Effectiveness of web-based play therapy intervention in supporting the development of children with attention deficit/hyperactivity disorder

Lina Budiyarti,[1] Nur Agustini,[2] Happy Hayati,[2] Ria Utami Panjaitan,[3] Nuraini Hakim[4]

[1]Faculty of Nursing, Universitas Indonesia, Depok, Indonesia; [2]Department of Pediatric Nursing, Faculty of Nursing, Universitas Indonesia, Depok, Indonesia; [3]Department of Mental Health Nursing, Faculty of Nursing, Universitas Indonesia, Depok, Indonesia; [4]Department of Pediatric Nursing, Faculty of Nursing, Universitas Cendekia Abditama, Tangerang, Indonesia

Correspondence: Nur Agustini, Department of Pediatric Nursing, Faculty of Nursing, Universitas Indonesia, Depok, 16424, Indonesia.
Tel.: +62.21.78849120; Fax: +62.21.7864124.
E-mail: tufahati@ui.ac.id

Key words: ADHD; nursing care; web-based intervention; children development; play therapy.

Acknowledgements: this research was funded by the Directorate of Research and Development, University of Indonesia, through the PUTI Postgraduate Grant 2022.

Contributions: LB, NA, HH, RUP and NH conceived the idea and plan of the research. All authors discussed the results and reviewed the final manuscript.

Conflict of interest: the authors declare no conflicts of interest.

Funding: this study was supported by Directorate Research and Development under Hibah PUTI Pascasarjana 2022 No. NKB-095/UN2.RST/HKP.05.00/2022.

Conference presentation: this final manuscript was presented at the 8th Virtual Biennial International Nursing Conference, Faculty of Nursing, Universitas Indonesia, on November 4th, 2022.

Availability of data and materials: all data generated and analysed during the study are included in this published article.

Ethical approval and consent to participate: the Ethics Committee of the Faculty of Nursing, Universitas Indonesia, approved this study (Ket-25/UN2.F12.D1.2.1/PPM.00.02/2022). All patient participants in this study signed a written informed consent form prior to participating in the study.

Consent for publication: written informed consent was obtained from legally authorised representative(s) for anonymised patient information to be published in this article.

Received for publication: 25 November 2022.
Accepted for publication: 31 January 2023.

Licensee PAGEPress, Italy
La Pediatria Medica e Chirurgica 2023; 45(s1):316
doi:10.4081/pmc.2023.316

Abstract

The high prevalence of children with Attention Deficit/Hyperactivity Disorder (ADHD) in Indonesia has become a concern for nursing because ADHD might emerge as neurological developmental problems if not treated early through appropriate intervention. This study aims to determine the effectiveness of web-based play therapy on the emotional, behavioural and social development of school-age children with ADHD. This study employs a quasi-experimental non-equivalent control group design with purposive sampling technique, and 126 children with ADHD (patients at a psychiatric hospital in Indonesia) as participants. The results show that play therapy is an effective intervention for the emotional, behavioural and social development of school-age children with ADHD ($p = 0.048$, $p = 0.030$, $p = 0.030$; $\alpha = 0.05$). This study is recommended as a reference for optimising nursing care for children with ADHD using information technology in the form of web-based play therapy designed in line with the fundamentals of intervention for children with ADHD, using attractive features and flexible access.

Introduction

Attention Deficit/Hyperactivity Disorder (ADHD) is a brain development disorder in children that results in increased motor activity, causing individuals with the condition to become hyperactive, impulsive and inattentive.[1] The prevalence of ADHD in the United Reports was reported in the 2016 National Survey of Children's Health (NSCH) survey, which gathered data on approximately 9.4% of the total US child population within the age range of 2 to 17 years from which we know that boys are more likely (12.9%) than girls (5.6%) to be diagnosed with ADHD.[2] In Indonesia, based on 2007 data from the Central Bureau of Statistics, or Biro Pusat Statistik (BPS), there were 8.3 million children (out of 82 million children) in Indonesia with special needs, including those with ADHD.[3]

The characteristics of children with ADHD who are impulsive, aggressive, controlling, and have difficulty listening to others can have an impact on the challenges they face with emotional regulation, behaviour regulation, and poor social skills. In addition, inattention is linked to low learning achievement.[4] ADHD problems in children who are not treated promptly with appropriate interventions may continue into adolescence and adulthood period, which can lead to further psychosocial issues such as low self-esteem, anxiety, aggression, frustration, and depression.[5] In light of this, conditions related to ADHD symptoms in children give rise to emotional,

behavioural, and social developmental problems associated with not achieving age-appropriate developmental milestones. Emotional, behavioural and social dysregulation in children impacts social relationship skills, contributes to poor academic achievement, and elevates the risk of further psychosocial problems.

