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The Relationship between Screen Time and Speech and Language Development in 3-6 Years Children

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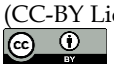

Abstract: Screen time activity in children at developmental age has an important positive and negative influence. Currently, screen time has become a habit for children in their daily activities, so it is not uncommon to find children with high and excessive screen time habits. This can affect the growth and development of children in various aspects, one of which is speech and language development. This study aims to determine the relationship between screen time and speech and language development in children aged 3-6 years in Ketara Village. This research uses a cross-sectional method with a quantitative approach. The population in this study is 261 children aged 3-6 years. The sampling method in this study uses purposive sampling with a sample size of 72 children. The hypothesis analysis of this study uses chi-square analysis. The research results show that most respondents experience a high level of screen time habit, with 37 children (51.4%), and most children with speech and language development measurements using the DENVER II observation sheet, 42 (58.3%) children experience suspect development. The Spearman rank correlation test result obtained a Chi-Square value with a significance level of < 0.001 (p-value < 0.05), which means that Ha is accepted, so it is concluded that there is a significant relationship between Screen Time and Speech and Language Development in Children Aged 3-6 Years in Desa Ketara.

Keywords: Child Development; Child Speech and Language; Screen Time

Introduction

The presence of technology in the modern era has brought about a major change in the way children learn. From an early age, children are familiar with various digital devices, making them a digital native generation who are used to using technology in the learning process, both in formal and informal environments. In recent years, the COVID-19 outbreak that has hit the world has also had an impact on early childhood, one of which is the increase in the use of digital devices and excessive screen time. Screen time refers to the activities that a person spends looking at the screen of electronic devices, such as televisions, computers, tablets, and smartphones (Dos Santos, et, al, 2024). The existence of increasingly sophisticated technology in this digital era has become an inseparable part of children's lives. This situation makes children familiar with various digital devices from an early age.

This condition triggers concerns regarding its impact on child development (Pratiwi, 2020). Development is a complex improvement in body structure and function in gross motor skills, fine motor speech and language, cognitive and social (Budiyanti et al., 2021). High screen time when children are still in their developmental period can have various adverse consequences for health and development, some of which are obesity (Fang, 2019), psychosocial disorders (Tamana, et al, 2019), problems in controlling emotions (Pozo-Cruz, et al, 2019), speech delays (Heuvel, et al, 2019), and limitations in academic activities (Kerai, et al, 2022). Early age is a time for every individual to experience rapid growth and development. Growth includes an increase in physical dimensions and body

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structure, this can be measured in terms of length and weight, while development focuses on complex, gradual changes involving maturation and learning processes.

Gross motor development involves the development of movement and posture, at the preschool stage gross motor progress begins with the ability to stand on one leg, jump with one leg, perform crawling positions and so on. Fine motor skills involve fine coordination of small muscles that play an important role. Fine motor development begins with the ability to shake toes, draw, be able to pinch, wave hands and others. Language is the ability to respond to sounds, follow instructions and understand prohibitions, and speak spontaneously is the initial stage of language development. The last aspect of ability is the ability to socialize (personal social), this involves the ability of children to be independent, socialize and interact with the environment.

Child development is one of the serious problems for developed and developing countries in the world. Development Delay is part of the problems that often occur during the growth and development of children (Rahmawati, et al., 2023). The age range of 0-6 years in children is considered very valuable or referred to as the "Golden Age" because in this period, the development of children's intelligence experiences extraordinary and rapid growth compared to the next age stage (Azijah & Adawiyah, 2020). This is considered crucial for children who reach the age of three years because in this phase, children experience development in various aspects, one of which is the aspect of speaking and language skills. Speech can be understood as the ability to pronounce words to communicate, while language is a system that regulates the way words are arranged and used (Priyoambodo, 2021).

Children learn to pronounce words through imitating sounds heard, especially from parents. Speech and language development during infancy begins when the baby is 4 weeks old with crying that indicates displeasure, 12 weeks of age the baby sometimes makes vocal sounds, at 20 weeks the baby starts to express the first chatter, at 6 months the baby starts to show better chatter such as vowel sounds and dead letters, at 12 months the baby talks with chatter such as singing or language intonation, expressing emotional cues to producing the first words, 18 months old can pronounce vocabulary between 3 to 50 words, sometimes pronounce sentences consisting of 2 to 3 words, and 24 months old children begin to pronounce vocabulary between 50 to 300 words, although not all of them are used carefully, children can pronounce sentences consisting of 2 or more words even if the grammar is not correct, but at this age children can understand the language they need simply (Kholilullah, 2020). Clarity in expressing speech and speaking well is usually achieved when the child reaches around the age of 3 years (Ardhyantama & Apriyanti, 2021).

