

REVIEW PAPER

The significance of health literacy in parents of chronically ill children

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ABSTRACT

Parents of children with chronic illnesses experience many challenges on an everyday basis. Interacting with medical staff, coping with their child's illness, and understanding information about the course of treatment require adequate health literacy (HL) and e-health literacy. The ability to look for, evaluate, and use health information depends on several factors, including socio-demographic and psychological. Cognitive abilities, motivation levels, and personality factors are crucial among the latter. Research has shown that adequate parental HL is associated with better child health, more effective treatment, and higher quality of life. Understanding health-related information enables efficient communication with medical personnel and thus promotes effective use of health services. It appears that parental health competencies are related to the development of pro-health attitudes in children, which, in the long term, can support the process of making good health decisions on their own. Therefore, assessing and developing parental health competencies is extremely important for their children, especially when they have long-term illnesses. It has been shown that an adequate level of HL also contributes to a health-promoting lifestyle, and that developing HL is one of the most important tasks of disease prevention and health promotion. The main aim of this article is to review the research results on the determinants and importance of health and e-health competencies of parents of children with chronic illnesses.

KEY WORDS:

health literacy, parents, chronic diseases.

INTRODUCTION

According to the World Health Organisation (WHO) definition, health literacy (HL) refers to “cognitive and social skills that determine the motivation and ability of individuals to gain access to, understand, and use information in ways that promote and maintain good health” [1]. The degree of HL within a specific community depends on socio-demographic, psychological, and cultural factors, health status, previous contact with the healthcare system, and the overall literacy level [2]. The caregivers' HL level is associated with maintaining their health and

that of their children [3]. Health literacy is particularly important for parents caring for children with chronic illnesses.

Limited parents' HL increases the cost of medical care and causes difficulties in understanding their child's illness and making appropriate decisions about their child's treatment. Some authors indicate that low HL may lead to poorer treatment outcomes for chronically ill children, including more frequent hospitalisations and emergency department visits [4, 5]. Adequate HL allows one to make the right decisions and take the right actions when interacting with the health care system. A person with a high

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HL is characterised by their ability to maintain good health and effectively treat their own or their child's illnesses. Can obtain reliable medical information, including that on risk factors for the development of diseases, and can apply this knowledge in practice. Health literacy is a key determinant of the ability to self-manage chronic disease and is associated with a higher feeling of parental self-efficacy [6]. The aim of this review is to highlight the importance of HL among parents of children with chronic illnesses. Using a combination of keywords (health literacy and parents and child or children and chronic illness or chronic disease), databases (PubMed and Google Scholar) were searched from September to November 2023 selecting full-text articles in English that met the search criteria. Only publications related to parental HL with chronically ill children were included, while articles focusing on the HL of children and those addressing mental HL were excluded. Finally, 3 systematic reviews and 24 original articles meeting the search criteria were selected for this study, at the discretion of the authors.

CHALLENGES FACED BY PARENTS OF CHRONICALLY ILL CHILDREN

Parents, as caregivers, are responsible not only for their own health but also for the wellbeing of their children [3]. Their HL level is crucial to ensure that the child receives appropriate care, whether healthy or ill. A long-term illness in a child is a special, non-normative condition that poses a huge challenge for parents and requires increased care and appropriate medical interventions.

According to the WHO, chronic diseases encompass all disorders or deviations from the established health norm, with symptoms persisting continuously for an extended period, typically exceeding 3 months. They are both congenital and acquired diseases affecting any system or organ. The persistence of pathological changes often leads to permanent disability. Chronic diseases can start in early childhood, and their symptoms and sequelae change as the patient grows older. Risk factors for their development and severity include an unhealthy lifestyle, individual behaviour, environmental factors, and genetic predisposition [7]. Chronic disease exacerbates the child's dependence on the care of the family.

