Original Research Article

**The Impact of Children's Oral Health on Families: The Role of Pain, Anxiety, and Socioeconomic Factors**

.

**ABSTRACT**

|  |
| --- |
| **Aims:** This study aimed to evaluate children's oral health-related quality of life (OHRQoL) and its impact on family life, considering factors such as anxiety, fear, stress, and dental caries. **Study design:** Cross-sectional study. **Place and Duration of Study:** The study was carried out with children aged between 6 and 12 who came to the Pediatric Dentistry Clinic at the Federal University of Alfenas (UNIFAL-MG) between March and June 2024. **Methodology:** To measure these variables, the Parent/Caregiver Perceptions Questionnaire (P-CPQ), the Family Impact Scale (FIS), the Jarman Socioeconomic Conditions Assessment Questionnaire, the Visual Analog Scale (VAS), and the deft/DMFT indices were used. Data were collected and tabulated in Excel and subsequently analyzed using JAMOVI software, version 2.3. **Results:** When comparing the FIS scale with parental age (*P*=.04) and the occurrence of toothache in children (*P*=.03), a statistically significant association was found. However, when comparing the P-CPQ scale with variables such as age (*P*=.51) and toothache (*P*=.21), no association was observed. Analyzing family income (*P*=.69; P=.50), fear (*P*=.31; *P*=.11), anxiety (*P*=.57; *P*=.62), stress (*P*=.57; *P*=.66), caries severity (*P*=.33; *P*=.81), and child’s age (*P*=.82; *P*=.08), no significant association was found with either scale, P-CPQ and FIS, respectively. **Conclusion:** When assessing OHRQoL, it was observed that there was a greater family impact when children experienced toothache and in families where parents were over 30 years old. |

*Keywords: Quality Of Life; Children; Oral Health; Pediatric Dentistry.*

**1. INTRODUCTION**

The WHO defines quality of life as "an individual’s perception of their position in life, within the context of the cultural and value systems in which they are embedded, and in relation to their goals, expectations, standards, and concerns." This concept emphasizes that an individual's well-being is associated with physical aspects, psychological state, social relationships, and even personal beliefs. In this way, oral health is a component of overall health that can directly affect an individual's quality of life (Wholqol,1997).

Oral Health-Related Quality of Life (OHRQoL) assesses the impact that oral conditions have on daily activities (Bönecker *et al*., 2014). One of the main oral alterations that affect quality of life is dental caries, which can lead to painful symptoms that impair chewing and speaking. As a result, the child may tend to eat soft foods, which can promote nutritional deficiencies and systemic impairments (Andrade *et al*., 2011; Wong *et al*., 2011; Kramer *et al*., 2013; Abanto *et al*., 2011). According to the WHO, dental caries is the second most common disease in the world (WHO, 2017).

It is important to emphasize that dental caries can be prevented through the promotion of healthy habits, such as reducing or avoiding the consumption of sugar and ultraprocessed foods, alongside encouraging tooth brushing as soon as the eruption of teeth occurs in the oral cavity (Ministério da Saúde, 2022).

Pain resulting from dental caries acts as a limiting factor for psychosocial well-being, sleep regulation, and even school performance (Barbosa *et al*., 2016; Bendo *et al.*, 2014; De Oliveira *et al*., 2004; Traebert *et al*., 2005; Marques *et al*., 2009). It is often observed that some parents neglect their child's oral health, fail to supervise tooth brushing, and reduce the frequency of dental visits, which exacerbates oral health problems (Oliveira *et al*., 2012).

Given the crucial role of parents in their children's overall care, this research is fundamental for developing preventive health strategies based on parental perceptions of their children's oral health and its impact on quality of life. Understanding the socioeconomic, demographic, emotional, and cultural context in which families live is essential to improving dental practices and promoting oral health.

**2. METHODOLOGY**

**2.1 Ethical And Legal Aspects**

This study consists of a cross-sectional clinical study conducted at the Pediatric Dentistry Clinic of the School of Dentistry at the Federal University of Alfenas (UNIFAL-MG), with the aim of understanding parents’ perceptions of the oral health-related quality of life of children and its impact on the family. A total of 43 children aged 6 to 8 years, along with their parents/legal guardians, who sought care between March and June 2024, participated in the study. The study was submitted and Federal University of Alfenas Approved by the Ethics Committee for Research Involving Human Beings at the Federal University of Alfenas (CAAE: 57180222.6.0000.5142).

