Assessment of the Functional Health Literacy in Parents and Infant Caregivers: A Cross-Sectional Study
Evaluación de la alfabetización funcional en salud en padres y cuidadores infantiles: un estudio transversal

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Abstract

Objective: To assess the functional health literacy of parents and carers of infants up to one year of age.
Methods: Cross-sectional survey of pregnant women and carers of infants up to 1 year of age. The population consisted of pregnant women, men and women caring for infants up to 1 year of age, over 18 years of age, residing in the State of Tocantins. We used the instrument culturally adapted and validated in Brazil to assess the level of functional health literacy related to child health, the Parental Health Literacy Activities Test (PHLAT).
Results: The sample consisted of 37 participants, the majority of whom were mothers. The mean age of the babies was 6.5 months. The majority of primary caregivers were married (78.4%) and had their mother as their primary caregiver (94.6%). The mean age of the primary caregiver was 32.0 years. Among the PHLAT domains, the clinical/assessment/vaccination domain showed high literacy. However, in two important aspects, two of the questions with the highest percentage of errors were also in this domain: administering medication without a prescription and dosing according to the instructions on the package leaflet (which is an inappropriate practice). Literacy was also low in the psychosocial/developmental domain. Also of concern is the nutrition domain, where four of the eight items had high literacy. The items with low literacy required reading infant formula labels, calculating serum therapy dosages, and being able to read and interpret content.
Conclusion: Participants demonstrate inadequate functional health literacy.

Keywords

Child Health; Health Literacy; Health Promotion; Quality of Life.

Resumen

Objetivo: evaluar la alfabetización funcional en salud de padres y cuidadores de bebés de hasta un año de edad.
Métodos: estudio transversal realizado entre gestantes y cuidadores de lactantes de hasta un año de edad. La población estuvo compuesta por mujeres embarazadas, hombres y mujeres cuidadores de bebés de hasta un año de edad, mayores de 18 años, residentes en el estado de Tocantins. Utilizamos el instrumento culturalmente adaptado y validado en Brasil para evaluar el nivel de alfabetización funcional en salud relacionada con la salud infantil: Parental Health Literacy Activity Test (PHLAT).
Resultados: la muestra estuvo compuesta por 37 participantes, la mayoría mujeres y madres. La edad media de los bebés fue de 6,5 meses. La mayoría de los cuidadores principales estaban casados (78,4 %) y tenían a su madre como cuidadora principal (94,6 %). La edad media del cuidador principal fue de 32,0 años. Entre los dominios PHLAT, el de Clínica/Evaluación/Inmunización mostró un alto nivel de alfabetización. Sin embargo, en dos aspectos importantes, dos de las preguntas con mayor porcentaje de errores también lo fueron en este dominio: administración de medicamentos sin prescripción médica y dosificación según las instrucciones del prospecto (lo cual es una práctica inadecuada). En el ámbito psicosocial/del desarrollo, el nivel de alfabetización también fue bajo. También es motivo de preocupación el ámbito de la nutrición, donde cuatro de los ocho elementos tenían un alto nivel de alfabetización. Los elementos con un bajo nivel de alfabetización requerían leer las etiquetas de las fórmulas infantiles, calcular la dosis de la terapia de suero y ser capaces de leer e interpretar el contenido.
Conclusión: los participantes demuestran una alfabetización funcional en salud inadecuada.

Palabras clave

Alfabetización en Salud; Calidad de Vida; Promoción de la Salud. Salud Infantil.

Introduction

Literacy refers to the process of developing the ability to read, write, and comprehend text. Functional literacy refers to the ability to read and write to participate effectively in a particular group. Functional health literacy assesses the ability to understand, interpret, and apply health-related information, whether written or spoken. Functional health literacy includes the knowledge, motivation, and ability to access, assimilate, analyze, and use health information to make decisions and judgments related to health care, disease prevention, and health promotion (Cangussú et al., 2021; Kumar et al., 2010; Passamai et al., 2012.

