Early Marriage and Maternal History with Stunted Children Aged 24-59 Months in Mataram City

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DOI: 10.24252/al-sihah.v15i2.41664
Received: 4 October 2023 / In Reviewed: 7 November 2023 / Accepted: 20 December 2023 / Available online: 30 December 2023

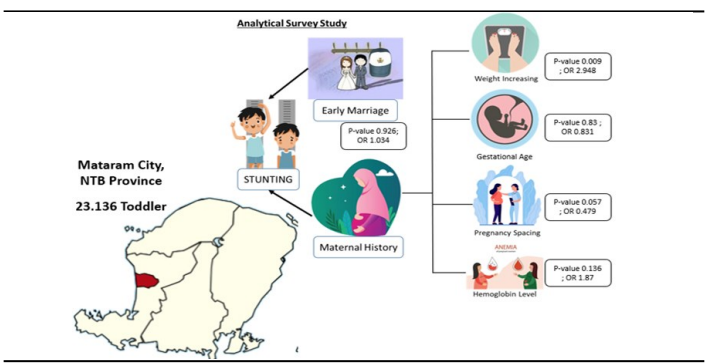
ABSTRACT

The prevalence of stunting among children in 2021 and 2022 was 25.3% and 24.4% respectively, according to Indonesian Nutritional Status Survey in Mataram City. The Religious Court of NTB Province reported that the rate of early marriage among children was 16.59%. Therefore, this study aimed to analyze the relationship between early marriage and pregnancy history with stunted children in Mataram City. An analytical survey method was used with a case-control design, questionnaire, and anthropometric measurements conducted in a single session. The samples were selected using cluster random sampling, reaching 61 children aged 24-59 months for normal and stunted groups. The results showed that the samples were predominantly male, while increased weight during pregnancy <10 kg (p=0.009, OR=2.948, CI=1.285-6.766) and maternal height <150 cm (p=0.004, OR=2.937, CI=1.406-6.135) were associated with the incidence of stunted children. On the other hand, early marriage (p=0.926, CI=1.31) had no significant relationship with the incidence of stunting. A history of pregnancy and early marriage simultaneously influenced stunting by 30.5%, with the highest predictor being the height of the mother. Therefore, pregnancy history greatly influenced the incidence of stunting among children in Mataram City.

ABSTRAK

Berdasarkan Survei Status Gizi Indonesia di Kota Mataram, terdapat anak yang mengalami stunting sebanyak 25,3% pada 2021 dan 24,4% pada 2022. Disamping itu, Pengadilan Tinggi Agama Provinsi NTB menyatakan bahwa persentase kejadian pernikahan dini pada 2022 adalah 16,23%, sehingga penting untuk diketahui korelasinya antara pernikahan dini dan riwayat kehamilan terhadap anak stunting di Kota Mataram. Penelitian observasional ini menggunakan metode survey analitik dengan desain case control, instrumen kuesioner dan pengukuran antropometri yang dilakukan dalam satu waktu. Sampel dipilih secara cluster random sampling sebanyak 61 anak untuk kelompok normal dan kelompok stunting dengan usia 24-59 bulan di Kota Mataram. Hasil observasi menyatakan bahwa sampel penelitian lebih banyak dengan jenis kelamin laki-laki. Peningkatan berat badan saat hamil <10 kg (p=0.009, OR=2.948, CI=1.285-6.766) dan tinggi badan ibu <150 cm (p=0.004, OR=2.937, CI=1.406-6.135) berhubungan dengan kejadian anak stunting sedangkan pernikahan dini (p=0.926, CI=1.31) tidak ada hubungan dengan kejadian stunting. Riwayat kehamilan dan pernikahan dini secara simultan berpengaruh terhadap kejadian stunting sebanyak 30,5% dengan predictor tertinggi yaitu faktor tinggi badan ibu. Oleh karena itu riwayat kehamilan sangat berpengaruh terhadap kejadian stunting pada anak di Kota Mataram.

