

Association between Internet Gaming Disorder and Associated Parental and Peer Attachment: A Cross-sectional Study among Thai Adolescents

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Parental and Peer Attachment and Internet Gaming Disorder in Adolescents

783 pairs of parents and adolescents
4th to 9th grade schools in Thailand

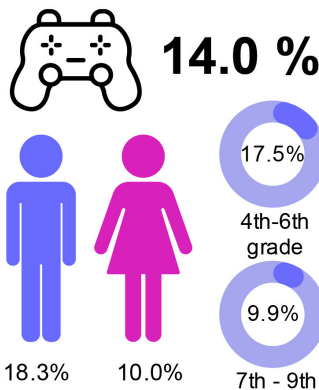
Poor parental attachment is associated with an *increased* risk of internet gaming disorder (IGD) in early and middle adolescents.



Online questionnaires

- The Thai version of the Internet Gaming Disorder Scale-Short-Form (IGDS9-SF)
- The Inventory of Parent and Peer Attachment-Revised for Children (IPPA-R)

Prevalence of IGD



Multivariable logistic regression analysis

1-year increase in adolescent's age	OR 0.8, 95%CI 0.7,0.9, $p = 0.002$
adolescent's male sex	OR 2.1, 95%CI 1.3,3.4, $p = 0.003$
Parent report adolescents playing online games (>18 hr/ wk)	OR 3.9, 95%CI 2.4,6.4, $p < 0.001$
adolescent report of their playing online games (>16 hr/ wk)	OR 2.3, 95%CI 1.4,3.7, $p = 0.001$
studying in public school	OR 0.4, 95%CI 0.3,0.7, $p < 0.001$
1-point increase in the IPPA-R parent scale	OR 0.9, 95% CI 0.9,1.0, $p < 0.001$



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SIRIRAJ
MEDICAL
JOURNAL

Saelim, et al. *Siriraj Med J* 2025;77(8):553-562.

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Received 30 January 2025 Revised 29 April 2025 Accepted 29 April 2025

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<https://doi.org/10.33192/smj.v77i8.273394>



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ABSTRACT

Objective: This study examined the prevalence of Internet Gaming Disorder (IGD) and its association with parental and peer attachment among Thai adolescents, accounting for gender and developmental stages.

Materials and Methods: A cross-sectional design involved 783 parent-adolescent pairs (4th-9th grade, Thailand). Online questionnaires, including the Thai version of the Internet Gaming Disorder Scale-Short-Form (IGDS9-SF) and the Inventory of Parent and Peer Attachment-Revised for Children (IPPA-R), were used. Multivariable logistic regression analyzed the data.

Results: The overall IGD prevalence was 14.0%, higher in males (18.3%) and 4th-6th graders (17.5%). Multivariable logistic regression analysis showed that a 1-year increase in adolescent age (OR 0.8, $p=0.002$), male sex (OR 2.1, $p=0.003$), parental report of adolescents playing online games (>18 hours/week) (OR 3.9, $p<0.001$), adolescent report of their playing online games (>16 hours/week) (OR 2.3, $p=0.001$), and studying in public school (OR 0.4, $p<0.001$), and a 1-point increase in the IPPA-R parent scale (OR 0.9, $p<0.001$) were significantly associated with IGD. No significant interaction terms for gender and developmental stages were identified.

Conclusion: Early male adolescents are at higher IGD risk. Poor parental attachment is associated with increased IGD likelihood. Preventive strategies focusing on strengthening parental attachment may help mitigate IGD in this population.

Keywords: Internet gaming disorder; prevalence; parental attachment; peer attachment; adolescents (Siriraj Med J 2025; 77: 553-562)

INTRODUCTION

Internet gaming has grown in popularity, with the number of players exceeding 3.2 billion in 2022. By 2025, this figure is expected to reach 3.6 billion. Over half of the players are from the Asia-Pacific region.¹ Excessive gaming can negatively affect physical and mental health, as well as education, career, and relationships of the gamer.² The American Psychiatric Association (APA) has recognized Internet Gaming Disorder (IGD) as a behavioral condition characterized by excessive gaming that leads to considerable impairment.³

A meta-analysis reported a pooled IGD prevalence of 4.6% among adolescents, a rate higher than that in other age groups, with the highest prevalence observed in Asian populations.^{4,5} This increased prevalence in Asia may be attributed to more permissive attitudes toward gaming and greater accessibility to gaming environments.⁵ During the COVID-19 pandemic, IGD prevalence increased;⁶ however, post-pandemic rates remain underexplored.^{7,8} In Thailand, the prevalence of IGD among school-aged individuals before the COVID-19 pandemic ranged from 5.4% to 15.0%.⁹⁻¹¹ Male adolescents consistently exhibit higher rates of gaming addiction than females.⁴ Despite these findings, research examined post-pandemic prevalence across different adolescent age groups remains limited.

