Abstracts Presented at the 2009 Conference

Thematic Areas:

THEMATIC AREA – ADULT BASIC EDUCATION (ABE)

Impact And Outcomes From Teaching Health Literacy To Adults With Limited Literacy.

Lorna Rivera[1]; [1]Mauricio Gastón Institute for Latino Public Policy, University of Massachusetts-Boston, Boston, MA (ID - 4)

Background

Over 90 million adults in the United States have limited literacy skills, and much research has shown that there is a strong correlation between low literacy skills and poor health outcomes. Adult Basic Education (ABE) programs serve adults with limited literacy and they are a vital avenue for reaching a highly vulnerable population that is adversely affected by health disparities. This research investigates the impact and outcomes of health literacy education on minority adults who participate in ABE programs in one of Boston's poorest neighborhoods. The research findings illustrate effective methods for teaching and learning about health literacy and they provide insight into the challenges facing adults with limited literacy.

Methodology

This research is funded by a grant from the National Center on Minority Health Disparities to investigate: 1) the content and processes used by Adult Basic Education (ABE) programs to teach health literacy; 2) how ABE students learn and apply what they have learned about health literacy; and, 3) how ABE learners increase their sense of self-efficacy related to health. Researchers studied three ABE programs in Boston, MA. Each program delivered health literacy education for ten weeks for two semesters. In the first semester the ABE health literacy class used a "teacher-centered" approach to instruction, and in the second semester the class used a "learner-centered" approach to instruction. Researchers gathered qualitative and quantitative data including: 1) Data on attendance and retention of participants who were enrolled in the health literacy classes; 2) Pre and Post Surveys of participants' health knowledge and perceptions about health topics; 3) Focus Groups with participants at the end of each semester; 4) Pre and Post Self-efficacy scales; 5) Participant observation of ABE health literacy classes; 6) Content analysis of health curricula; and, g) Interviews with program staff.

Results

The findings showed that the majority of participants shared what they learned in their health literacy classes with their families, friends, and people in their communities. All of the participants demonstrated increased levels of self-efficacy related to health. Researchers found no significant differences in health literacy knowledge acquisition between classes that utilized a "teacher-centered" approach versus classes that used a "learner-centered" instructional approach. In addition to documenting desirable changes in self-efficacy, collective efficacy was generated within the social network of the ABE classrooms. Bandura (1997) defines collective efficacy as a group's shared beliefs in its capacities to organize and execute actions to produce desired goals. For example, in one program the participants exercised together during their break time, and in another program they advocated that water be made available in vending machines. Our research showed significant improvement in participants' health knowledge and action about nutrition and healthy eating in particular.

Conclusion

Health care providers continue to under-utilize the Adult Basic Education (ABE) system as a vehicle for connecting with a hard-to-reach population (Zarcadoolas, Pleasant, Greer, 2006).

Our findings suggest that ABE programs that offer health literacy education are an important intervention in addressing the challenge of low health literacy and for addressing health disparities.

Expanding Public Health Literacy through Engaging English as a Second Language (ESL) Learners - Evaluation of the 'Learners as Interpreters' Pilot Project on Transnational Identity, Language and Food Culture.

Margaret A. Handley[1], Maricel G. Santos[2], Jeff McClelland[3]. [1]UCSF Assistant Professor in Epidemiology and Biostatistics and UCSF Center for Vulnerable Populations, Department of Medicine; [2]San Francisco State, Department of English; [3]Oakland Adult School. (ID – 24)

Background

Public health literacy is defined as the degree to which individuals and groups can obtain, process, understand, evaluate, and act on information needed to make public health decisions that benefit the community. Public health literacy can complement individual health literacy to take into account complex socio-ecologic forces affecting health. Public health literacy is particularly relevant for immigrant communities who may have limited access to medical care and thereby are more vulnerable to missing disease prevention messages, unless public initiatives are developed that can build these literacy skills. 'Transnational' immigrant communities are unique in that these immigrants maintain strong connections to places of origin through communication, food sharing and cultural exchanges. Because of this connectedness, transnational communities pose unique challenges as well as opportunities for improving public health literacy skills. On the one hand transnational communities face significant barriers in accessing health care because of limited English language and literacy skills, cultural clashes between health care expectations and home practices, and limited exposure to effective health-seeking behaviors. On the other hand, there are many strengths associated with transnational identity that have not been explored for the purposes of informing preventive health interventions.

Methods

Between 2008 and 2009 we conducted a qualitative classroom-based study of English as a Second Language (ESL) learners' interpretations of health-related texts related to staying healthy while preserving transnational food traditions, focusing on childhood nutrition and lead poisoning risk from eating imported contaminated foods. The study used an ethnographic evaluation based on grounded theory using notes, observations, interviews and transcripts from daily classroom-based activities. The project goals were to elicit ESL learners' interpretations of health-related texts to create health-promoting messages about staying healthy while preserving transnational food traditions. The steps for the study involved: (1) engaging ESL learners in the process of 're-storying' health-related texts; (2) using participatory methods to encourage a sense of shared responsibility for health messages; (3) developing strategies to promote transnational identity as a community health asset; and (4) evaluating the study using a public health literacy framework. The study was carried out in two ESL class settings in the San Francisco Bay Area.

Results

Learner sample (n=45): Predominantly Mexican-born (66%), between ages 30-40 years, with 4-8 years of education, and length of U.S. residence between 0 and 15 years. Findings indicate that ESL learners readily re-framed complex health information so as to provide more transnationally-oriented health messages. Learners also rapidly developed competencies related to public health literacy skills in the following areas: (1) knowledge of key public health concepts (prevention, non-visible exposures, social determinants); (2) critical skills (data synthesis, framing of health behaviors using self-efficacy models), and (3) civic orientation (ownership of transnational community health problems, de-stigmatization of risk behaviors) that are relevant to public health efforts beyond these topics.

Conclusion

ESL learners represent an under-appreciated transnational community whose perspectives can inform public health literacy interventions and the development of health messages. We believe the 'learners as interpreters' model can be extended to a wide range of public health topics.

THEMATIC AREA – CANCER

Information Needs of Cancer Patients with Limited Health Literacy Robin K Matsuyama[1]; Patricia Carcaise-Edinboro[1]; Laura Kuhn[1]; Maureen C Wilson[1]; [1]Virginia Commonwealth University (VCU), Richmond, VA. (ID - 3)

Background:

Cancer patients need to be able to obtain and understand complex information about cancer and treatment (e.g., risks and benefits, informed consent, odds in prognosis, median survival rates) however patients with limited health literacy may not be able to do these things successfully. It has been demonstrated that those at risk for lower health literacy are less-educated, elderly, poor, have chronic diseases, or are minorities; these are the same groups that are at risk for worse cancer outcomes.[1-2]

Methods:

The study aim was to examine the associations between the health literacy levels of newly diagnosed cancer patients and 1) their expressed cancer care information needs; 2) their reported receipt of relevant information; and 3) the discrepancy between expressed information need and information received. A longitudinal study was conducted over 9 months with a purposive sample of 79 newly diagnosed African American (N =33) and Non-Hispanic White (N = 46) cancer patients. The study employed validated measures to examine patients' health literacy levels, self-reported cancer care information needs and information received, as well as demographic, psychosocial and temporal factors that may affect health literacy. The Rapid Estimate of Literacy in Medicine (REALM; *)*[3] was used to measure health literacy. Participants rated information needs on a five point Likert scale from "not at all" to "very important." They also reported on what information they received. Where the participant reported an information need and did not receive the information, it was coded as an "information discrepancy."

Results:

Thirty percent of study participants had limited health literacy as measured by the REALM. These individuals reported greater information needs than those with adequate health literacy ($p < .05$). There also were significant differences in information discrepancies. Those with limited health literacy had greater information discrepancies than those with adequate health literacy ($p < .02$). Differences in information needs and information discrepancies were correlated with race and education.

Conclusions:

Cancer patients with limited health literacy are not receiving all the information they feel is important. These findings have implications for developing interventions to provide desired information to patients about their cancer care.

Voices of cancer survivors: social media as a new frontier in health literacy. Wen-ying Sylvia Chou[1] **;** Anna M. Folkers[2]; Yvonne Hunt[1]; Erik Augustson[1]; Brad Hesse[1]; [1]National Cancer Institute, National Institutes of Health, Bethesda, MD; [2]New College of Florida, Sarasota, FL. (ID - 6)

Background:

User-generated health-information has proliferated with the rapid growth of social media. In-depth qualitative analysis can provide important clues to the impact of this new information source on health literacy. The current study applied linguistic analysis to YouTube cancer survivors' illness narratives, with the goal of describing key narrative components that contribute to shaping public perception of the meaning of cancer survivorship.

Methods:

The terms "cancer survivor" and "cancer stories" were used for searches of YouTube. Forty videos were identified and transcribed. Led by a linguist, qualitative narrative analysis was conducted using a team-based, iterative process and Atlas.TI software.

Results:

YouTube stories can be characterized by language of agency, use of 'medicalese', emotional engagement, and depersonalized references to medical professionals. Through such linguistic choices, YouTube video Posters positioned themselves as owners of their illness, sharing knowledge/perspectives with viewers, and constructing themselves as taking control of their decision-making and overall outlook.

Conclusions:

While the health impact of social media remains is just beginning to be assessed, the findings of this descriptive study point to ways through which online personal stories and health information are shaping the public's health literacy. The observation that YouTube Posters self-position as highly in control suggests that social media may be a platform that transcends traditional roles and authority figures in the exchange of health information. In this context, social media may act as a vehicle for constructing and sharing meaning with others. User-generated health information content represents an exciting new frontier in health literacy.

Developing a computer touch screen colorectal cancer screening decision aid for urban low-literacy clinic populations: Lessons learned. Sarah Baurle Bass[1]; Sheryl Burt Ruzek[1]; Thomas F. Gordon[1]; Caitlin Wolak[1]; Michael J. Rovito[1]; Johnson Britto[1]; Gabriella Mora[1]; Lalitha Parameswaran[1]; Stephanie Ward[1]; Brian Meyer[1]; Karen Lin[1]; Anu Paranjape[1]; [1]Temple University, Philadelphia, PA. (ID -15)

Background:

Colorectal cancer (CRC) is the third leading cancer death in the United States, disproportionately affecting African Americans. While survival rates for CRC are high if caught early through screening techniques such as colonoscopy, African Americans exhibit significantly lower screening behavior and thus also have significantly higher mortality. Understanding what CRC screening is and communicating risk to patients with low literacy, however, can be challenging.

Methods:

This presentation will discuss the development of a CRC screening decision aid for African American patients in a General Internal Medicine clinic in Philadelphia who scored a six or below on the REALM-R literacy tool. We used data from focus groups and perceptual mapping surveys to identify themes that reflected attitudes and beliefs about CRC screening and perceived barriers to screening in African Americans with limited literacy. We developed and modified an interactive computer touch screen, web-based decision aid for this population using developmentally appropriate language, culturally appropriate graphics and videotaped testimonials from similar patients who had undergone colonoscopy screening. Part of a larger case-control study, comparing the use of the screening tool to a written handout on colonoscopy, 60 GIM clinic patients were randomized into a control or intervention group (28 control, 32 intervention).

Results:

Preliminary results indicate that patients in the intervention group liked the touch screen and were able to follow the directions on how to advance the tutorial. They also indicated liking the information the tutorial provided. Significantly more control patients indicated a willingness to have colonoscopy compared to those receiving the printed handout. A lesson learned was that many intervention patients advanced through the tutorial quickly, not seeing the patient testimonials. Those that did see the testimonials indicated they were an integral part of helping them understand how important colonoscopy is, thus making it important to build into the touch screen program a "stop" mechanism that does not allow a user to advance without seeing the videos.

Conclusions:

There are a number of challenges for developing the CRC decision aid for populations with limited literacy. However, specific strategies can be used to address the needs of those with limited literacy in a clinical setting.

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[1]; Lyndal Trevena[1]; Judy Simpson; Alexandra Barratt; Don Nutbeam; Kirsten J McCaffery[1]; [1]University of Sydney, Australia; (ID -16)

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.

THEMATIC AREA – CHRONIC DISEASE

Does Health Literacy Affect Asthma-Beliefs Among Older Asthmatics? Alex D. Federman[1]; Michael S. Wolf[2]; Juan P. Wisnivesky[1]; Howard Levental[3]; Ethan A. Halm[4]; [1] Mount Sinai Hospital, NY, NY; [2]Northwestern University, Chicago, IL; [3]Rutgers University; New Brunswick, NJ; [4]University of Texas, Southwestern, Dallas, TX (ID - 1)

Background

Asthma is associated with high rates of morbidity and acute care services use in older adults. Engagement in self-management may improve asthma outcomes, but older adults often face important barriers to disease self-management, including suboptimal asthma beliefs and inadequate health literacy (HL). Understanding the interaction between beliefs and HL may guide development of better educational interventions.

Methods

We interviewed a random selection of 50 adult asthmatics (age ≥50 y), in English or Spanish, in the hospital-based primary care clinic of a large, urban academic medical center in New York City, NY (response, 62%). Measures included the Short Test of Functional HL in Adults (STOFHLA) and asthma beliefs, including the No Symptoms/No Asthma belief (NSNA), which is associated with poor asthma-self management.

Results

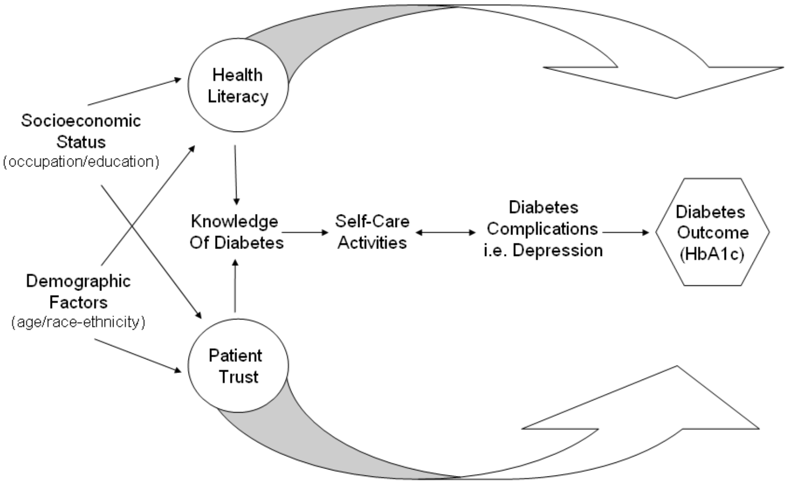
The mean age was 62 years, 88% were women, 51% Latino, 53% black, and 52% were previously hospitalized for asthma. HL was inadequate in 34%, and 40% had the NSNA belief. NSNA belief was more common among patients with inadequate HL (59% vs. 30%). Differences were also observed for other beliefs: doctor can cure asthma (47% vs. 27%); asthma drugs do not work as well if used all the time (41% vs. 34%); and future health depends on my asthma medications (61% vs. 76%).

Conclusions

Results of this pilot study suggest that adverse asthma beliefs may be more common among older asthmatics with inadequate health literacy. If confirmed in other studies, these findings would indicate a need to engineer low literacy health belief oriented messages in educational interventions for asthma.

The Impact Of Health Literacy And Patient Trust On Glycemic Control. Josephine M. Mancuso. Marquette University College of Nursing, Milwaukee WI (ID – 7)

Background: Diabetes with its consequence of premature death, complications, economic costs, and societal burden is antecedent to a public health crisis foreseen to worsen within several decades. Improvement of diabetes outcomes, specifically glycemic control measured by HbA1c, can



impact this critical situation. Thus, establishing determinants of glycemic control is imperative. Two elements identified in the literature that may affect the outcome of glycemic control are health literacy and patient trust. To date, there has been little research that measures patient trust and health literacy together in order ascertain their relevance on diabetic goals. This study examined health literacy and patient trust as predictors of glycemic control. Related factors of demographics, socioeconomic status, diabetes knowledge, self-care activities, and depression were also considered.

Framework: Constructed from a review of the literature, the conceptual framework postulates that patient trust and health literacy are associated with HbA1c. Socioeconomic status and demographics influence health literacy and patient trust subsequently shaping diabetes knowledge. Diabetes knowledge is related to performance of self-care activities, which in turn, affects diabetes complications, specifically depression, thereby impacting HbA1c.

Methods: Implementing a cross-sectional, predictive design, a convenience sample of 102 uninsured patients with diabetes was recruited from two urban primary care clinics. Standard multiple regression was calculated to predict the impact of health literacy, patient trust, self-care activities, diabetes knowledge, and depression on HbA1c. Correlations, with a Bon Ferroni $p<0.01$, were analyzed among socioeconomic status, demographics, health literacy, patient trust, diabetes knowledge, self-care activities, depression, and HbA1c.

Results: The convenience sample consisted of primarily Non-Hispanic Black (79%) females (61%). Mean age was 52 years. Employment was in the menial/unskilled/semi-skilled occupations (76%). Type II diabetes was predominant (96%). Trust in one's health care provider was high (98%) and most participants (64%) were health literate with a mean score of 75.9. Less than half of the participants (47%) had scores indicative of depressive symptoms. Mean HbA1c was 8.2% with 65% of the participants having uncontrolled diabetes. The regression model was significant with patient trust and depression accounting for 28.5% of the variance in HbA1c. There was a significant positive correlation between socioeconomic status and health literacy (rho=.35), between diabetes knowledge and health literacy (rho=.30), and between depression and HbA1c (r=.34). There was a significant negative correlation between patient trust and HbA1c (rho=-.43).

Conclusion: A majority of the population had poor glycemic control and was health literate, therefore, health literacy may have had less of an impact because other important issues may have overshadowed it i.e. psychosocial aspects. Results support promotion of the patient/provider relationship and depression screening within the diabetes population. Future research is needed to determine what factors may act in concert with, mediate, or override health literacy to fully appreciate the actual role of health literacy in glycemic control. Addressing other critical elements with health literacy may increase our understanding of effective strategies for addressing poor diabetes outcomes.

PLAIN Health (health literacy renamed) and Adherence. Kathryn Lauten[1]; Ulla Connor[1]; Marta Anton[1]; Julie Belz[1]; Beth Goering[1]; Paris Roach[1]; Jim Wolf[1]; [1]Indiana University Perdue University Indianapolis, Indianapolis, IN. (ID - 10)

Background

Health literacy is believed to play a role in the ability of individuals to effectively manage their own health care. Yet, a report by the Institute of Medicine (Ratzan & Parker, 2000) acknowledges that 90 million Americans with low literacy probably also have low health literacy, and that even individuals with adequate health literacy face challenges in the complex literacy demands of health care contexts. In the report, reading ability is one component in health literacy, another is numeracy; background knowledge of medical terms, concepts, and health care systems as well as listening and speaking skills also contribute to health literacy.

Despite the broadening definition of health literacy, most health literacy studies have focused on assessment of materials and on measures of reading ability. A way of assessing this broader definition needs to be developed. The Indiana Center for Intercultural Communication (ICIC) is moving toward that goal by making explicit crucial elements by using a new term, "PLAIN Health Indicators", to not only elicit the use of "plain language" in the health care context but to bring together the important elements -- Process, Literacy, Action, Intercultural interactive communication, and Numeracy.

Methods

This paper reports on a study of an interdisciplinary research project at ICIC that examines multiple dimensions of health literacy and their importance for patients' self-management of chronic diseases, diabetes Type 2 in our case. Effective adherence interventions must take into account the ways in which patients access, process, and act upon information in multiple reading, writing, listening, and speaking situations.

The specific aims of the project are to identify sources of information that diabetes patients access and determine the manner in which they access them; measure their current state of knowledge about diabetes; and measure patients' level of self-management and adherence across health literacy levels and relate this to specific and distinctive linguistic cues in narrative speech.

43 native English speaking US patients and 22 Spanish-speaking patients participated. Data were obtained through semi-structured, in-depth interviews and a survey questionnaire on subject demographics, information sources, ratings of information preferences, and a traditional health literacy test. In addition to such quantitative analyses, a comprehensive linguistic approach was used to analyze patient narratives, in order to identify subjects' attitudes and intentions toward adherence and self-management. A linguistic framework was created to measure components based on locus of control (Rotter, 1966; Wallston, et al., 1976), agency (Bandura, 1989), and patients' emotion toward disease, its management, and health care professionals.