Inadequate functional health literacy has a direct impact on population health. Social, economic, and educational challenges interfere with the development of the cognitive skills necessary for adequate functional health literacy, thereby limiting individual autonomy. Although health literacy is distinct from literacy, these skills have a direct impact on the level of functional health literacy. For example, people with poor reading and interpreting skills tend to have poor health literacy, which makes it difficult to understand medical instructions, read pamphlets and prescriptions, and so on (Rocha & Lemos, 2016; Volpato, Martins, & Mialhe, 2010).

Although educational attainment does not guarantee adequate health literacy, there is a trend toward lower levels of health literacy in lower social classes. This low level of health literacy results in an individual's inability to manage their own health, leading to lower adherence to prescribed treatment, lack of knowledge about prevention and health promotion activities, and poor understanding of available health services (Cangussú et al., 2021; Passamai et al., 2012).

Recently, the study of health literacy has gained prominence in Brazil, but there are few culturally validated instruments to assess literacy, mainly focused on children's health. In the case of children's health, adequate understanding of therapeutic instructions is essential, as care is the responsibility of parents or legal guardians. Understanding these instructions helps prevent health deterioration and avoidable hospitalizations, and promotes disease prevention, basic care, and child safety (Cangussú et al., 2021; Kumar et al., 2010; Passamai et al., 2012; Simch, Viera, & Toso, 2022).

The scarcity of theoretical material that relates these data to health literacy in pediatric care in Brazil is the motivation for this study, which aimed to evaluate the functional health literacy of parents and caregivers of infants up to one year of age. The hypothesis is that the participants present an inadequate performance in functional health literacy.

Method

Cross-sectional study conducted among pregnant women and caregivers of infants up to 1 year of age. The population was composed of pregnant women, men and women who are caretakers of babies up to 1 year of age, over 18 years old, residing in the State of Tocantins and having access to the Internet.

Snowball sampling was used. This type of sampling is a form of non-probability sampling using reference chains. This method presupposes a link between members of the population, given by the characteristic of interest, i.e. members of the population are able to identify other members of the population who can contribute to the research (Vinuto, 2014).

The invitation to participate in the research was distributed through social media (WhatsApp® and Instagram®). The data collection period was 42 days, starting on March 16, 2023 and ending on April 26, 2023. All procedures were previously approved by the research ethics committee in accordance with the relevant national guidelines (report number 64411322.4.0000.5516). Participants over 18 years of age who were caregivers of infants up to one year of age were included. Participants who did not meet the inclusion criteria, who were caregivers of infants older than 13 months, and who were occasional caregivers of infants, i.e., not responsible for daily care, were excluded.

The identification of the socio-economic profile was carried out – Brazilian Criteria of the Brazilian Association of Business and Research, which allows economic classification in: Class A, Class B1, Class B2, Class C1, Class C2, Class D-E and has as variables comfort items, level of education of the head of the family and access to public services (Abep, 2022).

We used the instrument culturally adapted and validated in Brazil to assess the level of functional health literacy related to child health is the Parental Health Literacy Activities Test (PHLAT), a scale that assesses the numeracy and literacy skills of caregivers of infants up to 1 year of age (Kumar et al., 2010; Simch et al., 2020).

The instrument contains 20 questions divided into clinical domains: 1) nutrition, psychosocial/developmental, 2) accident/safety, and 3) clinical/assessment/immunization. The skills assessed were: print literacy, addition and subtraction, multiplication and division, fractions and decimals, multiple mathematical functions and numbering, accounts, hierarchies and graphs (Simch et al., 2020).

Overall PHLAT performance was calculated as the percentage of questions answered correctly, which could range from 0 to 100%. Answers were recorded on the form, followed by a code of zero if the answer was correct and a code of one if the answer was incorrect. A score greater than or equal to 70% was considered high literacy, and a score less than 70% was considered low literacy (Simch et al., 2022).

The instruments were answered using Google Forms® and the data were analyzed according to the normative instructions of each instrument. The significance level used was 5% using Stata statistical software for data science®.

