








Factors associated with knowledge, attitude, and practice of schoolgirls about vaccination against Human Papillomavirus

Fatores associados ao conhecimento, atitude e prática de meninas escolares sobre vacinação contra Papilomavírus Humano

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ABSTRACT

Objective: to analyze factors associated with knowledge, attitude, and practice of schoolgirls about vaccination against Human Papillomavirus in large and medium-sized cities. **Methods:** cross-sectional analytical study conducted with 210 schoolgirls. The knowledge, attitude and practice survey was applied, and the vaccination scheme was verified. Association tests, prevalence ratio and Poisson regression with robust variance were used. **Results:** girls from the large metropolitan area had lower knowledge and practice ($p=0.000$). Adequacy of Knowledge in the big metropolis among white and catholic girls was higher, as well as that of Attitude. Family income of up to two thousand reais revealed lower adequacy of Attitude and Practice, and age below 12 years was lower for Attitude. **Conclusion:** factors associated with adequate knowledge about the vaccine against Human Papillomavirus were race and religion; to adequate attitude, were age, race, and income; and to adequate practice, was income. **Contributions to practice:** enable reflection and awareness about the importance of vaccination against Human Papillomavirus among schoolgirls as well as stimulate the planning of more effective strategies, to incite individuals to establish information exchanges on sexual and reproductive health, considering the social space of each municipality.

Descriptors: Health Knowledge, Attitudes, Practice; Papillomavirus Vaccines; Adolescent Health.

RESUMO

Objetivo: analisar fatores associados ao conhecimento, atitude e prática de meninas escolares sobre vacinação contra Papilomavírus Humano em municípios de grande e de médio portes. **Métodos:** estudo transversal analítico realizado com 210 escolares. Aplicou-se o inquérito conhecimento, atitude e prática e verificou-se esquema vacinal. Utilizaram-se testes de associação, razão de prevalência e regressão de Poisson com variância robusta. **Resultados:** meninas do município de grande porte apresentaram menor conhecimento e prática ($p=0,000$). Adequação do Conhecimento na grande metrópole entre brancas e católicas foi maior, assim como a de Atitude. Renda familiar de até dois mil reais revelou menor adequação de Atitude e Prática, e idade abaixo de 12 anos foi menor para Atitude. **Conclusão:** fatores associados ao conhecimento adequado acerca da vacina contra Papilomavírus Humano foram raça e religião; à atitude adequada, foram idade, raça e renda; e à prática adequada, foi renda. **Contribuições para a prática:** possibilitar a reflexão e conscientização acerca da importância da vacinação contra Papilomavírus Humano entre meninas escolares bem como estimular o planejamento de estratégias mais efetivas, a fim de incitar os indivíduos a estabelecer trocas de informações sobre saúde sexual e reprodutiva, considerando o espaço social de cada município.

Descritores: Conhecimentos, Atitudes e Prática em Saúde; Vacinas contra Papilomavirus; Saúde do Adolescente.

Introduction

Several factors have been associated with knowledge, attitude, and practice of adolescents to vaccination against Human Papillomavirus (HPV), such as individual, professional, and clinical factors, among them demographic and socioeconomic conditions, knowledge, beliefs, expectations, and intentions as well as behavioral and health aspects of both the professional and the adolescent⁽¹⁾. The discovery of these factors is necessary to program specific prevention actions aimed at increasing vaccination coverage, since the virus affects younger people and is related to the risk of neoplasia⁽¹⁾.

A Norwegian study described lower acceptance of HPV vaccine among adolescents with low income and low educational level⁽²⁾. Research with spatial analysis of vaccination in Brazil identified a decrease in the coverage of the second dose of HPV vaccine; furthermore, it points to the relationship with social inequality and the need to organize strategies to offer these immunobiological agents in the municipalities⁽³⁾. Most adolescents and responsible mothers were unaware of the causal relationship between HPV and cervical cancer, signs, and symptoms of infection by the virus, and had limited knowledge about the vaccine⁽⁴⁾. A similar result was observed in which approximately 66% of adolescents did not know how they could contract the HPV virus⁽⁵⁾.

In this context, studies on knowledge and adherence of adolescents to HPV vaccine in several regions, especially in municipalities with different population sizes diverge in their findings^(1,2-5), finding that the influence of social space and its determinants on HPV vaccine adherence is not well clarified in the literature.

