Maternal intention to use child care and actual enrollment: a longitudinal study from pregnancy to 12 months in a medium-sized Brazilian municipality

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Abstract

Objectives: to analyze maternal choices regarding child care from pregnancy to the child's first year of life.

Methods: prospective and quantitative longitudinal study developed in three stages (pregnancy, first and twelfth months of the child's life), with 140 women interviewed during home visits, in a medium-sized Brazilian municipality. Logistic regression was used to estimate the variable of interest: type of child care actually chosen at 12 months, categorized as "child care center" or "no child care". Explanatory variables were: the mother's intention to child care, mother's age, mother's education, parity, having worked during pregnancy and home ownership.

Results: during pregnancy, most participants expressed the desire to use child care centers; however, only a minority actually enrolled their children by 12 months. Even so, the estimates show that mothers who consistently intended to enroll their children in daycare were more likely to do so than those who consistently said they would not [OR=3.699; 95%CI= 1.18-11.6; p=0.019]. The main result is that higher maternal education was strongly associated with actual enrollment in all models estimated [OR=19.16; 95%CI=1.43-256.88; p=0.026]. No significant effects were found for maternal age, employment, or home ownership.

Conclusion: Even controlling for maternal preferences regarding child care enrollment, a positive association was found between higher education and the choice to enroll children in daycare. If daycare centers positively impact child development, this is a question to be considered in terms of public policy.

key words *Child, Child development, Child care, Child rearing*

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Introduction

Child care is widely recognized as a key setting for early childhood development, beginning in infancy and continuing through school entry for most children.[1] This environment is particularly beneficial in contexts of socioeconomic vulnerability,[2,3] demonstrating positive outcomes in cognitive development, motor skills, recreational engagement, and social interaction, provided the care setting is safe and of good quality.[4,5,6] High-quality care has been linked to stable, positive interactions between caregivers and children,[7,8] with long-term benefits for child development and parental support.[2,9] Conversely, unstable non-parental arrangements may lead to poorer health and developmental outcomes.[10] Early investment in developmental conditions is more effective and less costly than interventions later in life.[4]

Access to inclusive and affordable child care can also help reduce socioeconomic disparities.[11] Studies have shown that children from disadvantaged backgrounds particularly benefit in language development when enrolled in quality programs. In Brazil, continuous and early attendance in child care centers has been associated with improved cognitive outcomes.[5] However, the coverage in such settings remains low, underscoring the need to expand access to qualified environments during early childhood.[5]

Non-parental child care encompasses a range of arrangements, such as child care centers, family-based care, home-helpers, or care provided by relatives.[12,13] Maternal decisions regarding these arrangements are influenced by context, cost, care quality, and available resources, including physical space, educational activities, and interaction quality.[5,14] Employment outside the home is a significant factor influencing maternal preference for non-parental care, particularly when grandparents are involved.[15,16] First-time mothers may exhibit overprotectiveness and seek less information,[17] which can delay the initiation of child care. Moreover, maternal education is a key determinant of child development, and informed, proactive care-seeking is essential,[18] especially in low-income settings where empowering maternal decision-making can improve health outcomes.[19]

This study assumes that maternal expectations about child care begin during pregnancy and may change during the infant's first year. Thus, the objective was to analyze maternal choices regarding child care from pregnancy to 12 months of age.

Methods

A longitudinal, prospective and quantitative study was developed in three stages (gestation, first and twelfth child month), with women interviewed during home visits. It was conducted in a municipality in the Southeast region of Brazil, with a population of 700,000 inhabitants, and 44 primary health care units, including 17 with a Family Health Strategy.

Participants were selected based on information from a computerized system in the second half of 2018. Inclusion criteria were women in the third trimester of pregnancy, over 18 years old, with normal risk factors, who were followed up at a family health unit in the selected health district. Exclusion criteria were mothers in custody or hospitalized, who had premature births and children with special health needs, and those absent after three attempted home visits.

Of 528 pregnant women, 109 did not meet the inclusion criteria, 26 refused to participate and 174 met the exclusion criteria. Thus, 219 pregnant women were eligible to participate, but 79 were lost to follow-up due to discontinuation (refusals, change of municipality, non-participation in some stage, or not being located after three home visit attempts). Thus, 140 women and 140 children completed the three assessment points.