GRAPHICAL ABSTRACT



Keyword
growth disorders
marriage
maternal history
pregnancy
stunting

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ISSN-P : 2086-2040
ISSN-E : 2548-5334

INTRODUCTION

Stunting is characterized by the height of a child falling below two standard deviations of growth, showing chronic malnutrition from early life (WHO, 2018). The Asia United Nations Network on Nutrition (FAO, WFP, WHO, and UNICEF) stated that there were 78 million stunted children affected by lack of nutrition for basal metabolism during the COVID-19 pandemic. Indonesia was ranked the fifth country with the highest percentage of stunting in the world (FAO et al., 2020). Malnutrition, according to WHO (World Health Organization), refers to a deficiency, excess, or imbalance of energy and/or nutrients in food intake (Escobedo-Monge et al., 2021). Indonesia has a burden of malnutrition, namely underweight, stunting, overweight as well as wasted, and based on Riskesdas in 2018, the prevalence of stunted toddlers was 30.8% of 23,848,283, while the percentage of stunted babies was 22.7% (UNICEF, 2020; Kemenkes RI, 2018). According to the results of the 2019 Study of Nutritional Status of Indonesian Toddlers (SSGBI), the stunting rate in Indonesia was 27.75%, increasing in 2021 by 24.4% and decreasing in 2022 by 2.8% (Kementerian Kesehatan RI Badan Penelitian and Pengembangan, 2021; SSGI, 2023)

Based on the SSGI results in 2021, West Nusa Tenggara Province had stunted toddlers at 31.4% and increased in 2022 by 32.7%. The percentage is ranked fourth in Indonesia exceeding the average and the Province consists of 10 cities as well as regencies with the provincial capital being Mataram City. According to a report in 2021, Mataram is the fourth city with the most stunted toddlers compared to other cities and districts in West Nusa Tenggara Province. A population reaching 25.3% of toddlers were reported to be experiencing stunting but this figure decreased to 24.4% in 2022 (Kementerian Kesehatan RI Badan Penelitian and Pengembangan, 2021; SSGI, 2023). The high prevalence is an indicator that stunting is a serious problem exceeding the targets set by the Indonesian government and regional governments as outlined in the medium-term development plan. The National target (RPJMN) for stunting prevalence in 2020-2024 is below 14% (Kementerian Kesehatan RI, 2020). Stunting is a condition where a child appears physically short which occurs slowly over a long period and continuously. This condition is an indication of chronic nutritional problems with height for age (TB/U) in children below a z-score of -2SD due to insufficient food intake, poverty, history of infection, and inappropriate parenting patterns in the long term (Chandradewi et al., 2012; Suryani et al., 2017; Ahsan et al., 2021). Children who experience stunting tend to be different, not only having a short body, but also increased susceptibility to disease and decreased brain capacity resulting in a higher chance of becoming less productive in adulthood.

Factors that influence the occurrence of stunting include mothers who get married at the age of less than 20 years and a history of bad pregnancies. A previous study stated that maternal characteristics during pregnancy such as maternal height (Qurani et al., 2022), poor nutritional status, non-standard weight gain, and a history of infection contributed significantly to the incidence of stunting in children (Santosa et al., 2022). Mothers aged less than 20 years tend to have less knowledge about pregnancy, resulting in a heightened risk of experiencing nutritional deficiencies in their fetuses. Therefore, children born to married mothers under the age of 20 years are at risk of stunting 1.7 times more than those born to married mothers over 20 years (Kasjono et al., 2020; Pangaribuan et al., 2020).

The High Religious Court of West Nusa Tenggara Province recorded that 16.59% of children aged less than 20 years were married in

2021 and experienced a decrease of 0.36% in 2022 (DP3AP2KB, 2019; Badan Pusat Statistik, 2023). The high rate of early marriage is attributed to cultural, social, and economic factors (Eleanora & Sari, 2020). This phenomenon impacts the maternal condition during pregnancy and after post-partum, including knowledge, nutritional status, and parenting patterns for children (Abidin & Liliandriani, 2020)

The high incidence of women marrying at a young age of <20 years is associated with an increased risk of death in mothers and babies as well as being physically and psychologically immature. Therefore, this study aimed to determine the effect of early marriage and pregnancy history on the incidence of stunting among children aged 24-59 months in Mataram City.

