



Reducing Wait Times for Children's Developmental Disorders Consultations Via Simplified Primary Care Assessments

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Abstract: The number of children diagnosed with developmental disorders in Japan is increasing annually, primarily assessed by specialized physicians in pediatrics, pediatric neurology, and child psychiatry. However, medical institutions for children with developmental disorders often have fully booked schedules, forcing long waiting periods until initial consultations can be obtained. One reason for this is the shortage of specialized medical institutions and specialists. Prolonged waiting periods may not only delay intervention and support but also exacerbate the child's symptoms and cause psychological distress to the caregivers. Therefore, reducing the waiting period for initial consultations from the perspective of early detection and early support is an urgent issue. However, there is insufficient research on how to shorten the waiting period. Therefore, we focused on local primary care physicians, who are familiar with shortening the waiting time for initial consultations at specialist medical institutions. This aimed to investigate whether there was a change in the waiting time for initial consultations at specialist medical institutions when local primary care physicians used a simplified assessment sheet supervised by pediatric specialists, and referrals were made to specialist medical institutions after assessment. The participants consisted of 15 individuals referred from primary care physicians to specialist medical institutions and 15 who directly visited medical institutions, totaling 30 participants for evaluation. As a result, the group that made appointments and visited specialist medical institutions directly showed significantly longer waiting periods than those assessed by primary care physicians and referred to specialist medical institutions ($p < 0.05$). Assessment and treatment of developmental disorders in early childhood have primarily been conducted at specialized medical institutions. Still, using a simplified assessment sheet by primary care physicians suggests a potential reduction in the waiting time for initial consultations with specialists.

Keywords: child developmental disorders, waiting time, assessment sheet, primary care physician, first medical consultation

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I. INTRODUCTION

The prevalence of developmental disorders in Japan is increasing annually. These disorders, referred to as neurodevelopmental disorders in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Test Revision (DSM-5-TR),¹ encompass conditions such as Attention-Deficit-Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD). According to data from the Ministry of Education, Culture, Sports, Science, and Technology in Japan, there is a rising trend in childhood developmental disorders.² However, there is an issue regarding the waiting period for diagnosis by specialist physicians.^{3,4} Similar problems have been observed outside Japan. For instance, a study conducted in eight European countries regarding ADHD revealed long waiting times to be referred to a specialist physician.⁵ Another study reported an average time of 23.4 months from the initial suspicion of ADHD symptoms to diagnosis and 10.8 months from the first medical consultation to the confirmed diagnosis.⁶ Furthermore, waiting times have been associated with symptom exacerbation.⁷ These previous studies have demonstrated the crucial insight that prolonged waiting periods can result in disadvantages for both children with developmental disorders and their caregivers. However, medical systems vary across countries. Some countries, such as Japan, allow patients or guardians to directly schedule appointments with specialized medical institutions for childhood developmental disorders. Others, such as the UK, operate on a system where individuals first visit a general practitioner and are referred to specialist medical institutions if necessary.⁸ Therefore, comparing the length of waiting periods between countries with different healthcare systems is inappropriate. However, from the perspective of children with developmental disorders and their caregivers, the desire for prompt medical attention is universal across all countries. Despite differences in medical systems, childhood developmental disorders are typically diagnosed by specialist physicians using the DSM diagnostic manual.⁹ However, research indicates that teachers, parents, and primary care physicians are more likely first to suspect ADHD than specialist physicians. However, primary care physicians often lack sufficient knowledge and confidence in diagnosing ADHD or ASD.¹⁰⁻¹² Some studies have suggested that primary care physicians can accurately assess whether a child is near the threshold for ADHD diagnosis.¹³ Previous studies may yield differing insights, but their findings remain significant. Primary care physicians hold a significant proximity position for children with developmental disorders and their caregivers. Accurate diagnosis by primary care physicians and appropriate referral to specialist medical institution physicians are paramount. One of the factors contributing to waiting periods is the need for more specialist physicians and medical institutions. For example, although the Japanese Society of Psychiatry and Neurology lists 12,247 psychiatrists on its website,¹⁴ the Japanese Society of Child and Adolescent Psychiatry, which primarily deals with children's mental disorders, lists only 552 certified specialists.¹⁵ Dr. Arai's study highlights a reluctance toward treating children with developmental disorders. When viewing hospital or psychiatric clinic websites, phrases such as "It is difficult to provide care for children under junior high school age due to the absence of specialized staff" and "Treatment for children requires high levels of specialization, so refer patients to other facilities," are frequently encountered. Furthermore, it is highlighted that in medical institutions that advertise child psychiatry services, it is common for initial appointment

