



# Socio-demographic influence on the pregnant women's comprehension of maternal health information in Tanzania

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## ABSTRACT

**Background:** Pregnant women's understanding of maternal health information is critical in the application of information for pregnancy care, birth preparedness, and newborn care. However, the influence of socio-demographic characteristics on pregnant women's understanding of maternal health information is least understood.

**Purpose:** The study examined the influence of social and demographic characteristics on pregnant women's comprehension of maternal health information.

**Methodology:** A mixed research approach and descriptive cross-sectional design were applied. Questionnaires and focus group discussions were used to collect data from 132 pregnant women and 8 nurses/midwives. Data were analyzed using IBM SPSS version 21 and thematic analysis.

**Findings:** Most of the pregnant women had a good ability to comprehend maternal health information. Level of education was found to influence the reading ability and language understanding ability of the pregnant women unlike age, marital status, income, and occupation. Age, level of education, monthly income, occupation, and marital status were found to influence the ability of pregnant women to understand maternal health information.

**Conclusion:** The socio-demographic characteristics of pregnant women have an influence on their ability to comprehend maternal health information.

## 1. Introduction

Pregnancy is a period in a woman's life that is characterized by a series of physiologic changes that take place from conception to delivery. During pregnancy, most pregnant women become worried and stressed about their body changes. The new changes necessitate a need for information on their new lifestyle and care of their expected newborns. During this time, pregnant women need clear and relevant information to be aware of and understand the physiological changes that take place. According to Ref. [1], information and education inform pregnant women about the changes that take place in their bodies throughout the pregnancy ([2,3]). show that adequate maternal health information reduces worries and stress for pregnant women ([4,5]). suggest that antenatal care (ANC) is an essential source of maternal health information for all women during pregnancy. Evidence from Tanzania suggests that ANC provided to pregnant women by qualified healthcare providers equips them with the necessary information required for their pregnancy care, preparation for delivery, and post-natal care [6].

Maternal health information entails essential information that assists women in making decisions on their pregnancy care,

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preparation for delivery, and post-delivery care [7]. Access to and use of maternal health information is critical to women of child-bearing age as it can affect women's health during pregnancy, childbirth, and the care of newborns ([7–9]). Although access to and use of maternal health information is important for pregnant women and newborns [10], observed that health information becomes useful when the users are able to comprehend the health information they have accessed. Thus, in the context of this study, understanding health information is the ability of pregnant women to understand health-related information and resources and effectively use them to improve their health ([10]). Clear comprehension of health information is of paramount importance in improving women's good health and well-being and promoting Sustainable Development Goal 3.

The essentiality of comprehending maternal health has been associated with positive maternal impacts. For instance, researchers have linked the ability of pregnant women to understand maternal health information and better maternal outcomes ([11,12]). In this regard, pregnant women need to first understand maternal health information communicated to them in order to effectively use it to improve their health and that of their newborns. Notwithstanding the fact that there could be a number of factors that can affect pregnant women's comprehension of maternal health information, the current study was interested to explore on the influence of socio-demographic variables on understanding maternal health information communicated to them. Socio-demographics such as age, education, marital status, income, and occupation have been found to be among the key factors highly researched in the health sector that influence the use of health services ([13,14]). These factors can influence pregnant women's ability to read and comprehend health information content communicated. For instance, age, and education can influence how pregnant women access, learn, seek, and use maternal health information. In addition, pregnant women with stable incomes and occupations tend to have wider access to resources and can better comprehend health information. The literature reviewed revealed that most studies conducted in Tanzania on maternal health information have little documentation on pregnant women's comprehension of maternal health information ([7–9, 15]). In fact, none of the studies has researched the influence of socio-demographic characteristics on pregnant women's understanding of maternal health information, particularly in the Coastal region. Hence, this study was conducted to examine in detail the influence of social and demographic characteristics on pregnant women's comprehension of maternal health information in the coastal region of Tanzania. The study had the following specific objectives:

1. To examine the ability of pregnant women to read the maternal health information
2. To determine the influence of socio-demographic characteristics of pregnant women on their ability to read maternal health information
3. To assess the pregnant understanding of the language used to deliver maternal health information
4. To determine the relationship between socio-demographic characteristics of pregnant women and their understanding of the language used to deliver maternal health information
5. To examine the ability of pregnant women to understand maternal health information
6. To determine how socio-demographic characteristics influence the ability of pregnant women ability to understand maternal health information

## 2. Methods

A mixed research approach and descriptive cross-sectional study design were applied to address the study's research objectives. The study was conducted in Bagamoyo district, the Coastal region of Tanzania from May to August 2022. Data collection was carried out at Bagamoyo District Hospital, Kerege Health Centre, and Kiromo Dispensary; the health facilities that provide ANC to pregnant women in Bagamoyo district.