IGD is associated with both internal and external factors.^{2,12-14} Internal factors include being male, younger age, poor self-regulation, low social competence, mood

dysregulation, feelings of loneliness, and comorbidities such as attention-deficit/hyperactivity disorder, depression, and social anxiety. External factors include the type of game (genre), role-playing games with multiple players online (MMORPGs) and first-person shooter (FPS) games being particularly influential, as they engage reward systems at the neurobiological level. The aforementioned factors may interact.

In the first year of life, infants seek and maintain proximity to their parents through “attachment behavior”.¹⁵ Additionally, infants use their mother as a “secure base” for exploration of the world around them.¹⁶ This parental attachment continues into adolescence and adulthood and can shift toward other persons.¹⁵ Those with secure parental attachments often maintain strong peer relationships¹⁷, generally experience higher psychological well-being, self-esteem, and life satisfaction.^{18,19} In contrast, studies showed a negative association between IGD and both parental and peer attachment in middle and late adolescent.^{20,21} Internet gaming can act as an escape from real-life challenges for those from families with disorganized attachments, while also enabling the formation of new relationships online.^{13,20} However, current literature has not sufficiently explored the association between IGD and parental or peer attachment among early adolescent subgroups. Furthermore, this relationship has not been examined in the context of gender and age group differences, which are essential for designing effective preventive strategies tailored to specific populations.

Aims of this study were to analyze the prevalence of IGD in Thailand among adolescents and to analyze the relationship between IGD and parental and peer attachment of adolescents corrected for the effect of gender and developmental stage.

MATERIALS AND METHODS

The study was approved by the Siriraj Institutional Review Board, Faculty of Medicine Siriraj Hospital (257/2565(IRB3)). All participants provided written informed consent, and participation was voluntary.

Study design and participants

This cross-sectional study was conducted between January to March 2023, and involved students from the 4th to 9th grade across four public and four private schools, randomly selected from a total of 595 public and 356 private primary and secondary schools in Bangkok, Thailand. Participants were stratified into two age groups for sampling: early adolescence (4th to 6th grade, ages 10-12 years) and middle adolescence (7th to 9th grade, ages 13-15 years)²² as well as by school type (public and private). Inclusion criteria were proficient in Thai and having internet access to complete online questionnaires via Google Forms. After a detailed explanation of the study was provided, questionnaires were distributed to students at school by teachers and parent versions were sent home to be completed by parents. Teachers assisted students in completing the questionnaire if needed. They did not fill in answers to prevent information bias. Unreliable responses or failure to give consent were excluded from the study. An unreliable response was defined as one resulting from incorrect coding, selecting a single answer across all Likert scale items, or providing exaggerated numerical responses. Since the questionnaire had to be fully completed before submission, there were no missing data in this study.

Measurements

Participant characteristics data

The questionnaire for the adolescents asked for gender (with 'other' referring to sexual minorities), year of birth, education level, and weekly hours spent on online study and gaming. The questionnaire for the parents asked for gender, year of birth, highest education level, relationship to the adolescent, and monthly family income. It also asked for school record of the adolescent over the past year and weekly online hours spent studying and gaming. Additionally, it asked how long parent and adolescent had lived together.

Internet Gaming Disorder Scale 9–Short-Form (IGDS9-SF) Thai Version

The Thai version of the self-version IGDS9-SF questionnaire,^{23,24} was used to assess IGD. It is designed to screen individuals aged 6 to 25 for IGD, according to DSM-5 criteria.³ It consists of nine questions, answered on a 5-point Likert scale. The total score ranges from 9 to 45. A score above 29 indicates IGD. The parent-version questionnaire, developed from the self-version,²⁴ consists of the same nine questions and has an identical scoring system. Both versions demonstrated excellent internal consistency Cronbach's α ; 0.913 for the self-version and 0.922 for the parent-version.²⁴