**2.2 Data Collection**

Before starting the data collection, the participants were informed about the objectives, risks, and benefits, how their participation in the research would occur, the relevance of the study, its objectives, and the guarantee of confidentiality. Parents/legal guardians were instructed to read and sign the Informed Consent Form (ICF) if they agreed to participate in the study. For illiterate children, a team member explained all aspects of the research with the aid of the Assent Form (AF) in a playful manner to ensure they understood according to their capacity for interpretation. At the end, if they agreed to participate, they were instructed to mark the agreement option. For semi-literate children, a team member handed the Informed Assent Form (IAF) for reading, and any doubts were clarified before signing the form, in cases of consent. A team member assisted the parents in filling out the specific questionnaires for each one. Afterward, the child was taken to the reception to be seen at the Pediatric Dentistry Clinic by undergraduate students.

This study included children whose physical status was classified as ASA 1 and ASA 2 (based on the criteria of the American Society of Anesthesiologists); medical history without neurological or cognitive alterations; without the use of corticosteroid medication; and who were seen at the Pediatric Dentistry Clinic of UNIFAL-MG. Children and parents/legal guardians who did not agree to sign the AF/IAF/ICF or did not complete all the questionnaires and forms were excluded.

**2.1.1 Quality of Life Related to Children’s Oral Health**

The Brazilian version of the “Parental-Caregiver Perceptions Questionnaire” (P-CPQ) was used after translation and national cross-cultural adaptation. It was developed to measure parents/caregivers’ perceptions of children’s oral health, for children aged 6 to 12 years, over the last 3 months. This form contains 33 questions about symptoms, limitations in functionality, social and emotional well-being related to oral health problems, and their impact on the child’s quality of life. The responses are related to the frequencies with which they occur, as follows: 0 = never, 1 = once or twice, 2 = don’t know, 3 = sometimes, 4 = several times, and 5 = every day or almost every day. The result was obtained by summing the responses of each question, which therefore ranges from 0 to 4 points, where the answer option “Don’t Know” was counted as zero. The final score can range from 0 (least impact) to 132 points (most impact), with lower scores indicating a negative oral health-related quality of life and higher scores indicating a positive oral health-related quality of life (Goursand D, *et al.,* 2009; Locker D. *et al.,* 2002).

**2.2.2 Impact of the Child’s Oral Health-Related Quality of Life on Family Life**

The Brazilian version of the “Family Impact Scale” (FIS) was used, translated and cross-culturally adapted, consisting of 14 questions aimed at evaluating the effects that the child’s oral health condition may have on the parents and other family members’ lives. Some of the questions include: “How often have you felt guilty about your child’s oral health?” and “Has your child’s oral health condition caused financial difficulties?” The result was obtained by summing the responses of each question, which ranged from 0 to 4 points, where the response “Don’t Know” was counted as zero. The final score can range from 0 to 56 points, indicating that lower scores mean a lower family impact and higher scores indicate a more significant family impact (Goursand D, *et al.,* 2009; Locker D. *et al.,* 2002).

**2.2.3 Socioeconomic Condition**

To assess the socioeconomic condition of the participating families, the “Jarman Socioeconomic Conditions Assessment” questionnaire (1983) was applied, which aims to identify and report the level of education of the parents; number of children; family’s monthly income; parents’ working hours (full-time; part-time); number of individuals living in the household; ownership or rental status of the property; and number of rooms in the house (Jarman, 1983).

**2.2.4  Child’s Anxiety, Fear, and Stress**

To assess the child’s anxiety, fear, and stress during dental care, the Visual Analog Scale (VAS) was used, which consists of a 10 cm long horizontal line corresponding to each emotion (Soares *et al.,* 2024). They were filled out according to the dentist’s perception, made after the clinical care. To respond to the scale, the professional was to mark a vertical line, which, the closer it was to the far right, indicated a more exacerbated condition (more anxiety, fear, and stress). The closer the mark was to the left side, the less anxiety, fear, and stress. The three lines were measured with a ruler to define the size of each emotion attributed by the dentist to each child. Before starting data collection, the professionals were calibrated regarding the assessment of fear, anxiety, and stress, obtaining an intra-examiner agreement of .85 (Kappa coefficient) and an inter-examiner agreement of .80, considered a strong and substantial relationship.