Results

The sample consisted of 37 participants, the majority of whom were female (97.3%), mothers (94.6%), followed by fathers (2.7%) and paternal grandmothers (2.7%). The mean age of the babies was 6.5 months. The majority of primary caregivers were married (78.4%) and had their mother as their primary caregiver (94.6%). The mean age of the primary caregiver was 32.0 years. Regarding education, the majority had completed higher education (37.8%), followed by postgraduate studies (40.5%), completed secondary education (10.8%), and incomplete higher education (10.8%).

The socioeconomic classification of the participants varied, with the majority classified as B2 (35.1%) and B1 (24.3%). The other socioeconomic groups were less represented, ranging from 5.4% to 18.9% (Table 1). In the PHLAT score, the participants performed with percentages of correct answers ranging from 51.4% to 97.3%, the mean number of correct answers was 65%, with a standard deviation of 13.9. This indicates an inadequate level of literacy (Table 2).

Among the PHLAT domains, the one with the highest literacy was Clinical/Evaluation/Immunization, as the majority of items, seven out of nine, showed high literacy. However, in two important aspects, two of the questions with the highest percentage of errors were also in this domain, the administration of medication without prescription and dosage according to the instructions on the leaflet (58.3% - question 9 and 51.4% - question 13), which is an inappropriate practice. Medication should only be administered under professional guidance.

In the psychosocial/developmental domain, literacy was also low (36.4%). In the accident prevention/safety domain, the items showed high literacy. Also of concern is the nutrition domain, where four of the eight items had high literacy. The items that showed low literacy required reading infant formula labels, calculating serum therapy dosage, and being able to read and interpret the content.

Table 1. Sociodemographic and socioeconomic characteristics of the sample (n=37).

Variables	Values
Region where they live	
Midwest	4 (10.8%)
North East	2 (5.4%)
North	31 (83.7%)
Sex	
Female	36 (97.3%)
Male	1 (2.7%)
Pregnant	
No	35 (94.6%)
Yes	2 (5.4%)
Child relationship	

Paternal grandmother	1 (2.7%)
Mother	35 (94.6%)
Father	1 (2.7%)
Baby's age (month)	6.5 (±3.5)
Marital status	
Married	29 (78.4%)
In a stable relationship	8 (21.6%)
Child's main caregiver	
Mother	35 (94.6%)
Father	2 (5.4%)
Child's main caregiver age (years)	32.0 (±5.2)
Education level	
Complete high school	4 (10.8%)
Complete Higher Education	14 (37.8%)
Incomplete higher education	4 (10.8%)
Postgraduate	15 (40.5%)
Socioeconomic classification	
A	7 (18.9%)
B1	9 (24.3%)
B2	13 (35.1%)
C1	6 (16.2%)
C2	2 (5.4%)
Does the baby have a chronic illness or disability?	
No	36 (97.3%)
Yes	1 (2.7%)

Table 2. Description of PHLAT responses (n=37).