Data collection took place between November 2018 and March 2020. The data collection time points were selected to illustrate maternal choices regarding child care (final phase of pregnancy, adaptation after birth, and at the end of the first child's year), enabling a longitudinal analysis. In the three stages, data collection was conducted through previously scheduled face-to-face home interviews.

In the first interview, a questionnaire collected sociodemographic, occupational data, along with the type of care the mother intended for the child after birth. In the second interview, child data were added, and in the third, additional questions about the types of care were included. The questionnaires were developed by the authors but were not validated in terms of content, appearance or semantics with experts and/or target audience. The response options for types of care were: private child care; free private child care; public child care; relatives at home; another person at home; person who cares for other children in the neighborhood; not working outside to stay with child; and other. Postgraduate nurses, with prior training of the collection team, administered the questionnaires. Each interview lasted an average of 30 minutes. Information was inputted on tablets and stored on the Fulcrum platform-Mobile Form Builder & Data Collection App®.

Logistic regression was performed using the variable of interest (type of care at 12 months), categorized in binary form as child care or non-child care. The logit model was selected due to the binary nature of the dependent variable, which represents the probability of a particular outcome—specifically, whether mothers chose

to enroll their child in daycare upon reaching 12 months of age. The logit model (as well as the probit model) produces predicted values constrained between 0 and 1, thus ensuring consistency with the theoretical framework of probability models. A key distinction was the use of the mother's intention to child care as an explanatory variable, measuring both before birth and child one month old. The question used was, "If you were in a position that allowed you to choose any care option for your child from the age of 6 months, which would you choose?" Using this question twice (before and after the child's birth) allowed us to verify whether the change in choice was associated with the type of care actually provided when the child was 12 months old.

The other explanatory variables in this model were maternal age, maternal education, first child, work during pregnancy, and individual homeownership. These variables were chosen based on the literature related mainly to women's labor supply.[20] The decision to enroll a child in a child care institution at 12 months of age is associated with the mother's attachment in the labor market. Accordingly, we selected variables that capture for labor force participation preferences (first child and work during pregnancy), human capital measures (maternal age and maternal education), and a proxy for non-labor income (individual homeownership), which is a relevant factor in labor supply decisions. To assess potential multicollinearity among the independent variables, we computed the Variance Inflation Factor (VIF). The overall VIF value was 1.5 when all variables were included, indicating acceptable multicollinearity and providing sufficient justification to proceed with the analysis.

It is important to underscore that the primary aim of this study is to examine the association between prior expectations regarding the type of childcare arrangement and the actual use of formal child care during the child's first year of life. Such expectations are plausibly linked to women's labor supply preferences, which may be captured in the error term of the regression model estimating the type of care chosen when the child is 12 months old. Accordingly, the inclusion of these variables is primarily intended to mitigate potential omitted variable bias.

Research approved by the Research Ethics Committee (CAAE 70838817.2.0000.5393).

Results

A total of 140 mothers participated in the study. Nearly half (48%) were between 18 and 25 years old, 41.5% were aged 26-35, and 10.5% were over 36. Regarding parity, 42% were primiparous, 28.3% had one previous child, and 29.7% had two or more. Educational attainment varied: 43.8% had completed elementary education, 48.4% high school, and only 6.8% had completed higher education. During pregnancy, 56.6% reported working outside the home. Most households (36.5%) had an income below three minimum wages, indicating low- to-medium socioeconomic status.

Desired care options (pregnancy and the child's first month) and the type of care used (child's 12th month) are presented in Table 1. The number of mothers who actually enrolled their child in a child care center decreased compared to the initial desire to enroll. The numbers presented in Table 1 were derived from a balanced panel, meaning they only include mothers who responded to all three interviews.

Logistic regression models were estimated to assess factors associated with child care enrollment by 12 months (Table 2). In model 1, when maternal desires at both time points were included simultaneously, neither variable was statistically significant. This is likely due to collinearity between the variables (correlation equal to 0.33), and more significantly, the small sample size.

However, when included separately (models 2 and 3), both showed significant positive associations. Mothers who desired child care, either during pregnancy or postpartum, had approximately 2.5 times more chance to enroll their children than those who did not.

Maternal education was the most consistent predictor across all models. Compared to mothers with incomplete education, those with university degrees were consistently more likely to utilize child care services. Primiparity (model 5) also emerged as a negative predictor in some models, although the effect was not robust. Other variables – maternal age, employment during pregnancy, and home ownership – were not statistically significant.