METHODS

This study was carried out from February to March 2023 located in Mataram City, West Nusa Tenggara Province. An observational analytical survey method was used with a case-control design, while the population was children aged 24-59 months who actively attended posyandu, and were willing to be samples without comorbidities such as degenerative diseases, thalassemia, and others. The total sample for this study was 122 children with group divisions, namely, 61 each for normal and stunted. The selection was conducted through a random control trial from all data on children under five years spread across 11 health centers in Mataram City. The sample size for each dependent variable was calculated using the population proportion formula by taking the necessary statistical assumptions through the Lemeshow formula with a degree of confidence at 1.96 or 0.05. The instruments used consisted of child characteristics in the form of anthropometric and maternal data contained in questionnaires. The anthropometry used was 1) Microtoice: height measurements for children who could stand were carried out with an accuracy of 0.1 cm. 2) Digital weight scales to measure the weight at one time. Meanwhile, the questionnaire was a form of maternal characteristics, age at marriage, and pregnancy history which were filled in by the sample mothers.

Data were obtained in two ways, namely primary and secondary, in this context, primary data were collected through interview instruments on family characteristics, identity in the form of numbers, names, and characteristics of toddlers including name, age, gender, height, weight, and birth height. Other data include the weight and characteristics of mothers, namely age at marriage, age at pregnancy, weight gain during pregnancy, height, upper arm circumference, pregnancy spacing, hemoglobin levels, and supplement intake. Body weight data was obtained using a digital weight scale and height data was assessed with a microtoice. The limits applied to the variables studied were normal, such as 20 years for marriage which was selected because the age limit for teenagers according to WHO is 19 years. Therefore, those married under the age of 20 are still considered teenagers. The normal gestational age limit according to the Ministry of Health is 37-40 weeks and the height of the mother must be within the normal limit of 150 cm, referring to previous journals on the effect on stunting. Secondary data were in the form of Mataram City profile including the numbers and status of toddlers (Wasting, Underweight, and Stunting). West Nusa Tenggara Province data was obtained from SSGI and Satu Data NTB data for 2021 and 2022. Data processing was carried out using the Statistical Program for Social Science (SPSS) application with descriptive processing and relationship analysis between the variables through the chi-square test. A 95% confidence level was applied in the

Table 1
Distribution of Sample Characteristics

Variable	Normal	Stunting
Gender		
Male	35 (28.7%)	34 (27.9%)
Female	26 (21.3%)	27 (22.1%)
WAS (Weight/Age)		
Underweight	12 (9.8%)	42 (34.4%)
Normal	49 (40.2%)	19 (15.6%)
WAZ (BB/TB)		
Wasting	14 (11.5%)	13 (10.7%)
Normal	47 (38.5%)	48 (39.3 %)
Immunization		
Complete	51 (41.8%)	44 (36.1%)
Incomplete	10 (8.2%)	17 (13.9%)
Breastfeeded		
Exclusive	49 (40.2%)	52 (42.6%)
Non-exclusive	12 (9.8%)	9 (7.4%)
Family Income		
≥Regional minimum wage	3 (2.5%)	9 (7.4%)
<Regional minimum wage	58 (47.5%)	52 (42.6%)
Mother's Age at Marriage		
≥ 20 years old	30 (24.8%)	29 (24.0%)
< 20 years old	31 (25.6%)	31 (25.6%)
Mother's Age at Pregnancy		
≥20 years old	39 (32.0%)	35 (28.7%)
<20 years old	22 (18 %)	26 (21.3%)
Gestational Age		
≥37 Weeks	46 (37.7%)	48 (39.3%)
<37 Weeks	15 (12.3%)	13 (10.7%)
Weight gain during Pregnancy		
≥10 kg	24 (19.7%)	11 (9.0%)
<10 kg	37 (30.3%)	50 (41%)
Mother's height		
≥150 cm	37 (30.3%)	21 (17.2%)
<150 cm	24 (19.7%)	40 (32.8%)
Mother's Arm Circumference		
Normal	42 (34.4%)	35 (28.7%)
Low	19 (15.6%)	26 (21.3%)
Pregnancy Spacing		
<1 year	35 (28.7%)	45 (36.9%)
≥1 year	26 (21.3%)	16 (13.1%)
Hemoglobin		
Normal	28 (23%)	19 (15.6 %)
Anemia	33 (27.0%)	42 (34.4%)
Supplement		
Yes	6 (4.9%)	8 (6.6%)
No	55 (45.1%)	53 (43.4%)

relationship analysis, while the odds ratio was tested with an interpretation showing that factors studied are a risk factor when OR is greater than 1 or protective when less than one. This study received ethical approval from the Ethical Committee of Medical Research, Faculty of Medicine, Sebelas Maret University on January 16 2023 with registration number 10/ UN27.06.11/KEP/EC/2023.