reservations to be unavailable for several months, leading to delays in initial responses and increased workload for specialized physicians. In contrast, it has been reported that phrases such as "Patients aged 75 and above are not examined" and "Diagnosis of dementia requires high levels of specialization, so it refers patients to other facilities" are not commonly observed on websites. Specific reasons for reluctance to treat children are not explicitly stated. The need for physicians capable of diagnosing such disorders implies a shortage of medical facilities where examinations can be performed. Consequently, with each physician handling many patients, it can be inferred that medical care for children with developmental disorders is provided with significantly fewer resources than for adult patients.¹⁶ The scarcity of physicians who can make diagnoses likely contributes to extended waiting times and substantial patient loads for individual physicians. This, in turn, results in constrained resources for diagnosing childhood developmental disorders. Research on identifying biomarkers for conditions such as schizophrenia has made progress¹⁷; however, biomarkers for developmental disorders, such as ADHD and ASD, have yet to be identified. Studies have suggested that genetic and environmental factors and congenital functional impairments in the prefrontal cortex play a role; however, the underlying mechanisms remain unclear.^{18,19} Therefore, physicians rely on patient and guardian complaints, interviews, behavioral observations, and assessment tools to diagnose. Although various assessment tools have been developed and proven useful worldwide, they can take several minutes to over an hour to complete.^{20,21} Although studies have highlighted the lengthy diagnostic process, shortening waiting periods has yet to be adequately discussed, particularly regarding reducing waiting times for initial consultations. There are several issues related to childhood developmental disorders. This study focused on reducing the waiting period for children and their caregivers to receive initial consultations at specialized medical institutions for childhood developmental disorders. The research aimed to fill this void by investigating whether the implementation of assessment sheets by primary care physicians under the supervision of pediatricians specializing in developmental disorders could reduce waiting times for initial consultations at specialized medical institutions.

2. MATERIALS AND METHODS

2.1 Ethical Statement

This study was approved by the Research Ethics Review Committee of Ritsumeikan University, Japan (Approval Number: Kinugasa-Human-2022-15).

2.2 Location

This study was conducted at a medical institution specializing in child developmental disorders in Japan (1 facility)

2.3 Participant Demographic Details

The statistical characteristics of the participants in this study are presented in Table 1. The participants in this study consisted of 30 individuals, with 15 who received assessments from primary care physicians and were referred to specialist medical institutions for initial consultations and 15 who directly booked appointments for initial consultations at specialist medical institutions. The duration of the first consultation at the specialized medical institutions was

accurately recorded by medical staff or medical secretaries in minutes, from the patient's entry to exit from the examination room. The waiting period until the initial consultation at the

specialized medical institutions was defined as the difference in days between the date of booking the appointment and the date of the actual first visit.

