

Enhancing Learning Achievement in Sentence Structure among Grade 8 Students using the GPAS 5 STEP Learning Management Model

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Abstract

This study aimed to investigate the effectiveness of a learning management plan designed using the GPAS 5 Step model in enhancing the learning achievement of 31 Thai language learners in the area of sentence structure. Participants were selected through cluster sampling from a population of Thai language learners in a public school. The research instruments included the learning management plan, a learning achievement test, and a questionnaire to assess participant satisfaction with the learning experience. Data were collected using a one-group pretest-posttest design. Descriptive statistics, paired samples t-test, and an effectiveness index with a criterion of 80/80 were employed for data analysis. The results indicated that the learning management plan designed using the GPAS 5 Step model had a significant positive impact on participants' learning achievement in sentence structure. Additionally, participants reported high levels of satisfaction with the learning experience, highlighting the effectiveness of the GPAS 5 Step model in creating an engaging and satisfying learning environment. These findings contribute to the growing body of research supporting the effectiveness of the GPAS 5 Step model and emphasize the importance of participant satisfaction in language learning contexts.

Keywords: GPAS 5 step, sentence structure, language education, learning achievement, learning satisfaction

1. Introduction

At the junior high school level, the ability to form sentences is of utmost importance. It is during this phase that language is recognized not only as a means of communication but also as a fundamental component of knowledge itself (Amalia, Abdullah, & Fatimah, 2021). Students are expected to demonstrate their proficiency in using language with accuracy and appropriateness in terms of form and function (Defazio, Jones, Tennant, Hook, & Defazio, 2010). Mastering sentence formation equips students with essential skills that have far-reaching benefits in their academic pursuits, personal lives, and future careers (Bennett & Robertson, 2015). A strong foundation in sentence construction enables students to express their thoughts clearly, coherently, and persuasively, fostering effective written and oral communication skills. Additionally, understanding the intricacies of sentence structure enhances students' reading comprehension, enabling them to analyze complex texts and extract meaning with ease. In the context of education, the ability to form sentences demonstrates language proficiency, which is crucial for success in various subjects and academic assessments (Klimova, 2012). Furthermore, in future careers, strong communication skills, including the ability to construct well-formed sentences, are highly valued and sought after by employers across industries. Whether it be writing reports, presenting ideas, or engaging in professional correspondence, the ability to form sentences correctly and appropriately is a vital asset that opens doors to success in numerous endeavors. Therefore, Sentence structure is included in education curricula worldwide because it serves as a foundational element of language learning, enabling students to effectively communicate, comprehend written texts, and develop critical thinking skills (Inayah & Nanda, 2016).

Unfortunately, learning to create sentences is undoubtedly a challenging task, encompassing various components such as vocabulary, grammar, sentence structures, and the use of conjunctions (Lee, 2003; Lee & Yuan, 2021; Yu & Lee, 2014). It requires students to master a range of skills and knowledge to construct meaningful and coherent expressions. Firstly, vocabulary plays a crucial role as students need a diverse repertoire of words to accurately convey their intended meanings. Additionally, understanding and applying grammatical rules are essential in ensuring grammatical accuracy and coherence within sentences. Moreover, sentence structures

provide the framework for organizing ideas, requiring students to grasp the nuances of different sentence types, such as simple, compound, and complex sentences. Lastly, the appropriate use of conjunctions helps establish logical connections between ideas and facilitates coherence in writing. Learning to create sentences effectively necessitates practice, perseverance, and a solid understanding of these elements, ultimately leading to the development of strong written and verbal communication skills (Klimova, 2012).

At a contextual level, Thailand faces significant challenges in language classrooms where the primary focus tends to be on grammar teaching (Noom-ura, 2013). As a result, exercises often revolve around text completion utilizing grammar knowledge, while the development of sentence formation skills is often neglected. This approach leaves learners with limited experience in constructing their own sentences, exacerbating the existing gap between their native language (L1) and the target language (L2). Furthermore, the prevalent lecture-based instructional approach renders classes monotonous, passive, and unsuitable for effective language learning (Solomon, 2020). It is crucial for educational stakeholders to recognize the importance of incorporating comprehensive language instruction that encompasses grammar, vocabulary, and sentence formation, fostering active and engaging learning environments that empower students to become confident and proficient language users.