Question	Correct	Incorrect
	(n, %)	
1. Using the instructions available at the package of the powdered milk 1, how much water and how much of milk powder shall you use to make 120 ml of milk?	26 (74.3%)	9 (25.7%)
2. Using the instructions available at the package of the powdered milk 1, how much water and how much of milk powder shall you use to make 210 ml of milk?	19 (55.9%)	15 (44.1%)
3. Your baby has diarrhea, and the pediatrician recommends that you give a 240 ml bottle, mixing half of milk and half of oral rehydration whey. How would you prepare that bottle with the powdered milk1?	18 (64.3%)	10 (35.7%)
4. You are informed by your baby´s pediatrician to take him/her to the health care service if he or she has a temperature of 38°C or higher. The thermometer marks the following temperature: 37,8°C.	28 (75.7%)	9 (24.3%)
5. Let´s say your 10 months child weights 10.400 grams and normal height for the age. Using the chart about the use of child seats, which car seat shall you choose for your child?	34 (94.4%)	2 (5.6%)
6. At the follow-up visit of your baby´s 2 months, the doctor says that, according to the curve of child growth, he or she is at the percentile 25 of weight. What does this percentile mean? Please, look at the curve of growth shown.	12 (36.4%)	21 (63.6%)
7. If your 7 months baby weighs 8 kilos and is ill with fever, how much fever medicine shall you give him or her? Using the Table of Dosage of the medicine shown, indicate the quantity of drops of the medicine that types of child medicine for fever shown, which one of them you would need to use less drops, to treat your baby´s fever? You may give to your child. Decide the dose based on his/her weight.	26 (72.2%)	10 (27.8%)
8. Examining the leaflets of two types of child medicine for fever, of which one of them you would need to use less drops, to treat your baby´s fever?	31 (86.1%)	5 (13.9%)
9. If your 3 months baby weighs 5 kilos, is ill of fever and you buy the medicine for fever, in drops. Using the box as a reference, would you give the medicine to your baby?	15 (41.7%)	21 (58.3%)
10. If you are using child medicine to treat your child´s fever, and your doctor recommends that you only give ½ teaspoon of the medicine, how many milliliters (ml) you need to give? You may consult the chart.	30 (88.2%)	4 (11.8%)
11. Your 3-year-old and 16 kilos nephew comes to visit you and, suddenly, he is ill of fever. To treat him, you decide to give him what is recommended in the child's medicine for fever of 2,5ml leaflet. How much should you give him?	29 (82.9%)	6 (17.1%)
12. Your doctor gives you the following list of food to avoid giving to your baby: Milk; Egg whites; Grape; Popcorn; Peanuts; chestnuts; walnuts; Fish and seafood; Raw carrot; Hot-dog. After reading the list of ingredients of the biscuit given, would you give it to your 10 months baby?	32 (91.4%)	3 (8.6%)
13. At 6 months of age, your baby has a higher chance to get a cold and other infections. Taking as an example the paracetamol in drops given, decide if you would use this medication for your child and how much would you give.	17 (48.6%)	18 (51.4%)
14. According to the information at the box of the medication given, which symptoms this medication DOES NOT help to relieve.	28 (82.4%)	6 (17.6%)
15. Your baby is one year old, weighs 8 kilos and is ill of cold and fever. You give him or her the quantity of drops of paracetamol that you always use, however, an hour later, he or she is still with fever. You also have a bottle of dipyrone. What should you do, give the other medicine or wait?	28 (80.0%)	7 (20.0%)

16. Your baby has an ear infection, and the doctor prescribes amoxicillin 3 times a day (see bottle). Using the syringe/glass, demonstrate how you would administrate the prescribed dose of 5 ml.	29 (93.5%)	2 (6.5%)
17. A nutritionist tells you to give your baby, more than 6 months old, no more than 50 ml of juice each time. 200 ml of juice will be enough for how many times?	26 (96.3%)	1 (3.7%)
18. Processed sweetened drinks contain high quantity of sugar and low level of nutrients important to the maintenance of health. Natural juice with a 100% of fruit or vegetables shall be preferred. The processed juice must specify on the label the amount of sugar, vitamins, proteins, sodium and another component it contains. Based on this information, analyze the label with the Nutritional Data, of the juice offered, and decide if you would give it to your child?	20 (69.0%)	9 (31.0%)
19. In the first 3 days of breastfeeding, the breast gets swollen and painful. According to this leaflet, how long will it take to get better?	32 (97.0%)	1 (3.0%)
20. You are not sure if your baby is getting enough milk, since it takes around 15 minutes to feed in both breasts. According to this leaflet, this is: normal; more than the normal; less than the normal.	17 (48.6%)	18 (51.4%)

PHLAT: Parental Health Literacy Activities Test.

Discussion

The results of this study indicate the need for additional support for parents in developing numeracy skills to improve their understanding and performance in practical situations related to child health and care. It is worrying that the area of nutrition was the worst performing area, as eating habits are formed in early childhood and the behaviors adopted at that time are carried into adulthood.