Table 1: Demographic characteristics of the participants

No	Sex	Age(years)	Primary Care Physician's Assessment	Duration of first consultation at the specialized medical institutions	Waiting period for the first consultation (specialized medical institutions)
1	M	10	Yes	28	within 2 months
2	F	9	Yes	27	within 2 months
3	F	3	Yes	27	within 2 months
4	M	4	Yes	30	within 2 months
5	M	4	Yes	28	within 2 months
6	F	9	Yes	32	>2 months
7	M	13	Yes	32	>2 months
8	M	3	Yes	15	>2 months
9	M	5	Yes	29	>2 months
10	F	8	Yes	30	>2 months
11	F	15	Yes	25	>2 months
12	F	12	Yes	35	>2 months
13	M	5	Yes	29	within 2 months
14	M	7	Yes	32	>2 months
15	M	4	Yes	29	within 2 months
16	M	12	No	25	within 2 months
17	M	8	No	25	>2 months
18	M	7	No	27	>2 months
19	M	6	No	22	>2 months
20	M	7	No	16	>2 months
21	F	9	No	23	>2 months
22	M	8	No	35	>2 months
23	F	4	No	26	>2 months
24	M	6	No	33	>2 months
25	F	7	No	29	>2 months
26	F	2	No	17	>2 months
27	M	4	No	30	>2 months
28	M	6	No	28	>2 months
29	M	4	No	28	>2 months
30	M	5	No	30	>2 months

M-Male, F-Female

2.4 Data Collection

From August 1, 2022, to June 30, 2023, individuals who visited a specialized medical institution for their first consultation were targeted for developmental disorders. The physician provided them with an explanation of the research purpose. For children under 6 years old, consent was obtained from their parents/guardians. For children aged 6 and above, consent was obtained from the child and the guardian, with 30 individuals signing the consent form.

2.5 Inclusion Criteria

Referral patients from primary care physicians were limited to

one to two per month, resulting in 15 participants in each group. The inclusion criteria were as follows: children aged 2–17 years who underwent an assessment for suspected developmental disorders by their primary care physician using an assessment sheet and were either referred for the first time to a specialized medical institution for child developmental disorders or directly booked an appointment and visited a specialized medical institution for the initial consultation.

2.6 Exclusion Criteria

The exclusion criteria were under 2 years old or over 18 years old. And parents who did not consent to participate in the research.

2.7 Data Extraction and Management

Table 2: Interventions to Reduce Waiting Times for Initial Consultations at Specialist Medical Institutions

Practice characteristics	Type of practice (Primary Care Physicians, Specialized Medical Institutions)
Implementation	Types of interventions implemented to reduce waiting times for initial consultations at specialist medical institutions.
Comparator	Group that scheduled and visited specialized medical institutions directly without assessment by

Outcomes	primary care physicians
	Comparison of the initial waiting period and average outpatient time(comparison between the group referred to specialist medical institutions after assessment by primary care physicians and the group that directly booked and visited specialist medical institutions)

Participants were recruited sequentially from the start of the study until 30 participants, with 15 each from the group that made appointments directly with the medical institution and the group referred by their primary care physician, were enrolled. If participation was declined, another set of parents with appointments for the initial consultation was approached. Data extraction was performed on the items reported in the following table (Table 3).

3. STATISTICAL ANALYSIS

The aggregated data were analyzed using the Statistical Package for the Social Sciences (version 29.0.0) (241). Differences in the means were assessed using t-tests, and descriptive statistics and tests of proportions were evaluated using the chi-square test, with a significance level set at 5%.

4. RESULTS

4.1 Average Consultation Time During the Initial Outpatient Visit at a Specialty Medical Institution

Table 3: Descriptive characteristics of children					
Characteristics	Item	Number	Ratio	Mean	SD
Sex of children	Male(Boy)	20	66.7%		
	Female(Girl)	10	33.3%		
Age(years)				6.86	3.33
Primary Care Physician's Assessment					
Yes					
	Male(Boy)	9	30.0%		
	Female(Girl)	6	20.0%		
No					
	Male(Boy)	11	36.7%		
	Female(Girl)	4	13.3%		

The demographic characteristics of the participants are shown in Table 1. The characteristics of the 30 participants in this study were 20 boys (66.7%) and 10 girls (33.3%), with a mean age of 6.86 ± 3.3 years. Among those who received an assessment from their primary care physician and were referred to a speciality medical institution for an initial consultation, nine boys (30.0%) and six girls (20.0%) attended the initial consultation. In contrast, among those who directly booked an appointment and participated in the speciality medical institution, 11 were boys (36.7%), and four were girls (13.3%) (Table 3).