The onset of a chronic illness in a child involves several healthcare decisions for the child's carers, usually the parents, and the ability to communicate effectively with medical staff [8]. The health status of a child with a chronic illness depends on many factors, including the carer's knowledge of the disease, how it is treated, and how to prevent its consequences. Parents face many challenges in addition to providing for their child's wellbeing and psycho-physical needs, such as the need to comply with medical recommendations or repeated consultations with health professionals [9]. Interaction with the physi-

cian requires skills to process and apply information on the course of the disease and treatment. Children with chronic illnesses need multidisciplinary care, and the parents or legal guardians are responsible for coordinating this care [10]. Knowledge of the symptoms of the disease and actions to prevent its progression can protect against an increase in symptoms or the occurrence of complications [11].

The care for a sick child requires, among other things, monitoring of the child's health condition, appropriate dosage of medication, and sometimes adherence to complex dietary regimens [4, 9]. Some parents may have to provide specialised care for the child at home. This may involve acquiring skills such as operating a respirator, replacing a tracheostomy tube, or the ability to administer enteral nutrition by feeding tube or gastrostomy [9].

Caregivers of chronically ill children face many psychosocial challenges. They struggle with uncertainty and financial and economic difficulties concerning the expenses arising from the child's multi-specialist care [12, 13]. The responsibilities of the family are extended beyond the basic caregiving and parenting functions to include the acquisition of skills for managing the illness and passing on this knowledge to the child. The high level of stress and anxiety experienced daily is an additional factor that requires adequate strategies to cope with and prevent the additional burden. A state of concern about the child's health is a common experience for caregivers due to the chronicity of the illness and the lengthy process of treatment [11]. In situations of sudden deterioration in the child's health or the appearance of previously unknown symptoms, some parents seek information on their own, often from non-medical sources available on the Internet. The accurate interpretation of such information can present additional challenges [9, 11].

HEALTH LITERACY AND E-HEALTH LITERACY – BASIC CONCEPTS

The term "health literacy" has been used since the 1970s, coined by Scott Simonds. The term "literacy" itself refers to the basic skills of reading and writing. This narrow approach has been extended over the years to include the ability to understand the recommendations received, and later to include issues related to motivation and the social context. Nowadays, HL is recognised as a combination of skills, personalities, and motivations that enable people to care for their health [14].

From the beginning of the development of such a concept of HL, their practical dimension and the importance of health education were pointed out. Sørensen *et al.* outlined a coherent, multidimensional model of HL, including determining factors and areas of influence. Health literacy is based on basic literacy skills, which enable individuals to acquire, understand, evaluate, and use health information to make appropriate decisions about health

promotion, disease prevention, and treatment if they occur. The model emphasises the motivation of individuals to take these actions. The team led by Sørensen *et al.* developed an instrument for assessing the level of HL in society, known as the European Health Literacy Survey Questionnaire (HLS-EU-Q) [1].

The development of HL is currently recognised as one of the most important challenges for public health, with health education playing a paramount role in this process. With the advancement of research and societal transformations in health approaches, the concept of HL may evolve. Still, it will continue to be critical for maintaining and improving individual and societal health. In the age of widespread access to the Internet, online resources are one of the most accessible and important sources of health knowledge. The skills required to acquire and utilise health information available online are referred to as e-health literacy (e-HL) or digital HL. Skinner and Norman, who introduced this concept, also developed a scale for measuring such literacy known as the e-health literacy scale [11, 15]. Various tools have been devised to measure general HL and those relevant to specific domains and diseases. In addition to HLS-EU-Q, commonly used instruments include the Test of Functional Health Literacy in Adults and The Newest Vital Sign.

DETERMINANTS OF PARENTAL HEALTH LITERACY

Among the factors influencing the level of HL and e-HL, the most frequently mentioned are personal characteristics and environmental factors [2, 16]. Studies conducted among both healthy and ill populations indicate a significant relationship between HL and gender. Typically, lower HL is observed in males than in females. Married people have higher levels of HL. The age of the respondents is also relevant [17]. Results of the studies indicate that HL levels decrease with age, which may be related to cognitive impairment [2].