**2.2.5 Presence of Cavities and Tooth Pain**

The evaluations of dental cavities were performed by 3 examiners who were trained and calibrated (Kappa Coefficient=.82) to conduct the clinical examination using a number 5 mouth mirror, WHO probe, and clinical tweezers, followed by dental prophylaxis. Thus, the condition of each tooth was based on the deft/DMFT indices (deciduous/permanent teeth), according to the World Health Organization (WHO,1997), where all dental elements that were decayed, missing, and/or filled were noted. Furthermore, the children were classified according to the severity of the dental disease, where those who had no decayed teeth were classified as cavity-free; children who had between 1 and 5 decayed teeth were classified as low severity, and those with more than 5 decayed teeth were classified as high severity (Hallett; O’Rourke, 2006).

**2.3 Statistical Analysis**

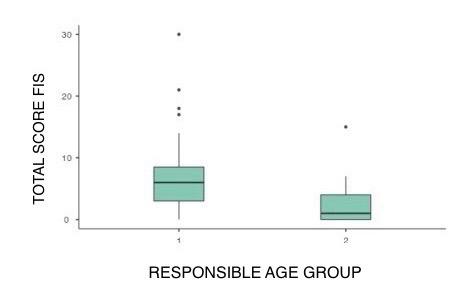
Descriptive and bivariate analyses were performed using the statistical software JAMOVI version 2.3 (The jamovi project, 2022). To assess the adequacy to the normal distribution, the Shapiro-Wilk test was used, which confirmed that the distribution of the variables would not follow a normal distribution (*P*<.05). Therefore, non-parametric tests were used: the Mann-Whitney test for comparison of two independent groups, the Kruskal-Wallis test for comparison of three or more independent groups, and the Spearman Correlation, according to the different outcome variables observed during the intervention visit. All tests were performed considering a significance level of 5%.

**3. RESULTS AND DISCUSSION**

A total of 43 parents and their respective children participated in the study, with a median age of 7 years (6.00–8.00) for the children, of whom 55.81% (n=24) were female. The parents had a median age of 32 years (30.00–38.00), with the majority being female (83.72%, n=36). Regarding family income, the median was 2,000.00 BRL (1,500.00–3,500.00).

The median score for parental perception of children's oral health-related quality of life was 25.00 points (21.00–40.50). Regarding the impact of children's oral health on family dynamics, the median score was 5.00 (1.00–8.00) points. Concerning children's anxiety levels, the median score was 0.70 (0.20–2.65) points; for stress, it was 0.20 (0.10–0.35) points; and for fear, it was 0.70 (0.20–2.10) points.

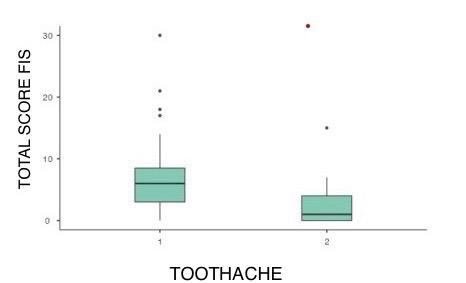
When analyzing the association between the P-CPQ and FIS scales and the gender of both parents (*P*=.53; *P*=.75) and children (*P*=.76; *P*=.91), no statistically significant associations were found. However, the Mann-Whitney test revealed a statistically significant association between the FIS scale and parental age (*P*=.04), indicating that parents over 30 years old had higher scores (Figure 1). In contrast, no significant association was found between the P-CPQ scale and parental age *(P*= .51).



**Fig. 1.Comparison between the responsible age group and the total score of Family Impact Scale (FIS).**

Source: Author (2024) Kruskal-Wallis test Box Plot, where *P*=.04. Legend: Group 1 = parents under 30 years old; Group 2 = parents aged 30 or older.

When comparing the occurrence of tooth pain, a significant association was found with the FIS scale (*P*=.03) (Figure 2), showing that children who experienced tooth pain had a greater impact on the family's quality of life. This was not observed when comparing the P-CPQ scale with tooth pain (*P*=.21). Regarding the severity of dental caries, no association was found between the P-CPQ (*P*=.33) and FIS (*P*=.81) scales.