These problems have yielded concrete evidence of the challenges faced in Thai language learning. The results of national tests reveal that the average Thai students achieve scores below half of the maximum attainable marks (National Institute of Educational Testing Service, 2022). Additionally, international assessments like the PISA test consistently place Thailand at the lower end of the proficiency rankings. These indicators highlight the urgent need for alternative instructional methods to be developed and implemented to address the existing situation (Schleicher, 2019). It is imperative to explore innovative approaches that prioritize comprehensive language instruction, including an emphasis on sentence formation, vocabulary development, and communicative competence. By adopting alternative methods, creating interactive and student-centered learning environments, and providing ample opportunities for meaningful language practice, the Thai education system can strive towards enhancing language proficiency and empowering students to succeed in their language learning journeys.

Regarding teaching methods, the GPAS 5 STEP model emerges as a promising approach developed by Thailand Institute of Academic Development (2018). It can be applied in various fields in education including language classrooms. Rooted in constructivist learning principles, this model empowers learners to construct knowledge from their existing understanding, promoting a deep and meaningful learning experience (Chuicomwong & Chuicomwong, 2022). Moreover, the GPAS 5 Step model aligns with the principles of active learning and learner-centered environments, as it grants students autonomy and encourages their active participation in learning activities throughout the process (Naktamna, Kuharueangrong, & Othakanon, 2020). By taking control of their own learning, students can develop metacognitive skills and cultivate higher-order thinking abilities (Tanyarattanasrisakul, 2023). The GPAS 5 Step model offers a comprehensive framework that addresses the crucial aspects of language learning, including sentence formation, while fostering student engagement, critical thinking, and self-directed learning. Implementing such an instructional approach has the potential to revolutionize language classrooms, providing a solid foundation for students to thrive in their language acquisition and ultimately improve their overall proficiency.

The GPAS 5 Step model, with its emphasis on gathering, processing, applying, and self-regulating knowledge, offers a holistic approach to developing students' ability to form sentences and achieve learning objectives related to sentence structure. By gathering relevant data, students can access examples of sentence structures and analyze them. Through the processing step, they can organize the information and identify patterns and connections between different sentence types. Applying knowledge involves applying their understanding of sentence structure in real-life situations, constructing their own sentences with accuracy and coherence. Finally, self-regulation enables students to monitor their progress, reflect on their sentence-forming abilities, and continuously improve through self-directed learning. Here are the details of each component of the GPAS 5 Step model.

Gathering and Selecting Data (G)

In this step, students engage in the collection and selection of relevant data. This involves using their senses, recording observations, and retrieving previously gathered information. The goal is to equip students with the necessary data to support their learning and decision-making processes.

Processing Data (P)

Once the data is gathered, students proceed to process and organize it. This step focuses on adding value to the

collected data, considering ethical considerations, and employing creative design and decision-making techniques. The aim is to transform raw data into meaningful information that can be utilized effectively.

Applying Knowledge (A)

The Applying step has two parts. Applying 1 involves planning and implementing activities that encourage problem-solving and innovation. Students work collaboratively to apply their knowledge to real-life situations, fostering creativity and critical thinking. Applying 2 focuses on summarizing knowledge and understanding fundamental principles, enabling students to present their ideas systematically and develop plans based on their acquired knowledge.

Self-Regulation or Self-Learning (S)

In the Self-Regulation step, students engage in evaluating the overall progress of their learning and projects. They reflect on their thinking processes, expand their values within society and the environment, and develop personalized thinking habits. This step promotes metacognition, self-directed learning, and the development of higher-order thinking skills.

By implementing the GPAS 5 Step model, students can actively engage in their learning, develop critical thinking skills, and enhance their proficiency in forming sentences. This comprehensive approach supports learners in acquiring a deep understanding of sentence structure, improving their communication skills, and achieving higher levels of learning achievement in the study of sentence structures.