The study used simple random, convenience, and purposive sampling methods. Simple random sampling was used to select three health facilities from the list of 19 health facilities in Bagamoyo district. A lottery method was used in which 19 health facilities in the Bagamoyo district were assigned numbers; three numbers were then drawn from the box randomly. Convenience sampling was used to obtain 132 pregnant women from all pregnant women who attended ANC at Bagamoyo District Hospital, Kerege Health Centre, and Kiromo Dispensary from May to August 2022. The study was limited to pregnant women in the coastal region who attended clinics. Besides, limited funds and time made it challenging to have a broader study that also accommodates other regions in Tanzania. Moreover, considering the study methodology, sampling, sample size, and nature of respondents (pregnant women), the researchers are confident that the sample size is sufficient for replicability. Data was collected from May to August 2022. Cochran's sample size formula;  $n = p(1-p) z^2 / e^2$  ( $z = 1.96$ ,  $p = 9.6$ ,  $e = 0.05$ ) was used to obtain a sample of 132 pregnant women [16]. The study also used a purposive sampling method to enroll nurses and midwives who provide ANC to pregnant women at the respective health facilities as the key informants from the list of all nurses and midwives in the studied health facilities. All nurses and midwives who provide ANC services at the selected health facilities; 4 from Bagamoyo District Hospital, 2 from Kerege Health Centre, and 2 from Kiromo Dispensary were enrolled in the study as the key informants. The nurses and midwives enrolled in the study provide maternal health information as part of ANC services in the named facilities.

Focus group discussions (FGDs) and questionnaires, were techniques and a tool used to collect data from nurses/midwives and pregnant women respectively. The review of previous studies ([11,12,17,18]) enabled the preparation of the research tools. Data collection was preceded by pilot testing of the questionnaires on 10 pregnant women at Zinga dispensary in Bagamoyo district, which was not among the health facilities selected during data collection. The Cronbach's alpha value of 0.794 was deduced from the questionnaire that was tested and used for data collection. The Cronbach's alpha value calculated indicates a high degree of internal consistency resulting from the analysis of the pilot study data. Slight changes were made to the questionnaire by rephrasing sentences and questions which were not clear to the respondents. A total of nineteen (19) questions were included in the questionnaires; 7

questions explored the social and demographic characteristics of respondents, 1 question examined the ability to read, 1 question examined pregnant women's language conversant and 10 questions examined pregnant women's understanding of maternal health information with each question focusing on a different topic. In addition, a FGD was used to have a broader understanding of some issues in pregnant understanding of maternal health, the outputs from the focus group discussion were used to confirm pregnant women's responses. To ensure validity and reliability of the study, the research tools were pretested in named health facilities and multiple methods were used to gather data (questionnaire and FGDs). The research data were collected by researchers assisted by two research assistants who were trained prior to data collection. Research assistants were trained to understand the concept of maternal health information and information comprehension, they were trained on how to clarify the intended message in every question included in the research tools as well as note taking and transcription of the recorded FGD.

Ethical clearance to conduct this study was obtained from the University of Dar es Salaam. Region administrative secretary of the Coastal region, the district administrative secretary of the Bagamoyo district, the district executive director of the Bagamoyo district council, and the Medical officer of the Bagamoyo district council provided the permission to collect data from the health facilities in the Bagamoyo district, Coastal region. All participants of the study provided informed verbal consent before participating in the study.

The IBM SPSS version 21 was used to analyze the quantitative data. The descriptive statistical methods; frequency, percentage, and standard deviation were used to characterize the data while the chi-square test and Pearson's correlation coefficient were used to establish the relationship between socio-demographic characteristics and comprehension to maternal health information. Thematic analysis was used to analyze the qualitative data. The findings of the study have been presented using tables, frequencies, and charts.