Thus, analyzing factors related to knowledge, attitude and practice regarding HPV and its vaccination among adolescents from municipalities with different population sizes from those found in northe-

astern Brazil may help clarify its influence to support strategies directed to the effectiveness of the purpose of primary health care according to their specificities, thus aiming to promote adherence to vaccination.

Therefore, this study aimed to analyze factors associated with knowledge, attitude, and practice of schoolgirls about vaccination against Human Papillomavirus in large and medium-sized cities.

Methods

Cross-sectional analytical study conducted with children and adolescents in elementary schools in two municipalities, one large and one medium-sized, in the Northeast region of Brazil in the period from August 2019 to January 2020. Large municipalities are classified as those with a population greater than 100 thousand inhabitants, and medium-sized municipalities as those with a population above 50 to 100 thousand inhabitants⁽⁶⁾.

After authorization was obtained from the Municipal Education Secretary and the board of directors of the educational institutions, schools were chosen in each municipality that accepted the research proposal and that had the largest number of students in elementary school, totaling six: five in the large-sized municipality and one in the medium-sized municipality.

The study population consisted of 2,526 children and adolescents from elementary schools. The inclusion criteria were to be female; be aged between nine and 14 years, the target age for HPV vaccination in Brazil; be regularly enrolled in one of the selected schools; and present an immunization card. As exclusion criteria, we adopted the absence of physical condition and understanding to respond directly to the data collection instrument, in addition to not being present at school at the time of the interview.

The sample is characterized as probabilistic and, for its calculation, we used a formula with the

following parameters: $Z\alpha$ =Confidence coefficient (95%); $Z\beta$ =Power (80%); p =Proportion of occurrence of the outcome (59.1%); d =Clinically important difference (20%). HPV vaccination rate was assumed as the outcome variable of this study. The final sample size was 210 participants with a 10% margin for possible losses.

Thus, the sample consisted of 101 girls for the large city and 109 girls for the medium-sized city. The sample was selected by stratification. We requested the list of elementary school students, organizing it into smaller groups: by grade/class; by female gender; and by age between nine and 14 years old. After this classification, the participants of the study were chosen in a simple random manner, that is, for each classroom, a draw was made among the girls between nine and 14 years old.

We applied the survey knowledge, attitude and practice about HPV and its vaccination structured and validated as to its content and pre-tested⁽⁷⁾ and verified information about the presence of doses of HPV vaccine in the immunization card. The survey is subdivided into seven sections with 31 questions in total: personal data (initials of name; address; telephone contacts); sociodemographic, economic and cultural aspects (age; race; income; religion); habits and health care (use of cigarettes, illicit substances and alcohol; type of health service they usually use); sexual and reproductive aspects (beginning of sexual life; number of partners; presence of Sexually Transmitted Diseases; use of contraceptive method; pregnancy, delivery, abortion; performance of gynecological prevention); knowledge about HPV and their vaccination (if they heard about HPV and where; what you think HPV is; if ever the health professional or any exam you did mentioned that you had HPV or genital warts; if you ever heard that there is a vaccine against HPV and where; if you know what the HPV vaccine is for); attitude towards HPV vaccine (what do you think about the use of vaccines; if you would get a vaccine in a vaccination campaign and if HPV vaccine was offered; what do

you think about the HPV vaccine); practice about HPV vaccination (did you start/continued the vaccination schedule).

According to the measuring instrument, adequate knowledge was considered when the participants had already heard about HPV and could refer at least one of these answer alternatives about HPV: "That it is a sexually transmitted infection", "That it causes cervical cancer/penile cancer/that it can become cancer" or "That it causes warts/disease/infection". For appropriate attitude, if the girl reported that she intended to be vaccinated. For appropriate practice, whether the girl received a dose of the vaccine. It is noteworthy that the classification of the response about the adequate or inadequate knowledge, attitude, and practice was exclusive to the researcher after individual analysis as established by the measurement instrument.

The participants were approached in the classroom by the interviewers, who totaled five, and invited to participate in the study. At this moment, the research objectives were explained, the girl's authorization was requested by signing the consent form, and a communication was sent to parents and/or guardians about the research with the consent form, requesting authorization. The girl should later bring the signed consent form to school and give it to the researcher or the school director.

