Oral Abstract Session I: Monday October 19, 2009 1:00pm

Empowering low-income parents to reduce excess pediatric emergency room and clinic visits through health literacy

Ariella Herman, PhD, Research Director, UCLA/Johnson & Johnson Health Care Institute, UCLA Anderson School of Management; Portia Jackson, MPH, Doctoral Student, UCLA Department of Health Services, Research Assistant, UCLA Anderson School of Management; Carol Teutsch, MD

Background: Studies estimate that ninety million Americans lack necessary health literacy skills to effectively utilize the healthcare system. Parents may default to emergency departments because of inaccessibility of other routes to care and convenience of 24 hour service. Low health literacy can contribute to parents' uncertainty about managing their children's health problems, particularly whether an urgent visit is required for an acute problem. This lack of understanding by parents of common pediatric health issues can lead to excess utilization of healthcare services for common childhood illnesses. Previous short-term interventions have addressed socioeconomic status and social environment as factors contributing to increased utilization, but have not demonstrated sustained impact on healthcare services utilization habits for acute childhood illnesses over time. Results of prior studies point towards the need for a carefully tailored intervention which uses empowerment as a tool for behavior modification and which has intensive reinforcements and follow up to maintain this change over time.

Our low literacy training on the management of childhood illnesses aimed to empower Head Start parents by training them on the use of a low-literacy health book. The goal of the intervention was to reduce the likelihood that parents would unnecessarily go to the doctor or emergency room for routine ailments affecting their children.

Methods: Our multicomponent education model trained low-income parents of young children (9,240 families) at 55 Head Start sites on the use of a low-literacy health book to respond to common childhood illnesses. The overall strategic framework required each Head Start site to create a Health Improvement Project (HIP) to plan, successfully train, monitor, and provide extended follow up to families. The study was conducted from 2001-2006. Each family was tracked for three months prior to the training using self-report, and for six months afterwards.

Results: 77.3% of parents completed the training and all pre and post assessments. The average number of ER and doctor visits decreased 58% and 41% respectively ($p<0.001$). Work days per year missed by primary caretakers decreased 42%, and school days missed per year decreased 29% ($p<0.001$). After the training, the percent of parents who stated that they would first refer to a health book when faced with a common childhood illness increased from 4.7% to 47.5%. At the same time, the percent of parents who reported that they would take their child directly to the doctor or ER for a temperature of 99.5° decreased by 63% (95% CI= 58-66%) and 75% (95% CI= 63-88%), respectively following the intervention (Table 1).

Conclusion: Following the health literacy intervention, reported ER and doctor visits decreased, as did the number of work days and school days missed per year. The emphasis of this study is on achieving long-term behavior modification by empowering low literacy parents with appropriate skills to address their child's symptoms and reinforcing this learning over time. From a cost perspective, by equipping parents with new skills, knowledge and support, this intervention may decrease inappropriate utilization of healthcare services.

Table 1
Query: "What would you do <u>FIRST</u> if your child had …?"

	99.5° Temp		Cough		Vomiting		Earache	
	Doctor	**ER**	**Doctor**	**ER**	**Doctor**	**ER**	**Doctor**	**ER**
Pre	38%	4%	41%	3%	58%	5%	81%	3%
Post	14%	1%	14%	0%	31%	1%	52%	1%
Decrease	**63%**	**75%**	**66%**	**97%**	**47%**	**80%**	**36%**	**67%**
95% Confidence Interval	58-68%	63-88%	62-70%	50-98%	37-56%	68-92%	31-43%	62-82%

Trust of Physicians Mediates the Association of Literacy with Perceived Efficacy of Patient-Physician Interactions Among Mothers of Early Preterm Infants

Ian M. Bennett MD PhD and Jennifer F. Culhane PhD MPH

Background: Preterm infants, particularly those before 35 weeks of gestation, are at increased risk of health conditions requiring complex interactions with the health care system and effective patient physician interactions. The rate of prematurity is also greatest among underresourced low income women who are simultaneously more likely to have low literacy which creates obstacles to communication. We wished to test a conceptual model in which trust of physicians was assessed for a mediating role between literacy and self efficacy for obtaining medical information and attention to medical concerns from physicians among women with early preterm infants.