We assess model performance using three goodness-of-fit measures: (i) a joint significance test for all covariates, (ii) the Hosmer–Lemeshow test, and (iii)

Table 1

Maternal intention to use child care centers during pregnancy and at 1 month, and subsequent enrollment at 12 months. Medium-sized municipality, Southeast region, Brazil, 2025.

	N	%
Mothers who intended to enroll their child in child care centers (at the time of pregnancy)	74	52.86
Mothers who intended to enroll their child in child care centers (at the time of the child's first month of life)	61	43.57
Mothers who had enrolled their child in child care centers (at the time of the child's 12th month of life)	32	22.86

Table 2

Logistic regression results: predictors odds-ratio of child care enrollment at 12 months. Medium-sized municipality, Southeast region, Brazil, 2025.

Independent variables	Mod. 1	Mod. 2	Mod. 3	Mod. 4	Mod. 5	Mod. 6
Desire for child care centers at the time of pregnancy	1.815	2.397**		1.822	2.489**	
	(-0.38;1.57)	(-0.02;1.77)		(-0.39;1.59)	(-0.01;1.83)	
	[0.230]	[0.056]		[0.237]	[0.052]	
Desire for child care centers at the time of the child's first month of life	2.056		2.566**	2.113		2.652**
	(-0.23;1.67)		(0.04;1.85)	(-0.22;1.72)		(0.06;1.89)
	[0.137]		[0.041]	[0.130]		[0.037]
Mothers aged between 18 and 25 years	1.91	1.626	1.847	1.329	1.027	1.262
	(-0.38;1.67)	(-0.49;1.46)	(-0.36;1.59)	(-0.85;1.42)	(-1.06;1.11)	(-0.86;1.33)
	[0.215]	[0.326]	[0.219]	[0.623]	[0.962]	[0.678]
Mothers aged between 26 and 35 years	2.444	1.672	2.275	1.566	1.078	1.425
	(-0.59;2.38)	(-0.89;1.92)	(-0.63;2.27)	(-1.14;2.04)	(-1.41;1.56)	(-1.21;1.92)
	[0.237]	[0.474]	[0.267]	[0.580]	[0.921]	[0.658]
Mother's educational attainment: completed elementary school	5.761	5.866	6.919*	6.239	6.716*	7.437*
	(-0.53;4.03)	(-0.46;4.00)	(-0.31;4.18)	(-0.45;4.11)	(-0.34;4.15)	(-0.24;4.25)
	[0.132]	[0.120]	[0.091]	[0.116]	[0.096]	[0.080]
Mother's educational attainment: completed high school	5.740	5.343	6.295*	7.248*	7.409*	7.947*
	(-0.43;3.92)	(-0.46;3.81)	(-0.31;3.99)	(-0.21;4.17)	(-0.17;4.17)	(-0.10;4.24)
	[0.115]	[0.123]	[0.094]	[0.077]	[0.070]	[0.061]
Mother's educational attainment: completed university level	14.263**	11.79**	16.23**	20.76**	19.78**	23.61**
	(0.13;5.19)	(0.02;4.91)	(0.30;5.28)	(0.44;5.63)	(0.44;5.53)	(0.61;5.71)
	[0.04]	[0.048]	[0.028]	[0.022]	[0.021]	[0.015]
Participated in the labor market during pregnancy	1.747	1.734	1.992	1.656	1.601	1.899
	(-0.51;1.63)	(-0.50;1.60)	(-0.37;1.74)	(-0.57;1.58)	(-0.59;1.53)	(-0.42;1.70)
	[0.307]	[0.305]	[0.2]	[0.359]	[0.384]	[0.237]
Home owned outright	1.541	1.405	1.644	1.695	1.649	1.787
	(-0.47;1.34)	(-0.52;1.20)	(-0.39;1.39)	(-0.40;1.46)	(-0.40;1.40)	(-0.33;1.49)
	[0.349]	[0.439]	[0.274]	[0.266]	[0.276]	[0.212]
Mothers in their first pregnancy				0.451	0.374	0.442
				(-1.85;0.26)	(-2.02;0.05)	(-1.86;0.23)
				[0.138]	[0.062]	[0.127]
Number of obs	131	143	132	131	143	132