Several factors are the causes of language delay in children, such as hearing problems, developmental problems in the brain, lack of weight at birth, lack of communication activities, neglected children, and lack of parental stimulation for children (Tan, et al, 2019). Parental stimulation of children can be influenced by parents who provide children with electronic devices such as gadgets with or without supervision with excessive screen time duration. It is important for parents to understand language and speech learning abilities and experiences that are appropriate for the child's age, so that children's language development can be optimized and they get appropriate communication experiences. Parents are role models for children in improving their speech and language development by learning each language characteristic through direct conversation (Lenhart & Lingel, 2023).

At the beginning of 2023, Global Mobile Statistics Reportal Data recorded that there were 5.44 billion smartphone users worldwide. This figure represents 68% of the total global population and shows a 3% growth in the number of users over the past year. There were 168 million new users who joined in the last 12 months. In 2022 BPS (Central Statistics Agency) data, as many as 77.04% of the population in Indonesia are internet users. A report from We Are Social and Hootsuite entitled "Mobile Internet Adoption in 2023" recorded that 167.0 million people or 60.4% of the population in Indonesia are smartphone users. The high use of gadgets in Indonesian children was shown in a study, with an average use of 7 hours and 59 minutes per day before the pandemic. This figure is even more worrying during the pandemic, where 25.4% of early childhood uses gadgets outside of the interest of learning, which is more than 5 hours per day (Widiputera, Perdana, & Zamjani, 2021).

Statistical data according to Katadata in 2023 shows that the average largest internet activity is in the Greater Jakarta area with an average of 8.5 hours per day, while in NTB according to BPS data in 2022 as much as 67.7% of the total population of the NTB community is connected to the internet. This is a reference that areas with high smartphone and internet usage tend to have a higher prevalence of screen staring time. According to the Central Statistics Agency 2020, in the early childhood category, the survey results show that the highest use of gadgets is in children aged 5-6 years (47.7%), followed by children aged 1-4 years (25.9%) and babies under 1 year old (3.5%).

According to UNICEF, 1 in 7 children worldwide experience developmental delays, in low- and middle-income countries it is estimated that as many as 25% of children under the age of 5 experience developmental

delays. The Central Statistics Agency in 2021 showed that 14.2% of children aged 5-14 years had developmental delays. This prevalence is higher in rural areas (17.3%) than in urban areas (12.1%). The Central Statistics Agency of NTB in 2021 showed that 15.5% of children aged 5-14 years experienced developmental delays. Higher prevalence was found in rural areas (17.2%) compared to urban areas (13.8%). The prevalence of speech and language delays reviewed from a study found that 2.3-19% of children aged 2 to 4.5 years experienced speech and language delays (Zulkarnaini, 2023). According to the Indonesian Pediatrician Association (IDAI), speech and language delays in children are often found at the age of 18-24 months, it is estimated that 5-8% of preschool-age children experience speech and language delays.

The results of a preliminary study that the author has carried out on 20 children in Kedara Village, found that 9 4-year-old children could not say their full names without help, could not answer the questions given, and did not follow the instructions that had been directed. There were 4 5-year-old children who could not name the object that had been designated, and did not follow the instructions directed. There are 2 3-year-olds and 5-year-olds who can say their full names without help. Researchers have also conducted interviews with parents regarding the use of gadgets in children. Of the 20 parents interviewed, all of them said that their children use smartphone-type gadgets almost every day.