Results

Through a multiple regression analysis, the study was able to identify core variables that explain adherence as well as breakdowns in the transmission of diabetes information into diabetes action. This allows us to draw a new model – PLAIN Health.

Conclusions

This multi-faceted approach provides an inclusive framework for evaluating what has been bundled in the term "health literacy". A longitudinal study is an appropriate next step to implement the PLAIN Health Model and pursue its adherence intervention potential.

Patient-Provider Communication and Low-Income Adults: Age, Race, Literacy, and Optimism Predict Communication Satisfaction. Jakob D. Jensen[1] ; Andy J. King[1]; Lisa Guntzviller[1]; LaShara A. Davis[1] ; [1]Purdue University , West Lafayette, IN. (ID -14)

Background:

Past research has identified communication satisfaction as an important outcome in healthcare interactions. Patients who are satisfied with their healthcare provider's communication skills are more likely to adhere to recommendations across the healthcare continuum. In recognition of this, *Healthy People 2010* established a goal to "increase the proportion of persons who report that their healthcare providers have satisfactory communication skills."

To date, several patient characteristics have been linked to the communication satisfaction targets set by *Healthy People 2010*. Women, non-Hispanics, and those under the age of 65 are all less likely to be satisfied with their provider's communication skills. Low-income populations and individuals without health insurance or a usual source of care also report lower communication satisfaction ratings.

Communication problems between low-income populations and healthcare providers are especially worrisome as low-income individuals have fewer resources and limited healthcare interactions. A primary concern of the medical community is that dissatisfied low-income patients may disregard health advice or reject the healthcare system as a whole, widening healthcare disparities. Previous research has examined the relationship between physician communication and patient communication satisfaction, but factors influencing patient perceptions—perhaps regardless of provider behavior—are less clear. For instance, literacy and numeracy problems are more common in low-income adults, and recent studies suggest that skill deficiencies may be related to communication dissatisfaction and a variety of negative health outcomes. Moreover, given the many challenges that low-income adults face in the healthcare system, coping mechanisms (e.g., optimistic or pessimistic thinking) may dominate their perceptions and behaviors. The present study addresses these issues by examining the relationship between low-income adults' communication satisfaction and literacy, numeracy, and optimism.

Methods:

Low-income adults ($N = 131$) were recruited from seven counties in Indiana through University extension programs serving low-income populations. To achieve research triangulation, participants were surveyed and interviewed about their communication satisfaction with health providers. Communication satisfaction was assessed using four measures from the Medical Expenditures Panel Survey (MEPS). Literacy, numeracy, and optimism were assessed with the Rapid Estimate of Adult Literacy in Medicine (REALM), a brief version of the Test of Functional Health Literacy in Adults (TOFHLA) numeracy scale, and the Life Orientation Test-Revised (LOT-R).

Results:

Survey data revealed that four variables significantly predicted satisfaction: age, race, literacy, and optimism (see Table 1). Low-income adults in the current study were more critical of their healthcare provider's communication skills if they were younger, White, functionally literate, and pessimistic. Follow-up interviews confirmed this pattern and suggested it was a byproduct of patient activism.

Conclusions:

In low-income populations, communication satisfaction may be lower for groups that are traditionally active in doctor-patient interactions (e.g., younger patients, patients with higher literacy skills). Healthcare providers should be aware that older, non-White, optimistic, and literacy deficient patients tend to report greater communication satisfaction than their younger, White, pessimistic, and functionally literate peers. Both groups may be coping with their situation. Healthcare providers should continue to seek out ways to facilitate dialogue with these underserved groups.

Literacy Explains Racial Disparities in Diabetes Medication Adherence. Chandra Y. Osborn[1]; Kerri Cavanaugh[1]; Kenneth A. Wallston[1]; Russell L. Rothman[1] ; [1]Vanderbilt University Medical Center, Nashville, TN. (ID - 25)

Background:

Recent studies suggest health literacy explains racial disparities in self-reported health status, HIV medication adherence, and select, preventative and chronic conditions. Medication adherence in diabetes management is critical for successful glycemic control and optimizing care. The effects of literacy and numeracy in explaining racial disparities in medication adherence and glyemic control have not been examined.

Methods:

From March 2004 until November 2005, 398 diabetes patients were enrolled in a cross-sectional study from two primary care clinics and two diabetes specialty clinics in Nashville, TN and Chapel Hill, NC. Structured in-person interviews were conducted to gather information on patient demographics, validated measures of health literacy (REALM), numeracy (WRAT-3R), diabetes-related numeracy (DNT), self-management behaviors (SDSCA), and glycated hemoglobin (A1C). Medication adherence was evaluated with an item from the SDSCA which asks, "On how many of the last seven days, did you take your recommended diabetes medications?"

Four structural equation models were estimated. Model 1 tested whether African American race predicted lower medication adherence after controlling for age, gender, education, income, insulin use, diabetes type, and duration of diabetes. Model 2 tested whether adherence predicted glycemic control, and explained the association between significant predictors of adherence and glycemic control. Model 3 tested whether race predicted literacy, general numeracy, and diabetes-related numeracy, and whether these variables, in turn, predicted adherence. Model 4, adjusted for significant predictors to adherence in prior models, and tested all direct and indirect pathways to medication adherence and glycemic control.

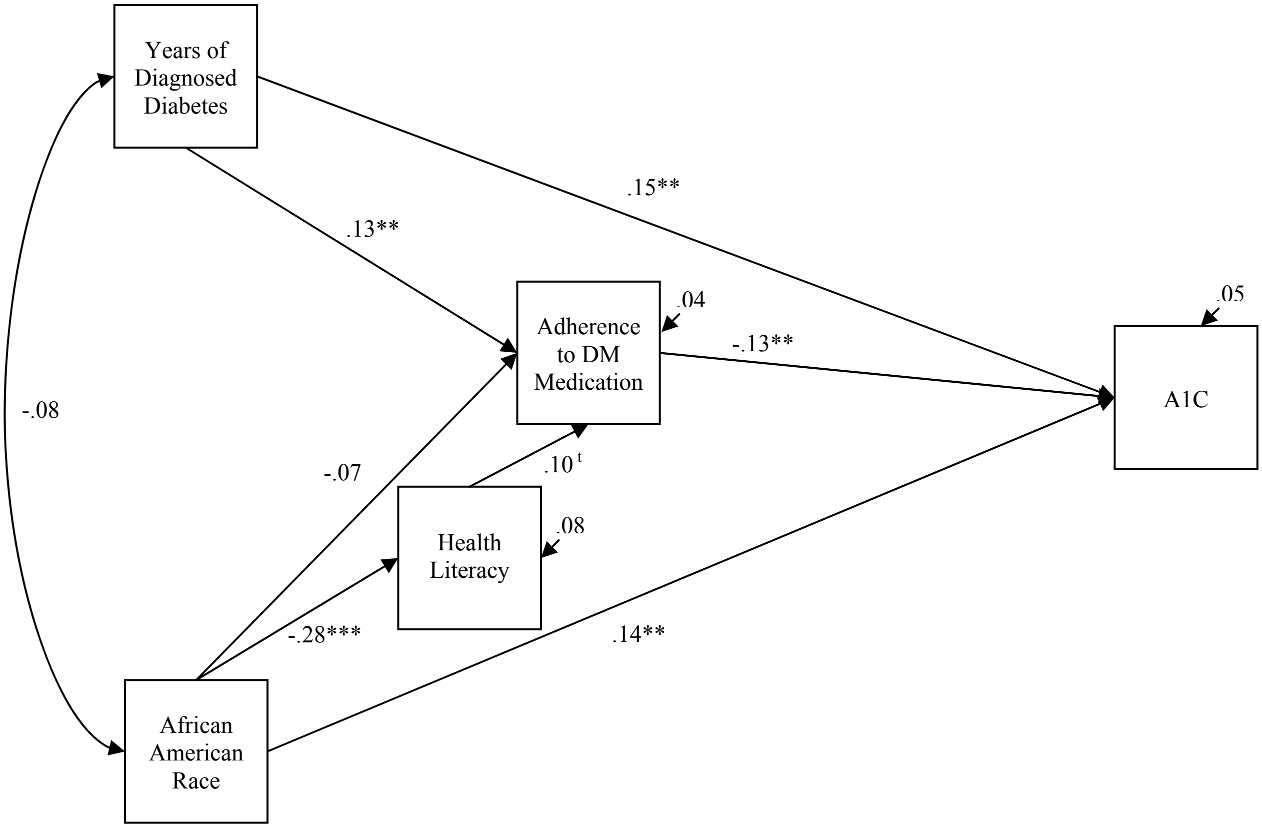
Results:

Patients who reported being African American (AA) or White race were included in the current analyses (n=383). Participants averaged 54 years of age (SD=12.9); 50% were female, 65% White, 44% had incomes <$20,000, 56% reported some college education, 31% had limited literacy (<9th grade reading) skills according to the REALM, and 69% had limited numeracy (<9th grade math) skills according to the WRAT-3.

In Model 1, duration of diabetes was associated with greater adherence (r=0.13, p<0.01), and AA race was associated with less adherence (r=-0.10, p<0.05). In Model 2, medication adherence was associated with lower A1C values (r=-0.13, p<0.01), but did not explain the association between duration of diabetes (r=0.15, p<0.01) and A1C, nor AA race and A1C (r=0.14, p<0.01). In Model 3, AA race was associated with limited literacy (r=-0.28, p<0.001), limited general numeracy (r=-0.43, p<0.001), and limited diabetes-related numeracy (r=-0.48, p<0.001), but only literacy predicted medication adherence. Higher literacy was associated with greater adherence (r=0.12, p<0.02), and reduced the effect of race to non-significance (r=-0.9, p=.14), thereby accounting for the association between AA race and low adherence scores (see Figure).

Conclusions: In patients with diabetes, medication adherence is an important behavior contributing to glycemic control and our findings highlight the importance of acknowledging literacy barriers when attempting to understand and eliminate racial disparities in diabetes. Literacy should be considered in the development of efficacious strategies to reduce differences in the execution of this fundamental self-management behavior.

Figure. Literacy Explains the Association between African American Race and Medication Adherence.



Health Literacy and Prospective Memory in HIV Seropositive Individuals.

Drenna Waldrop-Valverde[1]; Raymond L. Ownby[2]; [1]University of Miami, Miami, FL; [2]Nova Southeastern University, Fort Lauderdale, FL (ID - 36)

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.

Health Literacy is Associated with Executive Function in Older Persons with Memory Problems

Raymond L. Ownby[1]; Jessica Hirth[2]; Drenna Waldrop-Valverde[2], [1]Nova Southeastern University, Fort Lauderdale, FL, [2]University of Miami (ID - 49)

Background:

Data from several studies have suggested that health literacy levels are lower in older adults (e.g., Baker et al., 2000). Baker et al. (2002) studied the relation of cognitive abilities assessed by the Mini-Mental State Exame (MMSE) to scores on the Short Test of Functional Health Literacy in Adults (S-TOFHLA) in older adults and found differences among groups defined by S-TOFHLA score on a number of items, including language, orientation, and memory. Baker et al. (2000) noted that the basic cognitive abilities evaluated by the MMSE may not account for age-related deficits in health literacy. These authors suggested that more complex cognitive abilities, such as working memory that is known to decline with greater age, might account for age-related deficits in health literacy skills. The purpose of this study was to test the hypothesis that complex cognitive skills might be related to health literacy skills in older adults.

Method:

As part of a longitudinal study of the association of cognition, mood, and health literacy with medication adherence in persons treated for memory problems with cholinesterase inhibitor medications, participants ($n = 30$) completed the full TOFHLA at study entry and the ADAS-Cog at three month intervals for periods of up to two years. The battery also included a maze completion task in which individuals were timed while completing a single maze after a training maze. We hypothesized that the maze would evaluate executive abilities as successful completion requires intergration of visuospatial, planning, and psychomotor skills. Subtests of the ADAS-Cog that were similar to those of the MMSE and used in Baker et al.'s (2002) study were evaluated in a generalized estimating equation model that took advantage of repeated administrations of the ADAS-Cog. Models also included time scores on the maze task. Models were calculated using PROC GENMOD in SAS 9.1.

Results:

Results showed that participant performance on cognitive measures of receptive and expressive language skills (following commands and naming common objects), memory (short-term recall of a list of words), and orientation were not related to baseline TOFHLA score (all ps > 0.10). Maze performance, however, was significantly related to health literacy performance (Z score = -5.63, $p < 0.001$).

Conclusions:

Although limited by our small sample size, the robust association of maze performance with scores on a health literacy measure supports the suggestion by Baker et al. that more complex cognitive skills may be related to health literacy. Decline in executive or speed of processing abilities may account for the observed age-related deficit in health literacy proficiency.

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

H Shonna Yin[1]; Alan L Mendelsohn[1]; Michael S Wolf[2]; Ruth M Parker[3]; Arthur Fierman[1]; Linda van Schaick[1]; Isabel S Bazan[1]; Matthew D Kline[1]; Benard P Dreyer[1]; [1]New York University, New York, NY; [2]Northwestern University, Chicago, IL; [3]Emory University, Atlanta, GA; (ID - 53)

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.

Health Literacy and Disease Management in Adolescents with Diabetes Deena J. Chisolm[1]**;** William Gardner[1]; Lauren Johnson[1]; Kelly J Kelleher[1]; [1]Ohio State University, Columbus, OH. (ID - 55)

Background:

Adolescence is a transitional phase during which diabetic youths begin to take increasing responsibility for management of their condition. Challenges in this transition have made adolescence a time of deteriorating self-care and metabolic control. This study assesses health literacy and disease management in a population of adolescent diabetics. We hypothesize that health literacy is associated with self-efficacy and with personal responsibility for disease management but that the association between health literacy and actual disease management behaviors is smaller because of myriad intervening factors.

Methods:

Youths ages 13-18 were recruited in diabetes specialty care clinics affiliated with Nationwide Children's Hospital. Participants completed a health literacy assessment using the Brief Test of Functional Health Literacy in Adults (TOFHLA) and questionnaires including the Diabetes Behavior Rating Scale (DBRS) and the Self-Efficacy for Diabetes (SED) scale. The DBRS includes two subscales: frequency and responsibility. The frequency scale is scored on a 5-point scale where 5 indicates the desired behavior is always done and 1 indicates the desired behavior is never done. The responsibility scale is also scored on a 5-point scale where 5 indicates that the behavior is completely the youth's job and 1 indicates that the behavior is completely the parent's job. Correlational analysis was used to test bivariate relationships between health literacy level, DBRS-responsibility, DBRS-frequency, and SED scores. Multivariate linear regression models, controlling for age, gender, race, and zip code median income, were then built to control for potential confounding. Finally, we tested the relationship between health literacy and specific DBRS behaviors to identify behavior-specific associations with health literacy.

Results:

Ninety-one diabetics were recruited of whom 50% were female and 80% were White. Nine percent of the participants had marginal or inadequate health literacy with Brief TOFHLA scores ranging from 41 to 100 (mean 88.5, s.d. 14.5). Youth responsibility for disease management was significantly correlated with health literacy (r=0.29, p=0.01). Teens with adequate heath literacy scored an average of 4.20 while lower literacy teens averaged of 3.22 (p=0.002). Self-efficacy for diabetes management was also significantly correlated with health literacy (r=0.38, p<0.01). Adequate literacy teens averaged 4.57 on the 6-point SED scale and lower literacy teens averaging 3.42 (p=0.002). Both relationships remained significant after controlling for race, age, gender, and zip code median income. The overall frequency of desired disease management behaviors was not significantly associated health literacy or any other study variable, however, one specific behavior, use of food labels as part of meal planning, was significantly associated with health literacy.

Conclusions:

Most adolescents seen in diabetes specialty care clinics had adequate health literacy however teens with lower literacy took less responsibility for their own disease management and reported lower self-efficacy. Health literacy was not significantly associated with the overall frequency of desired self-management behaviors suggesting that other unmeasured barriers to performance (e.g., desire to "blend in" with peers, low motivation) may dominate health literacy. These findings suggest that health literacy is a necessary but not sufficient factor for maximizing disease management in diabetic teens.

Literacy influences asthma patients' trust of their physician through knowledge of management Andrea Apter; Bennett IM; Bogen D; Garcia L; Sharpe T; Jackson D; Priolo C; Wang X; Ten Have, Y. (ID - 78)

Objective:

Trust is a critical element of the patient-doctor relationship. Because half of the US population has only basic reading and numerical skills, the goal of this study was to assess the impact of literacy on patients' trust of their asthma physician and whether it is mediated by knowledge of inhaled corticosteroid function (ICSK).

Methods:

Secondary analysis of baseline data of an intervention study of adults with moderate or severe asthma. Adults with moderate or severe asthma completed a questionnaire assessing sociodemographics, the Asthma Numeracy Questionnaire (ANQ), the Short Test of Functional Health Literacy in Adults (S-TOFHLA), and the Trust subscale of the Primary Care Assessment Survey. The ANQ tests common numerical concepts discussed by physicians in teaching self-management of asthma. ICSK was measured by a 10-item questionnaire; inhaled corticosteroids are essential medications for all but the mildest asthma. The literacy-trust relationships were assessed with correlations and regression models to which an ICSK variable was added as a potential mediator along with confounder variables. Confounders (demographic variables) were defined to be variables that conceptually impacted either trust, ICSK, or literacy.

Results:

80 adults, 47 + 13 years, 55 female, 52 African American, 9 Latino, 69 high school graduates, 66% with yearly household income below $30,000, mean FEV1ppd 66% + 17%, 21 with hospitalizations and 39 with ED visits for asthma in the last year were evaluated. 53% chose an incorrect response on at least 2/4 ANQ items. On S-TOFHLA, 82% achieved adequate functional health literacy. Mean Trust score was 38 + 4.3. Mean ICSK score was 36 + 6. The ANQ was negatively associated with age (rho=-0.29, p=.01) and race (rho=-0.26, p=.03). The ANQ, but not the S-TOFHLA, was positively associated with ICSK (rho=0.43, p=.0001) and trust (rho= 0.28, p=.01). ICSK was also associated with trust (rho=0.45, p>.0000) satisfying the criteria for potential mediator of the numeracy-trust relationship. Accordingly, adding ICSK to the model of numeracy on trust, while controlling for age and race, eliminated the effect of numeracy on trust. Adjusting for confounders did not change this result.

Conclusion:

Low asthma-related numeracy is associated with distrust of asthma providers. We found evidence that poor understanding of knowledge of inhaled corticosteroid function, whether or not directly concerning numerical issues mediates this association of numeracy with trust. Further research is warranted to determine how interventions might make use of this relationship to improve asthma outcome.

Universal Medication Schedule to Improve Patient Understanding of Prescription Drug Instructions. Bailey Stacy[1], Davis Terry[2], Curtis Laura[1], Shrank WH[3], Parker Ruth[4], and Wolf Michael[1], [1]Northwestern University, Chicago, IL; [2]Lousiana State University, New Orleans, LA; [3]Brigham and Women's Hospital, Boston, MA; [4]Emory University, Atlanta, GA (ID – 94)

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.

THEMATIC AREA – COMMUNICATION

Health Literacy and Healthcare Communication Skills in African American Adults Across the Lifespan. Eva Jackson Hester[1] ; CDR. Mercedes Benitez McCrary[2]; [1]Townson University, Townson, MD; [2]USPHS, CMS, Baltimore, MD. (ID - 11)

Introduction:

Low health literacy has been reported as a pervasive risk factor for poor health outcomes for many African Americans. Health literacy is described as one's ability to access, comprehend, process, and utilize health services through speaking, listening, reading, and writing. Nutbeam (2000)further conceptualizes that health literacy involves not only the ability to read pamphlets and make appointments, but also includes the cognitive and social skills which enable a person to gain access to and use information which promote and maintain good health. However, reports suggest that many African Americans have limited skills in both reading health materials and applying the social, communicative and cognitive skills which promote and maintain good health. Effective language and communication skills are integral for successful provider-patient interactions as patients describe symptoms, inform, respond, and pose questions related to their health concerns. Many African-American adults have been reported to be less participatory in health care interactions by asking fewer questions, failing to request clarification of information not understood, and providing unclear explanations regarding health concerns.