Methods: One on one interviews were carried out with 560 women one month after an early preterm birth (<35 weeks gestation) in Philadelphia, PA. Along with demographic variables and other potential confounders the women were assessed for: 1) literacy using the Test of Adult Basic Education reading locator (TABE-RL), 2) the Perceived Efficacy for Patient-Physician Interactions (PEPPI), and 3) physician trust using a global rating from the Primary Care Assessment Survey (PCAS). The relationships of literacy with trust and perceived efficacy were assessed using standard descriptive methods. Evidence of mediation was assessed using multiple linear regression models. Potential confounders identified a-priori where included in analyses if associations with any of the key independent or dependent variables at $p \leq 0.250$.

Results: The sample was made up of a multiracial (African American - 74%, White – 10%, Hispanic/Latino – 14%) group of generally healthy (89% rated their health good, very good or excellent) young (mean age 24 years) women. A high proportion of these women had low literacy (9% < 4^{th} grade and 12% 4-6^{th} grade). Literacy was associated with self efficacy (Beta = 0.152, $p<0.0001$) and trust (Beta = -0.140, $p=0.001$). Trust was also associated with self efficacy (Beta = -0.401, $p<0.0001$) satisfying criteria for possible mediator. None of the potential confounders met our criteria for inclusion in the multiple regression models. When included in the regression model trust diminished the effect of literacy on self efficacy by 36%.

Conclusion: Lower literacy was independently associated with less trust of physicians and lower perceived self efficacy to obtain medical information and attention to medical concerns from physicians among women with preterm infants. We found evidence to support our conceptual model that the reduced trust of physicians associated with lower literacy contributes to the reduced perceived self efficacy. This is the first study which documents a link between literacy and self efficacy for effective patient-physician interaction which is a key component of common conceptual frameworks underlying the relationship between health literacy and health outcomes. The link between literacy and distrust of physicians has also not been previously found and it raises important implications for the mechanisms by which literacy is related to health outcomes. Interventions to improve the delivery of care to preterm infants should consider literacy in their design.

Universal Medication Schedule to Improve Patient Understanding of Prescription Drug Instructions

Bailey SC, Davis TC, Curtis LM, Shrank, WH, Parker RM, and Wolf MS

Background: Studies have shown that adults frequently have difficulty correctly interpreting common prescription drug instructions. We evaluated the effect of a universal medication schedule, with or without a graphic aid, on patient comprehension of common prescription drug label instructions compared to a current standard.

Methods: A controlled clinical trial testing the efficacy of the universal medication schedule (UMS) was conducted. Specifically, 500 adult patients were recruited from two academic and two community health primary care clinics in Chicago, IL and Shreveport, LA. In total, 500 adult patients were consecutively recruited and sequentially assigned to receive patients were assigned to receive either 1) standard prescription drug label instructions commonly transcribed onto prescription containers [standard], 2) labels using the UMS format that included plain language instructions mapped to four standard specified time periods [UMS], or 3) labels using the UMS instructions that includes a graphic aid to visually depict dose and timing of the medication [UMS + Graphic]. The primary outcome was functional understanding of three prescription label instructions as determined by a blinded panel review of patients' verbatim responses.

Results: Overall rates of correct interpretation to prescription drug container label instructions varied among standard, UMS, and UMS + Graphic labels (69%, 91%, and 86% respectively, $p<0.001$). In multivariate analyses, prescription instructions with the UMS format were significantly more likely to be correctly interpreted compared to standard instructions (Adjusted Relative Risk (RR) 1.33, 95% Confidence Interval (CI) 1.25 – 1.41). The inclusion of the graphic aid on the label (UMS + Graphic) decreased rates of correct interpretation compared to the UMS instructions alone (RR 0.93, 95% CI 0.89 - 0.97). Lower literate patients were significantly more likely to correctly interpret UMS instructions (without graphic aid) compared to standard label instructions (low literacy: RR 1.39, 95% CI 1.14 – 1.68; $p=0.001$). Differences between rates of correct interpretation for the UMS label and standard instructions was most significant for the more complex regimens (RR 2.00, 95% CI 1.44 – 2.42; $p<0.001$).