Given the rapid development of technology, research on how media technology affects early childhood language interaction and development is becoming increasingly important. Although research on the use of the internet and gadgets/smartphones in Central Lombok is still limited, comprehensive research is needed for the average early childhood in Indonesia spends 7 hours and 59 minutes per day using gadgets (Irzalinda & Latifah, 2023). During the pandemic, it was found that 71.3% of children already have their own gadgets, 17.1% are still under parental ownership, and another 11.6% use gadgets with joint ownership between parents and children, then as many as 25.4% of early childhood use gadgets for more than 5 hours per day outside of learning interests (KPAI, 2021). Pediatric health experts recommend limiting screen time for children to a maximum of 1 hour per day for optimal child development. Research shows that children who use smartphones or other gadgets for more than 1 hour per day have a 2.5 times higher risk of delaying speech and language development (Lin, 2020). Understanding the right trends, impacts, and solutions to overcome emerging problems, as well as the increasing level of screen time among early childhood triggers concerns and encourages research related to its impact on children's health and well-being. Realizing the urgency and complexity of speech and language development problems in early childhood, especially in this digital era, the researcher is interested in conducting research related to "The Relationship between Screen Time and Speech and Language Development of Children Aged 3-6 Years in Kedara Village".

Method

This study uses a quantitative research method with a type of Correlation Analytics research. The design used in this study is Cross Sectional, where in this study the researcher only observed and measured variables at a certain time. Measurement of unlimited variables must be precise at the same time, but it has the meaning that each subject is only subjected to one measurement, without any follow-up or measurement change (Unaradjan, 2019). The researcher provides an explanation to the respondents about the purpose and objectives and informs consent. The selected respondents were asked to fill out a questionnaire about screen time in the use of gadgets and the researcher will conduct a child development test using the DENVER II test form on the aspects of speech and language development of children aged 3-6 years in Ketara Village.

The data used in this study consisted of primary data and secondary data. Primary data was obtained directly from respondents in Kedara Village, while secondary data came from written data collected through preliminary studies and literature studies of previous research (Sinulingga, 2021). Primary data refers to information collected directly from the original source through direct interaction with respondents. In this study, primary data included screen time (X) and speech and language development of children aged 3-6 years (Y), which were obtained through questionnaires and Denver II tests. Meanwhile, secondary data is information that has been available and obtained indirectly through intermediaries. Secondary data in this study were obtained from preliminary studies and relevant previous literature, including factors that can affect children's speech and language delays as well as the results of previous research that support data analysis and interpretation (Ramdhan, 2021).

The data collection method in this study refers to the technique used to obtain information, while the data collection instrument is related to the tools used in the process (Abdussamad & Sik, 2021). Screen time (X) data was collected through questionnaires as primary data, while secondary data was obtained from previous literature studies that discussed the impact of screen time on child development. For the speech and language development variables of children aged 3-6 years (Y),

primary data were obtained through the Denver II test, while secondary data included information from previous studies relevant to children's language development.

At the data processing stage, this study uses a computerized-based approach to ensure the accuracy and accuracy of the information collected. This process consists of several essential steps that aim to manage data systematically and efficiently (Ramdhan, 2021). The first stage is **editing**, which is the process of evaluating the completeness of filling out the questionnaire to ensure that each statement has been filled out correctly and consistently. This step aims to avoid data shortages and maintain the integrity of the information collected. Next, coding is carried out, which is the process of converting questionnaire answers into numerical codes so that they can be further processed. In this way, data analysis becomes more systematic and efficient in examining the variables involved in the research.

The next stage is **processing**, where the encoded data is input into a computer and processed using the *Statistical Package for the Social Sciences* (SPSS) program. Certain statistical methods are applied to analyze the data, thus allowing the identification of patterns, correlations, and other important information relevant to the focus of the research. After the data processing process is completed, a cleaning stage is carried out to ensure that there are no errors in the data input. At this stage, follow-up checks are carried out to ensure the quality of the data and improve the reliability of the analysis results. This method is the key in managing information from respondents, especially related to screen time and speech development and language of children aged 3-6 years. The results of this data processing process will form a solid basis for further analysis in the research.

The data processing stages in this study include two main types of analysis, namely univariate analysis and bivariate analysis (Sinulingga, 2021). **Univariate analysis** was performed to evaluate each variable separately to summarize the measurement dataset. This analysis presents information in the form of statistical measures, tables, or graphs, depending on the type of data used. For numerical data, the approach used includes the calculation of mean, median, and standard deviation values, while for categorical data, the results are presented in the form of frequency distribution and percentage of respondents (Emiliana et al., 2021). In this study, univariate analysis was carried out on several variables, namely the child's age, the child's gender, the parent's occupation, and the parent's education level.