Additionally, older individuals demonstrate lower levels of e-HL measured using the eHealth literacy scale and less frequently perceive health resources available on the Internet as useful [11].

Determinants of HL also include socio-economic conditions and the level of education. Lower HL is observed in people with lower levels of education, who have lower income, and face difficult living conditions [17]. Among the psychological determinants of HL, self-efficacy, motivation for treatment, and cognitive functions, including verbal memory and cognitive processing speed, are highlighted [2]. The significance of self-efficacy as a predictor of HL in parents of children with epilepsy was demonstrated by Tschamper *et al.* The authors found that HL in this group depends on age and education, with parents over 35 years old and with higher education exhibiting higher HL levels [18].

Similarly, a study conducted among parents of children with spina bifida showed that parents with higher education have higher levels of HL [19]. A positive correlation was also observed between income, e-HL, and HL. Low HL levels and poorer adherence to medical recommendations were observed in low-income families [20, 21].

The same factors determine the HL of parents of healthy children as among caregivers of sick children, including age, education level, and monthly income [3].

Other social determinants should also be considered among the factors responsible for an adequate level of HL. These include language barriers and difficulties in understanding cultural norms [22, 23]. Place of residence or origin from the same cultural background in which medical services are received appears to be a significant factor associated with higher levels of HL. The family structure and personality traits of parents (extraversion, agreeableness, conscientiousness, neuroticism, and openness) were also factors influencing HL in full families, and education level was found to be significant. On the other hand, monthly income, agreeableness, and openness were recognised as factors influencing HL in single-parent families. The research was conducted in a group of 1407 parents, and the Big Five Inventory-10 was used to measure personality traits [16]. It is important to note that parents' HL can be developed through education, access to appropriate sources of information, and social support.

IMPACT OF PARENTAL HEALTH LITERACY AND E-HEALTH LITERACY

A 2009 survey of 6100 parents in the United States found that almost one-third (28.7%) of respondents had inadequate levels of HL. In addition, 46.4% of them had difficulties with the correct dosage of prescribed medications [24]. The results of studies carried out in Europe also indicate an insufficient level of parental HL. For example, as many as 45.8% of parents of school-age children in Germany had inadequate HL [3].

A survey of parents of patients treated in paediatric clinics showed that most guardians were keen to use online sources and new technologies to obtain information. Still, their level of HL was low, and 25% of parents surveyed had insufficient health skills [25]. These data align with reports on the state of HL among the European adult population [17].

The co-occurrence of adverse health consequences and low HL levels has also been confirmed in the Polish population. A study conducted in 2020 demonstrated that 35% of Polish adults show limited HL [26]. Parents' HL level should be considered during the medical care provided to children. It influences the caregiving approach for a healthy child as well as in situations when the child becomes ill [4]. Greater parental HL may contribute to improving the quality of life of the sick child and the whole family [27]. The relevance of parental HL

to a child's health has been studied concerning many conditions, including bronchial asthma, chronic kidney disease, diabetes, epilepsy, spina bifida, obesity, sickle cell anaemia, and neoplastic diseases.

THE IMPACT OF PARENTAL KNOWLEDGE AND BEHAVIOURS ON ENHANCING CHILDREN'S HEALTH

Parents' HLs are related to their knowledge of their child's illness, the adequate use of medical prescriptions, and the outcome of their children's treatment. Limited parental knowledge of the disease can lead to errors in managing chronic conditions [4]. Harrington and De Walt showed that parents of children with bronchial asthma who have limited HL have less knowledge of their child's disease and a limited range of ways to manage their child's symptoms. Research conducted by Krishnan *et al.* indicated that low levels of parental HL were associated with poor control of asthma symptoms in children [28]. Inadequate HL is associated with a more severe course of the disease and the child frequently missing school activities [29, 30]. Also, among children with nephrotic syndrome, there is a greater likelihood of relapse when parents have low levels of HL [31]. Al-Abdulrazzaq *et al.* found that parents who had inadequate levels of HL displayed diminished knowledge in sufficient control of glycaemia in a child diagnosed with type 1 diabetes [32]. Furthermore, parents with limited health knowledge may find it difficult to help their children adhere to complex diabetes treatment [33]. Finally, empirical evidence indicates that parents with adequate basic reading, writing, and numeracy skills manifest heightened proficiency in monitoring glycaemic levels in their children with type 1 diabetes [34].