**Table 1**  
Socio-demographic and pregnancy characteristics of the respondents.

Demographics	Frequency	%
Age		
16–20	12	9.1
21–25	37	28.0
26–30	42	31.8
31–35	25	18.9
36–40	13	9.8
>40	3	2.3
Marital status		
Single	11	8.3
Married	83	62.9
Cohabiting	32	24.2
Divorced	5	3.8
Widower	1	0.8
Educational level		
Non-formal	3	2.3
Primary	47	35.6
Secondary	59	44.7
College/University	23	17.4
Number of pregnancies		
One	36	27.3
Two	41	31.1
Three	39	29.5
Four and above	16	12.1
Number of deliveries		
None	41	31.1
One	17	12.9
Two	17	12.9
Three	27	20.5
Four	16	12.1
>Four	14	10.6
Occupation		
Dependents	11	8.3
Peasants	32	4.2
Casual laborers	51	38.6
Petty business women	17	2.9
Employees	21	15.9
Monthly Income		
<100,000 Tsh.	101	76.5
100,000–200,000 Tsh.	11	8.3
200,001–300,000 Tsh.	9	6.8
>300,000 Tsh.	11	8.3

Source: Field data, 2022.

### 3. Results

#### 3.1. Socio-demographic and pregnancy characteristics of the respondents

A total of 132 pregnant women and 8 nurses/midwives participated in the study. The mean age of the pregnant women was 28 years (SD = 5.98). Among the pregnant women enrolled into the study, 36 (27.3 %) were primigravida while 96 (72.3 %) were multigravida, 41 (31.1 %) were nulliparous and 74 (56.1 %) were multiparous with an average of 2.1 deliveries per every woman. More than two-fifths (44.7 %) of the pregnant women had secondary education while 2.3 % of the pregnant women did not attend any formal education. The majority of pregnant women (62.9 %) were married while the minority (0.8 %) was widowed. Results showed most (38.6 %) of the pregnant women were casual laborers, while a few (8.3 %) were housewives (dependents). In addition; a large proportional of pregnant women 101 (76.5 %) had low income less than 100,000Tsh (\$43.5) per month while a small proportion of the pregnant women enrolled in the study 31 (23.5 %) earned at least 100,000Tsh (\$43.5) per month. [Table 1](#) summarizes the socio-demographic and pregnancy characteristics of respondents.

#### 3.2. Pregnant women's ability to read maternal health information

Respondents were asked to indicate how best they could read maternal health information obtained from different sources. They were given five options that were ranked 1 = very poor, 2 = poor, 3 fair, 4 good, and 5 = very good. The results of the study revealed that the majority of the respondents 60 (45.5 %) had good ability while the minority 12 (9.1 %) had very poor ability to read maternal health information with an average score of 3.66. See [Fig. 1](#) below for more details:

To have a better understanding of the inquiry, the topic of pregnant women's ability to read maternal health information was raised during the focus group discussion (FGD) with nurses. For example, nurse 2 said:

“Most of them have good Kiswahili reading ability. We usually tell them to read out health instructions, posters, and leaflets loudly during every ANC visit. Yes, the majority of them have good reading ability though some are shy”

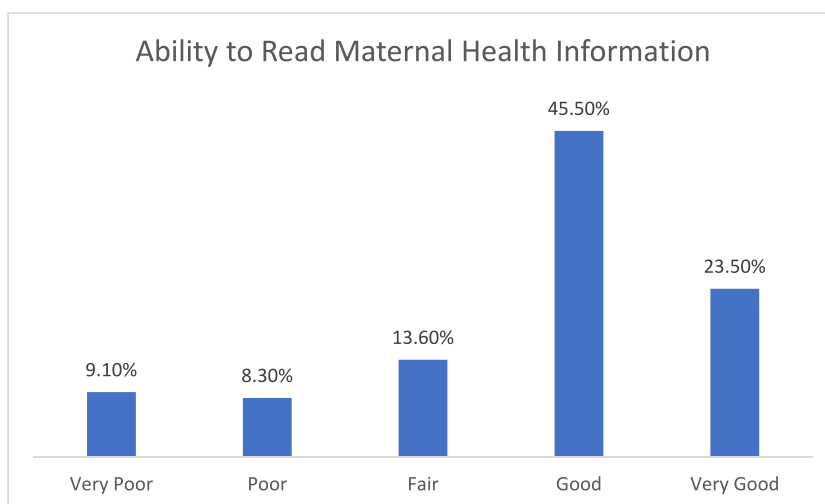
#### 3.3. Socio-demographic characteristics influence pregnant women's ability to read maternal health information