An ADHD intervention approach for school-age children (6–12 years) based on the recommendations of the American Academy of Pediatrics includes a combination of pharmacological (stimulant type) and non-pharmacological interventions approved by the Food and Drug Administration (FDA) of the United Reports.[6] A non-pharmacological intervention tailored to the child's developmental stage is play therapy, which is fairly effective in dealing with children with ADHD, including their behavioural symptoms; a considerable number of parents are satisfied with the approach. In addition to being applied to behavioural problem intervention, play therapy has been shown to improve concentration in children with ADHD who struggle with inattention.[7] Play therapy is designed as a therapeutic game that can easily be adapted as a manual game or a computer-based game that aims to improve skills for inhibiting impulses in children with ADHD.[8]

In line with the development of science and technology in the Digital Era 5.0 and the easier access to information technology and its utilisation, it provides opportunities to improve the quality of nursing care and expand the range of nursing services, especially for the people in Indonesia,[9] and including interventions for children with ADHD.[10] Adaptation of the utilisation of technology-based interventions for children with ADHD began in Indonesia through a technology-based intervention development project. One of these interventions (i.e., the Indonesia Computer-Based Game Prototype) was developed at a hospital in Indonesia. In one study, the Indonesia Computer-Based Game Prototype was tested on 10 children with ADHD for 20 sessions, with results showing that it can be used to develop computer-based game interventions for children with ADHD.[11]

There is a high population of school-age children with ADHD (653 cases) at one psychiatric hospital in Indonesia, as evidenced by the data from a preliminary study conducted from January 2021 to September 2021. Considering the significant impact if ADHD is not managed correctly, a comprehensive and sustainable intervention is needed. This study aims to identify the effectiveness of web-based play therapy on the emotional, behavioural and social development of children with school-age ADHD. The results of this study can be used as baseline data, and it provides useful information for paediatric nurses on providing nursing care related to ADHD management in children by utilising information technology via web-based play therapy interventions.

Materials and Methods

The research design used in this study is a quasi-experimental non-equivalent control group design. The independent variable in this study is web-based play therapy, while the dependent variable is the emotional, behavioural and social development of children with ADHD. Using purposive sampling, 132 children with ADHD aged