Parents' HLs are also important for the effectiveness of the child's epilepsy treatment. Reduced HL levels in parents of children aged 1-12 years were associated with more frequent skipping of medication doses and the increased incidence of seizures [21]. A study conducted among parents of children with glaucoma also demonstrated a correlation between their low HL levels and non-compliance with recommendations on the frequency of use of eye drops for their child [35]. There is also convincing evidence that limited health knowledge and insufficient skills to use it in practice determine inconsistent treatment of obesity in children [36].

Parents with higher HL are more capable of controlling potential risks to their child's health and are quicker to identify alarming symptoms, such as allergic reactions. A study among parents of children with allergies showed that the mother's HL level positively correlates with a lower frequency of allergic reactions in the child [37]. Parents' HL is associated with their abilities to recognise symptoms, take action during exacerbations of their child's illness, and ensure diligent adherence to

medical recommendations [38]. Parents' HL is related to their knowledge of how to recognise symptoms and their ability to take action when their child's condition worsens, and allows them to reliably follow medical advice. Adequate levels of parents' HL also contribute to their greater self-efficacy in monitoring their child's condition, administering medication, and following therapy. A survey of caregivers of children with sickle cell anaemia found an association between HL and the ability to provide adequate care and knowledge of the disease [6]. A higher level of HL among parents of children with ADHD was significantly associated with the ability to interpret symptoms accurately, describe them correctly, and understand the course of the disease [39].

An association of HL with the cessation of chronic disease progression was also found. A study on parents of children with kidney disease showed a 30% reduction in disease progression in children whose parents had high levels of HL [40]. According to Dore-Stites *et al.*, a higher likelihood of liver transplant acceptance was observed in children of parents with higher HL. Such parents communicated efficiently with medical staff, which enabled more effective implementation of recommendations and reduced the number of hospitalisations of children [41].

The level of HL of parents of hospitalised children is particularly crucial. A study conducted in 2018–2019 demonstrated that language barriers and low HL can significantly impede the communication process between parents and physicians, leading to poorer adherence to post-hospitalisation recommendations [42]. A study by Gallant *et al.* showed that both psychological factors, e.g. the parents' anxiety and stress levels, and their HL should be taken into account when informing caregivers about their child's further management at the time of discharge from hospital [43].

USE OF THE HEALTHCARE SYSTEM

An inadequate level of parental HL is associated with increased healthcare costs [44]. Children with chronic illnesses whose parents have limited HL are more frequently hospitalised during the illness and are more likely to be admitted to emergency departments. According to Morrison *et al.*, inadequate levels of parental HL and, as a result, parents' inability to adequately interpret their child's symptoms co-occur with unwarranted use of emergency departments [5].

Also, Brigham *et al.* pointed out that unnecessary visits to emergency departments may be related to inadequate levels of parental health knowledge. According to these authors, interventions that improve the level of HL can positively influence the rational use of health services [45].

Parental health awareness implies the ability to use the health care system efficiently. Written treatment plan guidelines given to parents have been shown to be useless if the parents do not have the competence to apply

them in practice. This can lead to erroneous decisions concerning the child's health [45]. Some authors suggest that the unjustified use of health services by parents with limited HL is due to a sense of helplessness and doubt in their own ability to care for their child [45, 46].