LR chi2(k)	17.36	15.77	17.49	19.62	19.43	19.9
Prob > chi^2	[0.0434]	[0.0458]	[0.0254]	[0.0331]	[0.0218]	[0.0186]
Pseudo R^2	0,1211	0,1021	0,1196	0,1369	0,1258	0,1361
Hosmer-Lemeshow chi^2 10grps	4.03	10.54	10.51	3.49	10.02	7.66
Prob > chi^2	0.8546	0.2291	0.2312	0.8998	0.264	0.4675
Pr (Y=1)	23.66%	23.08%	24.24%	23.66%	23.08%	24.24%
Sensitivity	80.65%	84.85%	75.00%	67.74%	69.70%	68.75%
Correctly classified	64.12%	67.13%	64.39%	65.65%	67.83%	66.67%

Odds ratio; Confidence interval shown in parentheses; *p*-value shown in brackets; **p*<0.10; ***p*<0.05; ****p*<0.01.

two predicted probability diagnostics—specificity (which captures the proportion of true positives—that is, mothers who enrolled their children in child care and were correctly classified by the model) and overall classification accuracy (the proportion of all cases in the sample that were correctly predicted, regardless of the child care decision). Overall, the models exhibit reasonable fit: all specifications pass both tests. On average, the models correctly classify approximately 63% of individual outcomes. Notably, models that omit a control for whether the pregnancy is the woman's first tend to yield improved overall classification rates, but at the cost of reduced specificity.

Longitudinal analysis of maternal preferences revealed that two-thirds of mothers maintained their initial preference between pregnancy and one month postpartum. About 20% shifted from preferring formal child care to non-formal options, while 11.4% shifted in the opposite direction. Among mothers who consistently preferred child care (Type 1), 33.3% actually enrolled their children, compared to only 16% of those who consistently intended not to (Type 2). Enrollment rates were similar for those who changed their preferences (Types 3 and 4), ranging from 18.8% to 20.7% (Table 3).

To explore the role of preference stability, a categorical variable representing four types of maternal desire trajectories (Types 1–4) was included in additional regressions (Table 4). Compared to mothers who consistently intended to enroll in child care (Type 1), all other groups showed lower likelihood of enrollment. This difference was statistically significant (at least 90% confidence) only when compared with Types 2 and 4. The largest negative effect (72% less likely to enroll in childcare) was observed among mothers who consistently intended not to enroll (Type 2). When Type 2 was used as the reference, no significant differences were found between it and Types 3 and 4. This suggests that maintaining a positive intention over time was more strongly associated with actual enrollment than simply changing one's mind.

Finally, responses indicated that the most common reason for not using childcare was "choosing not to work outside the home to care for a child," followed by "being cared for by family members". Notably, 37% of mothers who did not enroll their children stated that they would like to. Among these, 68% reported waiting for an available spot - a number that rose to 80% among Type 3 mothers, who initially did not want formal care but later changed their preferences.

Table 3

Maternal preference trajectories for child care and corresponding enrollment at 12 months. Medium-sized municipality, Southeast region, Brazil, 2025.

Groups of mothers	Desire regarding type of care		N	%	% who actually enrolled child in child care centers
	Pregnancy	Child's first month			
Type 1	Child care centers	Child care centers	45	32.1	33.33
Type 2	Non-child care centers	Non-child care centers	50	35.7	16.00
Type 3	Non-child care centers	Child care centers	16	11.4	18.75
Type 4	Child care centers	Non-child care centers	29	20.7	20.69
TOTAL			140	100.0	22.86

Table 4

Association between maternal preference patterns and child care enrollment at 12 months (Odd-ratios). Medium-sized municipality, Southeast region, Brazil, 2025.

