a bachelor's degree, and were self-employed.

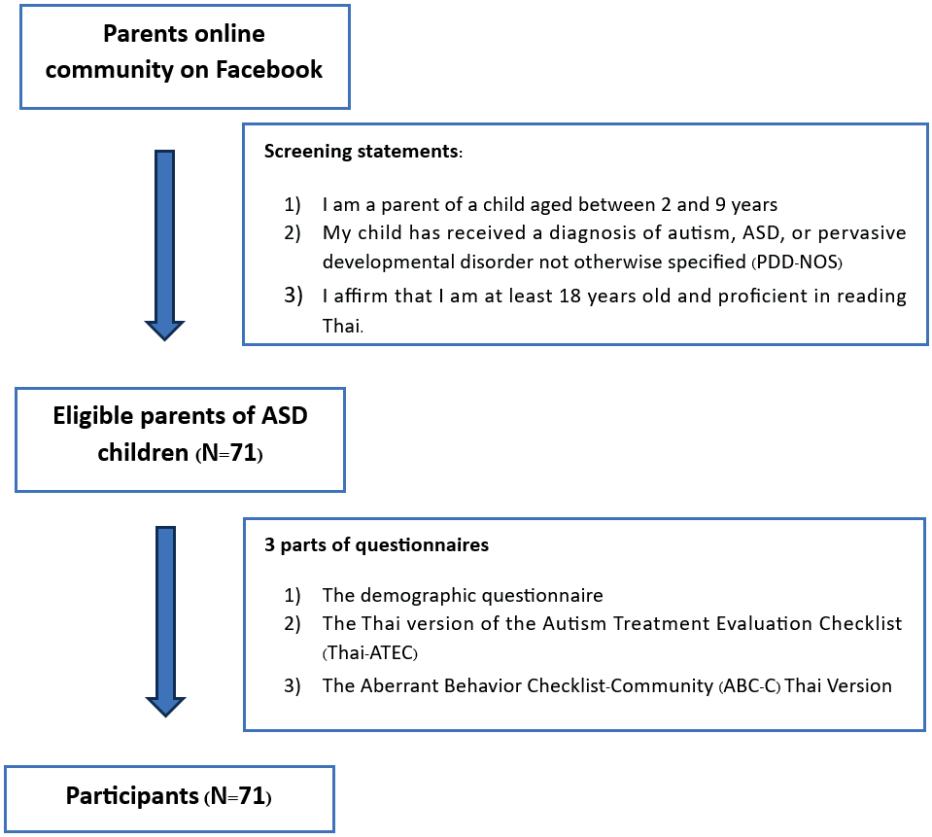

Figure 1. *Flowchart of study protocol.*

Table 1 Demographic characteristics of children with ASD (N=71).

Demographic Variable		N	%
Age, Mean (SD)		4.51 (1.9)	
2.0-2.11		3	4.2
3.0-3.11		25	35.2
4.0-4.11		18	25.4
5.0-5.11		7	9.9
6.0-6.11		6	8.5
7.0-7.11		4	5.6
8.0-8.11		4	5.6
9.0-9.11		4	5.6
Sex			
Male		61	85.9
Female		10	14.1
Birth order			
1st born		53	74.6
2nd born		17	23.9
3rd born		1	1.4
Education			
Not enrolled		28	39.4
Nursery		15	21.1
Preschool		17	23.9
Primary school		11	15.5
Autistic severity level			
ATEC	Mild	5	7.0
	Moderate	15	21.1
	Severe	51	71.8

Table 2 Demographic characteristics of parents of children with ASD (N=71).