Conclusion: A universal medication schedule that identifies daily intervals for when to take medicine can improve patient understanding, especially among those with limited literacy skills.

Parent Medication Administration Errors: Role of Dosing Instruments and Health Literacy

H Shonna Yin, MD, MS, Alan L Mendelsohn, MD, Michael S Wolf, PhD, MPH , Ruth M Parker, MD, Arthur Fierman, MD, Linda van Schaick, MS Ed, Isabel S Bazan, BA, Matthew D Kline, MA, Benard P Dreyer, MD

Background: Recent findings indicate that the majority of preventable adverse drug events in pediatric outpatients are attributable to errors in medication administration. While it is well-established that standardized dosing instruments are associated with fewer errors, there has been limited study of parent use of dosing instruments and the extent to which health literacy influences accuracy. We therefore sought to assess parent liquid medication administration errors by dosing instrument type and examine the degree to which parent health literacy influences dosing accuracy.

Methods: Experimental study of parents of children presenting for care in an urban public hospital pediatric clinic. Parents were observed for dosing accuracy (5mL dose) utilizing a set of standardized instruments (2 dosing cups [*#1:* printed calibration markings; *#2:* etched markings], dropper, dosing spoon, 2 oral syringes [+/-bottle adapter]). Health literacy (Newest Vital Sign), sociodemographics and child health status were assessed via face-to-face structured interview.

Results: Of 302 parents, 40.5% had low health literacy. The percent of parents dosing accurately (+/- 20%) with cup #1 and #2 was 30.5% and 50.2% respectively, while >85% dosed accurately with the remaining instruments. 25.8% and 23.3% of parents made large dosing errors (>40% deviation) using cup #1 and #2. In adjusted analyses, cups were associated with an increased odds of making a dosing error (>20% deviation) compared to the oral syringe (*cup #1:* AOR 26.7, 95% CI 16.8-42.4; *cup #2:* AOR 11.0, 95% CI 7.2-16.8). Compared to the oral syringe, cups were also associated with an increased odds of making large dosing errors (*cup #1:* AOR 7.3, 95% CI 4.1-3.2; *cup #2:* AOR 6.3, 95% CI 3.5-11.2). Limited health literacy was associated with making dosing errors (**Table 1**). The statistical significance of the relationship between low health literacy and dosing error varied by instrument type, with the effect of literacy more significant when parents used the dosing cups (p=0.01), compared to when parents used other instruments to dose.

Conclusions: Dosing errors by parents were highly prevalent with cups compared to droppers, spoons, or syringes. Strategies to reduce errors should address both accurate use of dosing instruments and health literacy.

Table 1. Impact of health literacy on dosing errors[a]

		Any Dosing Error[b]			Large Dosing Errors[c]		
		AOR[c]	**95% CI**	**p-value**	**AOR[c]**	**95% CI**	**p-value**
Health Literacy Level	High Likelihood of Limited Literacy	1.7	1.1-2.8	0.02	2.3	1.2-4.6	0.01
	Possible Limited Literacy	1.6	1.02-2.6	0.04	1.9	0.95-3.7	0.07
	Adequate Literacy	1.0	---	---	1.0	---	---

[a] Multiple logistic regression models utilizing generalized estimating equations (adjusting for parent age, relationship to child, marital status, language, ethnicity, US-birth, SES, presence of child in household ≤age 8 years, and presence of child in household with a chronic disease).
[b] Any dosing error defined as >20% deviation from recommended dose.
[c] Large dosing error defined as >40% deviation from recommended dose.

Oral Abstract Session II: Tuesday October 20, 2009 8:30am

Health Literacy and Prospective Memory in HIV Seropositive Individuals

Drenna Waldrop-Valverde, PhD, Research Associate Professor, University of Miami, Miller School of Medicine, Raymond L. Ownby, MD, PhD, Professor, Nova Southeastern University, Fort Lauderdale, FL

Background: Health literacy has been related to various health outcomes in the general population and to medication adherence in HIV seropositive patients. Moreover, HIV infection can also lead to deficits in neurocognitive functions shown to decrease adherence and performance of other relevant health behaviors. Recent evidence has implicated poor prospective memory, defined as "meta-memory" or the ability to remember to remember, in reduced adherence. Little is known about the relation of prospective memory to health literacy, however. We therefore evaluated the relation of prospective memory and other cognitive domains affected by HIV, to health literacy in HIV seropositive men and women with a history of heroin and/or cocaine dependence.