Table 4: Duration of the first consultation at the specialized medical institution

Characteristics	Item	Number	Mean	SD
Primary Care Physician's Assessment	Yes	15	28.53	4.50
	No	15	26.27	5.25

In this study, physicians or clinic staff accurately recorded the participants' outpatient visit times, noting when they entered and exited the examination room. The recorded times were in minutes, and seconds were not recorded. Outpatient consultation times were calculated as the difference between the entry and exit times. The average outpatient consultation time for initial visits to specialty medical institutions was 28.53 ± 4.50 min for the group referred after their primary care physician assessment and 26.27 ± 5.25 min for the group that directly booked and attended appointments at the specialty medical institution (Table 4).

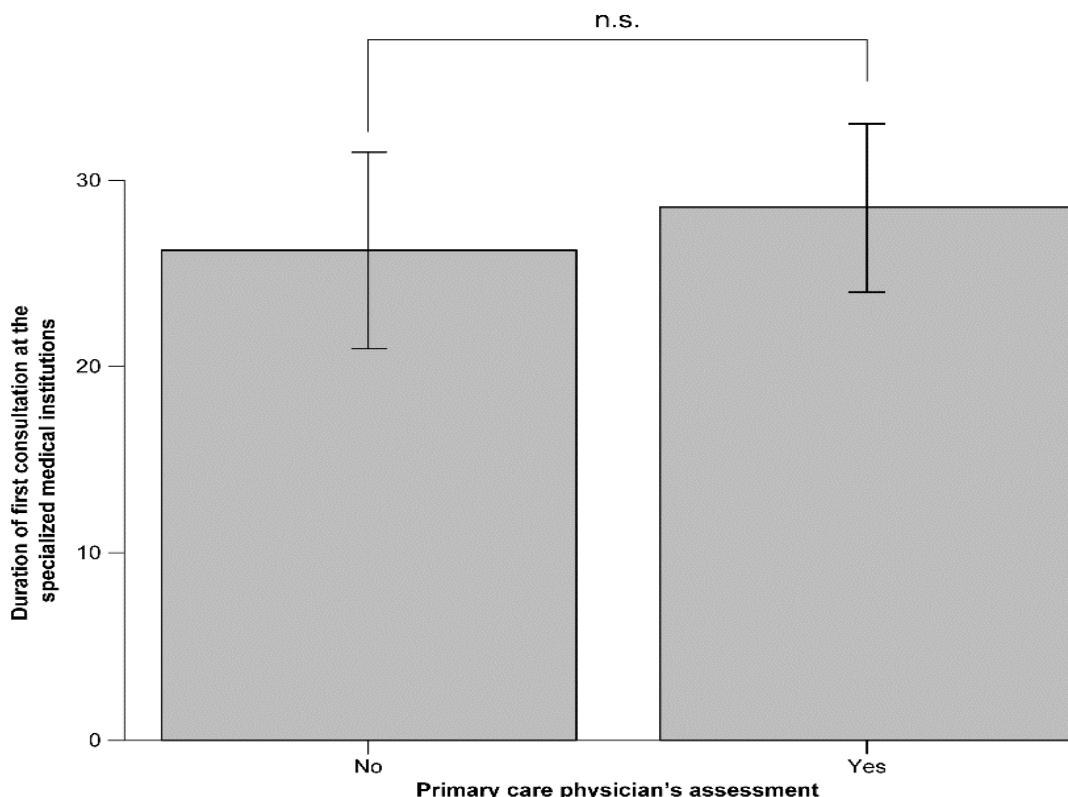


Fig 1: Duration of the first consultation visit at the specialized medical institution

The difference in mean outpatient visit times between the two groups was assessed using a t-test, which did not reveal any statistically significant difference ($p < 0.21$) (Figure 1).