Demographic Variable	N	%
Age, Mean (SD)	35.1 (6.5)	
Sex		
Male	20	28.2
Female	51	71.8
Marital status		
Single	2	2.8
Married	63	88.7
Separated	6	8.5
Highest Educational Level		
Less than bachelor	17	23.9
Bachelor	41	57.7
Higher than bachelor	13	18.3
Occupation		
Public	12	16.9
Private	16	22.5
Self-employed	43	60.6
Monthly Income (Baht/month)		
<15,000	8	11.2
15,000-30,000	12	16.9
30,001-45,000	16	22.5
45,000-60,000	16	22.5
>60,0001	19	26.8

Measures

The research tools consisted of 3 parts for collecting data. The demographic questionnaire was used for collecting demographic information on the children and parents. To assess the severity levels of autism symptoms, the Thai version of the Autism Treatment Evaluation Checklist (Thai-ATEC) was utilized and administered by caregivers. The Thai-ATEC provides a total score and four subscale scores. The first three subscales involve questions scored on a scale of 0-2, while the fourth subscale, Health/Physical/Behavior, is scored on a 0-3 point scale. The ATEC can be accessed online or obtained in a printed format. The first subscale, Speech/Language/Communication, comprises 14 items with a score range of 0-28 points. The Sociability subscale consists of 20 items, allowing participants to score 0-40. The third subscale, Sensory/Cognitive awareness, contains 18 items, with a score range of 0-36. Lastly, the Health/Physical/Behavior subscale includes 25 items. The scores from each subscale are combined to calculate a Total Score, which can range from 0 to 179 points. A lower score on the Thai-ATEC indicates lower severity levels of ASD symptoms. In this study, a cut-off point of scores ≤38 was used to differentiate between children with mild ASD symptoms and those with more pronounced ones. The sensitivity of this cut-off point was 94%, indicating its ability to identify children with mild ASD symptoms accurately. In comparison, specificity was 61.9%, suggesting a moderate level of correctly classified children without mild symptoms. The area under the receiver operating characteristic (ROC) curve, which assesses the overall performance of the cut-off point, was found to be 90%. Similarly, another cut-off point of scores ≥68 was employed to distinguish between children with severe ASD symptoms and milder ones. This cut-off point demonstrated a sensitivity of 94% and specificity of 62.8%, indicating its ability to identify children with severe ASD symptoms effectively while moderately classifying those without them. The area under the ROC curve for this cut-off point was 85%. Furthermore, the inter-rater reliability of the Thai-ATEC was found to be very strong, with an intra-class correlation coefficient (ICC) of 0.97. This indicates a high level of agreement between different raters when using the Thai-ATEC to evaluate ASD symptoms.[9]

The Aberrant Behavior Checklist-Community (ABC-C) Thai Version was utilized as the final assessment tool. This instrument primarily focuses on observing and evaluating behavioral problems or challenging behaviors. It consists of 58 items, categorized into five behavior domains:

Irritability, agitation, and crying (15 items), Lethargy and social withdrawal (16 items), Stereotypic behavior (7 items), Hyperactivity and non-compliance (16 items), and Inappropriate speech (4 items). Parents completed the 58-item ABC-C questionnaire, which provided their perception of their child's behaviors over the previous four weeks. Each item was scored on a 4-point scale, ranging from 0 (not a problem) to 3 (severe problem), to calculate raw subscale scores. The ABC-C Thai Version demonstrates high internal consistency, with a Cronbach's alpha coefficient of 0.922. It also exhibits strong inter-rater reliability and test-retest reliability, with intra-class correlation coefficients (ICC) of 0.90 (95% CI: 0.81-0.95) and 0.92 (95% CI: 0.86-0.96), respectively. Furthermore, the ABC-C Thai Version shows a strong positive correlation with the Clinical Global Impression-Severity Scale (CGI-S), indicating good concurrent validity with a correlation coefficient of 0.87 (p<0.01).[10]

Procedures

Varied demographic information was gathered, such as gender, age, education, occupation, and more, from both parents and children with ASD. The ASD children were evaluated using the ABC-C Thai version and Thai-ATEC assessments. This study followed a cross-sectional design and utilized anonymous online questionnaires (Figure 1). Before the survey, researchers conducted demonstrations and made necessary adjustments to ensure the scientific validity, rationality, and relevance of the survey plan. The quality of the questionnaire was maintained by making the core question require an answer. The questionnaire was distributed to participants through an online survey platform (Google Form) and shared via the ASD Thai parent community on social media platforms like Line and Facebook. The survey was conducted between February 2 and September 30, 2022. All participants provided electronic informed consent, which included information about the study's purpose, procedures, potential benefits, voluntary participation, and contact details of the researchers.