Method: As part of a study of the cognitive determinants of medication adherence in individuals with HIV infection and a history of heroin or cocaine dependence, participants ($n = 76$) completed a battery of neuropsychological measures that included measures of psychomotor speed (WAIS-III Digit Symbol subtest), reaction time (CalCAP simple reaction time), concept learning (Category Test), attention (WAIS-III Digit Span subtest), and verbal ability (WAIS-III Vocabulary subtest). Prospective memory was tested with the Prospective Memory Test which assesses both event and time-based prospective memory. Demographic information and CD4 cell counts were obtained as well. We assessed the relation of demographic (including years of education and CD4 counts) and cognitive variables to performance on the Short Test of Functional Health Literacy reading score (S-TOFHLA) in a regression model that entered the groups of variables as blocks.

Results: The regression model showed that of the demographic variables only years of education was significantly related to S-TOFHLA score. The following cognitive measures were related to S-TOFHLA score: (1) general verbal ability (WAIS-III Vocabulary; $t = 2.53$, $p = 0.014$); (2) psychomotor speed (WAIS-III Digit Symbol; $t = 3.92$, $p < 0.001$); (3) concept formation (Category test; $t = 2.04$, $p = 0.046$); and (4) prospective memory ($t = 3.04$, $p = 0.003$).

Conclusion: Results show that not only was prospective memory related to health literacy but so too were psychomotor speed and concept formation. The association of these diverse cognitive abilities with health literacy illustrates the complex array of skills that may be required to understand even basic healthcare-related tasks. Although general cognitive ability might be thought to account for the observed relations, it may be noted that one of the single best predictors of general cognitive status, general verbal ability, was included in the model. While clearly related to S-TOFHLA score, even after its inclusion these other variables remained significant. This suggests that beyond basic and general cognitive ability, health literacy may be related to complex cognitive functions such as meta-memory and concept formation.

Uncertainty Of Advance Care Planning Treatment Preferences Among Diverse Older Adults

Rebecca L. Sudore, MD, Assistant Professor of Medicine, University of California, San Francisco, Dean Schillinger, MD, Professor of Medicine, University of California, San Francisco
Terri R. Fried, MD, Professor of Medicine, Yale University

BACKGROUND: Hypothetical scenarios are often used in advance care planning (ACP). Older persons may be unprepared to make treatment decisions and uncertain about their preferences. Using a hypothetical scenario, we assessed certainty about treatment preferences among older adults.

DESIGN AND METHODS: 205 English and Spanish-speakers, aged ≥ 50 years, were recruited from a county hospital in San Francisco. The scenario: "Imagine your doctor said that you have a serious disease and may die within 6 months. You then get very sick. Your doctor thinks that life-support treatments will not help you live longer and will not cure your disease." Participants were asked to choose: all life support (LS) treatments; try LS with an option of stopping; or no LS, and then were asked how certain they were about this decision (very sure, sure, not so sure, not sure at all). Participants were considered to be completely certain if they reported "very sure." We assessed associations between uncertainty and patient characteristics and literacy.

RESULTS: Mean age of participants was 61 years and 31% were Latino, 25% White, 24% African American, 9% Asian/Pacific Islander,10% were Multi-ethnic, 52% female, 31% had < high school education, 40% had limited literacy, 29% were Spanish-speaking, and 69% had fair-to-poor self-rated health status. Ninety two participants (45%) reported not being entirely certain of their preferences: 21% wanted all LS, 30% to try LS, and 49% no LS. Uncertainty did not vary by treatment preference (p=0.35). In multivariable analyses, uncertainty was associated with being Asian/Pacific Islander (OR 4.90; 95% CI, 1.42-16.90) and Latino vs. White (OR 2.45; 95% CI 1.04-5.81); having limited vs. adequate literacy (OR 1.91; 95% CI 0.99-3.70), and fair-to-poor vs. good-to-excellent health (OR 2.03; 95% CI 1.00-4.15).

