

Chapter 2

Health Literacy and Child Health Outcomes: From Prenatal to Birth and Infant Stages

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The impact of parental health literacy and the health outcomes of young children is a poorly studied area. DeWalt et al., summarized the pertinent literature regarding literacy and child outcomes, not necessarily health literacy, from 1980 through 2008 [1]. They presented 24 studies that dealt with the relationship between literacy and child health outcomes and found that lower literacy was associated with a lack of basic knowledge regarding a known medical condition, difficulty utilizing consent forms, non-comprehension of the concepts behind prenatal screening, and non-understanding of educational brochures resulting in poorer health outcomes.

However, the impact of health literacy on a baby occurs before birth or even before pregnancy [1]. Gossett and co-workers demonstrated that lower health literacy is associated with limited appreciation of the implications of aging on fertility and pregnancy, and the success rates of infertility treatments [2].

Low literacy and numeracy scores are also associated with poor knowledge about contraception and difficulty with use of contraceptives [3]. Individuals with low health literacy skills are less likely to use the Internet and more likely to have self-efficacy limitations [4]. Thus, a program such as Text4baby, which has “a free cell phone text messaging service for pregnant women and new moms” and provides “text messages [that] are sent three times a week with information on how to have a healthy pregnancy and a healthy baby” [5] succeeds best with individuals with higher health literacy levels [6, 7]. In studies of pregestational diabetics [8] and gestational diabetics [9], those with poor health literacy had significantly more unplanned pregnancies, had not discussed pregnancy planning with a physician, or had taken folic acid. Their literacy level had a significant

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impact regarding their understanding of information about gestational diabetes mellitus [9]. Similar findings were found by You and colleagues with regard to knowledge about preeclampsia [10]. As both diabetes and pre-eclampsia are associated with preterm birth [11, 12, 13], there is an increased risk of lung disease, infection, and other complications that adversely impact health outcomes throughout life. Interestingly, the level of health literacy does not seem to predict smoking during pregnancy [14].

Low parental literacy affects almost every aspect of newborn and infant care, including breastfeeding, use of the emergency room, medication administration, and participation in social welfare programs. Kaufman and co-workers found that only 23% of first-time mothers with poor health literacy breast-fed exclusively for 2 months, compared to 54% of women who had higher levels of literacy skills [15].

With regard to the emergency room environment, Morrison and colleagues reported that as many as two thirds of caregivers presenting with their children had low health literacy, and these individuals had more than three times greater odds of presenting to the emergency center for a non-urgent conditions than did those with adequate health literacy. They also found that health literacy was an independent predictor of higher use of the emergency room for non-urgent conditions [16, 17].

Problems involving administration of medication, including the use of non-standard measuring devices, are well known when caregivers have low literacy [18–20]. Caregivers with lower numeracy skills were also more likely to provide inappropriate reasons for giving an over-the-counter medication [21]. Wallace et al., found that both directions for preparation and instructions for the use and storage of powdered infant formulas' labels had average reading scores at the college level. The Warnings and Safe Handling sections had reading difficulty levels between the 8th- and 9th-grade levels, inviting misinterpretation of proper formula preparation [22].

Participation in social programs such as Temporary Assistance for Needy Families (TANF), the Food Stamp Program, and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) are critical to healthy nutrition and normal development. Pati et al., found that participation in TANF was more than twice as common among children whose mothers had adequate health literacy compared with children whose mothers had inadequate health literacy [23]. Low health literacy also may contribute to gaps in Medicaid coverage, particularly when the caregivers have less than a high school education [24].

Lack of up-to-date immunizations at either age 3 or 7 months was related to education level (high school graduate or beyond), attending a hospital-affiliated clinic [25], and maternal employment [26], but not to the level of health literacy [25].

A problem with many studies on the impact of health literacy on children's health is that they rely on reported parental behavior, rather than measured behavior [27]. Unfortunately, self-reported data about participation are subject to recall bias and, depending on response rates, selection bias [23]. Thus, appropriately designed studies on this topic are critical to (1) accurately measure the impact of health literacy on caregivers' actions separate from other known influences and (2) hopefully narrow the gap between children's health outcomes seen in high- versus low-literacy caregivers.