**Fig. 2.Comparison between the toothache and the total score of Family Impact Scale (FIS).**

Source: Author (2024) Kruskal-Wallis test Box Plot, where *P*=.03.

Legend: Group 1= with tooth pain; Group 2= without tooth pain.

The other two factors analyzed were the presence of caries and family income in relation to P-CPQ and FIS, both of which showed no significant association (*P*=.40) e (*P*=.87)

Using Spearman's correlation, no relationship was found between the P-CPQ scale and anxiety (*P*=.57), stress (*P*=.57), and fear (*P*=.31). Similarly, no statistically significant relationship was found between the FIS scale and stress (*P*=.66), anxiety (*P*=.62), and fear (*P*=.11).

This study reinforces that dental pain significantly impacts family quality of life, as indicated by the FIS scale scores. These findings align with existing literature, which associates dental pain in children primarily with cavities (Souza et al., 2016). Given that parents are the primary caregivers, this condition can indirectly affect them, leading to missed workdays and emergency dental visits, with potential financial implications (Naidu et al., 2016).

In the study by Kramer *et al*., 2013, a direct relationship can be observed between the severity of cavities and oral health-related quality of life (OHRQoL); the more severe the cavities, the greater the negative impact on the child's and family's quality of life. However, this study did not find an association between the severity of cavities, OHRQoL, and family impact. A possible explanation for the results found is that most of the children participating in the research were classified as cavity-free or with low severity.

Given the demographic variables analyzed, the parents' age showed, in this research, an association with family impact. Although the literature reports that younger parents tend to have more knowledge about prevention and oral health due to easy access to information, they end up neglecting care and family routine because of their work hours (Garbin *et al*., 2016). However, it was observed in this study that parents over 30 years old perceive a greater impact on family dynamics due to their children's oral health condition. This can be explained by the greater financial and professional stability of these parents, which ensures greater availability for caring for their children's overall health (Cabral *et al*., 2017; Navarro *et al*., 2019). Although this study did not identify an association between parents' age and OHRQoL, the comparison with the literature became a challenge due to the scarcity of research, highlighting the need for further investigations on this topic.

The experiences and influences experienced by each child, such as medical history, caregiver behavior, and the occurrence or absence of pain in previous treatments, shape their behavior during dental care (Oliveira *et al*., 2012; Cunha-Soares *et al*., 2015). More anxious individuals tend to avoid treatment, which can lead to oral health problems, such as cavities, and negatively impact the child's quality of life (Oliveira *et al*., 2012; Cunha-Soares *et al*., 2015). The lack of association between fear, anxiety, and stress in this study, in relation to parents' perceptions and family impact concerning the child's oral health, may be explained by the older age of the participating children, with a median age of 7 years. The relationship between these variables can also be found in the study by Boka and colleagues (2017), which reports that older children experience less dental stress, according to their EVA scale scores. This occurs because, as they grow, they develop a better ability to discern their emotions and tend to externalize them less compared to younger children. As a result, this generates a lesser impact on parents' perceptions and family dynamics, corroborating the findings of this research.

No association was found between family income and children's OHRQoL, nor with its impact on family life. Although socioeconomic factors influence access to information, healthcare services, and limit habits, especially dietary and hygiene and care practices (Piovesan *et al*., 2011; Ramadan *et al*., 2014), this association may have been attenuated in the present study due to the homogeneity of the sample in terms of education and income.

It is known that the social component greatly influences access to healthcare services, demonstrating both the negative and positive effects of socioeconomic conditions (Piovesan *et al*., 2011). Studies show that people from lower socioeconomic groups tend to have less healthy eating habits due to a diet rich in foods high in fats and sugars, as well as limited access to information and healthcare systems (Ramadan *et al.*, 2014). The absence of such an association in the present study may be related to different sociodemographic variables, as well as cultural differences among the participants. Furthermore, the studied population showed some homogeneity in terms of parents' income and education, which could explain the lack of association.

The experiences lived by each child, such as medical history, caregiver behavior, and previous experiences with pain, influence behavior during dental care. More anxious individuals tend to avoid treatment, which can lead to oral health problems, such as cavities, and negatively impact quality of life (Oliveira *et al*., 2012; Cunha-Soares *et al*., 2015). The absence of an association between fear, anxiety, and stress with parents' perception of OHRQoL and family impact in this study may be explained by the older age of the participating children, with a median age of 7 years. Boka *et al*. (2017) report that older children experience less dental stress, according to the EVA scale, as they develop a greater ability to control emotions and externalize them less. As a result, the impact on parents' perception of OHRQoL and family dynamics tends to be lower, which was confirmed by the results of this research.