Data analysis

The statistical analysis was conducted using SPSS 23.0 software. Descriptive statistics, such as percentages, means, and standard deviations, were calculated for socio-demographic variables and participant characteristics. Mann-Whitney U Test was employed to compare the groups. In this exploratory report, significance was considered at p<0.05.

Results

The autism severity level and aberrant behaviors among ASD participants

Tables 3 and 4 provide a detailed overview of autism severity levels and aberrant behaviors observed in 71 children diagnosed with ASD. Among these children, 5, 15, and 51 exhibited mild, moderate, and severe symptoms, respectively, across all areas assessed by the Thai-ATEC evaluation.

Table 3. Distribution of autism severity level among ASD participants (N=71).

Thai-ATEC Subscale	Autism Severity Level, N (%)			Total (N=71) Range (Mean±SD)
	Mild (N=5) (Mean±SD)	Moderate (N=15) (Mean±SD)	Severe (N=51) (Mean±SD)	
Speech/Language/Communication	3.4±3.4	18.4±8.7	22.6±5.6	0-28 (18.4±8.7)
Sociability	7.4±6.5	25.0±11.2	30.5±7.6	0-40 (25.0±11.2)
Sensory/Cognitive Awareness	6.2±3.8	22.1±10.0	27.1±6.4	1-35 (22.1±10.0)
Health/Physical/Behavior	8.0±2.9	27.7±12.9	32.9±10.6	3-52 (27.7±12.9)
ATEC Total Score	25.0±11.2	93.2±37.9	113.0±22.6	12-147 (93.2±37.9)

Table 4 Distribution of aberrant behaviors among ASD participants (N=71).

ABC-C Thai version Subscale	Autism Severity Level			Total (N=71) Range (Mean±SD)
	Mild (N=5) Mean±SD	Moderate (N=15) Mean±SD	Severe (N=51) Mean±SD	
Irritability, agitation, and crying	2.8±1.8	12.6±10.1	29.7±8.9	0-43 (24.2±12.7)
Lethargy and social withdrawal	4.8±2.9	9.5±7.6	28.0±9.7	0-44 (22.5±12.6)
Stereotypic behavior	1.6±1.5	4.3±4.5	12.4±5.8	0-21 (9.9±6.6)
Hyperactivity and non-compliance	10.4±5.6	13.7±8.2	33.0±8.2	1-46 (27.3±12.2)
Inappropriate speech	2.6±2.6	3.1±2.7	5.7±3.7	0-12 (4.9±3.7)
ABC-C Total Score	21.8±5.3	42.1±28.7	106.9±28.7	7-143 (87.2±42.2)

The scores obtained from the ABC-C Thai version, which measures aberrant behaviors, showed a consistently upward trend in response to the severity levels of ASD symptoms. This pattern was evident across all four subscales and the overall total score. In breaking down the results by specific subscales, it is notable that mean scores for irritability, agitation, and crying were 2.8, 12.6, and 29.7 for mild, moderate, and severe symptoms, respectively. For lethargy and social withdrawal, the respective mean scores were 4.8, 9.5, and 28.0 for mild, moderate, and severe symptoms. Similar trends were observed for stereotypic behavior, with mean scores of 1.6, 4.3, and 12.4 for mild, moderate, and severe symptoms, respectively.