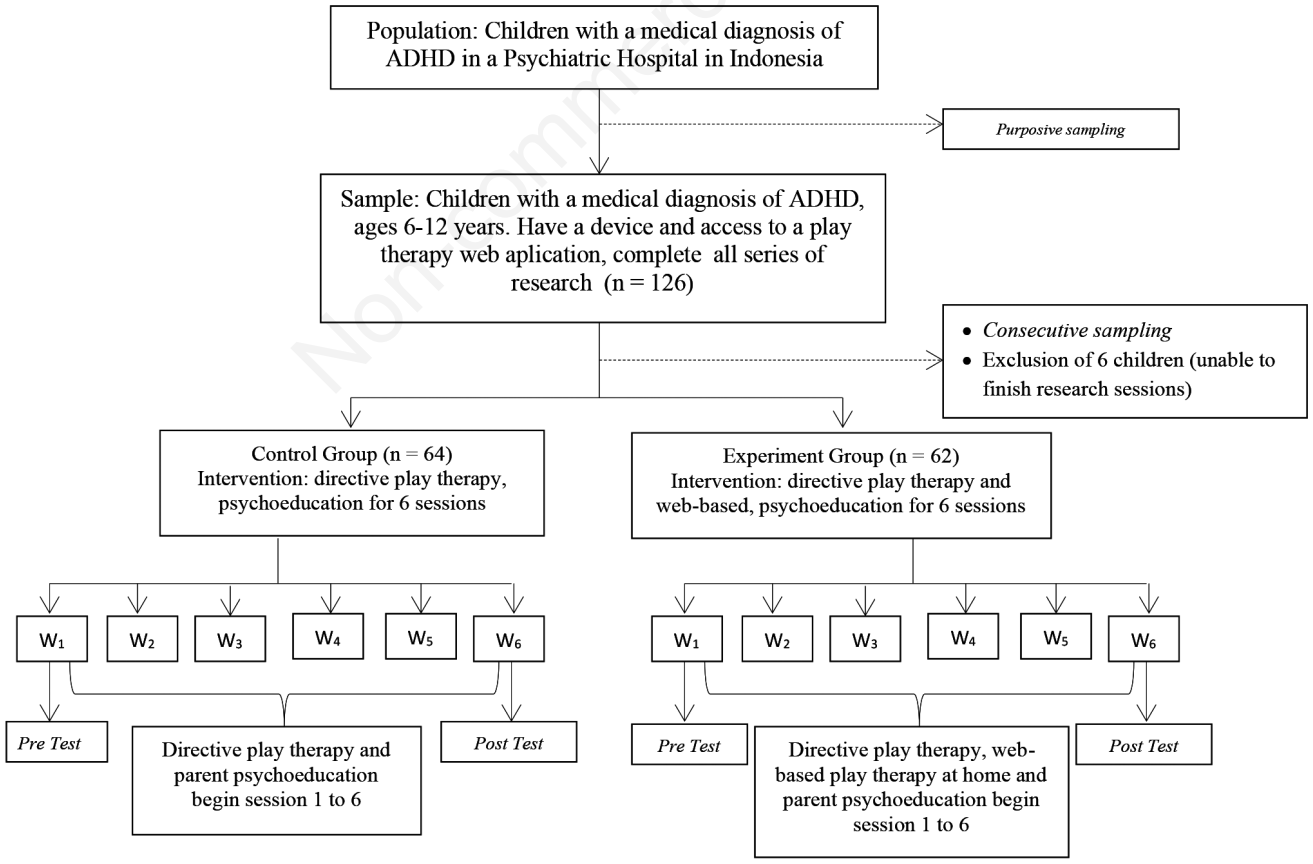

Figure 1. Research flow scheme.

6–12 years were recruited as participants at one psychiatric hospital in Indonesia (Figure 1). The participants were divided into two groups: a control group of 66 participants and an experimental group with the same number of participants. Each participant took a pre-test at the beginning of the study. Participants in the control group were administered directive or standard play therapy for six weeks. In contrast, participants in the experimental group were administered standard play therapy along with web-based play therapy as an additional intervention. During data collection, we had two individuals excluded from the control group and four individuals excluded from the experimental group because they could not attend the full session of the therapy programme. At the end of the experiment, all participants took a post-test. The web-based play therapy used in this study is called Teman Bermain Aku, an intervention birthed by the development of health technology that adapts technology to the concept of play therapy. Teman Bermain Aku includes several assignments, monitoring of daily activities, and nursing informatics accessed via a web-based application designed in line with the fundamentals of therapy for children with ADHD, thus helping children to learn emotional regulation, behaviour control, and well-adjusted social interaction.

The study began with obtaining ethical clearance from the Faculty of Nursing, Universitas Indonesia (clearance number: Ket-25/UN2.F12.D1.2.1/PPM.00.02/2022). All patient participants in this study signed a written informed consent form prior to participating in the study. The research instrument used in this study was a two-part questionnaire. The first part collected demographic data, and the second part was the Strengths and Difficulties Questionnaire (SDQ), which comprises 25 questions covering elements of emotional, conduct, hyperactivity, friendship, and prosocial behaviour. Assessment of the emotional, behavioural, and social development of children with ADHD was based on the subscales of the SDQ questionnaire. Emotional development assessment drew on responses to the emotional sub-scale questionnaire items, behavioural development was reflected in the hyperactivity/inattention and conduct problem sub-scale responses, and social development was measured using the peer problem and prosocial subscales. The total score was generated through a summation of the subscales, with the assessment classification comprising two categories: a good development category if the score is ≤ the cut-off point; and a poor development category if the score is ≥ the cut-off point.

Analysis was conducted using categorical analysis tests to determine the differences in the studied variables before and after the intervention and to identify the relationship between demographic characteristics and the development of children with ADHD. For this study, we used the McNemar test for paired groups and the chi-square test for unpaired groups. Fisher exact and Mann-Whitney tests were used if the chi-square test requirements were not met.