The first two years are a period of great opportunity to improve an individual's health, meaning that correct actions taken during this period will have a positive impact on the rest of that individual's life. It is during this period that human beings experience the greatest spurt of physical and neurological growth and immunological development. The counting of the first thousand days begins at conception, as embryonic and later fetal development is directly influenced by the pregnant woman's lifestyle habits (Black et al., 2017; Da Cunha & Corsino, 2021; Luby, 2020; Mennella et al., 2001; Mennella et al., 2017).

The rise of discussion about this period is part of a broad campaign launched in 2017 by the United Nations Children's Fund that is based on strategic pillars for the full and healthy life of children, with emphasis on nutrition, affection, care and the stimulus (Unicef, 2017).

In terms of nutrition, proper nutrition for the first thousand days begins with an adequate diet during pregnancy, followed by exclusive breastfeeding for six months, and after this period, with the introduction of appropriate food, with natural foods, without sugar consumption. and ultra-processed (Da Cunha & Corsino, 2021; Julie et al., 2017; Santos & Scheid, 2019; Spahn et al., 2019; Victora et al., 2015).

The Brazilian Ministry of Health has published (2019) a new food guide for Brazilian children up to 2 years of age, with a focus on health promotion. This guide reinforces the recommendation of exclusive breastfeeding until 6 months of age and advises children to avoid the consumption of ultra-processed foods and sugary drinks, such as juices and soft drinks. In addition, the guide suggests that the introduction of foods and preparations containing sugar should be delayed until after the age of 2 years (Brasil, 2019).

However, in 2021, data from the Food and Nutrition Surveillance System showed that a significant percentage of Brazilian children aged 6-23 months consumed sugary drinks (29%), ultra-processed foods (45%), and stuffed cookies, candies and sweets (26%). These figures are slightly higher in the northern region of the country, where consumption of sugary drinks reached 32%, consumption of ultra-processed foods reached 48%, and consumption of filled cookies, candies, and sweets remained at the national mean. Regarding breastfeeding, 52% of babies in Brazil were exclusively breastfed until 6 months of age (Sisvan, 2021).

The consequence of poor nutrition in childhood is the earlier onset of chronic diseases such as obesity, hypertension, diabetes mellitus and cardiovascular disease. These diseases follow the individual from childhood to adulthood. Foods aimed at children are often high in sugar, fat and salt and low in essential vitamins and nutrients. It is the responsibility of parents and caregivers of infants and children to promote good eating habits by offering healthy foods, involving the child in shopping and meal

preparation, and setting a good example by eating right (de Oliveira et al., 2016; Lima et al., 2020; Reis et al., 2022; Sabarense & Ferreira, 2022; Silva et al., 2018).

Medication management is another important area where low literacy levels were found. This care requires a great deal of attention because improper administration can lead to allergies, poisoning, and side effects. More worryingly, it can mask serious symptoms, prolonging the time it takes to seek health care and potentially leading to hospitalizations that could have been avoided if the disease had been treated appropriately and in a timely manner (Macedo, 2019; Medeiros et al., 2011; Silva & Oliveira, 2018).

In the Northern Region of Brazil, more than half (51.5%) of the poisoning cases registered in 2017 were caused by drugs. The most affected age group was 0-4 years, representing 31.7% of the total cases reported by the National Toxic-Pharmacological Information System. Poisonings occurred mainly as a result of accidents and errors in medication administration (Sinitox, 2017).

The high incidence of drug poisoning in children under 4 years of age suggests that parents or guardians lack information or understanding about proper dosage and storage of medications, as demonstrated in this study. It may also be a result of the practice of adults giving children medicines without a doctor's prescription. Symptoms such as fever, pain, cramps and respiratory symptoms may lead parents to medicate children without proper guidance (Medeiros et al., 2011; Oliveira et al., 2010; Silva & Oliveira, 2018).