The Inventory of Parent and Peer Attachment – Revised (IPPA-R) Thai Version

The Thai version of the IPPA-R is a self-report questionnaire designed to measure attachment to parents and peers among children and adolescents aged 9 to 15.^{19,25} The questionnaire consists of 28 statements on the parent scale and 25 statements on the peer scale answered on a 3-point Likert scale with no cut-off points. Higher scores suggest stronger attachment. The Thai version of IPPA-R demonstrated strong internal consistency, Cronbach's α 0.88 for the parent scale and 0.85 for the peer scale.²⁵

Statistical analysis

Data analysis was conducted using IBM SPSS Statistics for Windows, Version 29.0. We reported descriptive statistics as mean $\pm$ standard deviation (SD), median (interquartile range), numbers, and percentages. For comparisons between the IGD and non-IGD groups, we utilized the independent t-test for normally distributed data, the Mann-Whitney U-test for non-normal data, and the Chi-square or Fisher's exact test for categorical variables. Associated factors for IGD were presented as odds ratio with 95% confidence intervals, calculated using univariate logistic regression. Multivariable models were then applied to adjust for confounding factors in a forward stepwise selection manner with probability of score statistic for variable entry of 0.05 and probability of score statistic to remove a variable of 0.1. Interaction terms were explored. A p-value of <0.05 was considered statistically significant.

RESULTS

Out of 1,458 adolescents, 23 refused to give consent and 19 provided unreliable responses, leaving 1,416 available for data analysis. Among the 969 parents,

62 refused to give consent and 28 provided unreliable responses, resulting in 879 available for analysis. A total of 783 matched parent-adolescent pairs were included in the final analysis. Among these adolescents, 52.2% were female, with an average of 13.0 years ($SD = 1.7$). A majority attended public schools (52.2%) and co-educational institutions (71.9%), primarily from grades 4 to 6 (54.8%). Additionally, 99.1% maintained a grade point average of 2.0 (60%) or above over the past year. Of the parents 70.4% were mothers, mean age of 44.8 years ($SD = 8.7$), 55.9% had attained a bachelor's degree or higher, and 90.5% reported living with their adolescents since birth.

Adolescents in the IGD group had a mean age of 12.5 years ($SD = 1.6$), with 60% being male, and 68.2% were grades in 4 to 6. They predominantly attended all-boys (18.2%) and private schools (62.7%). The median weekly online study and internet gaming times were 9 hours and 28 to 30 hours, respectively. Adolescents with IGD scored lower on the IPPA-R parent scale and peer scales than those without IGD. Parents of the IGD group reported a family income of 100,001 baht or above (25.9%) (Table 1).

The overall prevalence of IGD among adolescents was 14.0%. When classified by gender, the prevalence was 18.3% in males, 10.0% in females, and 23.1% in sexual minorities (SM). When classified by age, the prevalence was 17.5% in early adolescents (4th to 6th grade) and 9.9% in middle adolescents (7th to 9th grade). The differences in prevalence between gender and age groups were statistically significant (Table 1).

Participants reported an average score of 64.8 ($SD = 9.3$) on the IPPA-R parent scale and 57.0 ($SD = 8.2$) on the peer scale. Males had a significantly higher average score on the parent scale (65.9, $SD = 8.8$), while females scored higher on the peer scale (58.6, $SD = 8.5$). When considering developmental stages, early adolescents scored higher on the parent scale (65.6, $SD = 9.2$), whereas middle adolescents had higher scores on the peer scale (58.0, $SD = 8.1$) (Table 2).

Multivariable logistic regression showed that higher adolescent's age, and higher IPPA-R parent scale score decreased the likelihood of IGD. While factors that increased the likelihood of IGD were playing online games for more than 16 hours per week as reported by the adolescent, playing for over 18 hours as reported by parents, attending a private school, being male, and identifying as SM. These results were adjusted for the adolescent's age, gender, duration of online gaming, type of school attended, and scores on the IPPA-R parent scale. No significant interaction terms were identified.

DISCUSSION

The primary objectives of this study were examine the prevalence of IGD in Thai adolescents and to explore the relationship between IGD and parental and peer attachment.