Scholars in Thailand have extensively studied the effects of the GPAS model in various fields within education (e.g., Chuicomwong & Chuicomwong, 2022; Naktamna, Kuharueangrong, & Othakanon, 2020; Papan & Kongnawang, 2022; Po Ngern, Sithsungnoen, Nilapun, & Poomrarueng, 2021; Saeyang & Seanruen, 2022; Tanyarattanasrisakul, 2023). For instance, Chuicomwong and Chuicomwong (2022) conducted research to compare the analytical thinking ability and students' satisfaction after implementing the GPAS 5 Step teaching model online. Their study involved 20 sixth-grade students, and the results revealed higher analytical thinking abilities and positive satisfaction levels among students. Similarly, Naktamna, Kuharueangrong, and Othakanon (2020) focused on the development of creative music club activities using the GPAS 5 Step concept. Their findings indicated improvements in students' knowledge and music practice skills, as well as high levels of satisfaction with the creative music club activities. Papan and Kongnawang (2022) explored the practical skills ability and learning achievement in the subject of editing graphics using the GPAS 5 Step model together with multimedia. The results showed significant improvements in both practical skills and learning achievement, along with high levels of student satisfaction. Furthermore, Po Ngern, Sithsungnoen, Nilapun, and Poomrarueng (2021) investigated the impact of the GPAS 5 Step model on teaching quality and students' learning skills. Their research demonstrated positive outcomes, including teachers' enhanced understanding of teaching and students' higher-order thinking skills, innovator skills, innovative abilities, and ethical values. Additionally, Saeyang and Seanruen (2022) implemented the GPAS 5 Step model with multimedia in teaching quadrilaterals, leading to effective lesson plans, improved learning achievement, and high student satisfaction. Finally, Tanyarattanasrisakul (2023) presented the concept of using the GPAS 5 Step process to enhance students' innovativeness in basic education. The study highlighted the consistency between the GPAS 5 Step model and the key features of an innovator, emphasizing the potential for developing students' innovative competency through each step of the GPAS 5 Step process.

These research findings provide substantial evidence of the positive impact and effectiveness of the GPAS 5 Step model across different educational contexts. By incorporating the GPAS 5 Step model, educators have the opportunity to enhance students' abilities to form sentences and improve their learning achievements in sentence structure. The GPAS 5 Step model promotes active learning, constructivist approaches, and learner-centered environments, allowing students to construct their knowledge, participate in learning activities, and develop higher-order thinking skills. Through the systematic implementation of the model, students can gain a deeper understanding of sentence formation, effectively apply their knowledge in various contexts, and regulate their learning process. The integration of this model into educational practices can pave the way for improved language learning outcomes and better equip students for success in their education and future endeavors. For this study, the GPAS 5 Step model was utilized, aiming to achieve the following research purposes: 1) To examine the effectiveness of the learning management plan designed using the GPAS 5 Step model in teaching Grade 8 students' sentence structure, 2) to compare grade 8 students' learning achievement before and after learning with the learning management plan designed using the GPAS 5 Step model, and 3) to investigate grade 8 students' satisfaction after learning with the learning management plan designed using the GPAS 5 Step model.

2. Methodology

2.1 Research Design

The research design for this study employs a one-group pre-posttest design. In this design, a single group of grade 8 students is selected and assessed prior to and following the implementation of the GPAS 5 Step model. The pre-test serves as the baseline measurement, capturing students' initial proficiency level in understanding the nature of sentences in Thai. Subsequently, the GPAS 5 Step model is introduced as the intervention, providing students with various learning activities and experiences to enhance their comprehension of sentence structure. Following the intervention, a post-test assessment is conducted to measure students' learning achievements. By comparing pre-test and post-test results, the effectiveness of the GPAS 5 Step model in improving students' understanding of sentence structure can be evaluated. Additionally, the study includes an assessment of students' satisfaction with the GPAS 5 Step model, allowing for insights into their perceptions and attitudes towards the learning process facilitated by the model.

2.2 Participants

The participants were 31 grade 8 students in Thailand. A cluster sampling method was employed to select the participants from a population of 62 students in a public school. Although the sample size may not encompass the entire population of Thailand, it is important to note that the participants encountered similar challenges faced by the majority of students in the Thai education system. These challenges include the language learning context, the education system, and teaching methods. Therefore, the selected participants can provide valuable insights into the effectiveness of the GPAS 5-STEP model within the broader context of Thai education and its potential impact on improving students' understanding of sentence structure.