Regarding hyperactivity and non-compliance, mean scores were 10.4, 13.5, and 33.0 for mild, moderate, and severe symptoms, respectively. At the same time, inappropriate speech had respective mean scores of 2.6, 3.1, and 5.7 for mild, moderate, and severe symptoms. Furthermore, the mean total score obtained from the ABC-C Thai version exhibited an incremental rise corresponding to the severity of ASD symptoms. Specifically, the mean total score was 21.8, 42.1, and 106.9 for mild, moderate and notably elevated severe symptoms, respectively.

Comparison of aberrant behavior profiles across different severity levels of autism symptoms

The classification of severity levels in this study involved grouping participants into "mild-moderate" and "severe" categories, a decision shaped by the distribution of individuals within these groups. While the conventional categorization of severity levels in ASD often encompasses three levels, it is important to note that the specific sample in this study had a relatively smaller number of participants exhibiting "mild" and "moderately severe" symptoms. In this study, the 71 ASD participants were divided into two distinct groups: a "mild-moderate" group consisting of 20 individuals and a "severe" group comprising 51. Then. the mean difference in the ABC-C Thai version subscale and total scores was compared. Results of the analysis comparing ABC-C Thai version subscale scores with autism severity levels are presented in Table 5 and Figure 2. When compared to the mild-moderate autism severity group, the mean scores for all ABC-C Thai version subscales were considerably higher in the severe autism severity group (p<0.001). In particular, the severe group outperformed the mild-moderate one considerably in terms of mean scores for Irritability, Agitation, Crying, Lethargy/ Social Withdrawal, Stereotypic Behavior, Hyperactivity/ Noncompliance, and Total Score (p<0.001). In addition, the mean scores for inappropriate speech varied significantly between the two severity groups (p=0.005). These results suggest a linear relationship between the scores of aberrant behaviors assessed by the ABC-C Thai version subscales and the severity levels of autism symptoms.

Discussion

This study aimed to explore and compare aberrant behavior profiles among Thai children with ASD across different severity levels of autism symptoms. The sample size for this study comprised 71 pairs of parents and children with ASD. Among ASD children, 5, 15, and 51 exhibited mild, moderate, and severe symptoms, respectively. For analysis, this study divided participants into two distinct severity groups: mild-moderate and severe. The comparison of mean scores across ABC-C Thai version subscales between these two groups showcased substantial differences. Specifically, the severe group demonstrated markedly higher scores across multiple ABC-C Thai version subscales, including Irritability, Agitation, Crying, Lethargy/Social Withdrawal, Stereotypic Behavior, Hyperactivity/Noncompliance, and Total Score. This statistically significant difference indicates that individuals with more severe autism symptoms exhibit more pronounced aberrant behaviors across various domains. These findings are consistent with previous research that has shown a positive correlation between the severity of autism symptoms and the presence of aberrant behaviors. Individuals with more severe autism symptoms tend to exhibit higher levels of Irritability, Agitation, Social Withdrawal, Stereotypic Behavior, and Hyperactivity/Noncompliance.[11-14]

Significant differences were evident across all five subscales and the overall ABC-C Thai version score when comparing mean scores between the mild-moderate and severe ASD groups. Interestingly, this study demonstrates a smaller disparity in mean scores for Inappropriate Speech between these two severity groups, underscoring how autism severity influences specific aberrant behaviors.

Table 5 Mean difference in ABC-C Thai version subscale and total scores by severity level.

ABC-C Thai version subscale	Autism Severity Level		*p* value
	Mild-Moderate (N=20) Range (Mean±SD)	**Severe (N=51)** Range (Mean±SD)	
Irritability, Agitation, and Crying	10.2±9.7	29.7±8.9	0.000
Lethargy/Social Withdrawal	8.3±6.9	28.0±9.7	0.000
Stereotypic Behavior	3.7±4.1	12.4±5.8	0.000
Hyperactivity/Noncompliance	12.7±7.7	33.0±8.2	0.000
Inappropriate Speech	2.9±2.6	5.7±3.7	0.005
ABC-C Total Score	37.1±26.4	106.9±28.7	0.000