The purpose of this study was to investigate the relationship between communication skills and health literacy skills of African Americans and determine the influence of age, education and gender on attainment of these skills

Participants:

The participants were 125 African-American adults recruited from senior citizen centers, social organizations, churches and government agencies in the Baltimore metropolitan area . Age range of participants was 25-85. Education levels ranged from high school to graduate degrees. All participants reported independence in activities of daily living. Participants were comprised of an approximate number of males and females.

Procedures:

Participants were screened using the Mini Mental State Exam to rule out cognitive and language impairments. Each participant was administered the Healthcare Communication Profile, Health Literacy Screening and *Short Test of Functional Health Literacy for Adults (STOFHLA*). MANOVA and multiple regression statistical procedures were used to analyze data.

Results

Preliminary findings indicate significant correlations (.41-.78) between communication skills and health literacy skills. Multiple regression analysis revealed that communication skills were predictors of health literacy skills for all participants. Although significant differences emerged for age, education and gender, mean ratings (3.0/5.0) for most participants on self-reported healthcare communication suggest that they only "sometimes" participate during healthcare visits. All participants obtained adequate health literacy scores on the STOFHLA.

Conclusions

Contrary to reports of African Americans demonstrating low health literacy skills on formal assessments, all participants in the present study demonstrated adequate health literacy scores on the STOFHLA. However, the present findings support reports of difficulty with health care communication by African American adults. The present results further suggest that

(1)pragmatics/social communication skills are related to health literacy skills, (2) further investigation of communication skills and health literacy is warranted for African Americans with and without communication disorders; (3) Investigations using both self-report measures and observed performance provide a more comprehensive view of communication skills and health literacy.

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

Ian M. Bennett[1];Jennifer F. Culhane[2]; [1]University of Pennsylvania, Phildelphia, PA; [2]Drexel Univeristy and Children's Hospital of Philadelphia, Philadelphia, PA. (ID - 34)

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% < 4th grade and 12% 4-6th 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.

Uncertainty Of Advance Care Planning Treatment Preferences Among Diverse Older Adults.

Rebecca L. Sudore[1]; Dean Schillinger[1]; Terri R. Fried[2]; [1]University of California, San Francisco, San Francisco, CA; [2]Yale University, New Haven, CT (ID - 43)

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.

THEMATIC AREA – CONCEPTUAL MODELS

Developing an empirically based conceptual model of how the determinants of health, including low Health Literacy, interact to influence health and well-being.

Gillian Rowlands[1]; Adrienne Shaw[1]; Jonathan Berry[2]; T Harpham[1]; [1]London South Bank University, London, UK; [2]Loughborough Innovation Centre, Loughborough, UK

(ID - 8)

Background

Health Literacy (HL) is a complex concept including both skills to understand health information and skills to act on health information to achieve and maintain health in a variety of health and community settings. Experts in the fields of Health Literacy have developed conceptual models of HL and how it impacts on health outcomes; to date these are theoretical rather than based on empirical data. Our study aims to develop a conceptual framework, arising from empirical qualitative data, of how basic skills and social determinants (social inclusion, self-esteem, self efficacy and social networks) combine to influence health and well-being.

Methods

Participants over 18 were recruited from the Skilled for Health programme, a UK community-based project aiming to develop literacy, language, numeracy and life skills as applied to health. Semi structured interviews were conducted with 20 people across four sites in the UK. These interviews elicited participants' perceptions of how basic skills and social determinants have influenced their health and well-being. Participants then attended focus groups where the factors arising from the interviews were explored further, with a specific focus on how factors combine to influence health and well being. Analysis of the focus groups was in two stages. Firstly we undertook an inductive approach to develop a model of how basic skills and social determinants combined to influence health and well-being amongst this group of people. We then undertook a deductive approach to compare our model with current theoretical models of HL.

Results

We have developed a conceptual model from the data to show how basic skills and social determinants combine to influence health in a group of people that had self-identified as having low health literacy skills. Our participants gained knowledge through interactions with health professionals, family and social contacts, and media sources. They then used this knowledge to make lifestyle choices that could influence their health and well-being; personal finances, stress, ethnicity, culture and local communities were important factors in this process. Our framework shows how previous and current theoretical models fit with the experience of our participants.

Conclusions

We believe that this is the first study to use empirical data to develop a model of how basic skills, social determinants, social inclusion, self-esteem, self efficacy and social networks combine to influence health and well-being. This model can only reflect the views and experiences of our study participants, and needs further exploration and validation; approaches could include both qualitative studies in other population groups, and statistical modeling using data on population skills and health outcomes. Once validated in larger studies, our model could form the basis of a 'whole systems approach' to health which maximizes meaning for vulnerable participants and thus increases the probability of understanding, participation and compliance.

Cultural and conceptual knowledge: Conceptual and measurement advances in health literacy

Lydia P. Buki[1]; Jessie M. Quintero-Johnson[2]; University of Illinois, Champaign IL

(ID - 37)

In 2004, a groundbreaking report by the Institute of Medicine identified 4 components of health literacy: print literacy, oral literacy, numeracy, and cultural and conceptual knowledge. Since that time, conceptual advances have been made on several of these components. Our interest in this analysis is to advance conceptual clarity and measurement of cultural and conceptual knowledge, with the goal of effectively exploring the relationships between cultural processes and health literacy. In the IOM report, cultural and conceptual knowledge is defined as: “Cultural and conceptual knowledge represents the filter through which individuals obtain, process and understand health information and options for diagnosis and treatment (IOM, 2004).” Parting from this definition, we delved into the cultural literature to develop a clear conceptualization and operationalization of the construct. Based on our conceptual work, which was required for the development of the Cancer Literacy Measure (Buki & Yee, 2008), we propose that cultural and conceptual knowledge encompasses attitudes, beliefs, and knowledge, all of which arise in the context of cultural values. We provide examples from our own work and those of others suggesting effective ways to conceptualize, operationalize and measure these constructs.

To define attitudes, we draw from Fishbein and Ajzen’s definition of attitude, wherein attitude is defined as “learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object” (Fishbein & Ajzen, 1975, p. 6). In their definition, the authors state that attitudes are *learned predispositions*, suggesting that attitudes are formed through experience and that they are relatively stable internal states that guide external expressions. Beliefs are the various attributes that an individual links to an object wherein an object can be any person, group of people, institution, organization, behavior, policy, and so on and attributes can be any object, trait, property, quality, characteristic, outcome or event (Eagly & Chaiken, 1993; Fishbein & Ajzen, 1975). We draw from what Hilpinen (1970) calls the “classic definition of knowledge” which suggests that knowledge is *justified true belief.* Central to this definition is the understanding that some beliefs are justified because they *verifiably true* (Klein, 1971). What differentiates knowledge from beliefs or attitudes, then, is that knowledge can be tested and validated. Beliefs are formed and influenced by various socializing forces like family, religious institutions, schools, and the mass media.

We noted that a lack of consistency in the way attitudes, beliefs, and knowledge are conceptualized and operationalized in the extant literature is hampering cultural advances in the study of health literacy. We hope that through providing greater clarity on these concepts, we will be more effective in our examinations of cultural processes and health outcomes.

Public perceptions of health and the connections to literacy and health literacy: An exploratory comparative study in South Africa and the United States.

Andrew Pleasant[1], Jessica R. Sandfort[2], Caitlin Sweany[2], Rebecca Yau[2], Marina Joubert[3]. [1]Canyon Ranch Institute Tucson, AZ, [2]Columbia University, New York, NY, [3]Southern Science, Pretoria, South Africa

Background:

Around the world, the public regularly receives messages about protecting or improving health.

Those messages often assume a shared understanding of core concepts such as 'health', 'science', or 'risk'. However, a PubMed database search for the phrases "what is health", "public perceptions of health" and "public understanding of health" in titles or abstracts found zero articles (as of 8-13-09). Very little research seems to explore what meanings people are making when they use their health literacy skills.

Health, while intricately involved with biological processes and environmental factors, is also a product of social and cultural practices such as health literacy. Health literacy is the wide range of skills and abilities reflecting the extent to which people are able to find, understand, evaluate, communicate and use health information and concepts to make informed choices, reduce health disparities, and increase quality of life in a variety of settings across the life-course.

This comparative study set out to explore public perceptions of health and related issues in the United States and South Africa.

Methods:
Two hundred people in New York City and 200 people in South Africa's Gauteng Province (Johannesburg and Pretoria area) were approached in public places and asked to participate in this exploratory study. Survey questions were predominantly qualitative and open-ended, but standard quantitative demographic categories and a previously validated public health knowledge scale were employed. Questions related to language and literacy practices were also included. All work was approved by the Rutgers University Institutional Review Board and the Departmental Research and Innovation Committee at Tshwane University of Technology.

Preliminary Results:
In preliminary analysis, differences within and between participants in both countries are apparent. For example, South Africans scored, on average, 8 points lower on a health knowledge scale than did Americans (87% vs. 80%). However, there was variation in the type of knowledge held in each country. Americans were less likely to correctly respond about genetics while South Africans were less likely to correctly identify the function of antibiotics.

Participants in both nations identify the 'sick role' as an indicator of not being healthy, but to differing degrees. U.S. residents identified obesity as one of several indicators of a lack of health, but South Africans never mentioned obesity. South Africans did introduce concepts such as ill health being inevitable or indicated when one is a burden on others.

Other differences included use of more languages by South Africans, while U.S. participants have taken more science and health education courses.

Conclusions:
Health policies and programs are often based on an assumption of a shared understanding of health, science, or risk. This study shows those assumptions are not always correct. While fundamental health literacy skills (e.g. reading, writing, speaking, listening) may be universal, their application and use must necessarily address and reflect local health, health care, and cultural contexts. Policy-makers and program developers need to better understand health

literacy and how individuals, communities, and health care professionals are using their health literacy skills to make meanings and decisions about health.

Health Literacy Is Related to Problem Solving Skills. Raymond L. Ownby[1]; Drenna Waldrop-Valverde[2], [1]Nova Southeastern University, Fort Lauderdale, FL; [2]University of Miami, Miami, FL (ID - 48)

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.

Methods

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.

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

Deconstructing Health Literacy: Toward Conceptual Specificity Pedah Touradji[1]; Felicia Hill-Briggs[1]; [1]John Hopkins University, Baltimore, MD. (ID - 65)

Background:

Health literacy is associated both with education and with literacy. However, the implications of these associations, with regard to characterizing health literacy as a unique construct, and considering whether unique assessment and intervention approaches are needed, have not been well-examined. While health literacy has emerged in the field of medicine as a key factor associated with health outcomes and disparities, in public health and in the field of neuropsychology/cognitive neuroscience, education and literacy, respectively, have been identified as determinants of similar health outcomes and disparities. When deconstructed, health literacy, as it is currently measured and applied, may represent common factors underlying education and literacy as determinants of health outcomes and disparities.

Purpose:

To consider evidence that: 1) the constructs of education, literacy, and health literacy represent a common 2-component phenomenon: academic achievement and social determinant factors that impact disparities in health outcomes, and 2) literacy, rather than education or health literacy, may be a basic skill that serves as a sensitive proxy for both the academic achievement and the social determinant factors that underlie the common phenomenon.

Method:

Review of new research directions in public health and neuropsychology examining the constructs of education and literacy and their contributions to health outcomes; systematic review of the literature to determine patterns, prevalence and magnitude of discrepancies between education, literacy and health literacy and their associations with outcomes and disparities.

Results:

Recent research supports education, literacy, and health literacy each as associated with various health outcomes and disparities; however, no study was found that measured and determined differential contributions of each. Correlations between the REALM and TOHFLA and the long-standing Wide Range Achievement Test (WRAT), a standardized measure of educational achievement, range 0.74 – 0.88, suggesting a unified construct. Education is reported to predict poor health outcomes across race/ethnicity, age, and geographic region. However, cognitive research has identified literacy as a more sensitive proxy than education. Controlling for literacy (measured using WRAT) attenuates racial and ethnic disparities both in cognitive function and dementia that persist when controlling for education. Evidence supports a discrepancy between years of education and literacy across adult age, race/ethnicity, and geographic region. Reviewed studies show greater magnitude of discrepancy between education and literacy for minorities; 7-19% of Caucasian adults compared to 33-69% of African-American adults obtained literacy levels below their reported education level. The majority of health literacy studies reviewed did not include a measure of literacy/reading grade equivalent. Similarly, studies of numeracy did not include an arithmetic grade equivalent score to determine if it is in fact patterns of discrepancy, indicating lower academic *achievement*, as compared to years of educational *attainment*, underlying associations found between health literacy and health outcomes and disparities.

Conclusions:

Current research from other fields highlights importance of greater specificity with regard to education and literacy, their differential impact on health outcomes, and understanding of the health literacy construct. A deconstruction approach may yield clearer and more scientifically sound solutions to health literacy measurement and intervention.

Socio-cultural factors, health literacy and health Knowledge Opinions and Practices in Latino Immigrants –A pilot Study. Maria Rosa Watson[1]; Anna Maria Izquierdo-Porrera[2]; Michelle Markey[1]; Shoou-Yih Daniel Lee[3]; [1]Primary Care Coalition Montgomery County, Silver Spring, MD; [2]Care for Your Health, Inc, Washington, DC; [3]University of North Carolina, Chapel Hill, NC. (ID -73)

Background:

Health literacy is of concern to everyone involved in health promotion, disease prevention, early screening, health care maintenance, and policy making. Low health literacy has been associated with increased use of hospital services, including inpatient and ED services, and disproportionately high rates of illness and mortality. The prevalence of low health literacy in recent Latino immigrants is unknown. Health behaviors and attitudes of Latinos are influenced by social and cultural factors that may be unique in their background; therefore, understanding health literacy as well as health behaviors and attitudes from a socio-cultural perspective, is critical for improving the health outcomes of this underserved population. The purpose of this pilot study was to qualitatively test, adapt, and validate several survey instruments including an oral health knowledge, opinion, and practices (OH-KOP) questionnaire, to be administered together. Later on a cardiovascular risk KOP questionnaire was pre-tested as well.

Methods:

We conducted 8 focus groups with 64 participants, and pre-tested survey instruments with 61 additional persons --including 20 people who participated in pre-testing of adapted survey instruments, for a total participation of n=124 Latino immigrants in an inner-city community. The instruments that were qualitatively validated include, the Short Assessment of Health Literacy for Spanish-speaking Adults (SAHLSA), a demographic questionnaire and an oral health KOP (both developed earlier with the same population), and a scale that assesses perceived social support (MOS).

Results:

Forty-nine percent of the respondents could correctly describe oral health knowledge items (i.e. what are fluorides?). When testing SAHLSA scores against responses on the OH-KOP, results yielded a strong relationship between SAHLSA scores and responses to one of the OH-KOP questions. In this pre-pilot calculation, estimates were not stable as the sample size was small. Regarding social support, many questions in the social support instrument used were repetitive and while a few questions may capture relevant information among Latinos, other sources of social support, such as community-based and networking support, were thought to be important. Suggestions for changes were discussed, implemented and pre-tested further. The shortened social support instrument in Spanish showed strong correlation with the longer MOS instrument, within this small sample.

Conclusions:

Quantitative testing with larger numbers—and in comparison with other tests measuring health literacy are needed to determine validity and applicability of our locally-developed questionnaires, in the context of a short survey for health literacy for use in primary care settings with Latinos. This qualitative data offer insight into socio-cultural issues that interplay with health literacy among Latinos. This project was funded by the National Institute of Dental and Craniofacial Research (1R03DE016913-01A1).

THEMATIC AREA – EDUCATION

Introduction of Health Literacy into the Dental and the Allied Dental Curriculum: First Step and Plans for the Future at the Indiana University School of Dentistry Richard D Jackson[1]; Lorinda L. Coan[1]; Elizabeth Hughes[1]; George J. Eckert[1] ; [1]Indiana University School of Dentistry and Medicine, Indianapolis, IN. (ID - 2)

Background:
As part of a new segment of the curriculum, second year dental hygiene students received a lecture concerning the prevalence of poor literacy in America and the possible consequences of poor literacy on their patients' ability to maintain oral health. The dental hygiene students were also given experience with administering a validated medical health literacy tool; the Simple Test of Functional Health Literacy in Adults (S-TOFHLA). This investigation had two goals; 1) to continue to gather data concerning the level of health literacy of adult patients at Indiana University School of Dentistry (IUSD) and 2) to tabulate data from the dental hygiene students as to their willingness to approach their patients about being screened for literacy.

Methods:
Adults were recruited from the Dental Hygiene Clinic during the individual's normal clinical appointment. Potential panelists were asked to read and sign an informational letter of consent and then the S-TOFHLA was administered by the student using the instructions and narrative provided by the authors of the S-TOFHLA.

Results:
Ninety-one individuals agreed to participate although the demographic questionnaire was completed by only 67 participants. The mean S-TOFHLA score for all 91 subjects was 31 with a range of 4-36 correct responses. The results indicated that 13% of the cohort of individuals scored in the "inadequate" or "marginal" categories. Because of the relatively small sample size, no significant differences were seen by educational attainment although interestingly of those claiming to have achieved a college degree or trade school certificate or higher the S-TOFHLA scores ranged from 21 to 36 correct responses indicating that educational attainment and literacy are not well correlated. Lower S-TOFHLA scores were also associated with the presence of periodontitis, and perceived symptoms of dry mouth. No association was found to having dental insurance, caries risk status or to self-reported frequency of toothbrushing or flossing. In regards to the hygiene students, their comments indicated that it was fairly evenly divided between having no apprehension about requesting that their patients take a literacy assessment and being uncomfortable with the request. It would be of benefit in the future to inquire of our students as to whether they would consider assessing patient literacy as part of their in private practice routine.

Conclusions:
A significant proportion of the IUSD patient population were found to have less than adequate health literacy skills. Because of this finding, the authors will propose a series of measures to increase health literacy awareness among our students, staff and faculty and to improve the written materials provided to our patients as a means of improving the level of healthcare.

An Interactive Health Literacy Workshop for Fourth Year Medical Students. Daniel Oates[1]; Michael Paasche-Orlow[1]; Boston University Medical Center, Boston, MA (ID - 20)

Background:
Limited health literacy is an increasingly recognized barrier to adequate healthcare and health outcomes. The Institute of Medicine's report on health literacy recommended that professional schools incorporate training in health literacy into their curriculum. Despite this, there remains little published literature on the effectiveness of educational strategies to improve trainees' education in this area. We report on the effectiveness of an interactive workshop in teaching fourth year medical students core concepts in health literacy.

Methods:
All Boston University medical students participate in a required geriatrics clerkship during their fourth year. As part of this clerkship, in addition to clinical experiences, students receive didactic education in many key geriatric content areas. We designed a workshop, based upon the American Medical Association (AMA) Foundation train-the-trainer program in health literacy, which contains 1 hour of didactic education on key areas in health literacy, followed by a faculty facilitated, case based discussion. Content areas covered include: Prevalence, data linking limited health literacy with poor health outcomes, the AMA Foundation patient testimonial video, and universal precautions for patient safety. To evaluate the success of this workshop we developed a web-based test which includes six knowledge questions and identification of the jargon in a video-taped, simulated patient interaction; students are asked to identify the instances of medical jargon and assess patient and provider understanding of each other. This evaluation tool is administered at the beginning of the four week rotation to get baseline measures and again at the end with a different video. The health literacy workshop is conducted in week two or three of the course.

Results:
We implemented the structured evaluation tool in July 2009 and will have three months of pilot data to present at the time of the conference in October.

Discussion:
Research regarding effective educational strategies to teach healthcare providers about health literacy is scarce. We report on the ability of an educational workshop to teach fourth year medical students key concepts and skills in this area. We also report on the web-based assessment tool we have developed. If the pilot data demonstrates the success of this workshop in raising awareness and instilling skills in medical students and/or exhibits the success of the assessment tool, it may encourage other institutions to implement similar strategies.