Independent variables	Reference = Type 1		Reference = Type 2	
	Mod. 7	Mod. 8	Mod. 9	Mod. 10
Mother desired child care centers at the times of both pregnancy and the child's first month of life (Type 1)			3.548** (0.195;2.338) [0.021]	3.699** (0.218;2.398) [0.019]
Mother did not desire child care centers at the times of either pregnancy or the child's first month of life (Type 2)	0.282** (-2.338;-0.195) [0.021]	0.27** (-2.398;-0.218) [0.019]		
Mother did not desire child care centers at the time of pregnancy but did desire it at the time of the child's first month of life (Type 3)	0.26 (-3.229;0.533) [0.16]	0.302 (-3.050;0.654) [0.205]	0.921 (-2.004;1.840) [0.933]	1.116 -1.755;1.975) [0.908]
Mother desired child care centers at the time of pregnancy but did not desire it at the time of the child's first month of life (Type 4)	0.328* (-2.306;0.076) [0.067]	0.349* (-2.258;0.152) [0.087]	1.163 (-1.110;1.413) [0.814]	1.291 (-0.995;1.505) [0.689]
Mothers aged between 18 and 25 years	2.096 (-0.440;1.920) [0.219]	1.477 (-0.873;1.654) [0.545]	2.096 (-0.440;1.920) [0.219]	1.477 (-0.873;1.654) [0.545]
Mothers aged between 26 and 35 years	2.208 (-0.637;2.221) [0.277]	1.51 (-1.207;2.030) [0.618]	2.208 (-0.637;2.221) [0.277]	1.51 (-1.207;2.030) [0.618]
Mother's educational attainment: completed elementary school	5.554 (-0.830;4.259) [0.187]	6.01 (-0.784;4.371) [0.173]	5.554 (-0.830;4.259) [0.187]	6.01 (-0.784;4.371) [0.173]
Mother's educational attainment: completed high school	5.73 (-0.578;4.070) [0.141]	7.032 (-0.457;4.359) [0.112]	5.73 (-0.578;4.070) [0.141]	7.032 (-0.457;4.359) [0.112]
Mother's educational attainment: completed university level	13.545** (0.084;5.128) [0.043]	19.162** (0.266;5.639) [0.031]	13.545** (0.084;5.128) [0.043]	19.162** (0.266;5.639) [0.031]
Participated in the labor market during pregnancy	1.67 (-0.494; 1.519) [0.318]	1.582 (-0.532;1.449) [0.364]	1.67 (-0.494;1.519) [0.318]	1.582 (-0.532;1.449) [0.364]

	1.564	1.691	1.564	1.691
Home owned outright	(-0.447; 1.342)	(-0.393;1.444)	(-0.447;1.342)	(-0.393;1.444)
	[0.327]	[0.262]	[0.327]	[0.262]
		0.487		0.487
Mothers in their first pregnancy		(-1.798;0.358)		(-1.798;0.358)
		[0.191]		[0.191]
Number of obs	131	131	131	131
LR chi²(k)	15.39	15.76	15.39	15.76
Prob > chi²	0.1186	0.1503	0.1186	0.1503
Pseudo R2	0.1299	0.1421	0.1299	0.1421
Hosmer-Lemeshow chi²(k) - 10 groups	6.67	10.67	6.67	10.67
Prob > chi²	(0.5722)	(0.2212)	(0.5722)	(0.2212)
Pr (Y=1)	23.66	23.66	23.66	23.66
Sensitivity	77.42%	70.97%	77.42%	70.97%
Correctly classified	69.47%	67.94%	69.47%	67.94%

Odds ratio; Confidence interval shown in parentheses; *P*-Value shown in brackets; **p*<0.10, ***p*<0.05, ****p*<0.01.

Discussion

This study examined maternal preferences and actual choices regarding child care during the child's first year of life. The results showed that the likelihood of childcare enrollment at 12 months was significantly associated with two main factors: higher maternal education and consistent desire for formal care expressed both during pregnancy and at one month postpartum. In contrast, primiparity was negatively associated with enrollment. Despite an initial intention to use childcare services, most mothers ultimately did not enroll their children, indicating that informal or family-based care remained predominant in this population.

Family members or other individuals provided child care, which is consistent with findings from other studies[10,13] and with the context in Brazil.[5,21] It has been found that children in non-parental care are more likely to experience interruptions in care and social adversities, such as neglect, abuse and poverty.[10,22]

Maternal education emerged as a key determinant in the decision to enroll the child in a child care center. It is likely that, for more educated women, the opportunity cost of interrupting or abandoning professional activities is higher, which contributes to a greater propensity to seek formal child care services. Previous studies have consistently highlighted maternal education as a critical factor in child development.[5] Furthermore, low educational attainment among parents has been identified as an independent risk factor for infant mortality, even when controlling for other socioeconomic variables.[23] These findings reinforce the role of maternal education as a structural determinant of child survival, growth, and development.