After accepting the invitation and formally presenting the authorization of the parents and/or guardians, there was individual recruitment, and the interviews took place in reserved spaces in the schools, each lasting 10 minutes, with only the participant and the interviewer present. At the end of each interview, the girls returned to the classroom. It is worth mentioning that the interviewers were trained by the researcher to use the data collection instrument in a collective face-to-face session lasting four hours. The training consisted of how to approach the participants, how to conduct the interview, and how to fill out the survey. In addition, all had experience in sexual and reproduc-

tive health research, being two nurses and undergraduate nursing students, one man and two women.

The data were compiled and analyzed using the statistical program SPSS version 20.0. In the bivariate analysis, Pearson’s Chi-square and Fisher’s exact association tests were performed as well as prevalence ratio (PR) with their respective 95% confidence intervals (CI), to verify associations between knowledge, attitude and practice, municipalities, and sociodemographic variables. The significance level used in the tests was 5%. The variables with statistical significance in the bivariate analysis were pre-selected and proceeded to testing in the multivariate model through Poisson regression with robust variance, being considered the value of $p < 0.20$ to remain initially in the model, persisting the variables with statistical significance of 5%.

The study was approved by the Ethics Committee of the Federal University of Ceará under opinion no. 2,645,679/2018 and by the Municipal Secretariat of Education with process no. P671227/2017. It is noteworthy that the legal guardians received a communication from the school about the research and its objectives. Both they and the study participants signed the terms of informed consent and assent respectively.

Results

The large-sized municipality has a higher proportion of girls under 12 years old (62.4%) compared to the medium-sized municipality (41.3%). Most participants in the two municipalities considered themselves non-white (large size: 73.3%; medium size: 89%), had an income of up to two thousand reais (large size: 81.2%; medium size: 69.7%), did not use cigarettes (100% in both municipalities), alcohol (large size: 95%; medium size: 94.5%) and illicit substances (large size: 100%; medium size: 99.1%), used the public health service (large size: 89.1%; medium size: 91.7%), and had not initiated sexual activity (large size: 96%; medium size: 97.2%).

Participants from the medium-sized city showed higher adequacy about knowledge ($p=0.000$) and practice ($p=0.000$) regarding HPV vaccination compared to those from the large city (Table 1).

Table 1 – Association between knowledge, attitude, and practice of the participants regarding vaccination against Human Papillomavirus and the large and medium-sized municipalities (n=210). Fortaleza, CE, Brazil, 2020

| Variables | Municipality size | | p-value* | †PR (CI/95%) |
|------------|-------------------|-------------|----------|-----------------|
| | Large n(%) | Medium n(%) | | |
| Knowledge | | | | |
| Adequate | 22(21.8) | 68(62.4) | 0.000 | 0.35(0.23-0.52) |
| Inadequate | 79(78.2) | 41(37.6) | | |
| Attitude | | | | |
| Adequate | 88(87.1) | 102(93.6) | 0.112 | 0.93(0.85-1.02) |
| Inadequate | 13(12.9) | 7(6.4) | | |
| Practice | | | | |
| Adequate | 24(23.8) | 89(81.7) | 0.000 | 0.30(0.20-0.42) |
| Inadequate | 77 (76.2) | 20(18.3) | | |

*p-value: Pearson’s Chi-square test; †PR (CI/95%): Prevalence Ratio (95% Confidence Interval)

According to Table 1, a statistical difference was observed between the size of the municipality and knowledge and practice regarding vaccination. The prevalence of adequate knowledge and practice was 65% and 71% lower, respectively, in participants from large cities compared to smaller ones.

Among the municipalities analyzed, referring to HPV vaccination, there was a statistically significant association between adequate knowledge and the variables race ($p=0.003$) and religion ($p=0.007$) as well as between the adequate attitude and the variables age ($p=0.030$), race ($p=0.007$) and income ($p=0.001$). The adequate practice showed a statistically significant association with the income variable ($p=0.020$) (Table 2).