RESULTS

The data for each sample had been checked for suitability and completeness, ensuring adherence to the criteria and requirements

Table 2
Bivariate Analysis

Variable	p-value	OR (95% CI)
Mother's Age at Marriage		
≥ 20 years old	0.926	1.034
< 20 years old		(0.507 – 2.110)
Mother's Age at Pregnancy		
≥20 years old	0.578	1.31
<20 years old		(0.636-2.728)
Gestational Age		
≥37 Weeks	0.83	0.831
<37 Weeks		(0.357-1.935)
Weight gain during Pregnancy		
≥10 kg	0.009*	2.948
<10 kg		(1.285-6.766)
Mother's height		
≥150 cm	0.004*	2.937
<150 cm		(1.406-6.135)
Mother's Arm Circumference		
Normal	0.26	1.64
Low		(0.782-3.450)
Pregnancy Spacing		
<1 year	0.057	0.479
≥1 year		(0.223-1.027)
Hemoglobin		
Normal	0.136	1.87
Anemia		(0.895-3.930)
Supplement		
Yes	0.777	0.723
No		(0.235-2.223)

Note : *= significance with p-value <0.05; OR = odd ratio; CI = Confidence Interval

outlined in the analysis, method followed by univariate, bivariate, and multivariate statistical analysis. The samples analyzed were in accordance with the number obtained in the size calculations, namely 61 each for stunting and normal groups with a total of 122 children aged 24 -59 months in Mataram City

Table 1 showed that 34 males and 27 females aged 24-59 months in Mataram City were stunted, indicating a higher susceptibility in females compared to males. Meanwhile, gender has a small influence on the nutrition of children (Samuel et al., 2022). The results showed that the percentage of stunting for underweight, early marriage, and height of mothers < 150 cm was 34.4 %, 25.6%, and 32.8%, respectively.

The bivariate analysis results presented in Table 2 showed that the causes of stunting included weight gain during pregnancy and maternal height with a greater risk of having a stunted child of 2.937 and 2.948 times.

Data was considered significant when the p-value was <0.05 and Table 3 showed that the result of the Nagelkerke R Square value was 0.305. The variable history of pregnancy and early marriage simultaneously influenced the incidence of stunting by 30.5% while 69.5% was influenced by other unexamined factors. The variable maternal height was the highest predictor with partial test values (wald) of 11.232 (P-Value < 0.05). Therefore, it was concluded that these variables when present together increased the risk of stunting in Mataram City.

Table 3
Regresi Logistic Analysis

Variable	B	Wald	*p-Value*	OR	95% CI		Nagelkerke R Square
					Lower	Upper	
Mother's Age at Marriage	-1.09	2.131	0.144	0.541	0.076	1.457	
Mother's age at Pregnancy	1.363	3.112	0.078	1.326	0.86	17.756	
Gestational Age	-0.65	1.629	0.202	1.014	0.188	1.423	
Weight gain during Pregnancy	1.107	5.378*	0.02	2.313	1.187	7.717	
Mother's height	1.505	11.232*	0.001	5.704	1.868	10.863	
Mother's arm circumference	0.7	2.188	0.139	1.088	0.979	5.086	0.305*
Pregnancy Spacing	-1.16	6.026*	0.014	0.195	0.123	0.791	
Hemoglobin	0.885	3.812	0.051	1.848	0.997	5.889	
Supplement	-0.4	0.32	0.572	0.956	0.168	2.679	

Note **:** * = percentage of correlation all variables with Nagelkerke = 30.5%, predictor effectiveness with wald

DISCUSSION

Stunting has negative impacts in the long and short term, such as decreased cognitive abilities in line with reduced learning achievement due to sub-optimal brain growth (Anggraini, 2019). Cognitive development is related to the ability to think, make decisions, and learn to solve problems in the form of concepts, letters, numbers, and symbols. Stunted children have lower cognitive scores compared to their peers. This is influenced by a chronic lack of nutritional intake causing changes in cell number, cell migration, myelination, synaptogenesis, hippocampal formation, and neurotransmission in brain structures (Tampy, 2020). The rate of growth and brain development peaks at 15-20 weeks of gestation and 30 weeks until the child is 18 months old. Stunted children with iodine deficiency and anemia cause irreversible brain damage (WHO, 2018).