Building Parental Health Literacy: A Campus Community Partnership. Beverly Roberson Jackson[1]; Kim Bullock[1]; [1]Georgetown University School of Medicine, District of Columbia. (ID - 59)

Background
Health literacy has emerged as defining a diverse set of skills and competencies that individuals develop over a lifetime of learning. Gaps and deficiencies in health literacy impact universally the US population; however certain demographic groups are disproportionately affected both in numbers and influence. The low-income African American and Hispanic populations in the District of Columbia are impacted by a low level of health literacy which complicates their response to accepted health promotion practices.

Health literacy has recently been infused in the medical school curricula in order to promote awareness and sensitivity by future doctors as part of a social-determinant framework. Perhaps the best early venue for teaching a broad view of health literacy is within Service-Learning courses, since service-learning is a process of collaboration, interaction and applied experiential learning about and with communities

Service-learning creates a framework of understanding that benefits both the students and the community as it relates to health literacy. A health literacy project was developed as part of the Georgetown University School of Medicine Service-Learning class. This course has been conducting short term, parent focused, health literacy activities with the United Planning Organization Head Start programs, a federally funded family support and education program serving low-income parents and children in all parts of the District of Columbia for five years. Each year a family/community health information product is developed by first year medical students in response to parent concerns generated through focus groups conducted by the medical students.

Methods

This course provides an opportunity for the students to examine the environmental and social context in which a targeted group of the city's population makes health decisions. At the beginning of the course the medical students conduct a community needs assessment and learn to recognize health resources and health impediments resident in targeted communities. Students study general factors related to various neighborhoods within the city (e.g., income, housing patterns, environmental toxins and the availability of fresh whole foods) and then select a targeted area and conduct a community needs assessment. The community study is followed by an introduction to qualitative research methods with a community based social science researcher. The students learn and practice conducting focus groups and key informant interviews and are matched with a Head Start parent group to assist in further study of the problem selected.

Results

The communication products developed by the medical students such as brochures, checklists and PowerPoint Presentations, were used to encourage health promotion activities. Families accepted and used the materials resulting in improved immunization and prenatal care compliance rates.

Conclusions

Health literacy that promotes compliance with health promotion activities for families produce successful outcomes when built on family generated concerns.

Health Literacy Skills for Professionals - A New Web-Based Training. Julie A. Gazmararian[1]; Cynthia Baur[2]; Laura Ours[2]; Stacy Robison[3]; [1]Emory University, Atlanta, GA; [2]Centers for Disease Control and Prevention, Atlanta, GA. [3]CommunicateHealth, Inc, Northampton, MA. (ID - 93)

Background:

Nine out of ten adults lack the necessary health literacy skills needed to manage their health and prevent disease. Everyday, the public receives health-related information that leaves many with unanswered questions. Much of the blame for this lack of skill and understanding has historically been placed on the patient/health consumer. However, it is important for public health professionals to understand how a complicated, decentralized, and costly health care system contributes to the issue of limited health literacy. There is a need to provide professional development opportunities for the public health work force and others who provide health communication and services to the general public to improve health literacy practice.

Program background: The Division of Health Communication and Marketing, National Center for Health Marketing, Centers for Disease Control and Prevention recognized this need for professional development and has created a web-based Health Literacy Training program for professionals. The objectives of the training are to:

1. Provide information that is essential to increasing knowledge of health literacy to improve the effectiveness of public health education and resources
2. Provide participants with practical health literacy strategies and tools that can be applied to public health practice.

Evaluation Methods and Results:

An extensive literature review and interviews with health literacy experts and state/local public health agencies were conducted to collect information on health literacy trends, needs, and existing statewide initiatives. Information collected from the literature review was adapted to reflect health literacy within a public health context. Examples were extracted from interviews with experts and state/local health agencies and incorporated into the training. The web-based course was designed according to principles of adult learning theory. In April 2009, the Health Literacy Training program was pilot tested with public health professionals from various areas of practice including nursing, medicine, health education, veterinary medicine, and pharmacy.

Four modules have been produced, which include: 1) Introduction; 2) What is Health Literacy?; 3) Why does Health Literacy Matter?; and 4) Applying Health Literacy to Practice. Results of the pilot test were used to make changes to the training. These results and an overview of the training will be presented during the session.

Conclusions:

The Health Literacy Training program is a research-based tool that provides an opportunity for all health professionals who create, share, and communicate health information for and to the public to build their health literacy skills.

Implications for research and/or practice: This online health literacy training is the first targeted at health professionals working in public health settings. There are few other opportunities that exist for public health professionals to learn about health literacy and apply its principles to their work. Continued research and education is necessary to build professionals' skills and achieve successful communication with the public.

THEMATIC AREA – GLOBAL

The World Health Communication Associates (WHCA) Global Health Literacy Initiative

Franklin Apfel[1]; [1]World Health Communication Associates (ID - 19)

Background

The World Health Communication Associates (WHCA) Global Health Literacy Initiative is an informal public private partnership which aims to raise public and policy maker awareness of health literacy as a critically important but too often neglected determinant of health and promote evidenced based corrective action. The partnership[1] which includes international agencies, professional associations, patient alliances, academia and industry, works to address the global imbalance in health literacy awareness and action by facilitating the transfer of learning and catalysing action on international, regional, national and local levels. The partnership has adopted an interactive framework approach to health literacy strengthening which aims to help public health and education agencies and advocates identify effective ways to both strengthen individual skills as well as enhance the health literacy friendliness of the systems and setting which serve them (Parker 2009). The partnership focuses on promoting action and research in six domains of influence including health and educational systems, home, workplace and community settings and the political arena.(Kickbusch and Maag 2008).

Methods

The partnership works to facilitate information exchange and raise awareness through the production of "action guides", international policy advocacy, promoting research, supporting and reporting on good practice initiatives and catalysing network development.

Results

Action Guides- Over the past year the initiative has been engaged in developing[2] an action guide series with globally relevant case studies. Partner agencies; including, WHO European Healthy Cities Network and the International Alliance of Patient Organisations (IAPO) have been gathering case studies for the guides. *WHCA Action Guide on Health Literacy Part 1- "The Basics"* was published in July 2009. Part 2 is due for publication in Fall 2009.

Meetings- The partnership has organised international educational meetings, workshops , receptions and luncheons with the WHO Healthy Cities Network in Europe, Liverpool UK, March 2009, Viana Portugal April 2009; the World Health Editors Network[3] (see www.whcaonline.org/when) , Geneva, May 2009; and the ECOSOC ministerial meeting, Geneva, July 2009.The ECOSOC Ministers meeting included a call for health literacy action in their Geneva 2009 declaration (http://daccessdds.un.org/doc/UNDOC/LTD/N09/399/96/PDF/N0939996.pdf?OpenElement).

Network development- The initiative is coordinating a WHO Healthy City Sub-Network on Health Literacy(26 cities have signed on) which will elaborate action projects and cooperate in joint research regarding measurement and community scorecard development. Discussions at the

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[1] Guide development group included participants from WHCA,Emory University, International Alliance of Patients' Organisations (IAPO), the WHO Healthy Cities Europe, Liverpool, and Johnson and Johnson.

[2] Drafts have been presented for consultation at selected international gatherings; including a meeting of the WHO European Healthy Cities in Liverpool UK in March 2009 and an UN Economic and Social Council (ECOSOC) Regional Meeting on Health Literacy in Beijing May 2009.

[3] The WHEN is a joint venture of WHCA with the World Medical association(WMA), the International Council of Nurse(ICN), the international Federation of Pharmacists(FIP) and World Dental Federation (FDI).

ECOSOC workshops called for new health literacy network building between Professional Associations and Patients Organisations.

Conclusions

This presentation will review approach and results to date of this initiative and elicit interest and feedback from participants for collaborative research, information dissemination and network strengthening.

THEMATIC AREA – MEASUREMENT

Promoting Functional Health Literacy. Sandra Smith[1]; Sandra Mobley[2]; [1]University of Washington, School of Public Health, Seattle, Washington; [2]Medical College of Georgia, Augusta, GA. (ID -5)

Background

This interdisciplinary study advances the science of health literacy research by 1) proposing a theoretical framework that focuses on functional health literacy (FHL); 2) field testing an instrument for measuring FHL; and 3) investigating the impacts of home visitation on parental FHL. The theoretical framework incorporates Nutbeam's concept of health literacy as progressive levels of functional, interactive and reflective skills to measure FHL as corresponding progressive levels of health functioning. The intervention aimed to develop FHL as a personal asset through community-based health promotion efforts. The overarching goal, to enable parents to use health information and services in ways that maintain and promote health and so to exert greater control over family health and health actions, differs fundamentally from the clinical goal of overcoming deficient reading skill in patients in order to improve their health and ensure efficiency in the system.

Methods

In this action research project, six home visitation programs implemented the Beginnings Guides Life Skills Development Curriculum to promote FHL in disadvantaged parents during the prenatal to preschool period. Visitors collected data on the health functioning of 2532 parent/child pairs during up to 36 months of service, using the Functional Health Literacy Measure (FHLM say *film*) developed for this project. The study employed both a longitudinal approach and a matched comparison group. Qualitative data from interviews with participating visitors and supervisors elucidated between-site differences.

The FHLM consists of two scales: The Functional Healthcare Literacy Scale (FHcL) rates parents' use of healthcare services and information; the Functional Selfcare Literacy Scale (FScL) rates self-management of personal and child health at home. The internal consistency of items was assessed by calculating Cronbach‟s alpha: FHcL=.76 FScL=.74. Examination of test-retest reliability by computing correlations between the first and second observations for each scale showed the expected correlations. Rating of 5 case studies by 12 home visitors produced an estimated inter-rater reliability of 90%. Associations between scores on both scales and several other indicators conformed to theoretical expectations about their inter-relationships.

Results

Parents demonstrated statistically significant improvement after six months of service (p=.001), with continued progress over time. Lower functioning parents (p=.001) and those with lower estimated reading levels (p=.001) produced the greatest gains.

Conclusions

1) Home visitation promotes parental FHL. 2) It is possible to meaningfully measure FHL using the FHLM. 3) The public health model of health literacy promotion is practical for implementation, improves understanding of health literacy, and opens new directions for intervention. 4) Reflection emerged as a literacy skill potentially as fundamental as reading ability to attaining and promoting functional health literacy. A national response to health literacy may be feasible through existing national networks of home visitation programs with short and long term benefits accruing to entire families, the healthcare system, and the schools.

Can Subjective Measures of Health Literacy and Numeracy be used in Place of More Objective Assessments?

Ken A Wallston[1]; Sunil Kripalani[1]; Alan B. Storrow[1]; Karen F. Miller[1]; Nathan E. Cutler[2]; [1]Vanderbilt University Medical Center, Nashville, TN; [2]John Hopkins School of Medicine, Baltimore, MD. (ID - 35)

Background

Brief subjective measures have been developed as screening tests for health literacy and numeracy. We examined whether these instruments could function as valid alternatives to more time-consuming, objective research measures in a busy clinical setting.

Methods

In the Emergency Department (ED) of a university medical center, we tested the performance of three brief health literacy questions (e.g., "How confident are you filling out medical forms by yourself?") advocated by Chew et al. (2008) versus the Rapid Estimate of Adult Literacy in Medicine (REALM). Numeracy was assessed objectively by the Wide Range Achievement Test (WRAT-3R) and subjectively by the 8-item Subjective Numeracy Scale (SNS; ex. "How good are you at working with fractions?" Fagerlin et al., 2007). Not all patients were administered (or completed) all measures. Two hierarchical multiple regression analyses were run predicting scores on the objective measure by the corresponding subjective measure controlling for patient's age, race, sex, and educational level. Then correlations among the literacy and numeracy measures were run separately for those with less than college education and those who were college educated.

Results

303 patients [49% female; 76% white; mean age [sd] = 45.5 [15.2] years] were administered one or more of the four measures. The two measures of health literacy correlated 0.46 (n =195, $p <$ 0.001), while the two measures of numeracy correlated 0.58 (n = 156; $p < 0.001$). In the multiple regression predicting REALM scores, the sum of the three health literacy questions explained an additional 8.9% ($p < 0.001$) of objective literacy scores above and beyond the 27.2% explained by the demographic covariates. In the regression predicting WRAT-3R scores, the SNS explained an additional 15.7% ($p < 0.0001$) in objective numeracy scores on top of the 28.6% explained by the demographics. The correlational analysis for those with a high school education or less showed moderately high concurrent validity for the subjective measures (rs = 0.46 and 0.55). Due to high ceiling effects on both measures, the three health literacy questions were uncorrelated with REALM scores for those patients with a college education, while the SNS was moderately correlated (r = 0.37) with the WRAT-3R for college educated patients.

Conclusions

It is feasible to collect valid information on health literacy and numeracy in acute care settings such as a busy ED. Subjective assessments, such as the SNS and the three health literacy screening questions, appear to be valid alternatives to more cumbersome and "costly" objective measures such as the REALM and WRAT-3R, especially for those patients with no college education--the group most likely to have literacy or numeracy deficits. The real test of whether subjective measures can effectively substitute for objective tests will depend on future research that also examines behavioral and clinical outcomes.

Development of a Measure of Health Literacy for High-School Students Deborah L. Begoray[1]; Amery D. Wu[2]; Marjorie MacDonald[1]; Joan Wharf Higgins[1]; James C. Frankish[2]; Brenda Kwan[2]; Winny Fung[2] ; Irving Rootman[1]; [1]University of Victoria, Victoria, BC; [2]University of British Columbia, Vancouver, B.C.
(ID - 41)

Background:
Health literacy has come to play a critical role in health education and promotion, yet it is poorly understood in adolescents and few measurement tools exist for this population. Standardized instruments to measure health literacy in adults assume it to be a derivative of general literacy. The purpose of the presentation is to report findings from a study to develop and validate a measure of health literacy for a high school-age population. Health literacy in this study is defined as students' ability to access, understand, evaluate, and communicate health information. The study focused specifically on measuring students' ability to understand and evaluate health information.

Methods:
In the spring of 2008, data were collected from 275, primarily 10th grade students in three public schools in Vancouver Canada using a self-administered questionnaire. Abilities to understand and evaluate health information were assessed using 47 free-response questions. The questions were nested in nine health-related stimuli passages. Students' family and school background were also obtained. Forty-eight percent were male, and 69.1% spoke English as a second language (ESL). Bivariate correlations between background variables and the domain and overall scores were calculated. A regression model was developed using 15 explanatory variables.

Results:
The reliability estimates, as indicated by Cronbach's alpha, were 0.91, 0.81, and 0.93 for "understanding", "evaluation", and "total" health literacy respectively. Factor analyses showed that all health literacy was unidimensional and was predicted by ESL (-), GPA (+), frequency of skipping school (-), self-reported academic skills (+), and outside-of-school time studying (+). Students performed better in "understanding" health information (M= 27.47 out of 60) compared to "evaluating "health information (M= 8.35 out of 45). Lower scores were achieved by males, ESL students, those who immigrated to Canada at a later age, and those who skipped school more often. Family factors were found to be less important than school-based factors in predicting health literacy scores.

Conclusions:
This study generated valuable knowledge about students' thought processes, the types of cognitive skills in which students excel or lack, and the factors influencing students' health literacy level. This knowledge is useful for improving the curriculum design of heath education at schools, and, for in developing multiple-choice items for large-scale assessment of health literacy among students. The most significant contributions of this work include the creation of a concrete measurement framework and instrument for measuring adolescent health literacy and the provision of evidence in support of the notion that health literacy is a distinct construct from that of general literacy.

The experience of shame during the assessment of health literacy. Dharma E. Cortes[1]; Barbara G. Bokhour[2,3]; Ellen S. Cohn[3]; Jeffrey L. Solomon[3]; Gemmae M. Fix[2,3]; [1]Cambridge

Hospital, Harvard Medical School, Boston, MA; [2]ENRM VA Medical Center, Bedford, MA; [3]Boston University School Public Health, Boston, MA.
(ID - 58)

Background:
The experience of shame during the process of completing health literacy assessments has not been documented at length, yet the experience of shame among individuals with low literacy has been well documented. The primary goal of this mixed methods study, conducted with U.S. veterans with uncontrolled hypertension (HTN), was to examine factors that influence patient self-management practices. One of the factors examined in the study was health literacy as measured by the S-TOFHLA and the Newest Vital Sign (NVS); since it has been documented that hypertensive patients with low health literacy had higher systolic blood pressure than those with adequate health literacy[4]. In addition, low health literacy is also associated with lower levels of knowledge about HTN[1,5] and less literate patients have difficulty using medications appropriately, leading to poor adherence[3,4]. The S-TOFHLA and NVS were administered at the end of a semi-structured interview designed to document participants' experiences managing their HTN.

Methods:
The study used quantitative and qualitative research methods to assess factors influencing HTN management among 45 patients with uncontrolled hypertension recruited at two large Veterans Affairs Medical Centers. Medical records were reviewed to obtain information about comorbidities, high blood pressure readings, prescribed medications, and length of HTN treatment. Demographic data (i.e., age, race/ethnicity, education, income) was also collected. Semi-structured interviews were conducted in order to document patient explanatory models, patient lived experiences, and patient management of hypertension. Verbatim transcribed interviews— that included the dialogue between the interviewer and the interviewee as the latter completed the S-TOFHLA and the NVS— were analyzed using grounded theory analytic techniques. Statements indicating experiences of shame were coded during the analysis of the qualitative data.

Results:
Although the relationship between health literacy (i.e., S-TOFHLA and NVS) and blood pressure reading was not conclusive, findings from the study's qualitative component shed light over participants' experiences during process of completing both measures. A significant number of participants expressed frustration and shame when they failed to understand the NVS questions and/or provide an answer to the NVS items. Also, many participants sought feedback and reassurance from the interviewer as they completed the NVS.

Conclusions:

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[4] Williams M, Baker D, Parker R, Nurss J. Relationship of functional health literacy to patients' knowledge of their chronic disease: A study of patients with hypertension and diabetes. *Arch Intern Med*. 1998;158:166-172.

[5] Gazmararian J, WIlliams M, Peel J, Baker D. Health literacy and knowledge of chronic disease. *Patient Education and Counseling*. 2002;51:267-275.

[3] Baker D, Parker R, Williams M, et al. The health care experience of patients with low literacy. *Archives of Family Medicine*. 1996;5:329-334.

[4] Kalichman S, Ramachandran B, Catz S. Adherence to combination antiretroviral therapies in HIV patients of low health literacy. *Journal of General Internal Medicine*. 1999;14:267-273.

Qualitative findings related to the use and administration of health literacy measures shed light on participants' level of comfort and experience of shame in the process of completing health literacy assessments. The fact that the NVS requires oral administration, recommendations are provided as to how to reduce respondents' performance anxiety and potential feelings of shame when they face difficulties understanding the items and providing answers.

Performance of 'Health Literacy' Tools among Adolescents and Young Adults. Laura P. Shone[1]; Cynthia Doane[1]; Aaron K Blumkin[1]; Jonathan D. Klein[1]; Michael S. Wolf[2]; [1]University of Rochester Medical Center, Rochester, NY; [2]Northwestern University Feinberg School of Medicine, Chicago, IL. (ID - 60)

Background

The measurement of health literacy (HL) and its correlation with health skills has been studied in adults, however, less is known about adolescents. Therefore, we sought to evaluate the psychometric properties of the most common measures of functional literacy skills among a sample of adolescent and young adult subjects.

Methods

We conducted a psychometric study of HL tools in a population-based sample of 189 youth in three age groups (16-17; 18-19, 20-23 years). Participants were recruited in primary health care settings and educational settings (e.g.: public schools, GED programs, vocational and technical training centers, and a community college) in Monroe County, New York between 1/08 and 8/09. We used random order of administration for four common HL tools: 1) S-TOFHLA); 2) REALM (≥ 18 yrs) or REALM-Teen (< 18 yrs); 3) Newest Vital Sign (NVS); and 4) a five-question adaptation of Chew's "Brief Questions" plus the WRAT-3 for validation. We also measured participant skills in health tasks including use of OTC medicines, use of a health insurance card, and emergency-department discharge instructions for care of a laceration. These tasks involved: text search, reading comprehension, numeracy, calculation, reasoning, inference, problem-solving, application, and memory for a total of 0-60 possible points. We used Crohnbach's coefficient alphas to examine reliability for each HL tool, and principal components analyses to identify a single factor structure per assessment. Pearson correlation coefficients were then used to validate each HL tool against a gold standard (WRAT-3) and to correlate scores on each HL measure with performance on everyday health tasks.