CONCLUSIONS: Approximately half of participants were less than completely certain about a scenario-based ACP treatment decision, even though the scenario included a clear outcome of treatment. Uncertainty was more common among minorities, participants with limited literacy, and poor health status. Many patients may be unable to make definitive ACP decisions. Culturally sensitive, literacy-appropriate tools are needed to help patients prepare for decision making about their future health care.

Health Literacy Is Related to Problem Solving Skills

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Drenna Waldrop-Valverde, PhD, Research Associate Professor, University of Miami

Supported by grant MH74664 to Dr. Waldrop-Valverde from the National Institute of Mental Health.

Background: Although health literacy can be thought of as a healthcare-related extension of the academic skill of reading, the complexity of dealing with health care situations suggests that a broader conceptualization may be useful. We argue that health literacy may be thought of as a form of everyday problem solving that requires not only basic reading ability but also knowledge about healthcare and the ability to use this information in novel situations. In this study, we test this hypothesis be evaluating which cognitive abilities are related to performance on the Test of Functional Health Literacy in Adults (TOFHLA), reading comprehension section.

Method: As part of a study of the cognitive determinants of medication taking skills in individuals with HIV infection, participants (n = 183) completed a battery of neuropsychological measures that included measures of psychomotor speed (the Purdue Pegboard), verbal memory (Rey Auditory Verbal Learning Test or AVLT), visual memory (Rey Complex Figure Test or CFT), and the reading comprehension section of the TOFHLA. They also completed the Tower of London, as standard measure of general problem solving skills that requires the person assessed to move rings according to rules from one position to another. It thus constitutes a novel problem that is unfamiliar to most individuals. We evaluated the ability of the battery of measures to predict individuals' performance on the TOFHLA by creating a multiple regression model that entered variables in three blocks: (1) demographics, (2) cognitive measures except the TOL, and (3) the TOL. We hypothesized that after taking age, education, ethnicity, psychomotor speed, and verbal and visual memory into account, the TOL would significantly predict health literacy, consistent with the hypothesis that health literacy is also related to the ability to solve novel problems.

Results: Results of the regression model confirmed our hypothesis. Of the demographic variables, only years of education predicted TOFHLA performance; age, gender, and ethnicity were unrelated. Of the cognitive variables, only verbal memory (AVLT) performance was related to TOFHLA score. After entering these variables, TOL score still significantly predicted TOFHLA score. Its inclusion in the regression model significantly increased the R^2 value associated with it (F [1, 175] = 9.63, p = 0.002).

Conclusion: These results are consistent with a conceptualization of health literacy, as least as measured by the TOFHLA, as a more complex skill that requires not only reading and knowledge but also may be related to novel problem solving. This conceptualization may be useful in developing interventions to improve health literacy and related health outcomes in vulnerable populations.

Measuring Health Literacy across Diverse Populations

Susan J. Shaw, PhD, James Vivian, PhD, Cristina Huebner, MA, Julie Armin, MA, Ana Vargas, Jeffrey Markham, Phuong Do, Victor Reyes, Fayana Richards, Anne Awad, MSW

BACKGROUND: Existing health literacy measures cannot be widely applied across culturally and linguistically diverse groups. Research from several fields has explored health literacy as multidimensional concept that includes cognitive tasks and self-care behavior. This paper will present health literacy findings from our multimethod study, "The Impact of Cultural Differences on Health Literacy and Chronic Disease Outcomes," based at a Massachusetts community health center.

METHODS: Epidemiological surveys were administered by bilingual interviewers to 296 participants from 4 ethnic groups (Vietnamese, African-American, white, Latino). We matched health literacy scales to participants' language of choice. In Wave 1, all participants completed the TOFHLA numeracy scale. Latinos completed the SAHLSA, while English-speakers (White and Black) completed the REALM. We translated the TOFHLA numeracy scale into Vietnamese. In Wave 2 (12 months from baseline), we added the complete TOFHLA reading comprehension scale, translating it into Vietnamese and administering English, Spanish and Vietnamese versions of the entire TOFHLA short form. (We did not repeat the SAHLSA and REALM.) Chronic illness outcomes (diabetes, hypertension) for all participants were assessed through chart reviews at baseline at 12 months (Wave 2), including hgA1c, blood pressure, BMI, lipid profile, and renal function. Quantitative data was analyzed using SPSS. Qualitative research methods were completed with a subset of participants, including in-depth interviews (n=30), home visits (n=6), chronic disease diaries (n=8), and focus groups (n=7). Interviews were recorded, transcribed, and coded and analyzed using Atlas.ti.