2.3 Instruments

2.3.1 GPAS 5 Step Learning Management Plan

The learning management plan for this study was specifically designed using the GPAS 5 Step model as a guiding framework. The plan focused on the main content related to the components of a sentence and the process of forming sentences. It encompassed various aspects, including the understanding and construction of simple sentences, compound sentences, complex sentences, and compound-complex sentences. To ensure a comprehensive and structured approach, the learning management plan consisted of eight sub lesson plans, with each plan designed to be completed within an hour.

Within each sub lesson plan, activities were carefully crafted to align with the principles of the GPAS 5 Step model. The activities encompassed the gathering and selection of relevant information, processing and organizing the data, applying and constructing knowledge through practical exercises, applying communication skills to express thoughts and ideas effectively, and finally, self-regulation and reflection on the learning process. The detailed activities following the GPAS 5 Step model can be found below.

Table 1. The GPAS 5 Step activities

GPAS 5 step activities	Detail
Gathering and Selecting Data (G)	<ul style="list-style-type: none"> - Have students read and analyze short paragraphs or sentences to identify simple sentences. - Ask students to highlight the subject and predicate in each sentence. - Discuss examples of simple sentences found in various texts, such as books, articles, or online resources.
<i>Processing Data (P)</i>	<ul style="list-style-type: none"> - Provide students with a list of subjects and predicates. - Instruct students to match the subject with an appropriate predicate to form complete and meaningful simple sentences. - Encourage students to create their own simple sentences using the provided subjects and predicates.
<i>Applying (A1)</i>	<ul style="list-style-type: none"> - Distribute worksheets or cards with incomplete simple sentences. - Ask students to complete the sentences by adding appropriate subjects and predicates. - Encourage students to share their completed sentences with their peers for feedback and discussion.
<i>Applying (A2)</i>	<ul style="list-style-type: none"> - Divide students into pairs or small groups. - Assign each group a specific topic or theme. - Instruct students to collaboratively create simple sentences related to their assigned topic or theme. - Encourage students to write their sentences on sentence strips or cards and display them in the classroom for others to read.
<i>Self-Regulation or Self-Learning (S)</i>	<ul style="list-style-type: none"> - Provide students with a simple sentence checklist or rubric. - Ask students to self-assess their own simple sentences based on criteria such as correct subject-verb agreement, clarity, and completeness. - Prompt students to reflect on their learning and identify areas for improvement in their sentence formation skills.

Three experts in the field of education and language teaching reviewed and assessed the plan to ensure its appropriateness and effectiveness in teaching sentence structures. Their expertise and feedback were instrumental in refining and enhancing the plan to align with the objectives of the study. Prior to implementation in the main study, a trial study was conducted to test the efficacy of the learning management plan. A sample group of 31 students, similar in characteristics to the target participants, was selected to participate in the trial. The plan was implemented in the trial study, and data regarding its effectiveness were collected and analyzed. The trial study allowed for any necessary modifications or adjustments to be made to the plan, ensuring its optimal suitability for the intended participants.

2.3.2 Learning Achievement Test

The learning achievement test used in this study consisted of 30 multiple-choice items that specifically assessed the content related to sentence structures. The items were carefully designed to cover a range of difficulty levels, with difficulty indices ranging from 0.71 to 0.97. These indices indicate that the items were appropriately challenging for the grade 8 students, ensuring a fair assessment of their understanding of sentence structures. To ensure the reliability and accuracy of the test, each item was analyzed for its discrimination value. The discrimination indices for the items ranged from 0.71 to 0.97, indicating that the items effectively distinguished between students with higher and lower levels of understanding. This indicates that the items were able to effectively discriminate between students' varying levels of knowledge and skill in sentence structures. Moreover, the test exhibited good internal consistency, as evidenced by a reliability coefficient of 0.88, calculated using the Lovett method. This indicates that the items in the test were highly reliable in measuring the students' learning achievements in sentence structures.

2.3.3 Satisfaction Questionnaire

The questionnaire aimed to gather feedback and insights from the participants regarding their experience in learning with the GPAS 5-STEP model. The questionnaire comprised 10 items that specifically addressed various aspects of the participants' learning experience within the context of the GPAS 5-STEP model. The questionnaire was evaluated by experts, and the Index of item objective congruence was 0.5-1.0. High reliability

coefficient of 0.93 was also found, indicating strong internal consistency among the items.