Results

Instrument Performance: The REALM demonstrated the strongest internal consistency (REALM: Crohnbach's alpha (α) = 0.91, [Eigenvalue= 11.01]) compared to the STOFHLA (α=0.64 [Eigenvalue= 3.84]) and NVS (α=0.59 [Eigenvalue =2.03]). Internal consistency of the NVS was progressively better with age (ages 16-17, α=0.57; ages 18-19, α=0.64; ages 20-23, α=0.78). The five "Brief Questions" demonstrated the least internal consistency (α=0.42 [Eigenvalue= 1.92]).

Instrument Validity: Again, the REALM was most highly correlated with the WRAT-3 overall and by subgroup (overall 0.73, range 0.72 to 0.78 across age and gender stratifications). Correlations with the WRAT-3 for the NVS, STOFHLA, and Chew's "Brief Questions" were all below 0.50 (range 0.03 to 0.49).

Predictive Validity (See table, next page): Overall, the validity of HL tools in predicting health skills was neither strong nor consistent across age or gender stratifications. The strongest correlations were again with the REALM, for specific subgroups including: 20-23 year-olds ($r=0.69$, $p<.001$); females ($r=0.62$, $p<.001$), and 16-17 year-olds ($r=0.59$, $p<.001$).

Conclusions

Among existing HL measures, the REALM demonstrated the best psychometric performance, whereas other common tools appeared to be more problematic. The S-TOFHLA, NVS, and Brief Questions demonstrated lower internal consistency, and both construct and predictive validity were questionable. The American Academy of Pediatrics has called for more HL research among adolescents. Given the current lack of literature regarding measurement of HL in this age group, future studies in adolescents and young adults should consider using the REALM until more comprehensive measures are developed.

Validation of a Spanish diabetes-specific numeracy measure: DNT-15_Latino

Richard White[1]; Sunil Kripalani[2]; Chandra Osborn[2]; Russell Rothman[2]; [1]Meharry Medical College, Nashville, TN; [2]Vanderbilt University Medical Center, Nashville, TN. (ID - 64)

Background

Disparate trends in care are well described among Latino patients with diabetes. The NAAL in 2003 suggested that nearly 65% of Latinos had limited health literacy skills. The relationships between health literacy, numeracy, glycemic control (HbA1c) and acculturation in this population are unclear.

Methods

The study objective was to examine these relationships in a sample of adult Latino patients with type 1 or type 2 diabetes from two community health centers in Nashville, TN.

In addition, we sought to establish the reliability and validity of a 15-item Spanish language, diabetes-specific numeracy measure (DNT-15_Latino). Surveys administered included: patient demographics and the previous validated Short Acculturation Scale for Hispanics (SASH), the Spanish Short Test of Functional Health Literacy in Adults (S-TOFHLA), and the math section of the Wide Range Achievement Test (WRAT-4). Most recent A1C data was collected from the medical record or by point-of-care testing.

Results

Complete data are available on 144 participants. Participants averaged 47.8 years of age (SD=12.3), 63% were female, 81% were uninsured, 85% had incomes < $20,000, and 59% had less than HS education. Low levels of acculturation (SASH <3.0) were observed in 96% of participants. Mean HbA1c was 8.1% (SD=2.4). Health literacy as measured by the S-TOFHLA was inadequate or marginal in 37% of participants and numeracy skills were at the 7th grade level or less in 88% according to the WRAT-4. Mean score and time to complete the DNT-15_Latino were 26.6% (SD=19.2) and 23.5 min (SD=10.9) respectively. Internal reliability of our scale was strong as demonstrated by a KR-20 of 0.783. Construct validity was strong as demonstrated by significant correlations between DNT-15_Latino scores and the WRAT-4 (Spearman's rho 0.53, $p<0.001$), S-TOFHLA (Spearman's rho 0.278, $p=0.001$), and education level (Spearman's rho 0.383, $p<0.001$). Univariate linear regression modeling failed to demonstrate predictive validity as no significant correlation between DNT-15_Latino score and HbA1c (β -0.035; $p=0.68$) was seen. Acculturation level was strongly correlated with both generalized numeracy

(Spearman's rho 0.257, p=0.003), and diabetes-specific numeracy (Spearman's rho 0.193, p=0.025) skills but again no significant relationship was observed between acculturation level and glycemic control (Spearman's rho 0.01, p=0.911).

Conclusions

Our study reveals a population with many socio-demographic challenges and limited health literacy and numeracy skills. Our DNT-15_Latino scale appears to be a valid numeracy measure for Latino patients with diabetes and may facilitate development of effective interventions to improve diabetes care in this priority population. Addressing issues related to acculturation may also prove to be a useful target for improving diabetes care.

Measuring Health Literacy across Diverse Populations

Susan J. Shaw[1]; James Vivian[2]; Cristina Huebner[3]; Julie Armin[1]; Ana Vargas[3]; Jeffrey Markham[3]; Phuong Do[3]; Victor Reyes[1]; Fayana Richards[1]; Anne Awad[3]; [1]University of Arizona, Tucson, AZ; [2]Wesleyan University, Middletown, CT; [3]Caring Health Center, Springfield, MA; (ID - 68)

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

Failure of the Rapid Estimate of Adult Literacy in Medicine (REALM) in a Large Observational Study of Low Income Women

Ian M. Bennett[1]; Rosemary Frasso[1]; Jennifer F. Culhane[2]; [1] University of Pennsylvania, Philadelphia, PA; [2]Drexel University, Philadelphia, PA. (ID - 69)

Background:

The Rapid Estimate of Adult Literacy in Medicine (REALM) is the most commonly utilized screening tool for risk of low reading skill in the health care context, a proxy for health literacy. In a study of 1,034 low income women in pregnancy and postpartum the rate of low literacy identified by using the REALM was found to be much lower than expected (4.8%) based on socioeconomic and demographic risk factors such as income and educational attainment. We wished to determine if the measure had performed adequately.

Methods:

A randomly chosen subset (n= 437, 38%) of English speaking participants in the original observational study were identified for re-assessment of reading skill in the health care setting. Repeat REALM assessment as well as the assessment of the short form of the Test of Functional Health Literacy in Adults (S-TOFHLA) were carried out as comparison assessments (Pearson Correlation). Variation in score distribution by interviewer (F statistic) and agreement in original and repeat assessment (Kappa) were used to assess the characteristics of the REALM measure.

Results:

236 (54%) women from the random subset completed a repeat literacy assessment. The sample was comprised of young (mean age 23.4, SD= 5.4), low income (mean annual income 8,803, SD = 13,209), primarily African American (82%) women with a proportion of low educational attainment (34% <High School). REALM scores were significantly different between the initial (mean = 60, SD = 9) and repeat (mean = 56, SD = 12; p<0.0001) assessments and measure of agreement was lower than expected (Kappa = 0.344, p<0.001). The number of women with 6th grade or less literacy was significantly lower (6% versus 14.1%) in pre versus post assessments respectively (p<0.001). The variation in REALM scores between interviewer was greater than expected by chance for the initial (F=15.7, df = 9, p<0.0001), and for the repeat assessments

(F=3.2, df = 6, p=0.004). Correlations between the initial REALM and the S-TOFHLA (0.533) were lower than previously published assessments and than those between the repeat REALM and S-TOFHLA (0.741).

Conclusions:

In this study of low income mothers we found evidence for failure of the REALM. Repeat REALM scores corresponded much better to the expected rate of low literacy based on risk factors and correlated with the S-TOFHLA, a written assessment of risk which is not dependant on interviewer interpretation for scoring. REALM scores varied more than expected between interviewers in both the initial and repeat assessments. While it is unclear why this measure did poorly it's reliance on interviewer interpretation of word familiarity is likely to be involved. Interviewers in the initial assessment included those who were from more similar socio-economic and cultural backgrounds whereas the interviewers in the follow up assessment were graduate students and more culturally distinct from the women being interviewed. It is possible that some interviewers will score the REALM differently based on their own language history. Studies of health literacy should consider this variability when determining which assessment to use.

THEMATIC AREA – METHODS

Asking patients to self-report health data: does health literacy influence the quality of information shared and the burden of the reporting task? Stephen Porter[1,2]; Kari Hironaka[3,4]; Rosanna Batista[1]; Chao-Yu Guo[1,2]; [1]Children's Hospital and [2]Harvard Medical School, Boston, MA; [3]Boston Medical Center and [4]Boston University School of Medicine, Boston, MA.
(ID - 32).

Background

Patients are increasingly expected to independently communicate health information needed to monitor chronic health conditions such as Attention Deficit Hyperactivity Disorder (ADHD). Design of data solutions that optimize patient-centered information exchange requires understanding how health literacy influences patients' capacity to report relevant data in varied task environments.

Objectives

1) To examine the association between health literacy and data quality (complete data to support a behavioral screen and accurate report of medications) produced by parents' data entry efforts across paper-based and computer-based environments, 2) To determine the impact of health literacy on the task burden associated with parents' efforts across the task environments.

Methods

We completed a randomized controlled trial with English- and Spanish-speaking parents of children with ADHD. Parents were assigned to complete data entry within a paper-based or a computer-based task environment. The paper task environment included the NICHQ Vanderbilt (a structured, 55 item survey) and an open-ended written report of current medications used for the child's ADHD. In the computer environment, parents reported the same content using an application designed to facilitate data entry with a structured series of steps. Each subject completed the Test of Functional Health Literacy in Adults (TOFHLA). Total TOFHLA score and categorical health literacy (analyzed as adequate versus marginal/inadequate) were explored as predictors. Primary outcomes included: insufficient data to screen for subtypes of ADHD, accurate report of total daily dose of all prescribed ADHD-specific medicines, and the total task burden as measured by the NASA task load index. The gold standard for accurate total daily dose of an ADHD medication was a structured in-person interview with the parent.

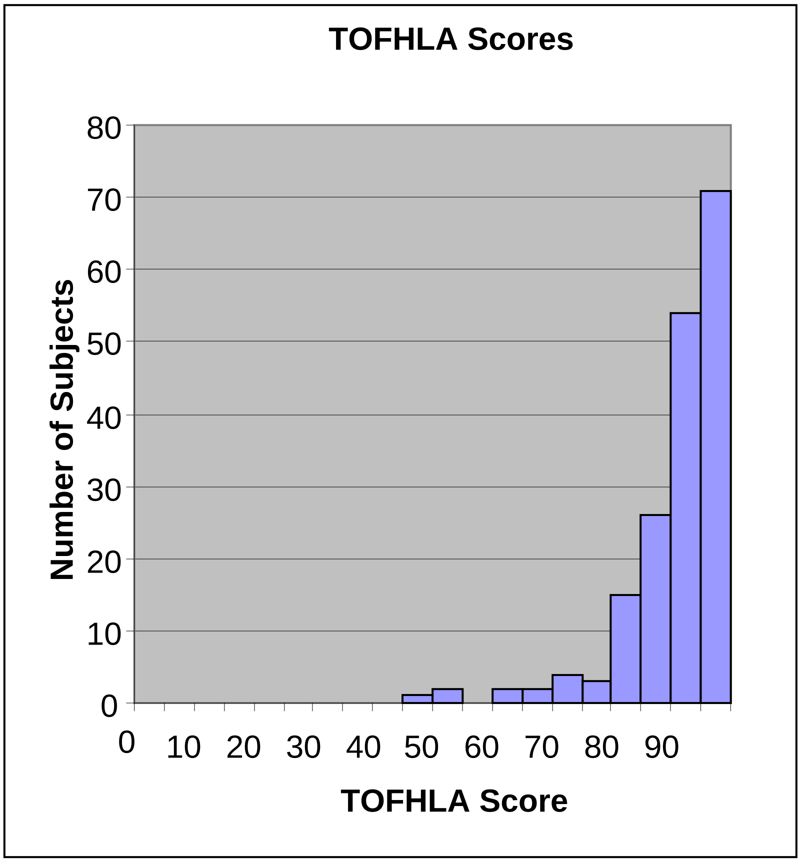
Results

271 parents were screened. Of those, 194 were found eligible and 182/194 were enrolled. Two parents were excluded post-hoc. 90 parents each were randomized to paper-based or computer-based tasks. 10/180 (5.6%) parents scored inadequate/marginal on the TOFHLA. Figure 1 shows the distribution of TOFHLA scores. Adequate health literacy was associated with a lower but non-significant risk of insufficient data (OR 0.66, (95%CI 0.2 – 2.4). Compared to parents scoring marginal/ inadequate, parents who scored adequate were more likely to give accurate medication reports (OR 4.5, 95%CI 0.5 – 38.5). Total TOFHLA score was significantly associated with medication accuracy (OR 1.1, 95%CI 1.0-1.1). Parents with adequate literacy were significantly more likely to report lower task burden (decrease in burden score of 1.15 SD, p=0.003). Notably, only the paper-based task environment demonstrated a significant relationship between task burden and categorical literacy - parents with adequate literacy were significantly more likely to report lower burden (decrease in score of 1.63 SD, p=0.0005). In

generalized linear models controlling for task environment, parents with higher TOFHLA scores produced improved medication accuracy (p=0.012) and experienced lower burden (p=0.004).

Conclusions

Health literacy independently affects parents' ability to share information across paper-based and computer-based task environments. Lower health literacy is predictive of lower quality data and increased burden associated with data entry tasks. A computer application tailored to patients' literacy needs can mitigate the task burden associated with data entry.



The Potential Use of Area-Based Population Characteristics for Targeted Selection and Balancing of Recruitment into Health Literacy Interventions. Kathleen M. Mazor[1]; Douglas W. Roblin[2]; Josephine H. Calvi[2]; Brandi Robinson[2]; [1]University of Massachusetts Medical School, Worcester, MA; [2]Kaiser Permanente Georgia (ID - 44).

Background

Individual-level measures of education or literacy are rarely available for enrollees of health care systems in the US. Thus, research or quality improvement interventions that target participation from enrollee subgroups defined by education or literacy must rely on other data sources. In this presentation, we will describe initial results from use of area-based, US Census measures of adult educational levels and African American (AA) residents to target participant recruitment into a health literacy study. Our objectives were to obtain balanced proportions of participants: 1) with low, moderate, and high levels of formal education, and 2) who were AA or white.

Methods

Kaiser Permanente Georgia (KPG) is one of 3 sites participating in the NCI-funded study "Health Literacy and Cancer Prevention: Do People Understand What They Hear?" KPG is recruiting 300 participants for completion of a 2-hour, computer-based assessment of health literacy. The intervention is primarily an assessment of comprehension of 16 videoclips on cancer screening and prevention. Additional instruments include measures of cognition, print literacy, and cancer knowledge and history.

Potential participants were KPG enrollees 25-74 years of age who were geocoded to their US Census tract using MapMaker Plus (N=185,150). Census tracts were linked to US Census SF-3 data to obtain percent AA and percent of adults with a high school education or less in each tract. Census tracts were classified into tertiles of percent AA and, within each tertile of AA, into tertiles of percent of adults with a high school education or less to create a 3 by 3 sampling frame (9 recruitment cells). Classification of education within race controlled for the confounding of race with formal education. Random samples of approximately 400 eligible participants per cell were selected for recruitment.

Results

As of 07/2009, 898 eligible participants had been invited to participate and 91 assessments had been completed (10% participation rate). 60% (n=55) of participants were AA; 33% (n=30) were white. Self-reported race paralleled the percent AA residents by US Census tract (Figure). The highest percent of participants with a self-reported high school education or less (31%, 8 of 26) was from US Census tracts with the highest percent of adults with a high school education or less (Figure). We have also found that the sampling frame is yielding a balanced recruitment by level of education within race. 15% of AA participants had a high school education or less (8 of 55); 23% of whites had a high school education or less (7 of 30).

Conclusions

Initial results indicate that this sampling strategy is achieving our goals: recruitment balanced by race and the confounding of race with formal education is being mitigated. Meaningful numbers of participants with a high school education or less from a health plan with a predominantly middle-class membership and no Medicaid plan are being recruited. In conclusion, area-based measures of education may facilitate recruitment of selected subgroups of participants in the absence of self-reported education. Whether or not formal education is a proxy for functional health literacy remains to be determined.

Content and structural features of parents' written communication about their children's medicines.

Stephen Porter[1,2]; Chao-Yu Guo[1,2]; Rosanna Batista[1]; Janine Molino[1]; Kari Hironaka[3,4]; [1]Children's Hospital and [2]Harvard Medical School, Boston, MA; [3]Boston Medical Center and [4]Boston University School of Medicine, Boston, MA (ID - 46).

Background

Written fluency is central to the construct of health literacy, but little research informs what patients communicate when asked to provide health information in written form. Understanding the content and structure of patients' written communication is key to identifying how written fluency may affect patient-provider and patient-health system interactions.

Objectives

1) To describe patterns of structure and content in parents' written communication about medications within a paper-based, unstructured task environment, 2) To explore the association between parental health literacy and the successful communication of a child's Attention Deficit Hyperactivity (ADHD) medications, 3) To investigate whether experience with a structured, computer-based, data entry application influenced parents' subsequent written report of medications.

Methods

We completed a secondary analysis of parents' writing samples collected as part of a randomized controlled trial. Using a crossover study design, English- and Spanish-speaking parents of children with ADHD were randomized to complete a paper-first versus a computer-first series of data entry tasks covering similar content. Each subject completed the Test of Functional Health Literacy in Adults (TOFHLA). On paper, parents were prompted to "write down all information about the medicines they used to treat their child's ADHD." On the computer, parents were led through structured prompts to provide medication-specific data. The primary outcome was the successful written communication of ADHD medications, defined ordinally as follows: 1) accurate report of the total daily dose of medications from memory, 2) accurate report of medications aided by referencing prescription labels, 3) inaccurate report of medications from memory, 4) inaccurate report despite referencing. The gold standard for accurate reporting of medications was a structured in-person parent interview. Secondary outcomes included variables related to content (word count, use of medical terms, report of treatment rationale, inclusion of time-specific references) and structure (narrative versus list/phrases).

Results: 182/194 eligible parents were randomized; two were excluded post-hoc. 88/90 of the paper-first writing samples were analyzed for content and structure; two were eliminated as outliers (one blank, one with 7 medications). Median number of medications reported was 1, (range 1-4). Mean word count was 14.8 (SD 16.0). Written communication of medications was categorized as follows: accurate report (7 from memory, 5 with referencing); inaccurate report (25 from memory, 38 despite referencing). Table 1 summarizes secondary outcomes. In a generalized linear model, total TOFHLA was not associated with successful written communication of medications (Model $R^2=0.043$, F value=1.06, $p=0.37$). Total TOFHLA was associated with parents' use of medical terminology (Model $R^2=0.167$, $p<0.0001$) and a list/phrase structure compared to narrative (Model $R^2=0.066$, $p=0.017$). Prior exposure to the computer-based environment significantly increased the odds of accurately communicating medication data in writing (odds of accurate report from memory 26.2, 95%CI 8.4-82.5; odds of accurate report with prescription label 18.9, 95%CI 5.2-66.2.)

Conclusions

TOFHLA scores do not correlate with parents' successful written communication of medicines, but are associated with aspects of written structure and content. Exposure to a structured, computer-based method of reporting medications greatly increased the chances that parents successfully communicated accurate data about medicines in a later writing task.

Table 1. Description of content and structure*

Outcome	# subjects (percent)
Use of medical terms	
Yes	73 (83.0)
Structure**	
Narrative	53 (61.6)
List/Bullets/Phrase	33 (38.4)
Treatment rationale given	
Yes	12 (13.6)
Inclusion of time-specific reference	
Yes	46 (52.3)

*N = 88; two subjects were excluded as outliers (one subject with no written content, another subject who reported a total of seven medications.)

** Structure is based off of a sample of 86 subjects

THEMATIC AREA – NUMERACY

Bringing Meaning to Numbers in Health Decisions. Ellen Peters. (ID – 12)

Background: Numeric information is often provided in decisions, but may not be useable by patients and consumers without assistance from information providers. The objective of this paper was to examine whether a manipulation of evaluative meaning (i.e., the extent to which an attribute can be mapped onto a good/bad scale) could help decision makers use important numeric information. A set of four studies examined this effect and possible theoretical mechanisms underlying the effect, including depth of processing and affect.