RESULTS: In Wave 1, we found significant variation in TOFHLA numeracy scores among ethnic groups, with African American and White means similar to each other and Latino and Vietnamese means similar to each other ($p=.000$). Among non-English-speakers, TOFHLA scores were positively associated with: fluency in and comfort with English ($p<.05$), years of education, and acculturation (for Latinos). In Wave 2, one-third of Latinos had inadequate health literacy as measured by the TOFHLA (with similar scores on the SAHLSA in Wave 1), compared with 45% of Vietnamese and over 80% of English-speaking (white and African-American) patients ($p<.04$). While Vietnamese patients had the lowest mean TOFHLA scores, they had the fewest abnormal test results in chart reviews, indicating better chronic disease management and health status. Qualitative interviews with participants indicated a wide range of interpretations of TOFHLA questions. In discussions of the TOFHLA instrument in a focus group setting, participants often substituted their own illness or health care experiences for the abstract examples offered in the instrument, at times leading to incorrect responses. Vietnamese participants were unfamiliar with the cloze procedure used in our translated version of the TOFHLA reading comprehension scale. This lack of familiarity intimidated Vietnamese participants who often became hostile and abandoned the instrument before completing it, despite producing correct answers and despite reassurances from the interviewer.

CONCLUSIONS: Current measures of health literacy have proved inadequate for uniformly assessing diverse groups. Translation of existing measures into other languages (e.g., Vietnamese) may not adequately measure real-life disease management capacity among non-English speaking populations

Oral Abstract Session III: Tuesday October 20, 2009 2:00pm

Supporting informed choices about bowel cancer screening among adults with lower levels of education and literacy: A randomized controlled trial of a decision aid

Sian K Smith, BSc (Hons), Lyndal Trevena, MBBS MPH PhD, Judy Simpson, PhD, Alexandra Barratt, MBBS MPH PhD, Don Nutbeam, PhD, Kirsten J McCaffery, PhD

Background: Despite the proliferation of interventions designed to engage and empower patients in clinical decisions, few efforts have been made to support patient participation in decision making among socioeconomically disadvantaged and low literacy populations. This paper presents the results of a randomized trial of a bowel cancer screening decision aid specifically designed to help adults with lower levels of education and literacy make informed decisions about faecal occult blood testing (FOBT).

Methods: This was a three-arm randomized trial conducted in New South Wales, Australia among men and women aged between 55-64 years, with lower levels of education and at average risk of bowel cancer. Participants were recruited by telephone from the Australian electoral register, from areas of higher socioeconomic disadvantage, between July to November 2008. All participants (n=572) received an FOBT screening kit and were randomized to 1 of 3 arms: (1) standard consumer information booklet from the Australian Government National Bowel Cancer Screening Program; (2) a decision aid (DA), audio visual DVD and a question prompt list (QPL) and; (3) DA and DVD only. Participants were assessed by telephone interview 2 weeks after they had received their test kit and information booklet. The primary outcomes of the trial were informed choice and involvement in screening decisions. Secondary outcomes included: decisional conflict and satisfaction, anxiety, screening interest and confidence in decision making. Screening behaviour was assessed from the bowel cancer screening laboratory records.

Results: Of the 2850 respondents who were initially contacted, 675 were eligible, and 572 (84%) consented to take part in the trial. A total of 530 participants (99%) completed the follow up telephone interview. Participants who received the decision aid demonstrated greater levels of knowledge about the cumulative outcomes of FOBT compared to the controls (mean scores (out of 12) were 6.50 for the decision aid groups, and 4.10 for the controls ($p<0.001$)). The decision aid significantly affected attitudes (51.0% of decision aid recipients had favorable attitudes towards FOBT versus 65.1% of control participants; P=0.002), and screening behaviour (59.1% of decision aid participants completed the screening test versus 75.1% in the standard information group; P=0.001). A significantly higher proportion of participants receiving the decision aid interventions made an informed choice, compared to the controls (33.6% versus 11.6% respectively; $p< 0.001$). The decision aid did not increase decisional conflict, anxiety, or worry about bowel cancer.