Age, marital status, levels of education, occupation, and income of pregnant women were cross-tabulated with the pregnant women's ability to read maternal health information. The cross-tabulation was done to identify the existing relationship between socio-demographic characteristics and the ability to read maternal health information at a 5 % level of significance. The results of cross-tabulation are presented in [Table 2](#).

Among the socio-demographic characteristics of the pregnant women studied levels of education were the only variable found to influence their ability to read maternal health information at the 5 % level of significance (P-value = .004). Age, marital status, occupations, and levels of income of pregnant women had no influence on their ability to read maternal health information (see [Table 2](#)).

#### 3.4. Conversant with language used to deliver maternal health information

Pregnant women were asked to indicate whether they were acquainted with the native Kiswahili language used to deliver maternal health information or not. Results show the majority 120 (90.9 %) of pregnant women understood the Kiswahili language used clearly



**Fig. 1.** Pregnant women's ability to read maternal health information. Source: Field Data (2022)

**Table 2**  
The relationship between socio-demographic characteristics and the ability to read maternal health information.

Variables	Pearson Chi-square value	df	P-value
Age	16.358	20	.694
Marital status	26.148	16	.052
Education levels	28.894	12	.004*
Occupations	22.203	16	.137
Income	16.081	12	.188

At 5 % level of Significance. Source: Field data (2022)

while 12 (9.1 %) were not conversant.

### 3.5. Socio-demographic characteristics influence the pregnant women's understanding of the language used to deliver maternal health information

Socio-demographic characteristics were cross-tabulated with pregnant women's understanding of the language used to deliver maternal health information to identify the existing relationship. The results are presented in Table 3.

The results of the study show that at a 5 % level of significance levels of education of the pregnant women were found to influence their understanding of the Kiswahili language used to deliver maternal health information (P-value = .018). The other socio-demographic characteristics studied were found to have no influence on the pregnant women's understanding of the Kiswahili language used to deliver maternal health information (see Table 3).

### 3.6. Understanding maternal health information

Respondents were asked to indicate how they understood maternal health information on different health topics. They were given options in five-point Likert scales and they were requested to indicate one option. The options were rated 1 = very poor, 2 = poor, 3 = average, 4 = good, and 5 = very good. The responses are presented in Table 4 below:

From Table 4, the percentage score of each topic on maternal health information was used to obtain the average percentage of the respondent's ability to understand maternal health information. On average, the highest proportion (49.8 %) of respondents had a good understanding ability while the lowest proportion (3.4 %) of the respondents had very poor understanding ability. In addition, 15.6 % of respondents had very good understanding ability. The mean score for the pregnant women's understanding of maternal health information was 3.68.

Furthermore, among the topics on maternal health information; information on expected delivery date (EDD) was understood by the majority compared to the information on family planning. In a focused group discussion, Nurses 2 and 5 said that;

*"Respondents understand their EDD mostly because they are told about it on the first ANC visit, it is written on ANC card and they are required to memorize it throughout pregnancy"* (Nurse 5).

*"Family planning is least understood because a number of pregnant women are not interested in family planning information. Some ask for information on family planning after delivery"* (Nurse 2).

When contributing to a discussion on the ability of pregnant women to understand maternal health information, key informants said generally, pregnant women had a good ability to understand the information given. For example, nurse 3 contributed that:

*"We usually ask them questions on every ANC visit especially after every maternal health session we give. They seem to understand, and most of them answer clearly though some are not confident"*

The findings indicate good ability respondents have a good ability to understand maternal health information with notable variations on abilities to understand maternal health information.

**Table 3**  
Association between sociodemographic characteristics and understanding of the language used to deliver maternal health information.