4.2 The Ratio of Waiting Time based on the Presence or Absence of Assessments by Primary Care Physicians

Table 5: Waiting period for the first consultation at the specialized medical institution

Characteristics	Item	Number	Ratio
With Primary Care Physician's Assessment			
	within 2 months	7	23.3%
	>2 months	8	26.7%
Without a Primary Care Physician's Assessment			
	within 2 months	1	3.3%
	>2 months	14	46.7%

Among the groups that received assessments from primary care physicians, seven individuals (23.3%) were referred to specialist medical institutions and had a waiting period of <2 months for their initial consultation, whereas eight individuals (26.7%) had a waiting period of ≥2 months. In contrast, in the group that directly booked appointments at specialist medical institutions, one individual (3.3%) had a waiting period of <2 months for their initial consultation, whereas 14 individuals (46.7%) had a waiting period of ≥2 months (Table 5).

Table 6: Waiting Period and Presence of Primary Care Physician's Assessment (chi-square test)

	Initial consultation of <2 months	Initial consultation of >2 months	Total Number
With Primary Care Physician's Assessment	7	8	15
Without a Primary Care Physician's Assessment	1	14	15
Total Number	8	22	30
P value			0.035

Regarding the proportion of waiting periods for initial consultations, two groups were examined: one referred by primary care physicians after receiving assessments and the other that directly booked appointments at medical institutions to compare the proportion of waiting periods for

initial consultations between the group referred by primary care physicians after receiving assessments. When the group booked appointments at medical institutions, the chi-square test was performed using cross-tabulation, categorizing the waiting periods as within 2 months and 2 months or more

based on assessments by primary care physicians. The cross-tabulation was conducted based on Table 5. The results indicated that the group that directly booked appointments at medical institutions had a significantly higher proportion of

Appendix

Assessment Sheet ver1.					
Sex : M· F	Age	years old	Name :		
"Please place a circle mark in the relevant section."					
1. Forgetful or often forgets things.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
2. Unable to sit still, restless.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
3. Difficulty in communicating with others.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
4. Impatience, tendency to cut in line.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
5. Strong attachment to one's own rules and ways, difficulty in letting go.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
6. Extremely sensitive to sound, light, smell, taste, and touch.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
7. Difficulty in concentrating on things or sustaining focus.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
8. Getting irritable or panicking when unexpected things happen.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
9. Having difficulty with reading or writing despite being able to understand.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
10. Having trouble with simple calculations despite being able to understand.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
11. There are many things that they do not understand compared with children of the same age.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	
12. They are clumsy compared with children of the same age.					
(1)Rarely applies	(2)Does not apply much	(3)Neither/nor	(4)Applies somewhat	(5)Applies very much	

5. DISCUSSION

5.1 The duration of outpatient consultations at specialized medical institutions

In this study, outpatient hours and initial consultation waiting times were analyzed at a specialized pediatric developmental disorder medical institution among 30 participants. Additionally, reports indicate that there are more boys than girls with developmental disorders. In this study, we analyzed

waiting periods of ≥ 2 months than the group that received assessments by primary care physicians ($p < 0.05$) (Fisher's Exact Test) (Table 6).

the outpatient time and waiting period for initial consultations at a specialized pediatric developmental disorder medical institution among 30 participants. It has been reported that there are more boys than girls with developmental disorders.^{22,23} Furthermore, this study observed a similar trend. The average outpatient times for the group referred by primary care physicians after receiving assessments and the group that directly booked appointments at medical institutions were 28.53 min and 26.27 min, respectively. The initial outpatient appointment time at this specialized medical

institution is 30 min. This study's average outpatient times were shorter than the 30-minute initial appointment time. The group receiving assessments by primary care physicians was hypothesized to have shorter average outpatient times. However, no significant difference in the average outpatient times was observed between the two groups. The healthcare system in Japan is primarily based on a universal health insurance system, where healthcare services are provided to all citizens under the national health insurance scheme²⁴. Reimbursements to healthcare institutions from health insurance funds are meticulously regulated based on medical procedures, with adjustments to reimbursement rates occurring biennially²⁵. Developmental disorders are believed to require a significant amount of time during examinations, which may have an impact. The average age of the group receiving assessments by primary care physicians was 7.40, whereas it was 6.33 for the group that directly booked appointments at medical institutions. Accurately conveying their symptoms to physicians is challenging for children, and the younger they are, the stronger this tendency becomes. Therefore, it is speculated that as the age decreases, conversations with guardians increase, resulting in shorter consultation times.