Table 2 – Association between participants’ sociodemographic data and adequate knowledge, attitude, and practice regarding vaccination against Human Papillomavirus in large and medium-sized municipalities. Fortaleza, CE, Brazil, 2020

| Variables | Adequate knowledge | | | | Appropriate attitude | | | | Appropriate practice | | | |
|----------------|--------------------|-------------|--------------------|-----------------|----------------------|-------------|--------------------|------------------|----------------------|-------------|--------------------|-----------------|
| | Municipality size | | p-value | *PR (CI/95%) | Municipality size | | p-value | PR (CI/95%) | Municipality size | | p-value | PR (CI/95%) |
| | Large n(%) | Medium n(%) | | | Large n(%) | Medium n(%) | | | Large n(%) | Medium n(%) | | |
| Age | | | | | | | | | | | | |
| < 12 | 8(26.7) | 22(73.3) | 0.729 [†] | 1.14(0.54-2.42) | 51(54.3) | 43(45.7) | 0.030 [†] | 1.41(1.03-1.93) | 12(26.7) | 33(73.3) | 0.251 [†] | 1.51(0.75-3.06) |
| ≥ 12 | 14(23.3) | 46(76.7) | | | 37(38.5) | 59(61.5) | | | 12(17.6) | 56(82.4) | | |
| Race | | | | | | | | | | | | |
| White | 10(52.6) | 9(47.4) | 0.003 [‡] | 3.11(1.59-6.08) | 24(66.7) | 12(33.3) | 0.007 [†] | 1.60(1.19-2.16) | 7(38.9) | 11(61.1) | 0.060 [‡] | 2.17(1.06-4.47) |
| Not White | 12(16.9) | 59(83.1) | | | 64(41.6) | 90(58.4) | | | 17(17.9) | 78(82.1) | | |
| Income (Reais) | | | | | | | | | | | | |
| Up to 2,000 | 17(27.0) | 46(73.0) | 0.747 [‡] | 1.35(0.45-4.01) | 70(50.0) | 70(50.0) | 0.001 [†] | 3.83(1.32-11.15) | 22(26.5) | 61(73.5) | 0.020 [‡] | 0.73(0.65-0.84) |
| > 2,001 | 3(20.0) | 12(80.0) | | | 3(13.0) | 20(87.0) | | | - | 17(100.0) | | |
| Religion | | | | | | | | | | | | |
| Catholic | 15(38.5) | 24(61.5) | 0.007 [†] | 2.80(1.27-6.20) | 41(53.2) | 36(46.8) | 0.114 [†] | 1.28(0.95-1.73) | 12(28.6) | 30(71.4) | 0.143 [†] | 1.69(0.84-3.42) |
| Non-catholic | 7(13.7) | 44(86.3) | | | 47(41.6) | 66(58.4) | | | 12(16.9) | 59(83.1) | | |

*PR (CI/95%): Prevalence Ratio (95% Confidence Interval); [†]Pearson’s Chi-square test; [‡]Fisher’s exact test

Table 2 shows some statistical associations between participants’ sociodemographic data and adequate knowledge, attitude, and practice regarding vaccination according to the size of the municipality. The prevalence of adequate knowledge among white and Catholic participants from large cities was 3.1 and 2.8 times higher, respectively, compared with those from medium-sized cities.

The prevalence of appropriate attitude among girls younger than 12 years old and of white race was, respectively, 41% and 60% higher in the large metropolitan area. Regarding income, girls in the large city that reported family income of up to two thousand reais had a 3.8 times higher prevalence of having appropriate attitude to vaccination. In contrast, the prevalence

of HPV vaccination practice in participants with income of up to two thousand reais was 27% lower when compared to those from medium-sized cities.

Although the statistical test has not identified any association at the 5% level, it was found that the prevalence ratio was statistically different from 1 according to its confidence interval (CI/95%: 1.06-4.47), showing that white girls from the large city had 2.2 times higher prevalence of adherence to HPV vaccine compared to those from the medium-sized city.

According to Table 3, the variables age, race, income, and religion remained in the multiple models, explaining the association to adequate knowledge, attitude, and practice to HPV vaccination.

Table 3 – Variables related to adequate knowledge, attitude, and practice regarding vaccination in large and medium-sized municipalities after Poisson Regression analysis. Fortaleza, CE, Brazil, 2020

| Variables | Adequate knowledge | | Appropriate attitude | | Appropriate practice | |
|-----------|---------------------|----------|----------------------|---------|----------------------|---------|
| | PR (CI/95%) | p-value* | †PR (CI/95%) | p-value | PR (CI/95%) | p-value |
| Age | - | - | 0.86 (0.79-0.94) | 0.001 | - | - |
| Race | 1.22 (1.04-1.44) | 0.015 | 1.21 (1.07-1.37) | 0.002 | - | - |
| Income | - | - | 0.79 (0.71-0.87) | 0.000 | 0.85 (0.79-0.91) | 0.000 |
| Religion | 1.15 (1.01-1.30) | 0.033 | - | - | - | - |

*p-value from multivariate analysis model (Poisson Regression with robust variance); †PR (CI/95%): Prevalence Ratio (95% Confidence Interval)

According to results in Table 3, the prevalence ratio of adequate knowledge about HPV vaccination in white and Catholic girls in the large city increased 22% (PR=1.22) and 15% (PR=1.15) respectively.