Results

The demographic characteristics of the respondents were as follows: the median of the average age was six years old in the control group and seven years old in the intervention group, the minimum age in both groups was six years old, and the maximum age in both groups was 12 years old. The study results on the proportion of other respondent characteristics and the assessed emotional, behavioural and social development of the participants are summarised in (Table 1).

The results include an analysis of the assessed differences in emotional, behavioural and social development of the participants, including in-and between-group comparisons (Table 2).

Furthermore, we also analysed the relationship between the respondents' demographic characteristics (including age, gender, intelligence level, medication history, and family economic status) and the emotional, behavioural and social development attributed to the intervention (Tables 3 and 4).

Table 1. Characteristic of respondents based on gender, intelligence level, treatment history, economic status families, emotional, behavioral and social development of children with ADHD.

Variable	Control Group		Experiment Group	
	f	%	f	%
Gender				
Male	44	68.7	47	75.8
Female	20	31.8	15	24.2
Intelligence level				
Average	30	46.9	48	77.4
Below Average	21	31.8	12	19.4
Borderline	13	20.3	2	3.2
Treatment history				
Without medication	60	93.8	54	87.1
With medication	4	6.2	8	12.9
Family economic status				
Above minimum wage	48	75.0	54	87.1
Below minimum wage	16	25.0	8	12.9
Emotional development				
Good	12	18.7	26	41.9
Less	52	81.3	36	58.1
Behavior development				
Good	5	7.8	17	27.4
Less	59	92.2	45	72.6
Social Development				
Good	7	10.9	10	16.1
Less	57	89.1	52	83.9

Discussion

Emotional, behavioural and social development characteristics of children with ADHD

The developmental characteristics of the study participants (132 children with ADHD) before intervention showed that most of the children had poor emotional, behavioural and social development. These observations are consistent with the reports of a prior study which mentioned that the difficulty of emotional regulation experienced by children with ADHD is due to a delay in the development of emotion-processing skills caused by deficits in executive function.[12] Second, regarding behavioural development, this study found that children with ADHD have low levels of self-

Table 2. Analysis of differences in emotional, behavioral and social development between individual groups and intergroups of children with ADHD.

Groups	Development	Criteria	Pre test		Post test		p-value
			f	%	f	%	
Control	Emotional	Good	5	12.5	37	57.8	0.282
		Less	56	87.5	27	42.2	
	Behavioral	Good	20	31.3	45	70.3	0.163
		Less	44	68.8	19	29.7	
	Social	Good	9	14.1	38	59.4	0.290
		Less	55	85.9	26	40.6	
Experiment	Emotional	Good	10	16.1	40	64.5	0.046
		Less	52	83.9	22	35.5	
	Behavioral	Good	15	24.2	46	74.2	0.050
		Less	47	75.8	16	25.8	
	Social	Good	11	17.7	49	79.0	0.030
		Less	51	82.3	13	21.0	
Intergroups	Emotional	Good	37	57.8	40	64.5	0.048
		Less	27	42.2	22	35.5	
	Behavioral	Good	44	68.7	47	75.8	0.030
		Less	20	31.3	15	24.2	
	Social	Good	38	59.4	48	77.4	0.006
		Less	26	40.6	14	22.6	

Table 3. Relationship between age and emotional, behavioral and social development of children with ADHD.

Variables Child's age	Development	f	%	Mean rank	p-value
Emotions	Good	93	73.8	63.6	0.115
	Less	33	26.2	74.1	
Behavior	Good	98	77.8	68.9	0.137
	Less	28	22.2	58.4	
Social	Good	102	80.9	66.8	0.847
	Less	24	19.1	65.4	

Table 4. Relationship between gender, intelligence level, treatment history and economic status families with ADHD children's emotional, behavior and social development.