2.4 Data Collection and Data Analysis

At the outset, a pretest was administered to assess the participants' initial learning achievement in sentence structures before implementing the GPAS 5 Step learning management plan. After the implementation of the GPAS 5 Step model, a posttest was conducted using the same learning achievement test to measure the participants' progress and learning outcomes. The participants' performances in doing activities in each sub-lesson plan were also collected to identify the effectiveness of the learning management plan. The comparison between pretest and posttest scores provided insights into the effectiveness of the GPAS 5 Step in enhancing the participants' proficiency in forming sentences. Additionally, a questionnaire comprising 10 items was administered at the end of the study to gather participants' perceptions and experiences of learning with the GPAS 5 Step model. The data were analyzed using mean score, standard deviation, a paired samples t-test, and an effectiveness index with a predetermining criterion of 80/80.

3. Results

3.1 The Effectiveness of GPAS 5 Step Model Learning Management

The effectiveness of the learning management plan in this study is measured through two dimensions: process effectiveness (E1) and product effectiveness (E2). Process effectiveness (E1) is determined by calculating the percentage of students' performance during the learning activities compared to the full mark. It assesses how well students engage with and complete the activities outlined in the GPAS 5 Step model. On the other hand, product effectiveness (E2) evaluates the learning outcomes by calculating the percentage of students' posttest scores compared to the full mark. It measures the level of knowledge and understanding students have acquired in sentence structures as a result of the learning management plan. The predetermined criterion for E1/E2 is set at 80/80, indicating that students are expected to achieve a performance level of 80% or higher during the learning activities and post-test. The result of the study is shown below.

Table 2. The effectiveness of GPAS 5 step model learning management

E	N	Fullmark	\bar{x}	S.D	%
Process (E ₁)	31	160	129.94	2.22	81.21
Product (E ₂)	31	30	24.38	2.16	81.29
Effectiveness index (E ₁ /E ₂) = 81.21/81.29					

The results of the study indicate that the process effectiveness (E1) of the developed learning management plan designed using the activities of the GPAS 5-STEP model for sentence structure was 81.21. Following the learning process, students underwent a posttest to assess the outcome effectiveness of the learning management plan. It was observed that the average score of the participants was 24.38 (S.D = 2.16) out of the maximum score of 30, indicating a high level of achievement in sentence structure. Consequently, the outcome effectiveness of the learning management plan was calculated to be 81.29, resulting in an effectiveness index of 81.21/81.29. These findings suggest that the implementation of the GPAS 5-STEP model in designing the learning management plan had a positive impact on students' ability to form sentences both throughout the learning process and at the end of the program.

3.2 The Comparison of Participants' Learning Achievements

Table 3. The comparison of participants' learning achievements

Test	n	Fullmark	\bar{x}	S. D.	t	Sig.
Pre-test	31	30	17.25	2.37	17.77*	.000
Post-test	31	30	24.38	2.16		

p<0.05

Moreover, the t-test was conducted to evaluate the effectiveness of the learning management plan using the GPAS 5-STEP model for sentence structure. In the current study, the results of a paired samples t-test showed a significant difference between the pretest ($\bar{x} = 17.25$, S.D = 2.37) and posttest scores ($\bar{x} = 24.38$, S.D = 2.16), with a mean difference of 7.13 points and a t-value of 17.03 ($p < .05$). This indicates that the learning management plan had a statistically significant effect on the subjects' scores on the posttest. Overall, these results suggest that the learning management plan, based on the GPAS 5 Step model, was effective in improving the

subjects' scores on the posttest and enhancing their proficiency in sentence structure.

3.3 Students' Satisfaction with the Learning Management Plan

Table 4. Participants' satisfaction with the GPAS 5-STEP model

No.	Items	\bar{X}	S.D.	Level of satisfaction
1	The activity format is interesting.	4.88	0.33	Very high
2	The activity is organized sequentially.	4.60	0.50	Very high
3	Students can learn and practice activities without difficulty.	4.64	0.49	Very high
4	Questioning and learning processes stimulate thinking skills and encourage inquiry for answers.	4.80	0.40	Very high
5	Learning activities help students organize their thoughts more clearly.	4.72	0.45	Very high
6	Learning activities promote reasoning skills.	4.60	0.50	Very high
7	Students are focused and enthusiastic in engaging in activities.	4.52	0.51	Very high
8	Students are satisfied with expressing their opinions and accepting others' viewpoints.	4.28	0.73	High
9	Teachers have good interactions that consistently enhance student learning.	4.72	0.54	Very high
10	Students enjoy the activity at every step.	4.60	0.50	Very high
Average		4.64	0.50	