Variables	Pearson Chi-square value	df	P-value
Age	6.910	5	.227
Marital status	2.638	3	.451
Education levels	11.977	4	.018*
Occupations	5.391	4	.204
Monthly income	3.896	3	.273

At 5 % level of Significance. Source: Field Data (2022)

**Table 4**  
Respondents' ability to understand maternal health information.

Maternal health information topic	Very poor (%)	Poor (%)	Average (%)	Good (%)	Very Good (%)
Information on pregnant danger signs	6.9	10.6	22.0	46.2	14.4
Information on intermittent preventive treatment	0.8	5.3	22.0	53.8	18.2
Information on healthy diet during pregnancy	2.3	7.6	28.0	46.2	15.9
Information on birth preparedness	3.8	5.3	22.7	51.5	16.7
HIV and STI prevention and treatment	4.5	6.1	31.1	43.9	14.4
Information on family planning	3.8	12.9	31.1	39.4	12.9
Information on labor signs	4.5	4.5	22.0	51.5	16.7
Information on expected delivery date	2.3	2.3	22.8	56.8	15.9
Proper use of medications provided	1.5	0.8	26.5	55.3	15.2
Information on exclusive breastfeeding	3.8	5.3	21.2	53.8	15.9
<b>Average</b>	<b>3.4</b>	<b>6.1</b>	<b>24.9</b>	<b>49.8</b>	<b>15.6</b>

Source: Field Data (2022)

### 3.7. The influence of socio-demographic characteristics in understanding maternal health information

The cross-tabulation was done to understand the existing relationship between the pregnant women's socio-demographic characteristics and their understanding of information on different maternal health topics. The results of the cross-tabulation are presented in Table 5.

## 4. Discussion

The study broadly examined the influence of social and demographic characteristics on pregnant women's reading and understanding of maternal health information. Findings showed among the socio-demographic characteristics studied, only a level of education was found to influence pregnant women's ability to read maternal health information. Having a small proportion of pregnant women with very poor ability to read maternal health information may be linked with continued government efforts to provide free primary education for all. As a result, most of the pregnant women had attained at least a primary level of education. The ability to read exposes pregnant women to vast of maternal health information and hence increases their likelihood of effective utilization of healthcare services. These findings are in line with previous studies conducted by ([15,19–21]) which found that levels of education had a significant influence on pregnant women's reading and comprehension to maternal health information. Supporting this [15], revealed that among the known socio-demographics, the level of education extensively influenced the reading ability of pregnant women [21]. further revealed that, in addition to the ability to read maternal health information level of education had an influence on the effective utilization of healthcare services.

Present findings found that the majority of the pregnant women were conversant with the native Kiswahili language used to deliver maternal health information at ANC. The ability to comprehend the message delivered could be attributed to two factors. One is the level of education while the other is the language used to deliver the maternal health information content. The level of education of the pregnant women was found to influence pregnant women's conversation abilities and using Kiswahili which is an official language in sharing maternal information. For instance, present findings on the level of education show a large proportion of respondents (97.7 %) have at least primary education which enables them to follow and understand instructions given on health. The other factor is the use of the Kiswahili language in providing maternal health information at health facilities. Pregnant women, being conversant with language used to deliver maternal health information have increased utilization of maternal health information and healthcare services and vice versa. For example [22]; found that women with language challenges were at risk of low prenatal care utilization. Contrary to studies of ([20,23]) who found pregnant women were not conversant in the language used to deliver health information,

**Table 5**  
Association between sociodemographic characteristics and understanding of maternal health information.

Maternal health information topic	Age	Education	Marital status	Occupation	Income
	d.f P-value	d.f P-value	d.f P-value	d.f P-value	d.f P-value
Pregnant danger signs	20 .002*	12 .717	16 .035*	16 .092	12 .525
HIV and STIs prevention	20 .073	12 .603	16 .576	16 .267	12 .315
Family planning	20 .582	12 .032*	16 .721	16 .035*	12 .007*
Malaria prevention	20 .000*	12 .680	16 .024*	16 .055	12 .272
Healthy diet	20 .056	12 .476	16 .167	16 .173	12 .165
Birth preparedness	20 .070	12 .394	16 .007*	16 .050*	12 .547
Exclusive breastfeeding	20 .038*	12 .094	16 .139	16 .218	12 .097
Labour signs	20 .000*	12 .582	16 .035*	16 .047*	12 .112
Expected delivery date	20 .070	12 .192	16 .345	16 .243	12 .333
Medication use	20 .354	12 .289	16 .787	16 .425	12 .435