Characteristics	Development								
	Emotional		p-value	Behavior		p-value	Social		p-value
	Good	Less		Good	Less		Good	Less	
Gender									
Male	55	36	0.866	63	28	0.480	62	29	0.925
Female	21	14		27	8		24	11	
Intelligence level									
Average	47	31	0.043	61	17	0.048	62	16	
Below average	23	10		21	11		20	13	0.001
Borderline	6	9		8	7		5	10	
Treatment history									
Without treatment	68	46	0.763	79	35	0.178	78	36	1.000
With treatment	8	4		11	1		8	4	
Economic status									
Above minimum wage	66	36	0.578	78	24	0.061	73	29	0.374
Below minimum wage	13	11		14	10		13	11	

control and elevated levels of disruptive, aggressive and oppositional behaviour, which contribute to their having low social skills. Furthermore, our findings on poor social development in children with ADHD are consistent with prior study which reported that children with ADHD have peer problems and exhibit poor prosocial behaviour, which affects friendship rejection and engenders low social skills those.[13] This condition is one of the factors that children with ADHD tend to experience social rejection. Based on this explanation, it can be concluded that the relationship between the emotional, behavioural, and social challenges faced by children with ADHD is that social problems can increase the risk of children experiencing emotional and behavioural imbalances in later developmental stages.

Differences in the emotional, behavioural and social development of children with ADHD after and before intervention

The utilisation of digital applications as an alternative non-pharmacological intervention for children with ADHD has been widely applied globally and in Indonesia. Digital-based play therapy is approved by the FDA as an intervention for children with ADHD.[6] In alignment with this, the use of information technology in the health sector is listed in Strategic Plan 2020-2024 of the Ministry of Health of Indonesia as one of its 12 strategic goals-especially pertinent in the effort to increase the availability and quality of basic and referral health service facilities.[14] Consequently, it can be concluded that digital-based interventions for children with ADHD are legal in health services and have many applications as innovative interventions that adapt developments in science and information technology to the fundamentals of ADHD intervention in children.

The findings regarding differences in the development of children with ADHD reached by comparing data on the control group with data on the experimental group show that there are significant proportional differences in the emotional, behavioural and social development of children with ADHD. These findings are consistent with those of prior studies from a previous systematic review, which concluded that digital interventions based on web, mobile and virtual reality applications have proven effective in increasing attention and self-regulation behaviour in children with ADHD. A similar research reports that electronic play therapy provides a fun and familiar way for children to explore previously unknown dimensions of the self via activation of the autonomic nervous system, resulting in improved self-awareness and self-acceptance.[4] Therefore, it can be concluded that web application-based play therapy presents diverse and engaging features for children, without compromising the therapeutic benefits for children with ADHD. This approach ensures that multiple senses are involved when children use web-based play therapy, including the visual, motor, and auditory senses; hence, it is possible to improve the general symptoms of children with ADHD.

Regarding the benefits of implementing digital-based play therapy, a previous study on the use of web health applications for monitoring children with ADHD reports that such monitoring lowers symptoms such as non-compliance, hyperactivity/impulsivity, aggression, lack of independence, and poor attention in children with ADHD.[15] Another study that concurs with the prior study, reports that using an Indonesian game prototype application as an intervention for kids with ADHD reduced hyperactivity symptoms and enhanced executive function (increased emotion regulation, initiation, cognition and organisation) over the course of 20 sessions.[11] Through the play therapy interventions in this study, children experienced a learning process in which the goal was to make cognitive, affective, and psychomotor changes**.** This is related to the subject matter of interventions in which play therapy is used to apply the curative power inherent in the concept of playful play, which includes learning processes targeted at improving relationship management, communication, role playing, mastery, and attachment formation to assist children in overcoming present and future psychological challenges**.**[16] The material on web-based play therapy-in the form of therapeutic games with several assignments-may influence the emotional and behavioural development of children with ADHD.

Based on this analysis, it can be concluded that web-based play therapy designed in keeping with the fundamentals of ADHD child therapy can reduce the general symptoms of ADHD, which then impacts improvements in the child's development pattern. The similarity of the research results of this study to the findings of previous research is because of the similarities in the characteristics of the respondents, including age, intervention material, and the types of therapeutic games (which are almost identical), such that it is possible to provide a similar therapeutic effect from managing children with ADHD problems.