Methods: We presented college-student, employed-aged, or elderly adults with numeric quality indicators about health plans or hospitals. Half of participants were presented with the numeric information made easier to evaluate through the use of evaluative markers (labels indicating the goodness or badness of the indicator shown); the other participants were shown only the numeric information. Each study examined the impact of the presence versus absence of the evaluative markers on judgments or choices. Possible cognitive and affective mechanisms underlying the effect were tested using measures of affect, memory, and reaction times.

Results: The results demonstrated that an evaluative-markers manipulation influenced preferences and led to a greater integration of important attributes and less influence of irrelevant mood states. In addition, this influence depended on numeracy. For participants lower in numeracy, evaluative markers appeared to provide more meaning to numeric information and to influence judgments more. Tests of underlying mechanisms were most consistent with affect rather than cognitive processes.

Conclusions: Numbers appear to be just that—numbers. The present results suggest that consumers may not use them as information until available data is analyzed to determine their meaning or until the data acquire evaluative meaning through other means. These results are consistent with the constructed-preferences approach in decision making. We argue that the evaluative labels act as overt markers of affective meaning and guide choices. Decision makers need help in interpreting not only what the numbers are but also what they mean, and this meaning is tied to affect at least in the present context.

Low diabetes numeracy predicts worse glycemic control. Kerri L. Cavanaugh[1]; Kenneth A. Wallston[1]; Tebeb Gebretsadik[1]; Ayumi Shintani[1]; Darren DeWalt[1]; Michael Pignone[2]; Tom A. Elasy[1]; Russell L. Rothman[1]; [1]Vanderbilt University Medical Center, Nashville, TN; [2]University of North Carolina, Chapel Hill, NC; (ID -18).

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

THEMATIC AREA – ORGANIZATIONAL

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

Oana Gröne[1]; Rima E. Rudd[2]; [1]HPH Catalonian Network, Barcelona, Spain; [2]Harvard School of Public Health, Boston, MA; (ID -21)

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.

How Health Literacy Friendly Are We? Use of a health literacy toolkit. Kara L. Jacobson[1]; Sunil Kripalani[2]; Margaret E. Gatti[3]; Karen J. McMorris[4]; Julie A. Gazmararian[1]; [1]Emory University, Atlanta, GA; [2]Vanderbilt University, Nashville, TN; [3]Georgetown University School of Medicine, Washington, DC; [4]Tufts University, Boston, MA; (ID - 29).

Background:
Public hospitals generally serve a disproportionate amount of low-income, indigent patients who often have limited literacy skills. Hospitals should work to address these needs to ensure that all patients can access and understand important health information. We developed an assessment toolkit for the outpatient pharmacies to identify how to meet patients' needs.
Methods and Results:
Using an organizational approach, the toolkit includes a: 1) pharmacy staff survey; 2) patient focus groups; and 3) an objective audit. Pharmacy staff respondents (n=53) were mostly female (71%) and African American (67%). Twenty patients participated in focus group discussions inquiring about the physical environment of the pharmacy, the readability of written materials dispensed within the pharmacy, and the demeanor and approachability of the pharmacy staff. Patients had a mean age of 47 years, were prescribed an average of 3.7 medications, and were mostly African American (85%) and male (60%). Three trained objective auditors assessed the pharmacies using a tool adapted from the *Literacy Alberta Tool Kit*. The assessments performed by each of the three components of the toolkit were aligned and similarities and dissimilarities were highlighted.

Only one-third of pharmacy staff agreed that the pharmacy staff, including management, had received awareness and sensitivity training about literacy and literacy issues. Twenty-eight percent of pharmacists reported receiving training in how to identify, prepare, and simplify materials to ensure that they are written in plain language. Yet, pharmacy staff members generally *agreed* that pharmacy print materials were health literacy friendly, while auditors and some focus group patients *disagreed*. Focus group patients voiced concerns about text size on prescription bottles labels and warning labels, while auditors found deficiencies in white space and graphics on various print materials and indicated the many materials were not easy to comprehend.

Half of pharmacy staff members reported having received training on how to communicate with patients using simpler language; however, 24% of pharmacy staff *disagreed* that medical jargon had been removed from medication counseling services. Auditors reported that pharmacy staff avoided using medical jargon when communicating verbally with patients; however, they noted that some improvements could be made. Focus group patients were generally positive about the use of medical jargon during medication counseling. "*They use the correct word and give you the explanation behind it*."

Conclusion:

These data indicate a need for heightened awareness of health literacy among health care professionals. Our three component audit toolkit is a useful way to assess how well an organization meets the needs of patients with limited health literacy skills and can be adapted for any health care environment.

Improving the Health Literacy of Wisconsin Hospitals—A Collaborative Model. Paul D. Smith[1]; Sue Gaard[1]; Michele Erikson[2]; Oscar Mireles[3]; [1]University of Wisconsin-Madison, Madison, WI; [2]Wisconsin Literacy Inc, WI; [3]Omega School, Madison, WI. (ID - 40)

Background: According to the 2003 survey of the U.S. Department of Education National Assessment of Adult Literacy, 36% of U.S. adults were found to have Basic or Below Basic health literacy skills. The ability of these individuals to understand and act upon basic health information is very limited and can create crisis situations affecting their safety and quality of life.

The aim of this project was to test a collaborative model between hospitals and adult literacy students that identifies health literacy barriers and proposes effective solutions for improving patient safety, satisfaction, and health care outcomes. This project applies the concept of "universal design," in which the health care environment is designed for use by all people, without the need for adaptation or customization.

Methods: Fifteen students from Omega School, a provider of basic adult education, were trained as health literacy consultants to St. Mary's Hospital in Madison Wisconsin. Omega students and a staff team from St. Mary's Hospital independently critiqued a hospital admission form and commonly used patient information guides for readability and assessed the ease of navigating through the hospital using an adaptation of a nationally developed health literacy assessment tool. Following these assessments, focus groups comprised of hospital team and adult literacy student panels were convened to further prioritize barriers to health literacy and feasible solutions to reduce or eliminate these barriers. Based on the outcome of this qualitative research, recommended processes will be developed for literacy programs and health care systems that desire to address health literacy using a collaborative model.

Results: The foundation to this collaborative work is the formation of a successful partnership and ongoing relationship between a health care system and an adult literacy program. In the end, both literacy organizations and health care systems benefit from improved understanding of health care information.

The results of this study suggest that the collaboration between St. Mary's Hospital and Omega School was very valuable; both for the hospital staff and for the students. The hospital benefited from the unique, unvarnished feedback from Omega students who described their challenging experiences with complex and confusing health care information. The students were given an opportunity to learn more about the health care system and how to communicate more effectively when they did not understand. Roundtable dialogue offered a unique forum to describe and explore recurring systemic issues and to identify potential solutions to benefit all patients.

Conclusion: This qualitative study was designed to test a model of collaboration between hospitals and literacy providers. Through independent assessments and roundtable dialogue, hospital staff and literacy student teams identified health literacy barriers they experienced with hospital navigation and written patient communication. Focus group results confirmed the value of successful partnerships between health care systems and literacy organizations. Based on the outcomes of this study, recommended processes will be developed for other literacy programs and health care systems that desire to improve the health literacy of their environments.

A coordinated multilevel organizational intervention to improve nutrition and physical activity habits among Head Start parents, staff, and children[6]

Carol B Teutsch[1]; Ariella Herman[2,3]; Portia Jackson[2]; [1]Merck&Co, North Wales, PA; [2]UCLA Anderson School of Management and [3]Johnson and Johnson Health Care Institute, Los Angeles, CA. (ID - 45)

Background:

Obesity and overweight present a significant long term threat to the health of the Head Start population. A study conducted in 2004 found that 27% of children who enrolled in Head Start in New York city were obese, compared to 13% of three to five year old children nationwide, and 18% of three to five year old children whose families were below the poverty line (but were not enrolled in Head Start). This information suggests that Head Start participants are more likely to be obese than the nationwide population and than other low-income children, potentially creating a lifelong legacy of poor health with increased risk of obesity related complications. Risk factors for cardiovascular disease (hyperinsulinanaemia, impaired glucose tolerance, dyslipidaemia, and hypertension) have been found in overweight children as young as five years old.[1] Several nutrition and physical activity programs have been created specifically for Head Start, including *Little Bites, Big Steps* and *I am Moving, I am Learning*. However, these programs for children addressed nutritional and exercise issues separately and did not include parents in the education. To attain and sustain impact, a program of obesity prevention should be tested which encompasses a comprehensive organizational and family-centered approach. Programs targeting children while they are young before unfavorable life-long habits regarding nutrition and physical activity are established may be crucial. Additionally, Head Start parents frequently have low literacy and available nutritional resources may not be suitable, understandable, or actionable. This pilot is designed as a coordinated organizational and family-oriented approach to empowering vulnerable parents, children, and staff to make healthier choices regarding nutrition and exercise.

Methods:

The UCLA/Johnson & Johnson Health Care Institute created a low health literacy training program on diabetes risk awareness, budget-conscious nutrition, and readily accessible physical activity for Head Start parents, children and staff. A classroom activity guide on physical activity and nutrition was developed consistent with curriculum standards and learning goals for Head

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[6] Child data to be presented separately.

Start children. Two hundred and six employees, including management, administrators, teachers and home visitation staff, participated in a day long training session on diabetes awareness, nutrition knowledge, and the importance of physical activity. Eighty seven parents were invited to four healthy living training sessions (held after work hours) as the core training. Reinforcement of learning and motivation was delivered through a workshop on healthy shopping, home visits with supplementary materials, newsletters, success stories of fellow attendees, and a graduation celebration that focused on budget-conscious nutrition and physical activity. Seventy seven families participated in at least two core trainings. Concurrently, 100 children received an interactive curriculum on nutrition and physical activity during class over a six month period.

Results:

77 parents and 187 staff participated in training and pre and post assessments over the 6 month intervention. Parents and staff showed improvement on a number of parameters related to eating and shopping knowledge and behavior, a few of which are featured here.

Among staff, the prevalence of morbid obesity decreased from 7% to 3% of all staff, while the prevalence of those classified as overweight decreased from 36% of participants to 31%. The percentage of staff who reported that they always read the nutrition labels on food increased 33% (from 30% at baseline to 45%). Exercise increased in frequency and duration of sessions per week. The percentage of staff that reported doing any form of exercise increased 23% percent (from 73% to 90%). The number who reported exercising 60 minutes or more per week increased 12 percent (from 67% to 75%).

Among parents, on average, body mass index (BMI) measurements decreased by 0.54kg/m^2, and average waist circumference decreased by 6.42 inches.. (Table 1) Among parents, ?overweight obesity decreased from a prevalence of 35% to 26%. There was a 75% increase in the percentage of parents who reported that they engaged in some form of exercise each week (57% to 100%). There was more than a two-fold increase in the percentage of parents who reported engaging in exercise for at least 60 minutes per week (43% to 91%). There were remarkable changes in eating behavior among parents as well. There was a 50% reduction in the percentage of parents who reported eating any fried foods following the intervention (70% to 35%). There was a more than a three-fold increase in the percentage of parents who reported drinking nonfat milk (13% to 48%). There was also a more than three-fold increase in the percentage of parents who reported they always understand nutrition labels (17% to 65%).

Conclusion:

Following the health literacy intervention, improvements were seen in knowledge and behavior, such as frequency of exercise and food choice in staff and parents; BMI decreased in some groups. Staff, parents, and children reinforced each other’s learning with coordinated activities for each level. These encouraging early results from this pilot call for more comprehensive study and refinement of the intervention.

Specific Care Recommendations from Information Prescription Therapy (SCRIPT): Using Information Therapy as a part of Patient Care. Amy Chesser[1]; Douglas D. Bradham; Traci Hart; (ID - 56).

Background:

The long-term objective of the SCRIPT project was to investigate a new model of primary care using “information prescriptions” in order to improve patient compliance, health outcomes, and reduce healthcare costs. Unaffordable healthcare is symptomatic of three root causes – (1) an inefficient healthcare delivery system, (2) American’s poor health habits, and (3) medical illiteracy – all of which contribute to non-compliance with medication management of many conditions. Incentives to improve consumer health behaviors and medical provider performance hold a promising key to addressing these root causes and making healthcare affordable and accessible to all Americans.

The *MedEncentive* Information Therapy Program (hereafter “The Program”), has several years’ experience in development and successful testing of using financial rewards to both providers and patients to encourage “mutual accountability”. The Program has made an important contribution toward transforming health and healthcare as evidenced through previous pilot studies. *Medencentive* uses care guidelines from *Healthwise* ®, a national resource for evidence-based protocols. The term “information therapy”, and its symbol “Ix®”, were coined by *Healthwise* ® to mean: “providing patients with the right information at the right time, in understandable terms, so patients can make an informed decision about their health.”

This study independently examined the Program’s effectiveness, during a five year period, on key outcomes of: (A) provider and consumer participation, (B) patient satisfaction and information prescription compliance, and (C) changes in overall healthcare costs.

Methods:

This study included a comparative effectiveness design to isolate each key outcome. Secondary, Retrospective Cohort Analysis was conducted. All participant data was transmitted to the Investigators from MedEncentive Inc. The informed consents for each employee and their dependents are a component of the insurance contract, which means that the study qualified for a waiver of consent. Usual care rates of outpatient and inpatient encounters and expenditures were derived from the Kansas Health Insurance Information System (KHIIS) allowing system-level comparison for outcomes as listed in Table 1.

Results:

Preliminary findings indicate increased access to system, health literacy scores and guideline use. A key element in program economic impact is the degree to which both physicians and patients participated in the EBM and Ix programs, respectively. Forty-eight percent of Ix prescription physician opportunities were completed.

Preliminary results indicate improved cost containment for the plan. The data were analyzed to ascertain the sources of the observed cost savings in Intervention as opposed to Baseline years. As predicted, the vast majority of the cost savings occurred because of decreased hospital-related costs and pharmacy. While the costs related to program administration of EBM and Ix were slightly higher, they were negligible compared to the savings achieved.

Conclusions:

Secondary data analysis indicates implementation of the Program (a P4P system characterized by use of EBM and Ix) could reduce global utilization of healthcare services resulting in lower global costs.

Table 1. Data sources, methods and analysis utlitzed

Aims	Data	Data Source	Retrospective, Secondary Analysis Methods	Analysis
1. Participation	Access to system; health literacy scores; mutual-accountability ratings; guideline use	MedEncentive Program	Questions presented on MedEncentive's online interface	SPSS for descriptive & content analysis, logistic regression of decision to participate
2. Patient Perceptions	Self-reported health-related quality of life; satisfaction	Participating patients	Annual surveys emailed from MedEncentive	SPSS for descriptive & factor analysis on satisfaction scores
3. Utilization and Cost	Encounters, hospitalizations, lengths-of-stay, costs of care	Insurance Claims	Claims denote: Date of service, Location and Provider, Primary and Secondary Diagnoses, Charges, Discounts and Reimbursed amounts	SPSS for descriptive frequencies by type of encounters and settings & non-linear regression of cost of care by condition to examine drives of expenses

A Collaborative Model for Community-Based Health Promotion Interventions to Support the Information Needs of At-Risk Consumers: The Fairfax County Health Literacy Initiative

Gary L. Kreps[1]; Vera Fessler[2]; Lois Culler[3]; Margaret Gastrock[4]; [1]George Mason University, Fairfax, VA; [2]Fairfax County Public Library, Fairfax, VA; [3]Inova Fairfax Hospital, Fairfax, VA; [4]Fairfax County Health Department, Fairfax, VA. (ID - 61)

Background

A community-based collaborative, the Fairfax County Health Literacy Initiative (FCHLI), was established to address major disparities in health outcomes at the local level that result from limited consumer access and understanding of relevant health information. The FCHLI targets the health information needs of poor, elderly, minority, immigrant, and other at-risk populations. Partners in the FCHLI collaborative include leaders from the Center for Health and Risk Communication at George Mason University, the Inova Fairfax Health Sciences Library (the Inova Health System), the Fairfax County Public Library, the Fairfax County Health Department, area schools, health awareness and prevention groups, social service agencies, and other non-profit organizations to strengthen outreach to poor and vulnerable populations in Fairfax County. Limited health literacy is a primary problem that hinders access to health care, informed health care decision making, and participation in prevention behaviors, resulting in negative health outcomes. The FCHLI develops intervention to provide relevant and accessible health information to improve health outcomes for limited literacy populations by encouraging early diagnoses, adoption of healthy behaviors, and cooperation with medical recommendations.

Methods

The FCHLI developed a collaborative model for helping at-risk populations within Fairfax County (a large culturally diverse metropolitan area with more than 1 million residents outside of Washington, DC), providing consumers with relevant and culturally sensitive health information to promote public health. This model uses the synergistic strengths of the partner organizations to design and implement concerted, strategic health communication programs to educate consumers, influence negative health-related behaviors, and enhance the quality of health care and health promotion efforts. The goal of the FCHLI is to improve patient outcomes through development and implementation of community health literacy programs that provide relevant and accessible health information for informed health decision making concerning early detection of health problems, adoption of health promotion behaviors, and adherence to medical recommendations.

Results

The FCHLI partners have collaboratively designed and produced innovative community programs for enhancing effective communication of relevant health information to at-risk populations. These health communication programs include:

- ✓ Culturally-sensitive health education materials for vulnerable community members,
- ✓ H1N1 influenza, AIDS/HIV awareness prevention, and immunization promotion health education campaigns,
- ✓ Consumer and health care provider educational programs to enhance health communication competence,
- ✓ “Ask the Expert” health series to interactively respond effectively to consumer health queries with culturally sensitive health information,
- ✓ Web portal to promote community (consumers, providers, and officials) access to health literacy resources and provide news about FCHLI activities
- ✓ Community-based health communication research projects to assess health disparities and develop strategic interventions.

Conclusions

This program reaches out to a large vulnerable population of consumers in Fairfax County, Virginia, providing consistent and effective health information messages delivered through multiple complementary communication channels. The FCHLI provides at-risk consumers with engaging, culturally-sensitive communication at optimal “teachable” moments, when they need support. This innovative community-based collaboration can become a model for leveraging resources to promote public health.

Putting Prevention into Practice: A Community-Based Participatory Research (CBPR) approach to incorporating prevention into a Community Health Center setting. Sean Arayasirikul[1]; Sandra Williams Hilfilker[1]; Kristin Anderson[1]; Linda Harris[1]; [1]U.S. Department of Health and Human Services, Rockville, MD. (ID - 62)

Background

Opportunities to meet the health literacy needs of diverse safety net populations are often missing in the primary health care system. A number of healthcare models such as Community

Oriented Primary Care and the Chronic Care Model emphasize prevention and the importance of patient-centered care, teamwork, productive interactions, and community-clinic connections. We leverage these models to investigate integrating prevention into the clinical workflow as a mechanism to achieve the distal outcome of improved health literacy and positive behavior change. This study uses a community-based participatory research (CBPR) approach to apply these concepts to developing a prevention intervention for a community health center serving a safety net population.

Specifically, this study evaluates the outcomes of an intervention in a Community Health Center (CHC) serving safety-net populations in order to improve health and disseminate prevention messages about smoking cessation and weight management. Concepts from the Chronic Care Model and Medical Home also informed the development of the intervention. This study included interpersonal messaging, evidence-based print and electronic materials and the use of outreach for patient support.

Methods

Three focus groups were conducted with patients to understand their prevention needs. Five facilitated meetings were held with a planning team including front desk staff, providers, patients, and community outreach workers. Based on input from the focus groups, the planning team developed an intervention for systematically incorporating prevention guidance into the health center visit and for continued support between visits.

Patients of one provider were invited to participate in a program that would offer team based support in making healthier lifestyle changes in weight management or smoking cessation. A pre/post clinical encounter survey measured patient reported self-efficacy and health seeking information preferences. Implementation lasted approximately six months and team coaching was provided for continuous quality improvement. A 30-day follow-up interview collected patient recall about the clinical encounter and whether behavior change occurred. Processes to extract qualitative and physiological EMR data were developed.