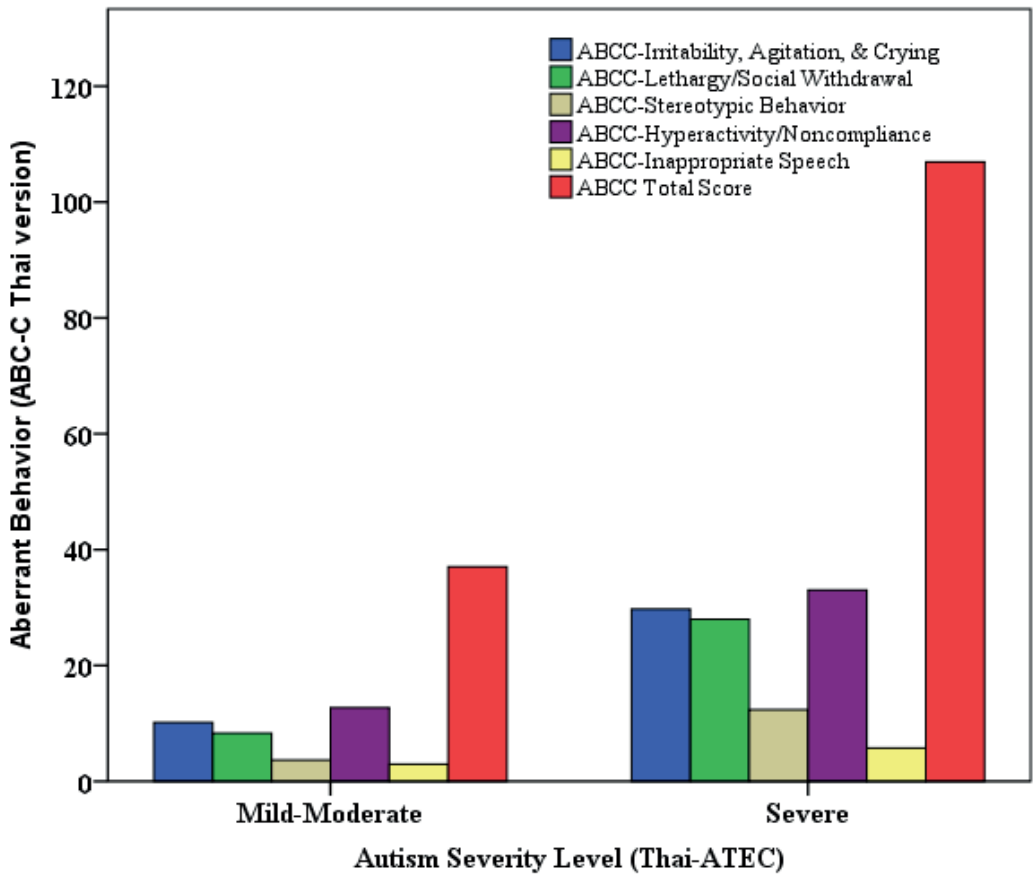

Figure 2. *Comparison of aberrant behavior profiles across different severity levels of autism symptoms.*

Remarkably, despite Inappropriate Speech being comparatively less frequent or intense than other behaviors, it still shows a notable distinction between the two severity groups. Individuals with ASD more frequently exhibit challenging behaviors, such as stereotypies, aggression, property destruction, and self-injury, which persons with ASD often exhibit.[13-15] These actions frequently include extreme severity, endangering the child's physical safety and the safety of people around him or her, and possibly limiting access to community and/or educational opportunities.[16] Additionally, if the behaviors go untreated, they will likely persist into adulthood and increase in severity as the child matures physically.[16]

While this study's findings regarding differences in aberrant behavioral profiles across severity groups in children with ASD were in line with expectations, delving deeper into several dimensions can enrich our comprehension. Notably, this study marks the first exploration of these patterns within the Thai context and carries critical clinical implications. Identifying unique behavioral profiles across severity groups underscores the urgency of tailored interventions that address the specific challenges encountered by individuals with varying autism severity levels. Utilizing the ABC-C Thai version subscales to assess aberrant behaviors offers valuable insights into the severity of autism symptoms. These findings can guide the design of interventions that align closely with the individual needs of those with different severity levels, thereby optimizing their therapeutic progress and overall well-being. This entails adopting a holistic approach encompassing diverse strategies, including sensory modulation techniques, social skills training, adaptive strategies, and cognitive-behavioral interventions.