A long-term condition increases the likelihood of needing to use the emergency department when symptoms deteriorate. A study by Carden *et al.* found a statistically significant association between low HL levels of parents of children with sickle cell anaemia and the frequency of emergency department visits, and the frequency of hospitalisation [47]. Increased likelihood of hospitalisation has also been observed among children with bronchial asthma whose parents have limited HL. Additionally, in this group, more frequent use of emergency departments and less frequent routine office visits have been noted [30, 48]. Some medical terminology and information can be difficult for people without medical experience to understand. The level of parents' HL is known to affect the quality of communication between caregiver and physician [49].

HEALTH-PROMOTING BEHAVIOUR

Parental HL plays an important role in promoting health and preventing disease in the child and subsequently influences the child's health status. Increased parental HL impacts various aspects of a child's wellbeing, including nutrition, physical activity, and oral health [3]. Stress management skills and HL are essential factors supporting proper dietary practices [50]. Insufficient HL is associated with a greater risk of childhood overweight [36]. It has also been observed that a mother's knowledge of oral health care influences the regularity of dental visits and the application of appropriate preventive measures. This helps prevent dental caries and other oral health conditions in children [51]. Caregivers' HL levels are also associated with a child's sleep quality. A study conducted in a group of parents of 3–6-year-old children revealed that a higher level of HL is linked to better sleep quality in preschool-aged children [52]. It has also been demonstrated that caregivers' HL levels are significantly related to knowledge and ability to take emergency action in health or life-threatening situations [4, 53].

RELATIONSHIPS BETWEEN PARENTAL HEALTH LITERACY AND STRESS AND ANXIETY

The nature of the interrelationship between experienced stress and anxiety and HL is not yet sufficiently understood. The available research findings indicate that parents' HL level is important for the severity of stress and perceived anxiety concerning caring for a sick child.

A higher level of knowledge about the child's illness and an adequate understanding of treatment recommendations and procedures may help to eliminate unneces-

sary anxiety. Gomes *et al.* showed that parents' limited HL was related to their perceived anxiety about the use of corticosteroid medications necessary for therapy in a child with atopic dermatitis [54].

Fong *et al.* showed that inadequate parental HL in relation to neonatal care correlated with increased levels of perceived stress and challenges in implementing medical recommendations [55]. The relationship between anxiety and HL was also analysed among parents of children hospitalised in surgical wards. In the study group, almost half of the respondents had insufficient HL, and 79.8% experienced anxiety [56]. It appeared that parents with limited HL declared higher levels of anxiety and a greater need for information.

Higher HL helps avoid being misinformed and increases self-efficacy, which can contribute to reducing perceived stress and expanding the strategy of coping methods. According to analyses by Shone *et al.*, parents with adequate levels of HL have higher self-efficacy, which minimises the degree of worry about their child's health and improves their quality of life [57]. Knowing how to respond during a health emergency can increase parental confidence and reduce the stress of unforeseen events. Caregivers with a higher sense of empowerment and self-esteem regarding their child's care feel less anxious about their child's health and can control their child's symptoms properly [46].

The mentioned factors also influence the level of HL. This illustrates the complexity of issues related to caregivers' experienced anxiety and stress in relation to HL and e-HL, which requires further research [11]. On the one hand, adequate HL may contribute to a reduction in experienced stress and anxiety; on the other hand, the psychological burden of caring for a child may itself modify HL levels. Parents under the influence of experienced stress may find it difficult to make adequate health decisions, be more prone to make mistakes, and be more likely to succumb to cognitive distortions more quickly. Analyses among parents of children diagnosed with retinal cancer showed that almost 60% experienced moderate anxiety. This condition resulted in feelings of helplessness and a low sense of self-efficacy. Parents with higher HL levels are more aware of coping strategies for stress. Research has shown that to influence the improvement of parents' HL, attention should also be paid to their psychological wellbeing [58].