Results

The intervention developed by the planning team was complementary to the Center’s current workflow and focused on smoking cessation and weight management. The following elements were also included:

- Interpersonal communication between patients and all members of the healthcare team
- User-friendly print and online information from healthfinder.gov
- Data collection through the Center’s electronic medical record
- Community outreach staff to provide opportunities for additional counseling

Results indicate that patients were more receptive to weight management prevention information compared to smoking cessation. Patient reported levels of self-efficacy increased in pre/post survey data.

Conclusions

Despite some challenges with using a CBPR approach, the planning team developed a patient-centered intervention that involved all members of the healthcare team and represented best practices in behavioral counseling. We suspect that productive patient-provider interactions may have contributed to the higher levels of patient commitment to behavior change. Many challenges were identified in this complex system of patients, providers, community linkages, and information technology. These findings support bridging community and clinic gaps for prevention in an effort to promote and improve health literacy among a CHC safety net population.

Literacy Level of Medicaid Applications and Child Medicaid Retention Rates: Comparison Across 50 States. Susmita Pati[1,2]; Jane Kavanagh[1]; Lihai Song[1]; Xianqun Luan[1]; [1]Children's Hospital of Philadelphia, Philadelphia, PA; [2]University of Pennsylvania, Philadelphia, PA. **(**ID - 70)

Background:
Gaps in health care coverage for children have been associated with poor child health outcomes. As studies have identified literacy-related difficulties as one of the primary barriers to Medicaid enrollment and retention, this study aims to compare the literacy level of Medicaid applications across all 50 states and to quantify the association between the application literacy level and child Medicaid retention rates.

Methods
Retrospective cohort study combining state-level Medicaid application and renewal process data with administrative child Medicaid eligibility data for all 50 states. State-level characteristics were obtained through internet searches and surveys with Medicaid staff. They included renewal frequency, interview policy, 12-month continuous eligibility policy, use of joint SCHIP/Medicaid application, and literacy level of the Medicaid application. The literacy level of each application was measured using Readability Studio© software. Administrative Medicaid eligibility files for children (0-18 yrs) from 2001-2002 were obtained from the Center for Medicare and Medicaid Services. Retention rates for each child (percentage of the 24 month observation period with coverage) were analyzed in relation to individual and state-level variables. Individual variables included age, gender, race/ethnicity, presence of chronic conditions, state of residency and Medicaid eligibility category (i.e. income, medically needy, foster care, supplemental security income [SSI]).

Results
In 2008, 46 states had guidelines related to the reading level of Medicaid information. While 17 states' applications scored within their target range on at least one of three readability tests administered (Flesch-Kincaid, New Fog, FORCAST), 80.3% of the scores were above the corresponding state's target. Also, 93% of applications scored at or above a 5th grade reading level. The mean cumulative duration of Medicaid coverage for a child in the 24-month period was 20.1 months. Coverage duration did not differ greatly between children from different age or racial/ethnic groups. On average, children with chronic conditions retained coverage for as long as their healthy peers (20.7 mths vs. 20.1 mths, $p = 0.03$). Of the 19 million children analyzed, 27.8% experienced at least one gap in coverage. The mean length of any single disenrollment was 6 months. Bivariate analysis showed that Medicaid recipients in states requiring eligibility recertifications every 6 months were 30% less likely to experience two years of continuous coverage than recipients in states with annual renewals. Recipients in states without 12-month continuous eligibility were 20% less likely to have continuous coverage. Preliminary results from proportional hazards multivariable regression models on a 5% sample of the Medicaid files demonstrate that children in foster care and those with SSI are 57% ($p<.0001$) and 70% ($<.0001$) less likely, respectively, to be disenrolled from Medicaid than income-eligible children. Analyses quantifying the relationship between application literacy levels and Medicaid retention rates are ongoing.

Conclusions

Medicaid renewal applications fail to comply with state literacy guidelines. Child Medicaid retention rates are more strongly associated with state Medicaid renewal characteristics than with individual child characteristics. To improve child Medicaid retention, efforts to simplify the renewal process merit serious consideration.

Health Literacy Missouri - A collaborative state-wide approach to addressing health literacy.

Susan Centner[1]; Thomas Adams[2]; Arthur Culbert[2]; Toni Garrison[1]; Sherri Hinrichs[1]; Stan Hudson[3]; Leah Prewitt[1]; Deborah Ward[1]; [1]Health Literacy Missouri; [2]Missouri Foundation for Health; [3] University of Missouri, Columbia, MO; (ID - 76).

Background

The Missouri Foundation for Health (MFH) developed the Missouri Health Literacy Enhancement priority area; now known as the HLM project to improve health literacy in the state of Missouri. MFH and health literacy stakeholders are focusing on the following goals: 1) improve the health literacy of Missouri's population in order to encourage better health decisions and healthy behaviors; 2) promote health literacy education and training for health professionals and community members 3) enhance communication between consumers and care providers.

To guide HLM, MFH formed a Health Literacy Coordinating Council. The Council has: 1) adopted a conceptual logic model; 2) formed subcommittees to conduct a statewide needs assessment and health literacy tool (resource) inventory; 3) recommended funding for health literacy demonstration projects and 4) developed a vision/mission statement.

Methods

Utilizing theory-based models to drive the development and implementation of its logic model, HLM addresses health literacy interventions on multiple levels. HLM features multi-pronged approaches; relying on project partners from community based organizations, academic institutions, foundation program officers and demonstration projects staff.

This weaves a rich patchwork of highly skilled collaborators functioning at local, regional and statewide levels. Regional Community Advisory Networks led by Missouri AHEC provide advisory support to all HLM staff and demonstration projects. The HLM Team of librarians and health researchers are building a Resource Inventory Database to identify and screen health literacy literature, tools, and products.

HLM is developing assessment tools to help health facilities evaluate their own health literacy policies and procedures.

HLM has developed a series of health literacy education modules and workshops targeting both medical and health professionals and students.

HLM is launching its web portal at www.healthliteracymissouri.org which provides links to evaluated health literacy materials from the resource inventory database.

Results:

HLM is working closely with the Missouri Hospital Association and the Missouri Primary Care Association to examine how existing standards and policies can be updated to provide more adequate support of health literacy practices.

HLM is also working closely with state agencies to provide recommendations for policy changes to encourage the use of health literate resources and services to MO HealthNet (Medicaid) participants and Missouri's citizens.

Conclusion:

This panel will discuss the formation of HLM, the development and implementation of the theory-based logic model which lays the foundation for HLM, and highlight HLM's experiences building partnerships, providing education, collecting and evaluating data, and the construction of its flagship Health Resource Inventory.

Effect of a Pharmacy-Based Health Literacy Intervention on Medication Refill Adherence in an Inner-City Health System. Sunil Kripalani[1]; Julie A. Gazmararian[2]; Kara L Jacobson[2]; Yi Pan[2]; Brian Schmotzer[2]; [1]Vanderbilt University, Nashville, TN; [2]Rollins School of Public Health, Emory University, Atlanta, GA. (ID - 92)

INTRODUCTION

- Only 50-60% of patients take their medications as prescribed.
- Low health literacy, which affects 40% of adult Americans, contributes to poor medication management.
- The effect is pronounced in inner-city health systems, which have a high prevalence of low health literacy.
- A pharmacy-based intervention that addresses low health literacy may improve medication adherence.

OBJECTIVES

- Determine the effect of a multi-component, pharmacy-based, health literacy intervention on medication adherence.
- Assess the effect of health literacy on the success of the intervention.
- Understand the perceived utility of and satisfaction with intervention components.

METHODS

- Setting/Subjects:
  - Intervention Site: Grady Health System Pharmacies (N=3)
  - Control Site: Dekalb Grady Pharmacy
  - Pharmacy users for at least 6 months and who picked up their own medications

- Intervention components:
  1) Automated telephone reminder calls to refill medications
  2) PictureRx cards
  3) Clear health communication training for pharmacists

- Outcomes:

    - Refill Adherence: Cumulative Medication Gap (CMG)
        - CMG values range from 0 (adherent) to 1 (non-adherent)
        - Computed for 6 months pre-intervention (baseline) and 6 month study period (follow-up)
    - Utility of and satisfaction with intervention components
        - From patient interviews and focus groups

- Design/Analysis:
    - Non-randomized comparison of CMGintervention vs. CMGcontrol
    - Powered for 20% difference
    - Paired t-test among patients with baseline and follow-up data
- Patient focus group comments indicated:
    - Pharmacists' explanations were easy to understand and useful.
    - PictureRx cards were self-explanatory, useful for understanding the medication regimen, improved pharmacist counseling, good for patient-physician communication.
    - Phone call reminders were easy to understand, were received at convenient times, and expedited the refill process.

DISCUSSION

- Multi-component, pharmacy-based intervention was well-received.
    - Improved pharmacist counseling
    - Patients found tools very helpful for understanding and remembering medicines
    - High patient satisfaction

- No significant improvement in refill adherence.
    - Analyses adjusting for site differences also showed no significant improvement (not shown).
    - Insufficient statistical power: only a 4% improvement observed
    - Intervention focused on understanding and reminders.
    - Other factors may have played larger role (transportation, cost, motivation, beliefs, etc).

- Limitations:
    - Controlled study, but non-randomized design
    - Approximately 90% African-American, other groups not well represented

- Future considerations:
    - Need to look at outcomes other than refill adherence.
        - Understanding, discrepancies, adverse drug events
    - Larger, 2-site, randomized study of pharmacist counseling with low-literacy aids is underway.

THEMATIC AREA – PATIENT EDUCATION

Empowering low-income parents to reduce excess pediatric emergency room and clinic visits through health literacy. Carol Teutsch[1]; Ariella Herman[1]; Portia Jackson[1]; UCLA/Johnson & Johnson Health Care Institute, UCLA Anderson School of Management; (ID - 9)

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 FIRST 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%

Low-Health Literacy: Message Construction and Measurement Challenges. Caroline K. Shue[1]; Laura L. S. O'Hara[1]; Jim McKenzie[1]; Jeffrey C. Bird[2]; [1]Ball State University, Muncie, IN; [2]Ball Memorial Hospital, Muncie, IN (ID - 13)

Background: Individuals who have diabetes and experience low-health literacy often face challenges as they negotiate the demands of managing their disease, including acquisition of health-related knowledge and communication with their physician. A group of physicians, educators, and researchers collaborated to develop a patient education intervention in the form of videos to help patients experiencing low-health literacy better understand their disease and communicate more effectively with their physician. Specific principles of low-health literacy message construction were followed during the development of the intervention, including the use of simple graphic representations, clear concrete messages, realistic suggestions for incremental behavior change, and a relatable character. This presentation demonstrates how components of the video intervention met information acquisition needs of this priority population and how the intervention influenced patient-physician communication.
Methods: Prior to physician appointments, consenting patient participants were interviewed so they could share information regarding their experiences with diabetes and so interviewers could determine their health literacy level as measured by the single item literacy screener (SILS). These participants then viewed one of eight videos designed both to educate them on a particular element of diabetes (e.g., diet, exercise, warning signs) and encourage them to discuss their diabetes management with their physician. After the appointments, patient participants completed a post-intervention interview to share their perceptions of the intervention and to discuss the communication that occurred with their physician. Interviews were transcribed and authors used constant-comparative methods consistent with a grounded theory perspective to identify excerpts focusing on participants' reactions to the videos and the impact of the videos on the patient's appointment with their physician.

Results: In total, 45 patients with diabetes, 26 men and 19 women with a mean age of 59 (SD = 13.84, range = 28 – 85, median age = 63) viewed the video intervention. According to the SILS results, 11% of these participants experience low-health literacy. Participants, regardless of health literacy level, found the intervention to be helpful, informative, and accessible, with some reporting a post-intervention interest in considering health behavior change. Participants also provided specific examples of how the intervention prompted them to engage in diabetes-related conversations with their physicians.

Conclusions: This project provides empirical support for the efficacy of interventions using low-health literacy principles for both those who experience low-health literacy and for those who do not. Specifically, this finding suggests that low-health literacy principles may be useful for a broader range of patients. An overarching challenge we faced in this intervention, however, was accurately identifying those who experience low-health literacy from those who do not. This presentation emphasizes the need to develop even more effective and efficient health literacy screening instruments that can be used in the clinical setting as part of a more complete understanding of low-health literacy in the context of diabetes management.

Vignettes and photonovellas to enhance training for workers with limited English

Boyd H. Davis[1]; Mary K. Smith[2]; [1]University of North Carolina-Charlotte, Charlotte, NC; [2]Central Piedmont Community College, Charlotte, NC (ID -22).

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.

Evaluation Of Tailored Education Using "Teach To Goal" In A Multimedia Type 2 Diabetes Education Program.

Charles Zei[1]; T. Leung[1]; D. Baker[1]; Q. Stephens[1]; S. Glass[1]; N. Kandula[1]; [1]Northwestern University, Chicago, IL. (ID -26)

BACKGROUND: When complicated health information is presented to patients, most cannot learn everything at once. Patients with low health literacy usually have lower baseline knowledge and, thus, more to learn. To address this, repeated assessments of knowledge gained and repetition of key learning goals that were not achieved has been recommended: the" teach-to-goal" (TTG) approach. We evaluated the effectiveness of TTG for improving knowledge gain and knowledge retention after patients viewed a multimedia diabetes educational program (MDEP).

METHODS: 100 patients, with and without diabetes, were recruited from primary care clinics at a federally-qualified health center and an academic health center. Patients were interviewed using a pre-test, post-test design to measure diabetes knowledge before and after viewing the MDEP. Knowledge was measured using open-ended questions, administered by the interviewer. Patients were allowed to answer in their own words, and the interviewer then coded whether the response was correct. The TTG intervention was tailored to each patient; if a patient was unable to answer a post-test question, the interviewer presented the information again using a script and teaching aids, such as sections of the MDEP or print materials with pictures from the MDEP. This process was repeated until the individual exhibited learning mastery of the information or for a maximum of two times. Knowledge retention was measured by telephone 2 weeks later. Health literacy was measured using the Short Test of Functional Health Literacy in Adults (S-TOFHLA), and categorized as "inadequate" (0-16), "marginal" (17-22) and "adequate" (23-36). The primary endpoints compared changes in knowledge and knowledge retention. Differences in knowledge gained and retained were compared by paired t-tests. We compared the MDEP-TTG groups´ results with a historical comparison group (n=190), recruited form the same clinics, who received the MDEP only.

RESULTS: Other than the MDEP-TTG group being slightly younger than the MDEP-only group ($p<0.01$), there were no significant differences in demographics or TOFHLA score between the two groups. The mean TOFHLA score for patients who completed follow-up in the

MDEP-TTG group was 28.5, with 22.2% of individuals having inadequate or marginal literacy, and 77.8% adequate. After viewing the MDEP, all individuals had significant increases in knowledge. In the MDEP-TTG group, individuals with inadequate or marginal health literacy gained 6.9 points (SD=4.2), and those with adequate health literacy gained 6.6 points (SD=6.1). The MDEP-only group had similar knowledge gains. At the 2 week follow-up, there were no significant differences in knowledge retention for the inadequate/marginal group; the MDEP-TTG group had a knowledge decrease of 4.1 points (SD = 3.7) compared to 3.4 (SD=2.5) in the MDEP-only group (p=0.56).

CONCLUSION: TTG improved initial knowledge gain when used in conjunction with a MDEP; however, adding TTG to the MDEP did not improve long-term knowledge retention. Additional research is needed to investigate the usefulness of TTG in effecting behavior change, improving health outcomes, and overcoming health literacy barriers. Other methods, such as problem based or active learning, may be more useful for long term retention.

Adolescent health literacy and use of online health information. Deena J. Chisolm[1]; Lauren Johnson[1]; [1]Ohio State University and Nationwide Children's Hospital, Columbus, OH. (ID - 54)

Background. The internet can be an important tool in helping teens to manage their chronic conditions. Online systems to enhance disease specific knowledge and to support proper self management behavior are currently available however it is unclear if limitations in adolescent health pose a barrier to effective use of these resources. This study examines health literacy, computer literacy, and computer self efficacy and their association with computer and internet access in adolescents with chronic disease.

Methods. Youth age 13-18 were recruited from asthma and diabetes clinics at Nationwide Children's Hospital and completed a battery of surveys including the Brief Test of Functional Health Literacy in Adults (TOFHLA), a computer and internet access survey (adapted from the Pew Internet and American Life Survey) and perceived computer literacy and self efficacy (adapted from the Beckers and Schmidt Computer Anxiety Scale). This preliminary analysis includes 145 youths, 91 diabetics and 54 asthmatics. Because health literacy in our sample is highly positively skewed, we used the nonparametric Wilcoxon rank sum and Spearman correlation tests to assess the relationships between health literacy and patient demographic characteristics, computer literacy, a computer self-efficacy. The relationship between health literacy and use of online health information was assessed using Fisher's exact test.

Results. Fifty percent of participants were female and 73.6% were white. One in thirteen (7.6%) had low or marginal health literacy levels. Health literacy scores ranged from 14 to 100 with a mean of 88.9. Health literacy was significantly associated with white race ($p<0.001$) and marginally associated with female gender ($p=0.09$) but was not associated with age or condition (asthma vs. diabetes). Ninety percent of participants reported going online for e-mail or web surfing. Nearly half of youth (47.9%) accessed online information on health, diet or fitness. Lower literacy youths trended toward higher internet use for finding general health information (54.5% vs. 47.3) and for finding sensitive health information (36.4% vs. 19.8%) but neither difference reached statistical significance. Health literacy was significantly correlated with perceived computer self-efficacy ($r= 0.21$, $p=0.01$) but was not correlated with perceived computer literacy.

Conclusions. Half of teens with a chronic conditions sought health information online. Limited health literacy was not a barrier to seeking online health information. Our results show that lower literacy youths are at least as likely, if not more likely, to use the internet for health information. Online health information appears to be an efficient tool for reaching many teens with chronic conditions, however, web designers must be aware that some users will have limited health literacy and should consider this in their content design. Additional research, with a larger, more literacy-diverse population, is needed to determine if the trend toward greater use by lower literate individuals

Limited Health Literacy and Designing Engaging Online Prevention Content: A Usability Study.

Sandra Williams Hilfiker[1]; Sean Arayasirikul[1]; Linda Harris[1]; [1]U.S. Department of Health and Human Services, Rockville, MD; (ID - 66)

Background: Choosing a healthy lifestyle and seeking preventive care require that people understand and use health information. However, much of today's health information is too complex for the average adult. According to recent national data, the majority of adults may lack the literacy skills needed to obtain, process, and understand basic health information and services. As more Americans are expected to take responsibility for managing their health, understandable and accessible health information becomes increasingly important.

The Internet has the potential to improve the health and well being of Americans, including the traditionally underserved. In fact, over 60% of Americans already use the Internet for their health information needs (Fox, 2009). In order for the Web to be an effective tool in improving health literacy and health outcomes, however, it must contain reliable and easy-to-use information. A 2006 PEW study found that a quarter of online health information seekers are overwhelmed by the amount of information found online and close to 20% feel confused by the information they find (Fox, 2006). In order for people to effectively manage their health, they must be able to successfully obtain, understand and use health information.

The purpose of this study was to test a Web-based prevention information prototype with a limited health literacy sample to explore the following research questions:

- Do participants find the information and tools in the prototype engaging?
- Do the information and tools in the prototype evoke self efficacy?
- Is the prototype easy to navigate and use?
- What specific characteristics of the prototype do participants find particularly useful or problematic?

Methods: A diverse group of 40 adult female participants between the ages of 25 and 64 was recruited for the study from a community health center patient population in Baltimore, MD. Specifically the recruiters looked for participants who made less than $40,000 a year, had a high school education or less, and who were not regular users of the Internet especially for health information. During a 1-hour session, participants were given tasks to complete using the prevention prototype. A usability test administrator recorded participant comments, facial expressions, mouse behavior, and screen navigation. Participants were encouraged to "think aloud" during the session. Upon task completion they were then asked to respond to two questionnaires containing measures of self-efficacy and engagement. Finally, they completed a demographic survey.

Results: Overall participants agreed that the information presented was easy to understand, easy to use, and useful to them. Participants also reported high levels of engagement and self efficacy after using the prototype. Specific characteristics of the prototype related to content, navigation, and page design were also identified as particularly useful.