As occupational therapists, recognizing distinct behavioral patterns across severity groups highlights the imperative of finely tuned interventions that cater to the unique needs of individuals with varying severity levels. By crafting interventions tailored to their specific challenges, occupational therapists play a pivotal role in enhancing functional abilities, independence, and overall quality of life. Moreover, acknowledging the ever-evolving nature of the individuals' needs, interventions must be assessed continually and adapted as individuals traverse the spectrum of autism severity. Ultimately, by aligning therapeutic strategies with the diverse behavioral profiles observed across severity groups, occupational therapists contribute significantly to advancing well-rounded support for individuals with ASD. This holistic and person-centered approach not only benefits the individual but also enriches our collective understanding of the complexities of autism and the effectiveness of tailored interventions.

Limitation

It is important to note that this study has some limitations. First, the sample size was rather small, limiting how broadly the results could be applied. These findings

need to be confirmed in larger, more diverse investigations in the future. Due to the distribution of the questionnaire being through an online survey platform and social media platforms such as Line and Facebook, control over the number of participants in each ASD severity subgroup was limited. Future studies should attempt to recruit a greater and more evenly distributed number of individuals in each severity subgroup to create a more representative sample.

Additionally, it is advised to use various questionnaire dissemination techniques to improve data collecting and guarantee a broader pool of participants. To reach a wider audience and include participants without access to or preference for Internet surveys could entail sending questionnaires via traditional mail in addition to online platforms. Using multiple data collection methods can help capture a broader range of perspectives and improve the reliability and generalizability of the findings. Second, the study relied on caregiver-reported data, which may be subject to bias. Incorporating objective measures and gathering input from multiple sources, including parents, could provide a more comprehensive understanding of aberrant behaviors in ASD.

Conclusion

All individuals with ASD in this study exhibited behavioral problems, and the severity of these problems increased with the severity of ASD symptoms. Strong positive correlations were found between aberrant behaviors and the severity of autism symptoms, which, as they became more severe, aberrant behaviors became more pronounced. Additionally, positive correlations were observed between the subscales of the Thai-ATEC and ABC-C Thai Version, suggesting that these measures capture similar constructs. Furthermore, the results of this study revealed significant differences in all five subscales and the total score of the ABC-C Thai version between the mild-moderate and severe ASD groups. This suggests that the presence of aberrant behaviors is more prominent in individuals with severe ASD symptoms when compared to those with mild-moderate ones. These findings have important implications for occupational therapy interventions, highlighting the need for screening and addressing aberrant behaviors in clinical settings. By assessing aberrant behaviors and tailoring interventions accordingly, occupational therapy services for children with ASD can better address the behavioral problems and severity of ASD symptoms.

The association between autism severity and aberrant behaviors, as measured by the ABC-C Thai version subscales, provides valuable evidence for understanding the relationship between these variables. It underscores the importance of considering and addressing aberrant behaviors as an integral part of comprehensive treatment approaches for individuals with ASD. By targeting and managing these behaviors, clinicians and therapists can improve the overall outcomes and well-being of individuals with ASD.

Conflicts of Interest

The authors declare no conflict of interest.

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References

[1] Association AP. Diagnostic and statistical manual of mental disorders: DSM-5: American psychiatric association Washington, DC; 2013.