CONCLUSIONS

The level of parents' HL is important for the knowledge of the child's illness and the effectiveness of its treatment, but also for the health promotion measures taken. Research conducted to date indicates that limited HL of parents is a leading cause of poorer effectiveness of treatment of chronic diseases in children. Parental involvement in the child's treatment process and greater

satisfaction with the parent-physician relationship are possible if parents have adequate HL. It seems parents' HL also determines their overall satisfaction with paediatric care. Nurturing the development of parents' HL should be an important goal of activities that are crucial for the management of children with chronic diseases.

DISCLOSURES

1. Institutional review board statement: Not applicable.
2. Assistance with the article: None.
3. Financial support and sponsorship: None.
4. Conflicts of interest: None.

REFERENCES

1. Sørensen K, van Den Broucke S, Fullam J, et al. Health literacy and public health: a systematic review and integration of definitions and models. *BMC Public Health* 2012; 12: 80.
2. Lam MHS, Leung AYM, Chan SSC. Psychological and cognitive determinants of the health literacy on soon-to-be-aged and older adults: a systematic review. *i-manager's J Nurs* 2011; 1: 46-56.
3. De Buhr E, Tannen A. Parental health literacy and health knowledge, behaviors and outcomes in children: a cross-sectional survey. *BMC Public Health* 2020; 20: 1-9.
4. Morrison AK, Glick A, Yin HS. Health literacy: Implications for child health. *Pediatr Rev* 2019; 40: 263-277.
5. Morrison AK, Schapira MM, Gorelick MH, et al. Low caregiver health literacy is associated with higher pediatric emergency department use and nonurgent visits. *Acad Pediatr* 2014; 14: 309-314.
6. Houwing ME, Grohssteiner R, Teuben SAMC, et al. Health literacy, self-efficacy and knowledge of sickle cell disease among caregivers. *Blood* 2019; 134: 129888.
7. World Health Organization. Global health risks: mortality and burden of disease attributable to selected major risks. Geneva 2009.
8. Gerc K. Suffering in chronically ill children in the context of psychological interactions supporting their families. *Psychoterapia* 2016; 179: 45-56.
9. Lawrence PR, Feinberg I, Spratling R. The relationship of parental health literacy to health outcomes of children with medical complexity. *J Pediatr Nurs* 2021; 60: 65-70.
10. Kuo DZ, Cohen E, Agrawal R, et al. A national profile of caregiver challenges among more medically complex children with special health care needs. *Arch Pediatr Adolesc Med* 2011; 165: 1020-1026.
11. Sarkar M, Sanders LM, Kelleher KJ, et al. Psychosocial health, e-health literacy, and perceptions of e-health as predictors and moderators of e-health use among caregivers of children with special healthcare needs. *Telemed e-Health* 2016; 22: 123-131.
12. Mooney-Doyle K, Lindley LC. Family and child characteristics associated with caregiver challenges for medically complex children. *Fam Community Health* 2020; 43: 74-81.
13. Thomson J, Shah SS, Simmons JM, et al. Financial and social hardships in families of children with medical complexity. *J Pediatr* 2016; 172: 187-193.
14. Nutbeam D, Kickbusch I. Health promotion glossary. *Health Promot Int* 1998; 13: 349-64.
15. Norman CD, Skinner H. eHealth literacy: essential skills for consumer health in a networked world. *J Med Internet Res* 2006; 8: 1-11.
16. Mai J, Yibo W, Ling Z, et al. Health literacy and personality traits in two types of family structure – a cross-sectional study in China. *Front Psychol* 2022; 13: 1-12.