The study's findings reveal that the participants showed significant satisfaction with the implementation of the GPAS 5 Step teaching method and the corresponding learning experiences ($\bar{x} = 4.64$, S.D = 0.50). Specifically, the learning management plan was perceived as highly advantageous for student learning and resulted in a gratifying learning experience. These results indicate that the incorporation of the GPAS 5 Step model in teaching was well-received by the participants, emphasizing its effectiveness in fostering favorable learning outcomes and student contentment.

4. Discussion

Findings from the present study support the effectiveness of the GPAS 5 Step model as a guiding principle for designing a learning management plan, specifically in enhancing participants' ability and knowledge in forming sentences. The participants demonstrated notable improvements in their sentence-forming skills, both during the learning process and after the treatment. Furthermore, the learning management plan had a positive impact on their overall learning achievement in sentence construction.

These findings align with previous research studies (e.g., Chuicomwong & Chuicomwong, 2022; Naktamna, Kuharueangrong, & Othakanon, 2020; Papan & Kongnawang, 2022; Po Ngern, Sithsungnoen, Nilapun, & Poomrarueng, 2021; Saeyang & Seanruen, 2022; Tanyarattanasrisakul, 2023) that have also highlighted the advantages and effectiveness of the GPAS 5 Step model in educational settings. The model's success can be attributed to its emphasis on constructivist learning, active learner participation, and the development of higher-order thinking skills. By allowing students to take control of their learning process and engage in meaningful activities, the GPAS 5 Step model facilitates deep understanding and application of knowledge.

The results of the study revealed high levels of satisfaction with the learning experience using the GPAS 5 Step model. Participants expressed positive sentiments towards the active learning approach implemented in the classroom. This can be attributed to the fact that active learning methods engage students more effectively, making the learning process enjoyable and meaningful. According to (Allsop et al., 2020), active learning creates an environment where students are actively involved in their own learning, participating in discussions, problem-solving activities, and hands-on tasks. This learner-centered approach fosters a sense of ownership and autonomy among students, as they are empowered to take control of their learning journey. By actively engaging in the learning process, students are more likely to retain information, develop critical thinking skills, and apply their knowledge in real-world contexts.

5. Conclusion

In conclusion, this study utilized the GPAS 5 Step model, a teaching model that emphasizes knowledge construction through the learning steps of gathering, processing, applying (x2), and self-regulating, to design a comprehensive learning management plan for the development of sentence structure skills among 31 Thai language learners. The findings of the study strongly indicate the effectiveness and satisfaction derived from

implementing the GPAS 5 Step model.

By employing the GPAS 5 Step model, students were actively engaged in the learning process, promoting a deep understanding of sentence structure concepts and enhancing their overall learning achievement. The structured and systematic approach of the GPAS 5 Step model facilitated the step-by-step progression of knowledge construction, allowing students to gather relevant information, process it meaningfully, apply it in various contexts, and regulate their learning experiences.

Based on the findings, it can be concluded that the GPAS 5 Step model is an effective pedagogical approach for teaching and developing sentence structure skills among Thai language learners. This model promotes student engagement, critical thinking, and knowledge application, ultimately enhancing their overall learning achievement. The satisfaction expressed by the participants further supports the value and effectiveness of the GPAS 5 Step model in creating a positive and enriching learning environment. In light of these findings, educators and curriculum designers are encouraged to consider the implementation of the GPAS 5 Step model as a valuable teaching strategy to enhance students' language learning and achieve positive learning outcomes.

However, it is important to acknowledge the limitations of this study, which employed only a quantitative method. While the quantitative approach provided valuable insights into the effectiveness and satisfaction of the GPAS 5 Step model, it may not capture the full depth and richness of participants' experiences and perceptions. Incorporating qualitative methods could have offered a more comprehensive understanding. Additionally, the study's focus on a specific population and educational setting limits the generalizability of the findings. Future research should consider employing mixed-methods approaches and expanding the study to diverse populations to enhance the understanding and applicability of the GPAS 5 Step model.

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Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Obtained.

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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.

Data sharing statement

No additional data are available.

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