References

1. DeWalt DA, Hink A. Health literacy and child health outcomes: A systematic review of the literature. *Pediatrics*. 2009;124(3 suppl):S265–74.
2. Gossett DR, Nayak S, Bhatt S, Bailey SC. What do healthy women know about the consequences of delayed childbearing? *J Health Commun*. 2013;18(1 Suppl):118–28.
3. Yee LM, Simon MA. The role of health literacy and numeracy in contraceptive decision-making for urban Chicago women. *J Community Health*. 2014;39(2):394–9.
4. Shieh C, Mays R, McDaniel A, Yu J. Health literacy and its association with the use of information sources and with barriers to information seeking in clinic-based pregnant women. *Health Care Women Int*. 2009;30(11):971–88.
5. Text4baby. <http://www.cdc.gov/women/text4baby/>. Accessed 19 Jan 2016.
6. Gazmararian JA, Elon L, Yang B, et al. Text4baby program: an opportunity to reach underserved pregnant and postpartum women? *Matern Child Health J*. 2014;18(1):223–32.
7. Gazmararian JA, Yang B, Elon L, et al. Successful enrollment in Text4Baby more likely with higher health literacy. *J Health Commun*. 2012;17(3 Suppl):303–11.
8. Endres LK, Sharp LK, Haney E, Dooley SL. Health literacy and pregnancy preparedness in pregestational diabetes. *Diabetes Care*. 2004;27(2):331–4.
9. Carolan M. Diabetes nurse educators' experiences of providing care for women, with gestational diabetes mellitus, from disadvantaged backgrounds. *J Clin Nurs*. 2014;23(9–10):1374–84.
10. You WB, Wolf MS, Bailey SC, et al. Improving patient understanding of preeclampsia: a randomized controlled trial. *Am J Obstet Gynecol*. 2012;206(5):431.e1–5.
11. Köck K, Köck F, Klein K, et al. Diabetes mellitus and the risk of preterm birth with regard to the risk of spontaneous preterm birth. *J Matern Fetal Neonatal Med*. 2010;23(9):1004–8.
12. Preeclampsia. <http://www.marchofdimess.org/complications/preeclampsia.aspx>. Accessed 19 Jan 2016
13. Xaverius P, Alman C, Holtz L, et al. Risk factors associated with very low birth weight in a large urban area, stratified by adequacy of prenatal care. *Matern Child Health J*. 2015;4. [Epub ahead of print]
14. Arnold CL, Davis TC, Berkel HJ, et al. Smoking status, reading level, and knowledge of tobacco effects among low-income pregnant women. *Prev Med*. 2001;32(4):313–20.
15. Kaufman H, Skipper B, Small L, et al. Effect of literacy on breast-feeding outcomes. *South Med J*. 2001;94(3):293–6.
16. 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(3):309–14.
17. Morrison AK, Chanmugathas R, Schapira MM, et al. Caregiver low health literacy and nonurgent use of the pediatric emergency department for febrile illness. *Acad Pediatr*. 2014;14(5):505–9.
18. Yin HS, Dreyer BP, Foltin G, et al. Association of low caregiver health literacy with reported use of nonstandardized dosing instruments and lack of knowledge of weight-based dosing. *Ambul Pediatr*. 2007;7(4):292–8.
19. Mira JJ, Lorenzo S, Guilabert M, et al. A systematic review of patient medication error on self-administering medication at home. *Expert Opin Drug Saf*. 2015;14(6):815–38.
20. Mehndiratta S. Strategies to reduce medication errors in pediatric ambulatory settings. *J Postgrad Med*. 2012;58(1):47–53.
21. Lokker N, Sanders L, Perrin EM, et al. Parental misinterpretations of over-the-counter pediatric cough and cold medication labels. *Pediatrics*. 2009;123(6):1464–71.
22. Wallace LS, Rosenstein PF, Gal N. Readability and content characteristics of powdered infant formula instructions in the United States. *Matern Child Health J*. 2016;20(4):889–94. [Epub ahead of print]
23. Pati S, Mohamad Z, Cnaan A, et al. Influence of maternal health literacy on child participation in social welfare programs: the Philadelphia experience. *Am J Public Health*. 2010;100(9):1662–5.

24. Lee JY, Divaris K, DeWalt DA, et al. Caregivers' health literacy and gaps in children's Medicaid enrollment: findings from the Carolina Oral Health Literacy Study. *PLoS One*. 2014;9(10):e110178.
25. Pati S, Feemster KA, Mohamad Z, et al. Maternal health literacy and late initiation of immunizations among an inner-city birth cohort. *Matern Child Health J*. 2011;15(3):386–94.
26. Brenner RA, Simons-Morton BG, Bhaskar B, et al.; NIH-D.C. Initiative Immunization Group. Prevalence and predictors of immunization among inner-city infants: a birth cohort study. *Pediatrics*. 2001;108(3):661–70.
27. Knapp C, Madden V, Wang H. Internet use and eHealth literacy of low-income parents whose children have special health care needs. *J Med Internet Res*. 2011;13(3):e75.

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