Furthermore, **bivariate analysis** is used to trace the relationship or correlation between two variables that are suspected to be related (Notoatmodjo, 2022). In this study, bivariate analysis aimed to evaluate the relationship between *screen time* and speech and language development in children aged 3-6 years in Kedara Village. The statistical method used in this analysis is the Chi-Square test, which falls under the category of nonparametric statistical tests. Bivariate analysis was carried out using *the Statistical Program for Social Science* (SPSS) version 26 program. The results of the Kendall Tau test are used to interpret the relationship between variables with the following conditions: if *the p-value* ≤ 0.05, then an alternative hypothesis (Ha) is accepted, which means that there is a relationship between *screen time* and the child's speech and language development. Conversely, if the *p-value* > 0.05, then the alternative hypothesis (Ha) is rejected, suggesting that there is no significant relationship between the two variables.

Result and Discussion

Screen Time

Based on the results of a study in Ketara Village, Pujut District, Central Lombok Regency, it was found that as many as 37 children (51.4%) out of a total of 72 respondents aged 3-6 years had *high screen time* habits , while 22 children (30.6%) had medium *screen time*, and 13 children (18.1%) had low *screen time*. This high *screen time* habit is influenced by several factors, such as the habits of parents who start introducing *screen time* from the age of under two years old, lack of supervision and understanding of the negative impacts of excessive *screen time* exposure , and low educational content provision. The absence of sufficient stimulation from parents also contributes to the lack of limits and rules in *screen time activities*.

The results of this study are in line with the Pinilih (2024) study which shows that most children (56.5%) have a high *duration of screen time*, which is more than two hours per day. The high use of *screen time* is caused by the lack of interaction and stimulation provided by parents. A similar study by Amalia et al. (2019) also found that children still have *screen time levels* that exceed the recommendations of the American Academy of Pediatrics (AAP), which suggests that children should not be exposed to *screen time* for more than one hour per day. Additionally, the content provided to children often does not conform to the AAP standards, which recommend quality and educational content. The research of Nofadina et al. (2021) also supports this finding, where the majority of respondents have a high level of *screen time* due to the lack of parental control over the use of digital devices.

However, these results are different from the research of Ayuningtyas (2023), which found that most children have *screen time* in the low category, with two-

thirds of the total respondents showing limited duration. Factors influencing these findings are the habits applied in schools, such as the high interaction of children with teachers and peers, as well as the role of parents who actively replace *screen time* activities with other more interactive activities.

In general, *screen time* is the activity of staring at the screen of a digital device that can have a positive or negative impact on children's development. Some of the benefits *of screen time* include increased vocabulary, expanded knowledge, and increased creativity, but this is highly dependent on parenting patterns. On the other hand, uncontrolled use of *screen time* can result in negative impacts, such as reduced social interest, bad character formation, gadget addiction, and low children's response to the surrounding environment (Sholikhah, 2023). In this study, it was found that many parents start introducing their children to digital devices from the age of under two years old, without adequate supervision regarding the type of content and duration of use. Parents' lack of knowledge in creating an optimal environment for children's development is also a major factor in the high habit of *screen time*.

The age of 3-6 years is known as *the golden age*, where children have a high ability to imitate what they see and hear from the surrounding environment, including from gadgets. Research shows that the use of technology without restrictions can have a negative impact on children's cognitive development, especially in speech and language aspects, which is at risk of causing *speech delay* (Wulandari, 2023). Screen *time activities* with high frequency and duration without pause reduce the stimulus of children's interaction with the surrounding environment, thereby hindering their communication development.

In this case, the role of parents is very important in supervising and limiting children's *screen time*. The AAP recommends that children under 18 months of age should not be given access to screen devices, except for video chat purposes related to long-distance communication. For children aged 2-5 years, it is recommended to limit *screen time* to a maximum of one hour per day with parental assistance. Meanwhile, children aged 6 years and older still need restrictions so as not to interfere with activities and other obligations. Parents are also expected to implement consistent rules, guide children in socializing, and follow parenting programs to increase their understanding of good parenting (Sawitri et al., 2019).