Relationship between demographic characteristics and the emotional, behavioural and social development of children with ADHD

The results of the analysis of the relationship between age and the development of children with ADHD show that there is no relationship between age and the emotional, behavioural and social development of children with ADHD. This finding differs from prior study which found that elevated ADHD symptoms at seven years of age is significantly associated with low emotional involvement at 10–12 years of age.[17] Furthermore, the results of the analysis regarding the relationship between gender and the development of children with ADHD indicate that there is no relationship between gender and the emotional, behavioural and social development of children with ADHD. The results of this study differ from other study which report that there are more males than females among children diagnosed with ADHD.[13] This is attributed to differences in gender phenotypes, with boys tending to exhibit more hyperactive behaviour than girls among children with ADHD. Furthermore, girls exhibit more emotional symptoms than boys, which is considered a means of expressing their difficulties and not problematic-in contrast to problematic hyperactive behaviour.[18] This distinction significantly affects clinical assessment in the enforcement of ADHD diagnoses.

The results of the analysis regarding the relationship between intelligence level and the development of children with ADHD indicate that there is a significant relationship between intelligence level and the emotional, behavioural and social development of children with ADHD. Groups of children with ADHD are known to generally have low intelligence scores, which has been associated with challenges in the cognitive domain, hyperactivity/impulsivity, and inattention.[19,20] Intelligence and motor skills can influence the emotional and social developmental patterns of children with ADHD, which then underpins the application of ADHD motor-cognitive interventions in children.[21]

Further analysis regarding the relationship between medication history and the development of children with ADHD indicates that there is no relationship between medication history and the emotional, behavioural and social development of children with ADHD. The results of this study differ from prior study which reports that children with ADHD experienced elevated neuroprotective serum levels related to symptom improvement after treatment with methylphenidate.[22] The findings also differ from other of this study, as they report that cognitive behavioural therapy (CBT) interventions effectively altered the physical domain based

on assessments of the quality of life of children with ADHD before and after therapy.[23]

From the analysis results of this study regarding the relationship between family economic status and the development of children with ADHD, we found no significant relationship between family economic status and the emotional, behavioural and social development of children with ADHD. These results are supported prior study which report no significant difference between the impact of good and poor economic status on treatment compliance and symptom reduction in children with ADHD.[24,25] However, findings that differ from other study that found that low socioeconomic status can elevate the risk of psychological problems in children, one of which is ADHD.[26] This difference in research results can be attributed to nominal limits or parental income, which are used to determine economic status. In addition, many other factors, such as the level of knowledge or understanding of the parents and the level of awareness or involvement of the parents in home follow-up on interventions for children with ADHD, may affect the intervention results.

The findings of this study can serve as a reference for optimising nursing care services for children with ADHD via the use of information technology in the form of web-based play therapy. In addition, we hope that further research will be conducted with a larger sample and at deeper levels of analysis, especially regarding the time required for play therapy to yield the best outcomes for the development of children with ADHD.

Conclusions

The use of health technology in interventions for children with ADHD provides opportunities for supporting therapy with increased access to care and flexibility of use. The results of this study indicate that there are significant differences in the emotional, behavioural and social development of children with ADHD before and after the provision of a web-based play therapy intervention. This study can serve as a reference for optimising nursing care services for children with ADHD via information technology using web-based play therapy. In addition, it is hoped that further research will examine a larger sample and analyse the retention time of web-based play therapy in providing therapeutic effects for children with ADHD.