Although no significant association was identified between anxiety, fear, stress, and parents' perception of children's quality of life, the literature suggests that these variables can hinder adherence to dental treatment. In this context, it is essential to conduct more studies on the topic, with the aim of developing educational strategies targeted at caregivers, who are key to encouraging preventive habits and minimizing the impact of oral health issues on families' daily lives.

**4. CONCLUSION**

Parents' perception of their children's oral health-related quality of life plays a crucial role in promoting oral health. This study highlighted that family impact is more significant when the child has already experienced tooth pain, which directly affects family dynamics. Another point observed was that older parents tend to perceive a greater impact on family quality of life, due to greater stability and availability to monitor their children's oral health. The anxiety, fear, and stress of the children did not affect OHRQoL and family impact.

**CONSENT**

As per international standards, parental written consent has been collected and preserved by the authors.

**ETHICAL APPROVAL**

The study was submitted to and approved by the UNIFAL\_MG Human Research Ethics Committee under CAAE number: 57180222.6.0000.5142.

**REFERENCES**

World Health Organization. (1997). WHOQOL – measuring quality of life. The World Health Organization quality of life instruments. Geneva: World Health Organization.

Bönecker, M., Abanto, J. (2014). How excellent research on quality of life related to oral health can contribute to clinical practice. Journal of the São Paulo Association of Dental Surgeons, 68(3), 220-222.

Andrade, L. H. R, Buczynski A. K., Luiz R. R., Castro G. F., De Souza I. P. R. (2011). Impact of oral health on the quality of life of preschool children: perception of guardians. Venezolana Dental Acta, 49(4), 1-9.

Wong, H. M., McGrath, C. P., King, N. M., & Lo, E. C. (2011). Oral health-related quality of life in preschool children in Hong Kong. Caries Research, 45(4), 370–376. DOI: https://doi.org/10.1159/000330231 5. Kramer, P. F., Feldens, C. A., Ferreira, S. H., Bervian, J., Rodrigues, P. H., & Peres, M. A. (2013). Exploring the impact of oral diseases and disorders on the quality of life of preschool children. Community dentistry and oral epidemiology, 41(4), 327–33

DOI:https://doi.org/10.1111/cdoe.12035

Abanto, J., Carvalho, T. S., Mendes, F. M., Wanderley, M. T., Bönecker, M., & Raggio, D. P. (2011). Impact of oral diseases and disorders on oral health-related quality of life of preschool children. Community dentistry and oral epidemiology, 39(2), 105–114. DOI:https://doi.org/10.1111/j.1600-0528.2010.00580.x

World Health Organization. (2017). Sugars and dental caries. Geneva: World Health Organization.

MINISTRY OF HEALTH. (2022). Oral health. Thematic notebook of the School Health Program / Ministry of Health, 45, 8-10.

de Souza Barbosa, T., Gavião, M. B., Castelo, P. M., & Leme, M. S. (2016). Factors associated with oral health-related quality of life in children and preadolescents: a cross-sectional study. Oral health & preventive dentistry, 14(2), 137–148. DOI: <https://doi.org/10.3290/j.ohpd.a35301>

Bendo, C. B., Paiva, S. M., Varni, J. W., & Vale, M. P. (2014). Oral health-related quality of life and traumatic dental injuries in Brazilian adolescents. Community dentistry and oral epidemiology, 42(3), 216–223. DOI:https://doi.org/10.1111/cdoe.12078

de Oliveira, C. M., & Sheiham, A. (2004). Orthodontic treatment and its impact on oral health-related quality of life in Brazilian adolescents. Journal of orthodontics, 31(1), 15-20.

DOI:https://doi.org/10.1179/146531204225011364

Traebert, ES, & Peres, MA (2005). Prevalence of malocclusions and their impact on the quality of life of 18-year-old young male adults in Florianópolis, Brazil. Oral health & preventive dentistry, 3(4), 217–224.

Marques, L. S., Ramos-Jorge, M. L., Ramos-Jorge, J., Pereira, L. J., Paiva, S. M., & Pordeus, L. A. (2009). Self-perception regarding the need for orthodontic treatment among impoverished schoolchildren in Brazil. European journal of pediatric dentistry, 10(3), 125–130.