17. European Health Literacy Project Consortium. Comparative report on health literacy in eight EU members status. The European Health Literacy Survey (HLS-EU) 2012.
18. Tschamper MK, Wahl AK, Hermansen A, Jakobsen R, Larsen MH. Parents of children with epilepsy: characteristics associated with high and low levels of health literacy. *Epilepsy Behav* 2022; 130: 108658.
19. Lightfoot M, Cheng J, Hu X, et al. Assessment of health literacy in adolescents with spina bifida and their caregivers: a multi-institutional study. *J Pediatr Urol* 2020; 16: 167.e1-167.e6.
20. Kristjánsdóttir Ó, Welander Tärneberg A, Stenström P, et al. eHealth literacy and socioeconomic and demographic characteristics of parents of children needing paediatric surgery in Sweden. *Nurs Open* 2023; 10: 509-524.
21. Paschal A, Mitchell Q, Wilroy J, et al. Parent health literacy and adherence-related outcomes in children with epilepsy. *Epilepsy Behav* 2016; 56: 73-82.
22. Rau N, Basir M, Flynn K. Parental understanding of crucial medical jargon used in prenatal prematurity counseling. *BMC Med Inform Decis Mak* 2020; 20: 1-7.
23. Lam W, Dawson A, Fowler C. The health literacy of Hong Kong Chinese parents with preschool children in seasonal influenza prevention: a multiple case study at household level. *PLoS One* 2015; 10: e0143844.
24. Yin H, Johnson M, Mendelsohn A, et al. The health literacy of parents in the United States: a nationally representative study. *Pediatrics* 2009; 124: 289-298.
25. Meyers N, Glick A, Mendelsohn A, et al. Parents' use of technologies for health management: a health literacy perspective. *Acad Pediatr* 2020; 20: 23-30.
26. Duplaga M. Determinants and consequences of limited health literacy in Polish society. *Int J Environ Res Public Health* 2020; 17: ijerph17020642.
27. Riemann L, Lubasch J, Heep A, et al. The role of health literacy in health behavior, health service use, health outcomes and empowerment in pediatric patients with chronic disease: a systematic review. *Int J Environ Res Public Health* 2021; 18: ijerph182312464.
28. Krishnan S, Rohman A, Welter J, et al. Relationship between health literacy in parents and asthma control in their children: a prospective study in a diverse suburban population. *Pediatr Allergy Immunol Pulmonol* 2018; 31: 221-225.
29. Harrington K, Zhang B, Magruder T, et al. The impact of parent's health literacy on pediatric asthma outcomes. *Pediatr Allergy Immunol Pulmonol* 2015; 28: 20-26.
30. Dewalt D, Dilling M, Rosenthal M, et al. Low parental literacy is associated with worse asthma care measures in children. *Ambul Pediatr* 2007; 7: 25-31.
31. Borges K, Sibbald C, Hussain-Shamsy N, et al. Parental health literacy and outcomes of childhood nephrotic syndrome. *Pediatrics* 2017; 139: e20161961.
32. Al-Abdulrazzaq D, Al-Ta'iar A, Al-Haddad M, et al. Cultural adaptation of health literacy measures: translation validation of the new-est vital sign in Arabic-speaking parents of children with type 1 diabetes in Kuwait. *Sci Diabetes Self Manag Care* 2021; 47: 164-172.
33. Janisse H, Naar-King S, Ellis D. Brief report: parent's health literacy among high-risk adolescents with insulin dependent diabetes. *J Pediatr Psychol* 2010; 35: 436-40.
34. Hassan K, Heptulla A. Glycemic control in pediatric type 1 diabetes: role of caregiver literacy. *Pediatrics* 2010; 125: 1104-1108.
35. Freedman R, Jones S, Lin A, et al. Influence of parental health literacy and dosing responsibility on pediatric glaucoma medication adherence. *Arch Ophthalmol* 2012; 130: 303-311.
36. Chari R, Warsh J, Ketterer T, et al. Association between health literacy and child and adolescent obesity. *Patient Educ Couns* 2014; 94: 61-66.