Prevalence of internet gaming disorder

In this study, 14.0% of participants were classified in the IGD group, consistent with a previous study in Thailand reporting a 15.0% prevalence.⁹ Contrary to our hypothesis that suggested a higher prevalence due to the COVID-19 pandemic, the prevalence remained stable, potentially due to the resumption of in-person schooling. During the global pandemic, a study employing measurements based on the DSM-5 proposed criteria for IGD in the same age group reported a similar prevalence.²⁶ However, other studies have reported widely varying prevalence rates of gaming addiction among children and adolescents, ranging from 2.3% to 29.4%.⁶ Variations in research methodologies complicate direct comparisons across studies. The increased prevalence has been particularly observed in studies with predominantly male participants and has been associated with increased time spent gaming during lockdown periods.²⁷⁻²⁹

Regarding gender differences, the highest prevalence of IGD was observed among SM adolescents at 23.1%, followed by males at 18.3%. This study highlights IGD prevalence in SM adolescents and is consistent with findings that problematic gaming is more prevalent among SM individuals over 15 years old and SM women (women who did not identify as heterosexual).³⁰ SM individuals may use online games to cope with psychological distress, social stigmatization, and isolation.³⁰ However, further research is needed to conclusively determine the prevalence of IGD within the SM subgroup. The differences in IGD prevalence between males and females aligns with previous studies in similar age groups^{4,9,11}, which have linked these disparities to variations in gameplay duration, frequency, and preferred genres. Male adolescents are also more likely to favor role-playing, fighting, and strategy games, which are associated with a higher risk of addiction.^{4,12}

IGD prevalence in early adolescents (17.5%) was nearly twice that of middle adolescents (9.9%), with the mean age of IGD onset being 12.5 years. These results could be linked to neurobiological factors, as early adolescence is characterized by an imbalance between the maturing prefrontal cortex and limbic regions, which may increase vulnerability to addictive disorders.³¹ Additionally, prevalence rates for both subgroups were higher than those observed in other age groups.^{5,10,11,32} Adolescents often perceive their parental relationships as less trusting,

TABLE 1. Characteristics of participants and associated factors of IGD.

Characteristics	Total n	IGD Yes n(%)	No n(%)	p-value
1.1 Adolescents	783	110(14.0%)	673(86.0%)	
Sex ^(a)				
Male	361	66(18.3%)	295(81.7%)	0.003
Female	409	41(10.0%)	368(90.0%)	
Other [#]	13	3(23.1%)	10(76.9%)	
Education level (age group) ^(a)				
4 th - 6 th (early adolescent)	429	75(17.5%)	354(82.5%)	0.002
7 th - 9 th (middle adolescent)	354	35(9.9%)	319(90.1%)	
Age (years) ^(b)				
Mean ± SD	13.0±1.7	12.5±1.6	13.1±1.7	0.001
Online studying (hours/week) ^(c)				
Adolescent report median [Q1, Q3]	5[0, 30]	9[0, 31.3]	4[0, 30]	0.034
Parent report median [Q1, Q3]	0[0, 4]	0[0, 6]	0[0, 4]	
Playing online games (hours/week) ^(c)				
Adolescent report median [Q1, Q3]	14[4, 30]	30[14, 56]	12[3, 28]	< 0.001
Parent report median [Q1, Q3]	14[4, 28]	28[14, 35.3]	12[3, 21]	
School type ^(a)				
Private	374	69(22.6%)	305(77.4%)	0.001
Public	409	41(11.1%)	368(88.9%)	
Co-educational school ^(a)				
Co-educational school	563	71(14.4%)	492(85.6%)	0.008
All-boys school	78	20(34.5%)	58(65.5%)	
All-girls school	142	19(15.4%)	123(84.6%)	
School record ^(a)				
<60%	7	0(0.0%)	7(100.0%)	0.272
61-69%	107	20(23.0%)	87(77.0%)	
70-79%	464	65(16.3%)	399(83.7%)	
80-100%	191	23(13.7%)	168(86.3%)	
Not available	14	2(16.7%)	12(83.3%)	
IPPA-R parent scale ^(b)				
Mean ± SD	64.8 ± 9.3	60.1 ± 9.2	65.5 ± 9.1	<0.001
IPPA-R peer scale ^(b)				
Mean ± SD	57.0 ± 8.2	54.8 ± 8.7	57.4 ± 8.0	0.002

TABLE 1. Characteristics of participants and associated factors of IGD. (Continue)