Malnutrition contributes to the risk of child morbidity, affecting organ development and growth, while the most common form of malnutrition is stunting (chronic malnutrition) (Anisadiyah & Sartika, 2016; Escobedo-Monge et al., 2021). The size and weight of the newborn, food intake, and the pregnancy history of the mother significantly influence the occurrence of malnourished children.

Stunting is a growth and development disorder characterized by inappropriate height for age, caused by prolonged malnutrition over a long period (Thurstan et al., 2022). The age of the mother at marriage and during the time of pregnancy, gestational age, as well as other pregnancy history, influence the incidence of stunting.

Early marriage, which refers to getting married under the age of 18 for both males and females is influenced by several factors, including cultural and social norms in society, economic status, and level of education. Cultural and social norms in society are related to beliefs that have developed, such as negative opinions of spinsters who are unmarried after the age of 17, hereditary habits of underage marriage, as well as promiscuity factors. Early marriage in families with low economic status affects economic stability. This is related to low education factors making it difficult to get a decent job (Atmilati & Soedarto, 2017). As stated in another study, early marriage or pregnancy is an indirect factor in the occurrence of stunting (Permatasari, 2022) due to the associated high risk of experiencing anemia, fetal growth, and development disorders, miscarriage, prematurity, low birth weight babies, preeclampsia, antepartum hemorrhage, and perinatal death

(Larasati et al., 2018). Early marriage has a negative impact on the health of the mother and baby including disruption of the reproductive organs when pregnancy occurs as well as low birth weight and length status respectively (Atmilati & Soedarto, 2017). This phenomenon leads to mothers not being optimal in their physical, mental, and material preparation, resulting in a lack of knowledge regarding how to provide good nutritional intake (Abidin & Liliandriani, 2020). In addition, early marriage causes pregnancies that are high in anemia, increasing the risk of preterm births and low birth weight babies (Aninora & Satria, 2022).

Factors influencing mothers to marry under 20 years of age include culture, as well as low education and economic level. This incidence increases the risk of health during pregnancy due to the need for nutrition during the growth period and the unmatured reproductive system (Escobedo-Monge et al., 2021; Restiana & Fadilah, 2023).

Maternal role in preventing stunting requires good behavioral changes with sufficient knowledge, hence, women about to marry must be equipped with sufficient education and knowledge related to health (Dhingra & Pingali, 2021). Meanwhile, women under 20 years of age are still in the process of education and have the potential to give birth to stunted children without sufficient knowledge of health. Mothers under 20 years of age have not yet developed their reproductive organs optimally, thereby increasing the risk of premature birth (Fadilah & Eliafiana, 2022). Based on the results, maternal age did not significantly influence the incidence of stunting, while other factors including psychological readiness, nutritional awareness during pregnancy and after delivery, as well as overall preparedness, played crucial roles (Santosa et al., 2022). However, mothers who marry under the age of 20 may not necessarily get pregnant quickly. A supportive environment with contributions from parents and family during pregnancy can positively influence the nutritional intake of mother and baby. Economic challenges, unplanned pregnancies, cultural factors, and low education contribute to the prevalence of early marriage (Pangaribuan et al., 2020), increasing the incidence of stunted children (Atmilati & Soedarto, 2017). According to a previous study, 75% of children are stunted because their mothers marry early (Abidin & Liliandriani, 2020). Children born by adolescent pregnant women are at risk of stunting 3.86 times greater than those born in adulthood (Larasati et al., 2018).

During pregnancy, various factors contribute to stunting, including maternal height, gestational weight, nutritional status, the incidence of anemia or infection during pregnancy, age, short birth intervals, and stunted fetal growth. Maternal height is associated with stunting because it correlates with intrauterine growth retardation.

Lifestyle in the form of nutrition and physical activity during pregnancy plays an important role in the growth and development of the baby. The nutritional needs of pregnant women increase as the fetus develops in the womb. The need for nutrients in the form of iodine and folate increases until post-partum (Dörsam et al., 2019). Furthermore, the young age of the mother has a negative impact on the health condition of both the mother and fetus, potentially resulting in malnutrition and preterm low-weight babies. Maternal age over 34 years and birth spacing of less than 24 months significantly impact fertility. Meanwhile, maternal age under 18 years and birth spacing of less than 24 months poses a heightened risk of stunting and anemia (Dörsam et al., 2019).