Speech and Language Development

Based on the results of a study in Ketera Village, Pujut District, Central Lombok Regency, the results were obtained that of 72 children aged 3-6 years who were measured in their speech and language development, as many as 42 children (41.7%) were included in the *suspect* category, while 30 children (58.3%) showed normal development. These measurements use the DENVER II observation tool, with test points adjusted based on the child's age line limit. Some of the deficiencies found during the measurement include: improper articulation in the pronunciation of words, inappropriate word choices, lack of attention to the surrounding environment and more focus on yourself, he did not respond when he was asked, tends to be passive when given gadgets and focuses more on spectacle than communication with others, difficulty responding to long sentences or instructions given.

In the group of 3- and 4-year-old children with the *suspect* category, most of them were unable to pass the test in terms of recognizing two types of activities, mentioning body parts, mentioning four pictures, understanding three adjectives, interpreting five words, and knowing the use of objects. Children in this group tend to be inattentive to their surroundings, do not respond to questions, and have difficulty explaining in appropriate words or sentences. Meanwhile, children aged 5 and 6 years who were included in the *suspect* category had difficulty in interpreting seven words, understanding counterwords, and doing calculations. Some children in this group also show a lack of attention to their parents or those around them, do not understand the instructions given, and experience resistance in word articulation.

The results of this study are in line with the research of Aziz et al. (2023), which found that 94% of children experience speech delays in the form of impaired word and sentence formation. The main factors that cause this condition are high exposure *to screen time* from the age of under 24 months, as well as the lack of interaction between children and parents during the use of digital media. This lack of interaction hinders the development of communication, considering that at the age of toddlers, social interaction plays a role as a learning process in communicating. Therefore, it is important for parents to supervise the use of electronic media and ensure that the content that children watch is appropriate to their developmental needs.

Research by Suryawan & Merijanti (2021) also showed that 39% of the total respondents experienced speech and language delays. This study confirms that children's development will run optimally if they get good parenting from their parents. Speech and language development that is not optimal can affect children's cognitive, motor, psychological, and emotional aspects.

However, the results of this study are in contrast to the research of Mulyani et al. (2023), which examined the impact of watching TV on the language development of children aged 5-6 years. The results of the study showed that the aspect of children's language development was

relatively good, where the children in this study were able to understand commands, repeat complex sentences, and express their ideas and ideas to others. In addition, they are also able to understand stories, recognize symbols, and understand the relationship between sounds and word forms.

Language is a communication tool that plays an important role in social interaction and children's cognitive development (Saragi et al., 2023). Language skills involve the acceptance of responses, the expression of ideas, as well as the designation of emotions and beliefs (Anggraini, 2020). Children's speech and language development is influenced by various factors, including physical condition, health, intelligence, social environment, economy, and neurological factors (Aulina, 2019).

The role of parents is very important in supporting children's language development. Limited social interaction in children can inhibit the stimulus needed to improve their speech skills. If children experience a lack of stimulation from the environment, they are at risk of *speech delay* (Oktariani, 2022). *Speech delay* is a condition in which a child's speech skills do not develop according to their intended age (Saragi et al., 2023).

Some signs of a child experiencing *speech delay* include; does not respond to sounds or stimuli, experiencing developmental setbacks, difficulty communicating and receiving directions, removing inappropriate words or sentences, speaks slower and tends to stutter, difficulty socializing and interacting with peers. Children who experience *speech delay* tend to have limitations in communication processes and social relationships, which has the potential to hinder their learning process (Fauzia et al., 2020). Therefore, parents' efforts to reduce *screen time* exposure, increase direct interaction, and provide sufficient stimulation are indispensable to support children's speech and language development optimally.

The Relationship of Screen Time with Speech and Language Development

Based on the results of a study conducted in Ketara Village on 72 parents and children, it was found that the development of speech and language in children with the category of "suspect" was most found in children with high screen time, namely 32 respondents. Meanwhile, children with speech and language development in the "normal" category had the most low screen time, namely 22 respondents. The results of the Spearman rank correlation test showed a Chi-Square value with a significance level of < 0.001 (p-value < 0.05), which means that H0 is rejected and Ha is accepted. Thus, it can be concluded that there is a significant relationship between screen time and the speech and language development of children aged 3-6 years in Kedara Village.

The results of this study also show that the least number of respondents was found at a low screen time level in the suspect category, namely 1 child. Furthermore, the suspect category with medium screen time was found in 9 children, the normal category with high screen time was 5 children, and the normal category with medium screen time was 13 children. The majority of children who experience signs of delay in speech and language development have high screen time habits, while children who use low-intensity gadgets show more age-appropriate development.