Oliveira, M. F., De Moraes, M. V. M., Cardoso, D. D. (2012). Assessment of childhood anxiety prior to dental treatment. UEPG Publication: Biological and Health Sciences, 18(1), 31-37. DOI:https://doi.org/10.5212/publicatio%20uepg.v18i1.3736

Goursand, D., Paiva, S. M., Zarzar, P. M., Pordeus, I. A., & Allison, P. J. (2009). Family Impact Scale (FIS): psychometric properties of the Brazilian Portuguese language version. European journal of pediatric dentistry, 10(3), 141–146.

Locker, D., Jokovic, A., Stephens, M., Kenny, D., Tompson, B., & Guyatt, G. (2002). Family impact of child oral and oro-facial conditions. Community dentistry and oral epidemiology, 30(6), 438–448. DOI:https://doi.org/10.1034/j.1600-0528.2002.00015.x

Jarman B. (1983). Identification of underprivileged areas. British medical journal (clinical research ed.), 286(6379), 1705–1709. DOI:https://doi.org/10.1136/bmj.286.6379.1705

Soares, L. P., da Trindade, M. L. S., Rodrigues, R., Orlandi, L. E., Ribeiro, M. E. D. R., Nogueira, D. A., et al. (2024). Impact of sociodemographic conditions on children's fear, anxiety and stress regarding dental care. Contributions to the Social Sciences, 17(3), e5634. DOI: <https://doi.org/10.55905/revconv.17n.3-058>

Hallett, K. B., & O'Rourke, P. K. (2006). Caries experience in preschool children referred to dental care specialists in the hospital. Australian dental journal, 51(2), 124–129. DOI: <https://doi.org/10.1111/j.1834-7819.2006.tb00415.x>

The jamovi project (2022). jamovi. (Version 2.3) [Computer Software].

Available: https://www.jamovi.org.

Souza J. G. S., Martins A. M. E. B. L. (2016). Dental pain and associated factors in Brazilian preschool children. Pediatrics, 34(3), 336-342.DOI: http://dx.doi.org/10.1016/j.rppede.2016.03.002

Naidu, R., Nunn, J., Donnelly-Swift, E. (2016). Oral health-related quality of life and early caries among preschool children in Trinidad. Oral Health BMC, 16(1), 128. DOI:http s://doi.org/10.1186/s12903-016-0324-7

Garbin, C. A. S., Soares, G. B., Martin, I. M., Ísper Garbin, A. J., & Arcieri, R. M. (2016). Oral health at school: assessment of parents' knowledge and children's oral health status. Journal of the Faculty of Dentistry - UPF, 21(1). DOI: <https://doi.org/10.5335/rfo.v21i1.5965>

Cabral R. A. Santos B. M. O., Cano M.A.T. (2017). The experience of being a mother for the first time after the age of 35. Journal of the Department of Physical Education and Health and the Master's in Health Promotion of the University of Santa Cruz do Sul, 18(4), 279-284. DOI:https://doi.org/10.17058/cinergis.v18i4.983

Navarro, P., Féres-Carneiro, T., Mello, R. (2019). Children of late parenthood: Childhood and adolescence. SPAGESP Journal, 20(2), 6-23. DOI:http://pepsic.bvsalud.org/scielo.php?script=sci\_arttext&pid=S1677-29702019000200002&lng=en&tlng=en.

Cunha-Soares, F., Salvador D. M. L., Azoubel, K. B., Colares, V. (2015). Dental Anxiety in Children and Associated Factors: Literature Review. Psychology, Health and Disease, 16(3), 373-385.

Piovesan, C., Marquezan, M., Kramer, P. F., Bönecker, M., & Ardenghi, T. M. (2011). Socioeconomic and clinical factors associated with caregivers' perceptions of children's oral health in Brazil. Community dentistry and oral epidemiology,39(3),260-267.DOI:https://doi.org/10.1111/j.1600-0528.2010.00598.x

Ramadan, Y. H., Koltermann, A. P., & Piovesan, C. (2016). Dental caries in Brazilian children: trend and polarization. Disciplinarum Scientia | Health, 15(1), 137–146. DOI: https://doi.org/10.37777/1072