Source: Field Data (2022).

the findings of this study showing increased usage of Kiswahili may reflect the strength of using native Kiswahili language, which is an official medium of communication in the country and also used in teaching at primary level. Moreover, with regard to those who were not familiar with the language used to deliver messages, one reason that could have contributed to their lower abilities to read and understand the language communicated could be being more attached to the mother language which is the first to many who have been born and raised in rural areas. In Tanzania, there are more than 120 spoken languages and only two official languages which are Kiswahili and English [24]. Being a national language, Kiswahili is spoken by the majority of Tanzanians regardless of their social status and this explains the fact that socio-demographic factors such as gender, and age excluding the level of education do not influence understanding of the Kiswahili language.

In addition, the findings of the study reveal that a number of pregnant women understood the maternal health information given at the health facilities. This is explained by the fact that most of the pregnant women had a good ability to read maternal health information and were conversant with the Kiswahili language used to deliver maternal health information. Pregnant women, being conversant with a medium of instruction and ability to read enable them to follow and understand maternal health information given. Additionally, as the majority of pregnant women had attained at least primary education, an understanding of maternal health information shown may be linked to their education levels. Supporting the authors' argument [21], also show that education attainment is a significant factor in understanding maternal health information as a result it influences healthcare services utilization. The findings contradict other similar studies conducted in Nigeria and India by ([25,26]) respectively which show respondents had a low ability to understand maternal health information. The difference between findings from the two studies presented may largely be attributed to personal attributes including the difference in respondent's ability to read and use effectively the medium of instruction. Other factors could be differences in culture, learning environment, and political and economic conditions.

From the current study findings, each socio-demographic feature was found to influence pregnant women's understanding of maternal health information on at least one maternal health topic. For instance, the influence of age on pregnant women's understanding of information on pregnancy danger signs, labor signs, and exclusive breastfeeding could be linked to the fact that older pregnant women have experience from previous pregnancies and deliveries ([27,28]). argued that young pregnant women who mostly are students and those not married; delay attending ANC fearing to disclose pregnancy. The delayed attendance of young pregnant women to ANC reduces their access to maternal health information and may be linked to their low understanding of maternal health information as compared to older pregnant women. Supporting the findings [29], revealed that sociodemographic features such as education and marital status have an influence on pregnant women's understanding of health information which in turn affects the use of ANC.

The findings also revealed that occupation and monthly income influence the understanding of information on family planning. The researchers envisage that the motivating factor may be that pregnant women seek information on family planning in order to understand safe family methods that prevent unwanted pregnancies and pave the way for them to engage more in work-related activities. Furthermore, the influence of education on understanding of information about family planning may be explained by the exposure of educated pregnant women to extensive information resources. Educated pregnant women depending on other factors may have a better ability to seek information from various health information sources such as doctors, use of internet, read magazines, newsletters, and pamphlets and read advanced health information sources such as journals. These findings align with studies of [30] which found there is an influence of age, level of education, occupation, and monthly income on understanding maternal health. Moreover, a study by Ref. [31] revealed that among the socio-demographics, women's age and level of education mostly affected the understanding of pregnant women. Additionally [15], study found the level of education extensively affected pregnant women's ability to comprehend health information and make clear decisions about their pregnancies.

## 5. Conclusion

Socio-demographic characteristics were found to influence pregnant women's comprehension of maternal health information. The study concludes that based on study variables, the level of education is a strong determinant that influences the ability of pregnant women to read and understand maternal health information. In addition, the medium of instruction, particularly native language is a crucial element that facilitates pregnant women's clear decision making. The study recommends health facilities diversify methods used in communicating maternal health information considering the level of education. The study also suggests disseminating maternal health information such as mobile phones and not only based on word of mouth and/or print. Policymakers should consider socio-demographic characteristics when planning for the distribution of resources for ANC.

## Data availability

Data associated with this study has not been deposited into a publicly available repository because currently, the guidelines and policy in Tanzania do not allow the disclosure of data generated from the health facilities.

## CRedit authorship contribution statement

**Emmanuel F. Elia:** Writing – review & editing, Validation, Supervision, Methodology, Formal analysis, Conceptualization. **Jelly Ayungo:** Writing – original draft, Investigation, Formal analysis, Conceptualization.

## Declaration of competing interest

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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