[2] Wallis KE, Adebajo T, Bennett AE, Drye M, Gerdes M, Miller JS, *et al*. Prevalence of autism spectrum disorder in a large pediatric primary care network. Autism. 2023:13623613221147396. doi: 10.1177/13623613221147396.

[3] Plubrukarn R, Piyasilp V, Moungnoi P, Tanprasert S, Chutchawalitsakul V. Trend study of autistic spectrum disorders at Queen Sirikit National Institute of Child Health. J Med Assoc Thail. 2005; 88: 891-7.

[4] Hansakunachai T, Roongpraiwan R, Sombuntham T, Limprasert P, Ruangdaraganon N. A new structured interview for children with autism spectrum disorder based on the DSM-IV. J Med Assoc Thail. 2014; 97: S7-S14.

[5] Li C, Liu Y, Fang H, Chen Y, Weng J, Zhai M, *et al*. Study on aberrant eating behaviors, food intolerance, and stereotyped behaviors in autism spectrum disorder. Front Psychiatry. 2020; 11: 493695. doi: 10.3389/fpsyt.2020.493695.

[6] American Psychiatric Association, D. and A. P. Association (2013). Diagnostic and statistical manual of mental disorders: DSM-5, American psychiatric association Washington, DC.

[7] Megerian JT, Dey S, Melmed RD, Coury DL, Lerner M, Nicholls CJ, *et al*. Evaluation of an artificial intelligence-based medical device for diagnosis of autism spectrum disorder. NPJ Digit Med. 2022; 5(1): 57. doi: 10.1038/s41746-022-00598-6.

[8] Aman MG, Burrow WH, Wolford PL. The Aberrant Behavior Checklist-Community: factor validity and effect of subject variables for adults in group homes. Am j ment retard. 1995.

[9] Sunakarach K, Kessomboon, Pattapong. Validity and reliability of the Thai version of the Autism Treatment Evaluation Checklist: A two-phase diagnostic. F1000research. 2018. doi: 10.12688/f1000research.14537.1.

[10] Narkpongphun A, Charnsil C. Reliability and Validity of Aberrant Behavior Checklist-Community, Thai Version. J Child Adolesc Behav. 2018; 6: 373. doi: 10.4172/2375-4494.1000373.

[11] Matson JL, Nebel-Schwalm M. Assessing challenging behaviors in children with autism spectrum disorders: A review. Res Dev Disabil. 2007; 28(6): 567-79. doi: 10.1016/j.ridd.2006.08.001.

[12] Mudford OC, Arnold-Saritepe AM, Phillips KJ, Locke JM, Ho I-CS, Taylor SA. Challenging behaviors. Clinical assessment and intervention for autism spectrum disorders: Elsevier; 2008: 267-97.

[13] Horner RH, Carr EG, Strain PS, Todd AW, Reed HK, disorders d. Problem behavior interventions for young children with autism: A research synthesis. J Autism Dev Disord. 2002; 32: 423-46. doi: 10.1023/A:1020593922901.

[14] Militerni R, Bravaccio C, Falco C, Fico C, Palermo MT. Repetitive behaviors in autistic disorder. Eur Child Adolesc Psychiatry. 2002; 11: 210-8. doi: 10.1007/s00787-002-0279-x.

[15] Symons FJ, Sperry L, Dropik P, Bodfish J. The early development of stereotypy and self-injury: a review of research methods. J Intellect Disabil Res. 2005; 49(2): 144-58. doi: 10.1111/j.1365-2788.2004.00632.x.

[16] Sigafoos J, Arthur M, O'Reilly M. Challenging behaviour and developmental disability. Baltimore: Paul H Brookes Publishing Co; 2003.

[17] Murphy GH, Beadle-Brown J, Wing L, Gould J, Shah A, Holmes N. Chronicity of challenging behaviours in people with severe intellectual disabilities and/or autism: A total population sample. J Autism Dev Disord. 2005; 35(4): 405-18. doi: 10.1007/s10803-005-5030-2.