This research is in line with research conducted by Damayanti et al. (2020), which identified the negative impact of the use of gadgets on children's language development. The results of the study showed that many children experienced speech delays, disturbances in expressive development, lack of ability to use Indonesian well, difficulties in nonverbal communication, and lack of eye contact when interacting with others.

This research is also in line with the results of Rihlah's (2021) research, which shows that screen time on screen media has a negative influence on the language and social development of children aged 5-6 years. In addition, research by Suryawan & Merijanti (2021) also shows that there is a meaningful relationship between the intensity of gadget use and children's speech and language delays. Respondents who experience speech and language delays generally have a habit of using medium- to high-intensity gadgets, which leads to reduced children's interaction with the surrounding environment.

However, the results of this study are different from the research of Dewi et al. (2019), which found a positive but weak relationship between the use of gadgets and children's language development. Based on their observations, another factor that contributes to children's language development is the lack of motivation and stimulation from parents. The children in the study tended to use apps with video content that were not educational, so they did not provide benefits for their language development. Therefore, the role of parents in directing children to educational content is very important.

The research of Azlina and Surjadi (2023) also shows results that are in line with this study. They found that screen time had a meaningful relationship with developmental delays in toddlers, especially if the duration of its use exceeded the WHO recommendations.

However, research by Lin et al. (2020) found that there was no significant relationship between the intensity of gadget use and children's speech and

language delays. Instead, they found a relationship between gadget use and emotional and behavioral problems in toddlers. The results of the study by Putri and Soesyasmoro (2023) are also contrary to this study, where they did not find a significant relationship between the intensity of gadget use and the language skills of children aged 3-6 years.

The preschool period is an important stage in a child's development, where the brain undergoes rapid growth and becomes the basis for cognitive development and language skills (Yuliani, 2020). At the age of 3-6 years, children are active in playing, imitating, and chatting, and begin to be able to compose words into good sentences (Sukmawati, 2019). Therefore, the speech and language delays experienced by children at this stage can be categorized as abnormal when compared to children of their age (Sawitri et al., 2019).

A child needs enough stimulation to develop speaking and language skills. Many factors can affect speech and language development disorders, one of which is high screen time habits. According to Wati's (2021) research, the impact of high screen time on preschool children includes impairments in psychomotor development, motor sensors, low socialization and interaction, and delays in language development. Children who often use gadgets tend to communicate in one direction, have difficulty understanding the meaning of speech, and become passive listeners who are less able to respond to their environment.

Although screen time has a positive impact, excessive use can cause children to become addicted, thus hindering their development optimally. Therefore, the role of parents in supervising and regulating the use of screen time is very important to ensure that children get enough stimulation to support their speech and language development.

Conclusion

Based on the results of the research and discussions that have been carried out on the relationship between screen time and speech and language development in children aged 3-6 years in Ketara Village, it can be concluded that: Overview of Screen Time Habits and Speech-Language Development The majority of respondents had high screen time habits as many as 37 children (51.4%), followed by moderate screen time as many as 22 children (30.6%), and low screen time as many as 13 children (18.1%). Children's speech and language development was categorized as suspect in 42 children (58.3%), while 30 children (41.7%) had normal development. The relationship between Screen Time and Speech and Language Development: The results of the Spearman Rank correlation test showed a Chi-Square value with a significance level of < 0.001 (p-value < 0.05). This shows that an alternative hypothesis (Ha) is accepted, so it can be concluded that there is a significant relationship between screen time and speech and language development of children aged 3-6 years in Ketara Village. Limitations and Implications of the Study, This study has limitations in terms of the representativeness of supporting data, Further research with a stronger design is needed to confirm the findings of this study as well as identify other factors that may play a role in children's speech and language development. The results of this study are a reminder for parents to limit screen time in children, especially from infancy to preschool age, and prioritize a stimulating environment to support optimal language and communication development in children.

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Author Contributions
Conceptualization, methodology, validation, formal analysis, investigation,.; resources,; Data Curation,.: Writing—Original Draft Preparation,.; writing—review and editing,.: visualization,. R. A. All authors have read and agreed to the published version of the manuscript.

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The authors declare no conflict of interest.

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