Characteristics	Total n	IGD		p-value
		Yes n(%)	No n(%)	
1.2 Parents				
Sex ^(a)				
Male	164	21(14.7%)	143(85.3%)	0.606
Female	619	89(16.8%)	530(83.2%)	
Age (years) ^(b)				
Mean ± SD	44.8±8.7	43.7±6.7	44.9±9.0	0.166
Highest education level ^(a)				
Below Bachelor's degree	344	39(12.8%)	305(87.2%)	0.174
Bachelor's degree	309	53(20.7%)	256(79.3%)	
Above Bachelor's degree	127	18(16.5%)	109(83.5%)	
Not available	3	0(0.0%)	3(100.0%)	
Parental role ^(a)				
Father	149	21(16.4%)	128(83.6%)	0.035
Mother	551	86(18.5%)	465(81.5%)	
Relatives	77	3(4.1%)	74(95.9%)	
Other [#]	6	0(0.0%)	6(100.0%)	
Family income (THB/month) ^(a)				
0-30,000	329	34(11.5%)	295(88.5%)	0.003
30,001-50,000	144	19(15.2%)	125(84.8%)	
50,001-100,000	152	27(21.6%)	125(78.4%)	
100,001 and above	143	28(24.3%)	115(75.7%)	
Not available	15	2(15.4%)	13(84.6%)	
Living with adolescent since ^(a)				
Birth	698	99(16.5%)	599(83.5%)	0.411
6 months old	17	4(30.8%)	13(69.2%)	
2 years old	56	6(12.0%)	50(88.0%)	
Not available	12	1(9.1%)	11(90.9%)	

[#] Other = Sexual minorities

^(a) Chi-square test ^(b) Independent t-test ^(c) Mann-Whitney U-test

Abbreviations: IGD, Internet gaming disorder; IPPA-R, The Inventory of Parent and Peer Attachment – Revised; THB, Thai Baht

TABLE 2. IPPA-R parent and peer scale scores classified by gender and age group.^(b)

Characteristics	Total n	IPPA-R parent scale Mean ± SD	IPPA-R peer scale Mean ± SD
Sex			
Male	361	65.88 ± 8.8	55.41 ± 7.5
Female	409	63.94 ± 9.5	58.63 ± 8.5
Other [#]	13	59.31 ± 10.8	50.85 ± 7.6
p-value		0.002	<0.001
Education level (age group)			
4 th - 6 th (early adolescent)	429	65.60 ± 9.2	56.19 ± 8.2
7 th - 9 th (middle adolescent)	354	63.74 ± 9.3	58.02 ± 8.1
p-value		0.005	0.002
Total	783	64.76 ± 9.3	57.02 ± 8.2

[#] Other = Sexual minorities^(b) Independent t-test**Abbreviations:** IPPA-R, The Inventory of Parent and Peer Attachment – Revised**TABLE 3.** Multivariable logistic regression analysis of factors associated with IGD in adolescents.

Factors	Beta	S.E.	Adjusted OR (95% CI)	p-value
Adolescent's age (1-year increase)	-0.230	0.075	0.8 (0.7, 0.9)	0.002
IPPA-R parent scale (1-point increase)	-0.080	0.013	0.9 (0.9, 1.0)	<0.001
Playing online games (hours/week)				
>16 hour/week (adolescent report)	0.816	0.249	2.3 (1.4, 3.7)	0.001
>18 hour/week (parent report)	1.362	0.253	3.9 (2.4, 6.4)	<0.001
School type				
Private school	reference		reference	
Public school	-0.896	0.247	0.4 (0.3, 0.7)	<0.001
Child's sex				
Female (ref)	reference		reference	
Male	0.745	0.248	2.1 (1.3, 3.4)	0.003
Other [#]	0.629	0.802	1.9 (0.4, 9.0)	0.432
Intercept (constant)	4.956	1.305	-	<0.001

[#] Other = Sexual minorities**Abbreviations:** IPPA-R, The Inventory of Parent and Peer Attachment – Revised**Note:** Adjusted for child's age, gender, playing online games more than 18 hours/week, studying in private school, and IPPA-R parent scale

characterized by lower levels of communication and support,³³ and may turn to gaming as a form of escapism or to seek online relationships.³⁴ These findings highlight the need for targeted interventions among specific age groups.