Conclusions: Tailored decision support information can be effective in facilitating informed choices and greater involvement in decisions about bowel cancer screening among adults with lower education levels without increasing anxiety, decisional conflict and worry about bowel cancer. The decision aid affected attitudes and screening participation.

Keywords: decision aid, informed choice, education, literacy, randomized controlled trial, bowel cancer screening, faecal occult blood test.

Low diabetes numeracy predicts worse glycemic control

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Background: Lower health literacy has been associated with worse glycemic control (A1C) among patients with diabetes. Recently, in a cross-sectional study, diabetes-related numeracy has also been associated with worse glycemic control. The objective of this study was to examine in a longitudinal trial, the impact of literacy and diabetes-related numeracy on the change in hemoglobin A1C (A1C).

Methods: Two concurrent randomized controlled trials were performed to evaluate the role of a literacy and numeracy-focused diabetes management intervention. Between April 2006 and June 2008 198 patients with diabetes and A1C $\geq$ 7.0% were enrolled from two academic medical centers and followed for 6-months. Both control and intervention patients participated in a 3-month diabetes disease management program and intervention patients participated in an enhanced program that included literacy and numeracy-sensitive diabetes education. At enrollment, literacy was measured with the Rapid Estimate of Adult Literacy in Medicine (REALM) and diabetes-numeracy with the Diabetes Numeracy Test (DNT). A1C was collected at baseline, 3-months, and 6-months. The relationship between patients' diabetes-related numeracy skill (DNT) and A1C was evaluated at each time point using Spearman's rho. Multivariable linear regression analyses evaluated diabetes-related numeracy on glycemic control, adjusting for age, gender, race, study site, diabetes type, income, study group assignment, time of A1C assessment, and baseline A1C.

Results: Patients were a median of 52 [IQR: 42-59] years old, 36% were male, and 43% African American. Almost half (49%) had a high school education or less, and almost 40% of patients had a literacy level below the 9th grade. DNT performance suggested diabetes-related numeracy deficits with a median score of 59% [IQR: 26%-86%]. The median baseline A1C was 9.1% [IQR: 7.7%-10.4%]. No association was found between patient's diabetes-related numeracy skill (DNT) and baseline A1C (spearman's rho: -0.03; p=0.67). However, lower DNT score at enrollment was significantly associated with a higher A1C at both 3-months (rho: -0.23; p=0.003) and 6-months (rho:-0.30; p<0.001). Lower baseline DNT correlated with decreased improvement in A1C from baseline to 3 months (rho:-0.20; p=0.009) (Figure 1). In adjusted analyses, higher baseline DNT score remained a significant predictor of improved A1C (β [95%CI]: -0.62 [-1.22 to -0.02]; p=0.044). No association was found between literacy and glycemic control at baseline, 3 or 6 months follow-up.

Conclusions: Diabetes care often includes interpretation and application of quantitative information. Lower diabetes-related numeracy skill identifies patients more at risk for persistent poor glycemic control and may be an important independent target in future interventions.

Clinical Trials Registrations: NCT00311922 & NCT00469105

Results of an evaluation of the health literacy environment in Catalan hospitals

Oana Gröne, MA, Rima E. Rudd, ScD, MSPH

Background The US Institute of Medicine highlighted the importance of attention to the dual nature of health literacy: to the literacy skills of individuals and to the literacy related assumptions and demands of health systems and health institutions. The mismatch between existing skills of individuals and the demands of systems results in well documented negative health outcomes and to health disparities. We report on a systematic assessment of 10 hospitals in the Autonomous Community of Catalonia, Spain, to identify literacy related barriers that might impede access for those seeking services and care.

Objective To evaluate the health literacy environment in Catalonian Hospitals by a) assessing the navigation in hospitals of the Catalan HPH network and b) assessing written communication (such as informed consent and patient education materials) for one key health care process: cataract surgery.