The results on maternal age and employment did not achieve statistical significance, but they nonetheless showed an influence on decisions about childcare. Evidence from previous studies suggests that children born to older mothers received greater stimulation and developed stronger socio-emotional skills than those born to young mothers.[24] Additionally, a study found that the availability of child care was associated with maternal satisfaction, particularly for mothers with greater ties to the labor market. In contrast, this association was not observed among fathers.[25] Another study reported that an increase in kindergarten availability led to a rise in the employment rate of mothers of preschool-age children and, on the other hand, the drop in places resulted in a net loss for annual public finances.[26] Child care has traditionally been viewed as serving two purposes: to provide enriching environments that nurture child development and to enable parents to work.[27] A small proportion of mothers actually enrolled children in child care centers in the first year of life. It has already been found that parents believed that child care centers were more appropriate at older ages [16]. In the Brazilian context, starting child care centers between 13 and 29 months was more frequent, and when older age was analyzed separately it was associated with a higher

development score at 36 months, but these results need warrant further exploration.[21]

Adaptation of children to child care centers, especially in the first year of life, is an important issue, encompassing specific developmental needs of infants, mother-child and educator-child relationships, and environmental dynamics. Studies have reported situations of maternal insecurity,[28] and a tendency for primiparous mothers to be overprotective of their children.[18]

Attention to young children is essential, especially in vulnerable situations. Well-structured early childhood care and education programs have demonstrated equitable health and education outcomes.[8] Furthermore, intersectoral actions between health, education and social protection are important to consolidate integrated care.[29] This avoids fragmentation and duplication of services, facilitating effective connections in the protection network over time.

The decision to place a child in center-based care is complex and often laden with uncertainties for mothers. It involves not only logistical and financial considerations, but also emotional concerns related to trust, child readiness, and perceived maternal responsibilities. These concerns underscore the need for a better understanding of parental experiences and decision-making processes, particularly among mothers, in the early years of caregiving.[14,16,17]

While child care centers are primarily viewed as environments that promote child development, they may also influence the home environment and maternal well-being. High-quality early care settings can offer age-appropriate cognitive stimulation and serve as models for emotionally responsive interactions that may extend to family dynamics.[30] However, research on how the quality and consistency of child care affects broader domains, such as maternal mental health, parental stress, or home routines, remains limited and warrants further investigation.[27,30]

This study presents some limitations. It focused exclusively on mothers and the child's first year of life, with a modest sample size, which may limit generalizability. In addition, the questionnaires used were not validated, and the data were collected prior to the COVID-19 pandemic, a period that likely altered maternal decision-making regarding child care due to social distancing measures and service disruptions. Future studies should consider broader age ranges and long-term follow-up to better understand the multifactorial dynamics of child care decisions over time.

Among the strengths of the study is the novelty of utilizing maternal intention for child care as an explanatory variable, measured both during pregnancy and postpartum. This approach allowed for the identification of shifts in preference and their association with actual enrollment at 12 months. It also enabled interaction analyses with control variables such as maternal education. For instance, the study showed that mothers with similar preferences but different educational attainment made distinct choices, likely due to disparities in access and opportunity. Exploring preference trajectories over time offered insights into decision-making, unmet intentions, and alternative care arrangements among mothers who abandoned or revised their original plans.

This study highlights the gap between maternal intention and actual use of formal child care during the child's first year of life. Although many mothers initially expressed a desire to enroll their children in child care centers, this preference often diminished postpartum, and only a minority of children were enrolled by 12 months. Higher maternal education emerged as a key factor associated with the fulfillment of this intention.

These findings underscore the necessity of supporting families, particularly those with lower educational attainment, in navigating decisions about early childhood care. Health professionals involved in prenatal care, postnatal follow-up, and home visits play a strategic role in identifying parental expectations, fears, and constraints. Early and respectful dialogue about childcare options can help align maternal intentions with available resources, contributing to equitable access and promoting child development from the earliest stages.

Author's contribution

Prado NCPH: Conceptualization, Validation, Investigation, Resources, Manuscript Writing – Original Draft, Manuscript Writing – Review & Editing, Visualization. Scorzafave LGDS: Methodology, Formal analysis, Manuscript Writing – Review & Editing. Pazello ET: Methodology, Formal analysis, Manuscript Writing – Review & Editing. Santos DD: Methodology, Formal analysis, Manuscript Writing – Review & Editing. Gondim EC: Investigation, Manuscript Writing – Review & Editing. Bardívia CB: Investigation, Writing – Review & Editing. Mello DF: Conceptualization, Methodology, Validation, Investigation, Resources, Manuscript Writing – Original Draft, Manuscript Writing – Review & Editing, Visualization, Funding acquisition. All authors approved the final version of the article and declared no conflicts of interests.

Data Availability

All datasets supporting the results of this study are included in the article.

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