Based on the results, maternal factors during pregnancy also determine the duration of the baby birth. Mothers with low weight

gain in the first to second trimesters have an impact on babies born with low birth length. This is due to insufficient energy and protein availability, as well as inadequate nutritional exchange between mother and fetus. Anemia during pregnancy also has a positive impact on stunting. Anemic pregnant women experience a lack of oxygen supply to body and brain cells, causing symptoms of fatigue, lethargy, and reduced appetite which indirectly impact nutrition (Abdillah, 2022).

Mothers aged 25 years, particularly during the first pregnancy, can help prevent babies from being born with a short body length, age 27-29 years reduces infant mortality and prevents stunting, while age 20-24 increases the incidence of stunting with the birth of premature babies. Premature babies have low levels of plasma insulin-like growth factor-binding protein 2 (IGFBP-2), an endocrine growth regulator, which causes children to have shorter stature (Royani et al., 2021).

Maternal factors affecting the incidence of stunting comprise both direct and indirect effects. Direct factors include maternal knowledge about nutrition and health, feeding, and exclusive breastfeeding. On the other hand, indirect factors include low family economic factors, indicators of unwanted pregnancy, poor mother-child bonding, and birth spacing (Santosa et al., 2022). Planned pregnancies can help in spacing births and prevent babies from being born with low weight and short height. This has a significant impact on reducing the incidence of stunting in children (Chungkham et al., 2020). Longer birth intervals (> 24 months) potentially reduce the risk of malnutrition in children and mitigate the risk of malnutrition in subsequent pregnancies (Fadilah & Eliafiana, 2022; Ntambara et al., 2023).

Based on the results, the relationship between the condition and characteristics of the mother before and during pregnancy was identified as a factor influencing 30% of stunting incidence in Mataram City. A previous study found that maternal height under 150 cm correlated with the incidence of stunting, causing an increased risk 2.92 times greater than those with a height of more than 150 cm. This is related to pathological conditions such as growth hormones which have genes for short stature, thereby increasing the possibility of children inheriting these genes (Fadilah & Eliafiana, 2022; Restiana & Fadilah, 2023; Sumarsono & Irwanto, 2022). Moreover, the factor of maternal weight exceeding 10 kg, considering BMI before pregnancy, has a positive impact on reducing the incidence of stunting among children (Noviyanti et al., 2019). This is because mothers with optimal nutritional status can reduce morbidity during pregnancy (Sejati et al., 2023). The major limitation of this study was the focus on the first child as the minimum sample examined.

CONCLUSIONS

In conclusion, factors contributing to stunting stem from various aspects, including the role of the mother. Based on the results, mothers with a height below 150 cm have a 2.9 times risk of giving birth to stunting children compared to those with a height exceeding 150 cm. A history of weight gain during pregnancy was associated with a 2.94 times higher likelihood of stunted children, particularly with a weight gain of less than 10 kg. However, pregnancy spacing had a minimal risk of causing stunting. To solve the problem of stunting, the Mataram City Health Service should increase promotion and education for young women in the growth process to fulfill nutritional requirements and achieve appropriate height. In addition, intensive assistance and education activities should be provided for mothers during pregnancy to maintain their nutritional status.

ACKNOWLEDGEMENT

Researchers would like to thank the Head of the Mataram City Health Service who has provided assistance and support since the beginning of the research. Researchers also thank all heads of Mataram City Health Centers who have permitted and supported the research until the end.

FUNDING

The authors received no specific funding for this study.

AUTHORS' CONTRIBUTIONS

Rufaida Rosyida designed the study, formulated the concept, chose the appropriate methodology, analyzed the data, wrote the first version of the manuscript, reviewed the manuscript, approved the final version, and submitted the manuscript to the OJS system. Vitri Widyaningsih was also involved in designing the study, critically reviewing the article, revising the manuscript. Ida Nurwati was reviewing and revising the manuscript .

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COMPETING INTERESTS

The authors confirm that all of the text, figures, and tables in the submitted manuscript work are original work created by the authors and that there are no competing professional, financial, or personal interests from other parties.

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