Methods We conducted walking tours in 10 hospitals in Barcelona Spain and examined navigation and written communication. For the assessment of the navigation system we used standardized ratings based on internal self-assessment and external participant observation. For the assessment of the written communication we applied specific health literacy assessment tools such as SAM, INFLEZS, PMOSE/IKIRSCH and the Plain Word Technique to patient information materials for the cataract surgery.

Results While the evaluation identified many good practices, areas that would benefit from improvement were also identified. In many cases signs and other navigation elements such as the telephone service did not facilitate orientation for both hospital staff and patients and their families. Illegible signs, use of scientific language and acronyms, lack of consistency in the used terminology, and lack of maps for visual orientation were some of the literacy related barriers we found.

Regarding written communication, the assessment yielded that information material, in particular informed consent forms, required a high educational and health literacy level. INFLESZ scores ranged from 87,22 for a patient material distributed before surgery, result indicating a good material requiring only 4 years of education, to 44.35 for an informed consent that would require at least a college degree in order to be understood by the patient. The way informed consent forms and patient information materials were elaborated differed significantly from one hospital to another in content, organization, layout and presentation.

Conclusions The assessment tools applied are appropriate to identify concrete improvements in the revision of navigation elements and wording, style and layout of written materials. Action within institutions can redress several of these issues at relatively low cost in terms of time and funding. Such action could include orientation for all new staff, discussions about literacy skills and examples of action to reduce demands. In addition, training of professional staff responsible for the development and distribution of newly written materials to be used by patients is one important step that proved to be efficient not only in improving the accessibility of patient materials but also in increasing staff awareness of and sensitivity to health literacy issues.

Vignettes and photonovellas to enhance training for workers with limited English

Boyd H. Davis, PhD, Mary K. Smith, RN, MBA

Background

We focus on the need for enhanced training for second language and low literacy adult providers that improves their health literacy skills in oral and written communication, cross-cultural communication, and internet-delivered information. Literacy experts have strongly recommended the use of graphics and storylines since the mid-nineties; photonovellas were developed for low-literacy recruits during World War II; and clinical vignettes can be used to measure successful medical education, a technique in use for more than fifty years. Graphics, narratives, photonovellas and vignettes can easily be adapted to healthcare training for second-language and low-literacy entry-level healthcare workers. 55% of Nursing Assistants (NA) have no more than a highschool degree and roughly 25% of today's NA students are second-language newcomers, placing them at risk for both low literacy and low health literacy.

Methods

We developed miniaturized vignettes for interactive multimedia (Figure 1) and internet-delivered materials for training of second language and low-literacy NAs. Using a community based participatory action approach, we incorporated university student created photonovellas on healthcare for the elderly across multiple cultural groups. The learning process involved reading, talking and writing in response to the vignettes collected through ethnographic observation and group-generated photovellas. As a result, NA participants exhibited increased vocabulary and lexical density as well as cross-cultural problem-solving skills. The materials were developed with the support of the Alzheimer's Association, and tested and implemented at Central Piedmont Community College (Charlotte, NC, USA) across 15 courses for NAs, and 3 courses for first-year Nursing students, a total of 400 students.

Results

After implementation of the enhanced materials, NA student outcomes at certification level produced pass rates for nurse aide certification that increased to 90% on average across 15 classes; their previous pass rate had been 80%. Instructors report a greater retention of second language learners due to accessibility of materials and ability to practice and repeat, and an advance in language skills by an average rise of two years per student as demonstrated in standardized pre- and post-testing using the Test of Adult Basic Education. In conjunction with colleagues in Taiwan, photonovellas were expanded into cross-cultural units in online collaboration with university students in Taiwan to introduce issues of aging and health literacy into units for high school students. Consequently, photonovellas and multimedia became models for role-playing about health communication in nursing courses in both Taiwan and North Carolina.

Conclusions

NAs represent the greatest part of hands-on care, yet receive inadequate training to prepare them to communicate with an increasingly ethnically, racially and linguistically diverse group of people. Training that includes multilingual vignettes and photonovellas about cultural features of caregiving that they are likely to face can increase their engagement, their literacy, and their health literacy.