References

1. Alkaff M, Khatimi H, Sari Y, Darmawan P, Primananda R. Android based expert sistem to detect types of ADHD. J Teknol Inf dan Ilmu Komput 2019;6:135–40.
2. Danielson ML, Bitsko RH, Ghandour RM, et al. Prevalence of parent-reported ADHD diagnosis and associated treatment among U.S. children and adolescents, 2016. J Clin Child Adolesc Psychol 2018;47:199–212.
3. Sasono CK, Setiawati Y, Irwanto I. Correlation Between children's temperament and risk factor of attention deficit/hyperactivity disodrer in elementary school. Biomol Heal Sci J 2019;2:17.
4. Kusumasari D, Junaedi D, Kaburuan ER. Designing an interactive learning application for ADHD children. MATEC Web Conf 2018;197:4–8.
5. Mitrpanont J, Bousai B, Soonthornchart N, et al. iCare-ADHD: A mobile application prototype. Seventh ICT Int Student Proj Conf 2018;2018–21.
6. Pandian GSB, Jain A, Raza Q, Sahu KK. Digital health interventions (DHI) for the treatment of attention deficit hyperactivity disorder (ADHD) in children - a comparative review of literature among various treatment and DHI. Psychiatry Res. 2021;297.
7. Zakershoshtari M, Bozorgi ZD. The effectiveness of play therapy on reduction of the symptoms of attention deficit hyperactivity disorder (ADHD) in children. Asian Soc Sci 2016;12:188–92.
8. Crepaldi M, Colombo V, Mottura S, et al. Antonyms: A computer game to improve inhibitory control of impulsivity in children with attention deficit/hyperactivity disorder (ADHD). In 2020;11:1–10.
9. Boro MFV, Hariyati RTS. The use of telenursing through the nursing care. Jendela Nurs J 2019;3:114–21.
10. Oppenheimer J, Ojo O, Antonetty A, et al. Timely interventions for children with ADHD through web-based monitoring algorithms. Diseases 2019;7:20.
11. Wiguna T, Ismail RI, Kaligis F, et al. Developing and feasibility testing of the Indonesian computer-based game prototype for children with attention deficit/hyperactivity disorder. Heliyon 2021;7:e07571.
12. Sánchez M, Lavigne R, Romero JF, Elósegui E. Emotion regulation in participants diagnosed with Attention Deficit Hyperactivity Disorder, before and after an emotion regulation intervention. Front Psychol 2019;10:1–10.
13. Ragnarsdottir B, Hannesdottir DK, Halldorsson F, Njardvik U. Gender and age differences in social skills among children with ADHD: Peer problems and prosocial behavior. Child Fam Behav Ther 2018;40:263–78.
14. Ministry of Health Republic of Indonesia. Peraturan Menteri Kesehatan Republik Indonesia Nomor 21 Tahun 20220 Tentang Rencana Strategis Kementrian Kesehatan Tahun 2020-202. [Regulation of the Minister of Health of the Republic of Indonesia Number 21 of 20220 concerning the Strategic Plan of the Ministry of Health for 2020-2020] 2020;1–9.
15. Merlo G, Chiazese G, Ferreira M, et al. The WHAAM application: a tool to support the evidence-based practice in the functional behaviour assessmentThe WHAAM application: a tool to support the evidence-based practice in the functional behaviour assessment. J Innov Heal Informatics 2018;25.
16. El-Nagger NS, Abo-Elmagd MH, Ahmed HI. Effect of applying play therapy on children with attention deficit hyperactivity disorder. J Nurs Educ Pract 2017;7:104.
17. Rushton S, Giallo R, Efron D. ADHD and emotional engagement with school in the primary years: Investigating the role of student – teacher relationships. 2019;
18. Mowlem F, Agnew-Blais J, Taylor E, Asherson P. Do different factors influence whether girls versus boys meet ADHD diagnostic criteria? Sex differences among children with high ADHD symptoms. Psychiatry Res 2019;272:765–73.
19. Arnold LE, Hodgkins P, Kahle J, et al. Long-term outcomes of ADHD: Academic achievement and performance. J Atten Disord 2020;24:73–85.
20. Mustafaoglu N, Unal D, Cak T, et al. Comparative analysis of the WISC-IV in a clinical setting: ADHD vs. non-ADHD. Arch Pediatr 2021;28:16–22.
21. Klupp S, Möhring W, Lemola S, Grob A. Relations between fine motor skills and intelligence in typically developing children and children with attention deficit hyperactivity disorder. Res Dev Disabil 2021;110:103855.
22. Molina-Carballo A, Cubero-Millán I, Fernández-López L, et al. Methylphenidate ameliorates the homeostatic balance

between levels of kynurenines in ADHD children. Psychiatry Res 2021;303.
23. Mei Rong, Huang F, Zhao MJ, et al. A comparison of efficacy between cognitive behavioral therapy (CBT) and CBT combined with medication in adults with attention-deficit/hyperactivity disorder (ADHD). Psychiatry Res 2019;279:23–33.
24. Safavi P, Saberzadeh M, Tehrani AM. Factors associated with treatment adherence in children with attention deficit hyperactivity disorder. Indian J Psychol Med 2019;41:252–7.
25. Guhn M, Emerson SD, Mahdaviani D, Gadermann AM. Associations of birth factors and socio-economic status with indicators of early emotional development and mental health in childhood: a population-based linkage study. Child Psychiatry Hum Dev 2020;51:80–93.
26. Slobodin O, Crunelle CL. Mini review: Socio-cultural influences on the link between ADHD and SUD. Front Public Heal 2019;7:1–7.