Girls from the larger white municipality showed higher prevalence of appropriate attitude (PR=1.21). On the other hand, girls younger than 12 and with family income up to two thousand reais had, respectively, lower prevalence of 14% (PR=0.86) and 21% (PR=0.79) of adequate attitude to vaccination.

The prevalence of adequate vaccination practice in girls in the big metropolis with an income of up to two thousand reais was lower by 15%.

Discussion

When comparing municipalities with different population sizes, one imagines that there is considerable difference in their primary prevention services, being greater in the capital. However, the results of the present study contradict this thought because other factors may be related to adequate knowledge, attitude, and practice regarding vaccination.

The literature shows that primary care services focused on vaccination are more successful in smaller municipalities. A Brazilian study showed that smaller

municipalities showed better results in the actions of reception and active search for children and adolescents at risk⁽⁸⁾.

Small and medium-sized municipalities exhibit a health and service organization reality that is different from that found in large urban centers, since there is the influence of population size, as well as differences between Brazilian regions. Large urban centers have a large and complex network of health services coupled with situations of poverty and social inequalities, violence, crime, unemployment, disarticulated and poorly distributed health care network, among other characteristics, showing a multifactorial problem that requires not only public health policies, but also articulation with other sectors such as urban development, setting a challenge for the reorganization of the primary care model in Brazil⁽⁹⁾.

The smaller city of this study has financial investment and improvement of its basic public services, including in the areas of health and education, which are key areas to encourage vaccination against HPV, which may justify higher prevalence in adequate knowledge and practice regarding the HPV vaccine. Moreover, there is a strong strategy of taking the vaccine to municipal public schools to reach and adhere to the target audience, since the focus is on adolescents, extending the campaign beyond the municipal health units.

It is essential that education and health professionals work together, seeking strategies for clarification about HPV and its vaccination in schools, to make students less susceptible to contamination and more aware of the importance of prevention⁽¹⁰⁾. There are similar data to the results presented in this research, stating that adolescents who did not live in the capital had higher chances of initiation of HPV vaccination⁽¹¹⁾.

In contrast, they showed statistically significant odds that knowledge and practice about HPV and its vaccination were low at the municipal level and among girls from areas with lower population density when compared with those living in denser areas⁽¹²⁻¹³⁾. Most of the disparities in vaccination service use can

be attributed to differences in municipal characteristics, such as access to care, social and economic factors⁽¹³⁾. Thus, it is perceived that specific characteristics of municipalities can explain possible inequalities in knowledge, attitude and practice related to HPV vaccination among adolescents.

As for the association between sociodemographic variables, the prevalence of adequate knowledge showed significance and was higher for white race and Catholic religion in the larger municipality. Converging with these findings, an American study of 19,518 adolescents based on data from the 2012-2013 National Immunization Survey found that 13- to 17-year-old white adolescents living in large metropolitan areas had greater knowledge and parental acceptance to receive the HPV vaccine when compared to those in less/not urbanized areas⁽¹⁴⁾.

There may also be a relationship between knowledge, religion, and vulnerability. A study in basic units of a capital city in the northern region of Brazil, involving 300 parents or guardians of children and adolescents between nine and 14 years old showed that religious barriers, such as taboo and fear of discussing sex and sexually transmitted infection among parents, children and religious community, and even the apprehension about the vaccine being an incentive to the early initiation of sexual relations are factors that directly impact the reduction of vaccination coverage. It is observed that belonging to evangelical and Jehovah's Witnesses religions has significant influence on the lack of communication between parents and children, misinformation and non-adherence to HPV vaccine when compared to the Catholic religion, corroborating the present study⁽¹⁵⁾.