37. Egan M, Yin H, Greenhawt M, et al. Low caregiver health literacy among pediatric food-allergic patients is associated with poorer food allergy management knowledge. *J Allergy Clin Immunol Pract* 2019; 7: 655-658.
38. Zaidman EA, Scott KM, Hahn D, et al. Impact of parental health literacy on the health outcomes of children with chronic disease globally: a systematic review. *J Paediatr Child Health* 2023; 59: 12-31.
39. Porter S, Guo C, Molino J, et al. The influence of task environment and health literacy on the quality of parent-reported ADHD. *Appl Clin Inform* 2012; 3: 24-37.
40. Ricardo A, Pereira L, Betoko A, et al. Parental health literacy and progression of chronic kidney disease in children. *Pediatr Nephrol* 2018; 33: 1759-1764.
41. Dore-Stites D, Lopez M, Magee J, et al. Health literacy and its association with adherence in pediatric liver transplant recipients and their parents. *Pediatr Transplant* 2020; 24: 1-7.
42. Hoang K, Halpern-Felsher B, Brooks M, et al. Addressing goals of parents of hospitalized children: a qualitative analysis of parents' and physicians' perspectives. *Acad Pediatr* 2021; 21: 244-251.
43. Gallant AJ, Bishop A, Cassidy C, et al. Using behaviour change theories to understand pediatric emergency discharge communication interventions. *Res Square* 2020.
44. Morrison A, Myrvik M, Brousseau D, et al. The relationship between parent health literacy and pediatric emergency department utilization: a systematic review. *Acad Pediatr* 2013; 13: 421-429.
45. Brigham E, Goldenberg L, Stolfi A, et al. Associations between Parental health literacy, use of asthma management plans, and child's asthma control. *Clin Pediatr* 2016; 55: 111-117.
46. Wood M, Price J, Dake J, et al. African American parents'/guardians' health literacy and self-efficacy and their child's level of asthma control. *J Pediatr Nurs* 2010; 25: 418-427.
47. Carden M, Newlin J, Smith W, et al. Health literacy and diseasespecific knowledge of caregivers for children with sickle cell disease. *Pediatr Hematol Oncol* 2016; 33: 121-133.
48. Rosas-Salazar C, Ramratnam SK, Brehm JM, et al. Parental numeracy and asthma exacerbations in Puerto Rican children. *Chest* 2013; 144: 92-98.
49. Pio F, Nosa V. Health literacy of Samoan mothers and their experiences with health professionals. *J Prim Health Care* 2020; 12: 57-63.
50. Heerman W, Lounds-Taylor J, Mitchell S, et al. Validity of the toddler feeding questionnaire for measuring parent authoritative and indulgent feeding practices which are associated with stress and health literacy among Latino parents of preschool children. *Nutr Res* 2018; 49: 107-112.
51. Dieng S, Cisse D, Lombrail P, et al. Mothers' oral health literacy and children's oral health status in Pikine, Senegal: A pilot study. *PLoS One* 2020; 15: e0226876.
52. Ono S, Ogi H, Ogawa M, et al. Relationship between parents' health literacy and children's sleep problems in Japan. *BMC Public Health* 2021; 21: 1-7.
53. Heerman W, Perrin E, Yin H, et al. Health literacy and injury prevention behaviors among caregivers of infants. *Am J Prev Med* 2014; 46: 449-456.
54. Gomes T, Kieselova K, Guiote V, et al. A low level of health literacy is a predictor of corticophobia in atopic dermatitis. *An Bras Dermatol* 2022; 97: 704-709.
55. Fong H, Rothman E, Garner A, et al. Association between health literacy and parental self-efficacy among parents of newborn children. *J Pediatr* 2018; 202: 265-271.
56. Kampouroglou G, Velonaki V, Pavlopoulou I, et al. Parental anxiety in pediatric surgery consultations: the role of health literacy and need for information. *J Pediatr Surg* 2020; 55: 590-596.
57. Shone L, Conn K, Sanders L, et al. The role of parent health literacy among urban children with persistent asthma. *Patient Educ Couns* 2009; 75: 368-375.
58. Gelkopf M, Chang T, Zhang Y, et al. Parental coping with retinoblastoma diagnosis. *J Psychosoc Oncol* 2019; 37: 319-334.