Parental attachment and internet gaming disorder

In our study, higher parental attachment scores were negatively associated with IGD after adjusting for covariates. This finding is consistent with previous studies^{21,35,36}, indicating that parent-child closeness predicts a decrease in problematic gaming behavior.³⁵ Specifically, the quality of attachment with mothers measured by trust, communication, and alienation and with fathers, particularly in terms of alienation, has been linked to less internet gaming addiction in adolescents.²¹ Secure parental attachment is associated with higher life satisfaction as it enables individuals to maintain relationships and share emotions with others, thereby lowering the risk of gaming addiction.³⁶

However, some studies suggest that parental attachment does not significantly predict IGD.³⁷⁻³⁹ These discrepancies may be due to differences in age groups studied. Our study, focusing on younger adolescents, found that early adolescents reported higher parental attachment scores than middle adolescents. A poorer quality of parent-child relationship has been associated with problematic internet gaming,³⁴ in which parental attachment is also a key component of this relational dynamic.¹⁵ Among the age range studied, no significant interaction was found between age group and parental attachment in relation to IGD. Although parental attachment may shift during adolescence as new attachment figures emerge,¹⁵ such changes did not substantially weaken parental attachment to a degree that influenced IGD within the studied age range. The higher prevalence of IGD in males may be attributed also to other factors, as previously discussed. Further research involving a broader age range is needed to explore the interaction between age group and parental attachment in relation to IGD.

When considering the interaction term between gender and parental attachment, no significant interaction was found to be associated with IGD. Although female adolescents may seek alternative attachment—such as peers—rather than their parents for trust, communication, and emotional intimacy,⁴⁰ this may not considerably influence the relationship between parental attachment and IGD.

Peer attachment and internet gaming disorder

Interestingly, after adjusting for other factors, peer

attachment was not significantly associated with IGD in our study sample. This finding is consistent with results of another study,⁴¹ which also found no direct association between peer attachment on gaming addiction among out-of-school adolescents. However, several studies have identified a negative association between peer attachment and IGD.^{36,42-44} One possible explanation for our results may relate to the inclusion of parental attachment in the analysis, which could influence the relationship between peer attachment and IGD, particularly in early adolescents who may rely more on their parents for security than on peers. Another explanation is the ‘counterbalance effect,’ in which peer attachment may shape adolescents’ gaming behavior through modeling, as adolescents tend to emulate peers in the pursuit of social validation and identity development.^{45,46} Additionally, peer attachment may support adolescents in problem-solving through social support and may be associated with higher self-esteem, which facilitates their ability to regulate behavior and avoid gaming addiction.^{18,36}

Limitations

This study has some limitations. First, it utilizes a cross-sectional design, which inhibits our ability to establish causal relationships. Second, data collection was based on self-report questionnaires, which may result in an underestimation of the reported hours of gaming. To mitigate this problem, we gathered information from both adolescents and their parents to improve accuracy of the data. Third, the sample was exclusively composed of school-based participants from 4th to 9th grade, which limits the generalizability of the findings to other groups. Future research should consider utilizing a longitudinal design using a community-based samples with a broader age range to enhance generalizability and better illustrate the associations.

CONCLUSION

This study provides updated prevalence data on IGD and its association with parent and peer attachment among early to middle adolescents in Thailand. To establish causal relationships, further research is recommended. Based on these insights, preventive strategies and interventions to promote and maintain secure parental attachment should focus on individuals at risk of IGD.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ACKNOWLEDGEMENTS

The authors would like to acknowledge Mr. Suthipol Udompunturak for providing statistical analysis support in this study.

DECLARATIONS

Grants and Funding Information

This study was funded by the Research Department, Faculty of Medicine Siriraj Hospital, Mahidol University, Thailand (Grant number: R016631008). The funder had no involvement or relationships that could influence the submitted study.

Conflicts of Interest

The authors declare no potential conflicts of interest.

Registration Number of Clinical Trial

None.

Author Contributions

Conceptualization and methodology, S.S., T.H., and S.H.; Data curation, S.S.; Funding acquisition, T.H.; Investigation, S.S.; Supervision, T.H., and S.H.; Visualization, S.S.; Writing - original draft preparation, S.S.; Writing - review and editing, S.H. All authors have read and agreed to the final version of the manuscript.

Use of Artificial Intelligence

The authors used ChatGPT (OpenAI) and Perplexity ai to assist with grammar correction, sentence refinement, and reference formatting. All AI-assisted content was thoroughly validated and approved by the authors to ensure accuracy and compliance with academic and ethical standards.

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