The lowest prevalence of appropriate attitude towards HPV vaccination was observed in girls under 12 years old in the large metropolis, which may have been influenced by the fact that they are very young and need adult guardianship, since there is a strong presence of parental participation in decision-making to perform the vaccination, confirmed in a study conducted in Indonesia⁽¹⁶⁾.

This difference in the attitude level of girls from the large city, when compared to those from the medium-sized city, can also be justified by the nature of the city, since one consists of an extensive metropolis and the other of its metropolitan region, a possible discrepancy found in analyses between areas of different population levels described in other studies^(12,17).

Also related to the appropriate attitude, there was a higher prevalence among the white race of the large city according to the data from this research. Results of a study among white and African American women showed that there are racial/ethnic disparities in knowledge, attitudes, and beliefs about HPV and, consequently, about the vaccine, being less appropriate among the black race⁽¹⁸⁾.

There are notable differentials in living conditions and existence between whites and blacks. Often, the white population may have better opportunities in access to goods, science, and health services. This reflects that more vulnerable population groups have greater difficulty in accessing information, which makes the issue worrisome in the context of public health, and it is necessary to create effective strategies for reducing social inequalities. However, the individual's own culture and beliefs can be influential when it comes to vaccination, regardless of race, impacting negatively or positively on their attitude and practice.

A relationship between low socioeconomic status and lower appropriate attitude toward vaccination in the large city was also evidenced in this study. The National Adolescent Immunization Survey in 50 states in the District of Columbia, United States, showed that despite significant increases in HPV vaccination initiation observed over the five-year period, HPV vaccine uptake was not influenced by poverty status despite the population size of the region. However, disparities between adolescents in regions of different population sizes persisted over time⁽¹⁹⁾.

Geographic factors need to be considered in the disparities observed in relation to low-income children and adolescents, especially those living among

multiracial and ethnic minority groups. Thus, it is worth noting the influence of individual, social, and geographic factors on positive behavior for HPV vaccination and active targeting.

As for the prevalence of proper practice of HPV vaccination in participants from large cities with income of up to two thousand reais, there was less adherence. Like this data, a study that identified factors associated with non-practice of HPV vaccination in areas with different population sizes revealed that, in mainly urban areas, low income was a factor associated with not initiating the HPV vaccination series according to the adjusted prevalence ratio analysis⁽²⁰⁾.

In this context, it can be inferred that knowledge, attitude, and practice for HPV vaccination can be proportional to the socioeconomic and demographic level in which the individual is inserted.

Study limitations

As this is a cross-sectional study, it is limited because it is not possible to identify the cause-effect relationship of the outcome due to reverse causality bias. It is also noteworthy that the response of the measurement instrument was obtained through self-report during the interview, which may have caused memory bias. In addition, the study covers only two municipalities within a large geographic field, from which it follows that future studies should expand the research sites.

Contributions to practice

It is expected that the research contributes to reflection and awareness of children and adolescents, parents and/or guardians and health and education professionals about the importance of vaccination against HPV as well as to stimulate the planning of more effective strategies, especially in school settings, such as the use of educational games and conversation

circles, to encourage individuals to establish exchanges of information on sexual and reproductive health. Furthermore, it is expected that the study may increase the dissemination of existing immunization campaigns directed to parents and/or guardians, children, and adolescents, considering the social space of each municipality.

Conclusion

School girls from municipalities of large size showed lower prevalence of adequate knowledge and practice than school girls from medium size municipalities. There was no statistical significance between attitude related to HPV vaccine and municipalities.

The factors of the municipality of large size associated with greater adequate knowledge were: being white; and being catholic. Belonging to the white race also showed a higher quantity of appropriate attitude, and age less than 12 years with family income of up to two thousand reais revealed a lower parameter of attitude adequacy. For adequate practice, the factor associated with lower adherence to HPV vaccination in the big metropolis was having family income of up to two thousand Brazilian reais.

Authors' contribution

Conception and design, data analysis and interpretation, writing and relevant critical revision of the intellectual content: Ferreira HLOC, Pinheiro AKB. Critical revision of the intellectual content: Ribeiro SG. Final approval of the version to be published: Ferreira HLOC, Ribeiro SG, Pinheiro AKB. Agreement to be responsible for all aspects of the manuscript related to the accuracy or completeness of any part of the work to be properly investigated and resolved: Ferreira HLOC, Siqueira CM, Costa N, Pereira EC, Fiúza AA, Ribeiro SG, Pinheiro AKB.

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