The main causes of hospitalization and death among children in Brazil are related to diseases of the respiratory system, and many of these hospitalizations are the result of the administration of medicines without a proper prescription. In addition, there are diseases that originate in the perinatal period, which are considered sensitive conditions for primary care. According to the latest morbidity indicator of DATASUS, in the State of Tocantins, the hospitalization rate of children under 1 year of age for conditions sensitive to primary care in the Unified Health System was 1,799 hospitalizations per 10,000 inhabitants. This indicates the need to strengthen primary health care, with the aim of preventing and adequately treating these conditions, in order to reduce avoidable hospitalizations (Brasil, 2012; Justino et al., 2021; Silva & Oliveira, 2018).

There are several factors that can affect an individual's level of literacy, such as education, income, age, and gender. Other studies have shown that the higher the level of education, the higher the level of literacy and numeracy. Education is one of the factors of social determination of the health-disease process. There is a significant relationship between lower education and low ability to understand medical instructions (Antonio et al., 2019; Kumar et al., 2010; da Rocha et al., 2019; Rocha & Lemos, 2016).

Although 40.5% of the participants in this study had a postgraduate degree and 37.8% had completed higher education, it was found that the level of health literacy was still below ideal. Health literacy is an area of little research in Brazil, and there are no national surveys that estimate the level of health literacy of the population. In addition, there are no public policies that recognize the importance of health literacy in improving the health of the population. As a result, we do not have studies that evaluate health literacy in different regions, making comparisons with the results of this study impossible (Moraes, 2018; Passamai et al., 2012).

A recent study conducted in 2022 examined health literacy, threat perception of COVID-19, and vaccination intentions among Brazilian adolescents. The results showed that adolescents living in the northern region of the country felt more threatened by COVID-19 compared to other regions. These differences may be attributed to socioeconomic disparities between the North/Northeast and South/Southeast regions of Brazil, which influence access to and quality of health care. These findings provide important information for policymakers, highlighting challenges, successes, and research needs to improve the health of the entire Brazilian population. This context is particularly relevant given the increase in poverty during the current economic recession and social setbacks (Marinho et al., 2018; Pimentel, Avila, Prata, Nunes, & Silva, 2022).

In the current scenario of social regression, one of the main impacts on the right to health has been the implementation of Constitutional Amendment No. 95/2016, also known as the "public spending freeze". This measure has compromised the Unified Health System by limiting the resources allocated to health

in Brazil until 2036. The proper functioning of the unified health system is essential for the level of functional health literacy, especially in primary health care, which is the main source of free assistance for a large part of the population. However, restricting the proper functioning of health services negatively affects several aspects, from infrastructure and working conditions to the recruitment of professionals in the field. This results in overburdening, low quality of services, deterioration of facilities, lack of resources and lack of maintenance of equipment. As a result, the population as a whole loses access to health care and the opportunity to promote health and self-care (Brasil, 2021; Passamai et al., 2012; Rocha & Lemos, 2016).

As such, it is important that health services are able to adapt to the needs and abilities of users and improve their forms of written and oral communication. The unified health system plays a fundamental role in reorienting care strategies and teaching-learning related to health. To achieve this, it is necessary to adopt innovative practices in the training of health professionals, in health education, in the production of knowledge and in the provision of services. It is essential to increase the level of functional health literacy of individuals and to improve communication between health professionals, the health system and users (Passamai et al., 2012).

We suggest that future studies address the assessment of functional health literacy in more diverse samples, considering different age groups, educational levels, and sociocultural contexts. Besides, research on educational interventions and strategies to promote health literacy may contribute to the development of effective approaches aimed at improving the level of understanding and application of health information by caregivers.

Conclusions

Participants demonstrate inadequate functional health literacy. Functional health literacy is an evolving skill that can be improved through educational interventions and awareness programs. Therefore, the dissemination of health information in a clear and accessible manner, as well as continuous support for caregivers in interpreting and applying this information, are fundamental to promoting adequate health literacy. This dissemination must be carried out by health professionals who are responsible for these families, especially when it comes to the unified health system.

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