5.2 The potential for reducing waiting times for initial consultations at specialized medical institutions

They subsequently, analyzed the waiting periods for initial consultations between the group referred by primary care physicians after assessments and the group that independently scheduled appointments at medical institutions. Previous studies have reported waiting periods exceeding four months in over 50% of cases²⁶. Because the Ministry of Education, Culture, Sports, Science, and Technology in Japan recommended a waiting period of over 3 months to the Ministry of Health, Labour and Welfare,⁴ a waiting period of 2 months was set in this study. As a result, the group that directly booked appointments at medical institutions showed a significantly higher proportion of waiting periods of 2 months ($p < 0.05$). Research on waiting times and patient satisfaction suggests that longer waiting times are significantly associated with lower patient satisfaction^{27,28}. However, while longer waiting times were associated with decreased parental satisfaction with visits to pediatric clinics, an increase in time spent with physicians tended to mitigate this relationship^{29,30}. In Japan, maintaining a consistent level of support for children's developmental disorders and establishing a support system through the division of roles between specialists and primary care physicians is essential.³¹ Furthermore, in Japan, managing children's developmental disorders involves various professions beyond physicians, such as psychologists and speech therapists, and further promotion is necessary³². In this study, by conducting assessments by primary care physicians in the community, it was suggested that waiting periods at specialized medical institutions could be shorter than those for individuals directly booking appointments at medical institutions. However, there needs to be more knowledge and educational deficiencies regarding developmental and behavioral disorders in general practitioners³³. For instance, some referral notes from primary care physicians highlight only certain symptoms of ASD as reasons for referral, underscoring the need for ongoing ASD training for primary care physicians³⁴. Similarly, it is noted that ADHD also faces the risk of underdiagnosis or misdiagnosis³⁵. In Japan, regional medical collaboration is being promoted, and physicians often know each other well, with referrals between them being

common. While medical collaboration for developmental disorders is also being promoted, strategies such as ensuring accurate knowledge and training for primary care physicians through medical collaboration are considered necessary to address these issues.

6. CONCLUSION

In this study conducted at a specialized pediatric developmental disorder medical institution, we examined the average outpatient time and waiting period for initial consultations between the group referred by primary care physicians after receiving assessments and those directly booked appointments at medical institutions. This study showed that the proportion of individuals with more than 2 months waiting periods was significantly higher among those who directly booked appointments and visited specialist medical institutions for initial consultations. Since healthcare systems vary across countries, the results are limited. Still, it is clear that specialized medical institutions for children with developmental disorders are consistently fully booked, and the longer the waiting time for children and caregivers, the more exacerbated the child's problem behaviors and caregiver psychological distress become. The findings suggest the effectiveness of assessments by primary care physicians in reducing waiting times as one method to shorten the waiting period. However, the limitations of this study include the fact that it was conducted at one specialized pediatric developmental disorder medical institution and the small sample size of 30 participants. Further research is required to expand the target facilities and continue the study. Prolonged waiting periods are undesirable from the perspective of early detection and intervention, and collaboration between primary care and specialist physicians is necessary for the management of children's developmental disorders in Japan. In the future, it is necessary to conduct surveys on the waiting time and satisfaction of parents referred by primary care physicians who have received consultations at specialized medical institutions. Developmental disorders in children require seamless treatment and support, and to effectively utilize limited medical resources, further promotion of medical collaboration between primary care physicians and specialists is essential. Although conducting a study using a simple assessment sheet with primary care physicians and referred to specialist physicians, investigating whether similar trends exist with different assessment methods would be a future research topic.

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8. AUTHORS CONTRIBUTION STATEMENT

Conceptualization, Takaaki Kuranami, and Kimiya Kon; Methodology, all authors; Writing original draft preparation, Takaaki Kuranami; Writing Review and editing, all authors; Statistical calculations, Takaaki Kuranami. All authors have read and agreed to the published version of the manuscript.

9. CONFLICT OF INTEREST

Conflict of interest declared none.

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