Conclusions: Health literacy is relevant to a number of key behaviors tied to health status and outcomes, including health information seeking, information processing, and decision making. To improve health literacy, the strategies discussed in this presentation will help eHealth providers redesign products and applications to fit the capacities and interests of populations with limited health literacy.

The role of health literacy in an integrative wellness and prevention program: Findings from a collaborative community-based program at a Federally Qualified Health Center in the South Bronx, New York. Warf, Rainy D., Pleasant, Andrew, Sardo, Christine L., Cabe, Jennifer, McIntire, Janice, Sanchez, Zoila, Lester, Debbie, Iqzuierdo-Hernandez, Paloma, Carmona, Richard H. (ID – 71)

Background:

The Canyon Ranch Institute Life Enhancement Program (CRI LEP) is an integrative program to improve health and wellness. A core principle is to increase participant engagement with their own health through increased health literacy in order to achieve behavior change producing healthy physical and physiological changes. The 12-week program meets twice weekly, for approximately two hours each session. The CRI LEP curriculum includes experiential and participatory sessions in nutrition, physical activity, health behavior, spirituality, integrative medicine, and social support.

The first CRI LEP, that this presentation will report on, was developed with and offered by Urban Health Plan (UHP) in the South Bronx, New York, and was conducted in Spanish. Program materials are currently available in English and Spanish with future expansion planned.

Methods:

A data collection protocol was developed that includes measures of physiological, physical, behavioral, attitudinal, and knowledge outcomes as well as to monitor and improve program processes. The design included data collection at pre, post, and process evaluation stages. Pre and post measures included assessments of nutrition, physical fitness, stress, and a routine set of blood tests to help assess physiological health..

Results:

Preliminary data indicate participants reported functional gains in health literacy in post-program focus-group sessions. For example, one participant stated, “What impacted me was the talk about how to prepare you for a doctor’s visit. I never imagined before. It never crossed my mind that one could prepare themselves for a doctor’s visit. I said, ‘How can I prepare myself for a doctor’s visit?’ …I ask is my body fat good? Why? I ask everything. He has to find the time because I came to the appointment and it is my time.”

Another participant reported, “I (now) know how to read food labels. Before, I would only look at them, only look at them, but now I pay attention to them.”

Participants also said that they have integrated their new knowledge into their lives and were sharing the knowledge with members of their family and community. One participant stated, “I am teaching my grandchild. I took her to the supermarket to teach her to read the food product labels. She says to me that she didn’t know that; she didn’t realize that it was so easy to read the labels.”

Participants in the CRI LEP at UHP who were assessed post-program also showed improvement in health indicators. Sixty-one percent of the participants decreased their body weight 4.6 pounds on average. All participants reported decreased pain in daily activities, with an average decrease of 3.4 points on a 10-point self-report scale. Ninety three percent of the participants had a decreased waist size, with an average reduction of 1.75 inches. Seventy seven percent of participants showed an increase in physical flexibility.

Conclusions:

The Canyon Ranch Institute Life Enhancement Program is a proven approach to advancing health literacy and improving integrative wellness and prevention of disease. Due to these results, CRI and Urban Health Plan are recruiting participants for future English- and Spanish-language cohorts of the program.

How susceptible are U.S. consumers to purchasing drugs from illegitimate internet pharmacies? An exploratory study of eHealth literacy. Lana V. Ivanitskaya[1]; Dmitry Erofeev[1]; Autumn Cooper[1]; Jodi Brookins-Fisher[1]; Irene O’Boyle[1]; Danielle Robling[1]; [1]Central Michigan University, Mount Pleasant, MI; (ID -75)

Background. We examined health consumers’ vulnerability to fraud by illegitimate internet pharmacies. Federal efforts may be insufficient to protect U.S. residents who purchase drugs online. Consumer education is likely to play an important role. An example of consumer education that build eHealth literacy is an FDA consumer update titled “The possible dangers of buying medicines over the internet.” It instructs consumers to look for the following signs of trustworthiness: a U.S. location, a pharmacy license by the state board of pharmacy, complete contact information (patients can talk to a licensed pharmacist), and a requirement of a prescription from a licensed health care provider for any prescription medicine. It also lists signs that help detect rogue pharmacies: no phone contact with pharmacy staff, medicines that are priced much lower than the average market price, an illegal practice of requiring no prescription, and poor protection of consumers' personal information. This study examined how individuals evaluate the websites of two internet pharmacies that were specifically designed to show many of the unsafe signs modeled after five actual pharmacy websites that the researchers considered to be potentially dangerous to consumers (see Table 1). The two websites had no signs of trustworthiness, as specified by the FDA consumer education materials.

Methods. Two thousand and ninety-six students completed an interactive online assessment between September 2005 and March 2008 (participation rate was 78%) and evaluated pharmacy websites. The vast majority of students (75%) were enrolled in an undergraduate Healthy Lifestyles course. They were asked to evaluate each website and report on its trustworthiness. They also reported if they used online information to make health decisions.

Results. Over 22% of respondents recommended Pharmacy A to friends and family, as compared to 10% of respondents who would recommend Pharmacy B. While 16% said people should be advised to buy cheaper drugs at these internet pharmacies, 62% of respondents suggested that people should be warned against buying drugs at Pharmacy A and Pharmacy B. Study participants who reported making health decisions using information they found by searching Google or another Internet search engine were less capable of judging pharmacy trustworthiness (n = 762, $M = .61$, $SD = .23$) than individuals who did not make such decisions (n = 1,152, $M = .65$, $SD = .21$). Similarly, individuals who helped another person (e.g., a relative or a friend) to make a health decision based on the information they located in Google or another Internet search engine had worse judgment of online pharmacies (n = 604, $M = .61$, $SD = .24$) than individuals who did not help others to make such decisions (n = 1,310, $M = .65$, $SD = .21$). Both *t* tests were significant, $t(1,912) = 3.62$, p < .001 and $t(1,912) = 3.75$, p < .001, respectively.

Conclusions. Health consumers are vulnerable to fraud by illegitimate internet pharmacies. More needs to be done not only to build health information literacy skills of students and other community members using the internet.

My Health Companion Demonstration Project. Ingrid Taylor[1]; Rosetta Keeton[2]; Darcell P. Scharff[3]; Arthur Culbert[4]; [1]Allies in Healthcare, LLC, Saint Louis, Missouri; [2]St. Louis ConnectCare, Saint Louis, Missouri; [3]St. Louis University, Saint Louis, Missouri; [4]Missouri Foundation for Health, Saint Louis, Missouri (ID - 81)

Background:
Health literacy is the ability to obtain and understand basic health information. Overwhelming evidence shows people with limited health literacy have less understanding of disease management, report poor health status, are less likely to seek preventive services and encumber the health care system.

Purpose:
To determine the effect of supplying tools and basic information to a population with low health literacy. St. Louis ConnectCare shall distribute the *My Health Companion: A Portable Paper Health Organizer* and *Taking Control: Making the Most of Your Doctor's Visit DVD*. These planning tools are administered in two settings: chronic care clinics and at health empowerment

parties (HEP). The goal is to allow patients to gain confidence and skills to discuss their medical conditions with their health providers.

We have completed one year of a two year demonstration project.

Evaluation Method:

Patients are administered a pretest prior to receiving the Organizer and DVD. The pretest measures participants' confidence, communication skills and satisfaction with healthcare interaction they have received. Participants are then given direction in how to use their Organizers.

Post-tests are administered one month after participants initially receive the planner, and every six months life of the project. Additional questions added in the later testing include assessment of the participants' level of use of the Organizer and understanding of the DVD. Survey questions are multiple-choice format graded on a Likert response scale.

Results:

The preliminary data on patients with both pre- and post-tests (n=35) indicate that slight improvements between pre- and post-test scores have occurred in 12 out of 19 items, e.g., finding information, compliance to medication regimens, the level of respect received from the physician regarding the participants' own opinions, and note-taking during the office visits. Additionally, the proportion of patients who reported "no emergency room visits" increased during the post-testing. Likewise, a slight increase was observed in the proportion of patients who reported "no hospitalizations" during post-tests.

Conclusions:

Early data suggest that use of the *My Health Companion: A Portable Paper Health Organizer* may realize intended results: participants report increased self-confidence in discussing their health concerns with health care provider, increased communication skills during the clinical encounter, and improved satisfaction with the decisions made about their care.

The reduction in emergency room visits and hospitalizations is promising. A larger sample size and results from physician interviews will strengthen these data and thus our findings. Innovative ways to ensure follow up are needed, as this population can be transitory.

Understanding Risks: Health Literacy vs. Cognitive Accessibility. Ruth S. Day[1]; [1]Duke University, Durham, NC **(**ID - 86)

Background

It can be difficult to understand and remember prescription drug information, especially risks such as side effects. In fact, people understand and remember drug benefits much better than risks (Day, 2006). Although there are many possible reasons for this discrepancy, our research shows that "cognitive accessibility" plays a key role. Benefits are generally presented in ways that make them more accessible -- easier to find, understand, remember, and use.

Written information is especially problematic for people with low health literacy levels. Spoken information should be easier for such people, since it removes the burden of reading. Direct-to-consumer (DTC) television ads seem better for informing them, since risks are usually spoken rather than written. However cognitive accessibility is generally better for drug benefits than risks, even in television ads. For example, as the side effects are spoken, there can be more visual distraction than during presentation of benefits.

Methods

Participants were adults from the general community, with a wide range of ages, education levels, occupations, ethnicities, and health literacy levels. They watched a television ad for a prescription drug, "just as they would in everyday life." On a random basis, half saw an ad with distracting visual information during the side effects, while the others saw the ad without any visual distractions.

Participants were tested on their knowledge about side effects in the ad, using several cognitive tasks. In the Number Estimation Task, they estimated "about how many" side effects were in the ad – they did not have to say what the side effects were, just give a ballpark number. In the Free Report Task, they reported as many of the side effects in the ad as they could. In the Recognition Task, they heard one side effect at a time and said whether each had – or had not – been presented in the ad. These three tasks measured knowledge at successively "deeper" levels of processing.

Results

Even though side effects were spoken rather than written, the low literacy participants had less knowledge about the side effects in the ad. They substantially underestimated the number of side effects provided, were able to report fewer of them, and were less able to identify which side effects had occurred when given a list of possibilities. However those who viewed the ad without visual distraction had better knowledge.

Conclusions

Although spoken information may be easier for low literacy people to understand in general, understanding risks such as side effects is still difficult. The problems lie not just with the people though, but also in how risks are presented. When presentation techniques interfere with normal cognitive processing, people have considerable difficulty; however when such impediments are removed, they improve. These results are compared to those from a similar study using written materials. Overall this research shows that making risk information more cognitively accessible – removing impediments to cog cognitive processing – can enable low literacy adults to understand drug information more fully.

Environmental Health Literacy: What Experts Say and What the People Understand.

Lynn Waishwell[1]; Diane Lucas[1]; Susan Santos[1]; [1]University of Medicine and Dentistry School of Public Health, Piscataway, NJ; (ID - 89)

Background

The overall goal of this presentation is to describe key findings of a project, *Environmental Health Literacy for Low Literate Groups*, funded by the National Institute of Environmental Health Sciences, which determined key concepts important for describing environmental health risks to the public and developed appropriate environmental health risk visual and written concepts for individuals with low literacy skills. The general public lacks an understanding of the relationship between environmental factors and disease; and, while the public has concerns about environmental health issues, they do not have adequate understanding and knowledge to take appropriate actions to protect the environment and their health. Increasing evidence suggests that disproportionate risk of exposure to environmental hazards among low-income and minority groups may contribute to health disparities, and these groups have been shown to have greater degrees of low literacy.

Methods

The focus of this project was to determine environmental risk images and messages appropriate for low literacy audiences. To create these messages, a fundamental understanding of the terminology and concepts that experts believe is needed to understand environmental risk was first developed. Twenty-three environmental health scientists or communicators were interviewed to determine what specific environmental health concepts these professionals considered essential to discuss when describing the environmental conditions and resulting health concerns with the public. Interviewees were asked to characterize how they approached talking to a community, what terms they felt were important to explain, what terms or concepts they though everyone knew, and if (and how) they made adjustments to their presentation or materials for low literate audiences. A content analysis was performed using Atlas.ti to characterize key concepts, the ways that environmental professionals presented them, and characterize ways that they adapted their concepts and presentations for low literate audiences. Key concepts were then discussed in focus groups (N=6) with low literate reading level participants to assess their perception of what the key concepts meant and explore ways to convey environmental concepts appropriately for this audience. Materials were then developed and pretested with focus groups (N=4).

Results

Commonly used terms used to convey environmental health concepts such as risk, contaminant, and dose are not well understood by low-literate groups and often have other interpretation. Perhaps more importantly, most environmental experts felt they could determine audience reading level by observation and few environmental scientists we interviewed made any accommodation for low literate groups when presenting material. The specific concepts identified as important to conveys to audiences by experts were fairly consistent. Focus groups also reported great mistrust of "experts" that influence the ability to communicate effectively.

Conclusions

There is a need to educate environmental health communicators about best practices for working with low literate audiences. As low literate audiences are often in environmentally comprised areas, thus communication and outreach approaches should encourage participation rather than information giving. This presentation will provide suggestions on visual images and written terms that can be used to describe environmental health concepts and discuss ways that environmental health experts can better communicate with low literate audiences.

Patient Knowledge and Cognition Interact to Influence Health Literacy. Dan Morrow[1]; Jessie Chin[1]**;** Elizabeth Stine-Morrow[1]; James F. Graumlich[2]; Thembi Conner-Garcia[2]; Michael D. Murray[3]; [1]University of Illinois Champaign-Urbana, Champaign, IL; [2]University of Illinois

College of Medicine, Peoria, IL; [3]University of North Carolina School of Pharmacy, Chapel Hill, NC. (ID - 91)

Background

Health literacy couples task demands and patient abilities. However, we know little about these abilities. An important component is comprehension, as suggested by the definition of health literacy as the capacity to obtain, understand and use information to make health decisions. Reading is also required by common health literacy measures such as the STOFHLA and REALM. Comprehension depends on broader fluid mental abilities (e.g., working memory) required by processes such as word recognition, and crystallized abilities such as general knowledge about language and domain-specific knowledge (e.g., health). Aging is often accompanied by declining fluid ability but also by knowledge gains. While fluid ability can impair older adults' comprehension, these declines are sometimes offset by knowledge. We investigated trade-offs between fluid ability and knowledge as predictors of health literacy among older adults with hypertension, who experience fluid ability declines due to normal aging exacerbated by illness, but may also gain general knowledge from years of reading and health knowledge from illness experience.

Methods

Tests measuring health literacy, fluid mental abilities, domain-general knowledge, and hypertension knowledge were administered to 146 adults (60-87yrs old; 103 diagnosed with hypertension and 43 without chronic illness). 35% had high school or less education and 8% had less than adequate health literacy for both the REALM and the STOFHLA. A fluid ability composite was created from measures of working memory, processing speed and reasoning (Cronbach α=.83) and a crystallized ability composite from vocabulary and general literacy measures (α=.87). The hypertension knowledge measure (α=.90) was modified from Gazamararian et al. (2003).

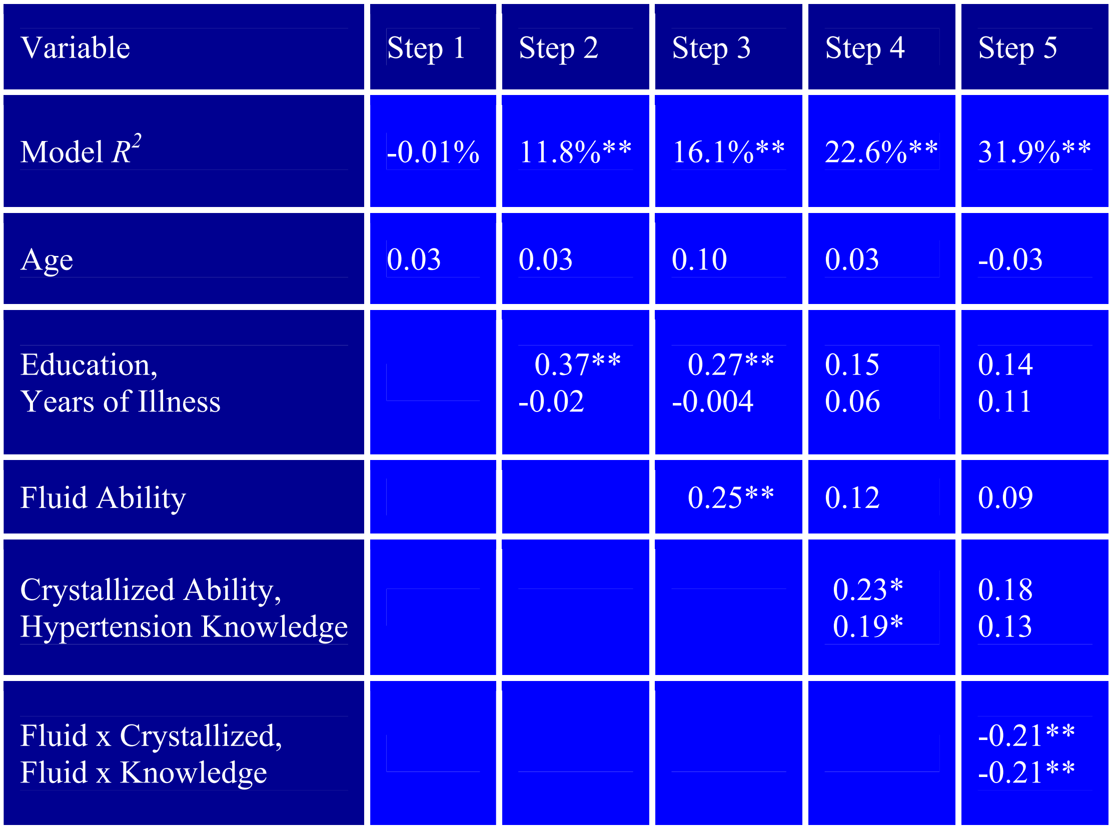
REALM and STOFHLA scores were separately analyzed in regressions with the following predictor variables: 1) Age, 2) Education and Years of Illness (possibly related to illness knowledge), 3) Fluid ability, 4) General knowledge and Illness knowledge, 5) Fluid x Knowledge interaction terms to explore potential trade-offs between abilities.

Results

From the table it can be seen that better performance on the REALM was associated with more education, fluid ability, crystallized ability, and illness knowledge (ability measures explained education-related effects). Most important, the interaction terms were significant: Fluid ability was associated with performance for low but not high general and health knowledge. Fluid ability was more important in the STOFHLA analysis (accounting for three times the variance in the REALM and explaining age and education differences). High levels of general but not health knowledge offset the impact of fluid ability on STOFHLA performance.

Conclusions

Knowledge reduced the impact of fluid ability on health literacy performance. Trade-offs between fluid ability and knowledge suggest the importance of multiple abilities for determining health literacy such that patients can achieve adequate health literacy by different routes. The different pattern of predictors for the two tests is consistent with models where health literacy emerges from the interaction of abilities and task demands. Our findings also suggest the value of considering what tests are intended to measure. Measures of health literacy among older adults with chronic illness should capture illness knowledge in order to adequately capture how well patients manage their illness.



Variable	Step 1	Step 2	Step 3	Step 4	Step 5
Model R^2	-0.01%	11.8%**	16.1%**	22.6%**	31.9%**
Age	0.03	0.03	0.10	0.03	-0.03
Education, Years of Illness		0.37** -0.02	0.27** -0.004	0.15 0.06	0.14 0.11
Fluid Ability			0.25**	0.12	0.09
Crystallized Ability, Hypertension Knowledge				0.23* 0.19*	0.18 0.13
Fluid x Crystallized, Fluid x Knowledge					-0.21** -0.21**

** p < .01

THEMATIC AREA – PREVALENCE

Developing an Interactive Tool to Advance Action on Health Literacy in Missouri. Laurie T. Martin; Teague Ruder[1]; Allen Fremont[1] ;Chloe E. Bird[1]; José J. Escarce[1] ;Marc Elliott[1]; Arthur Culbert[2] ; Nicole Lurie[1] ; [1]RAND Corporation, Grosse Pointe Park, MI; [2]Missouri Foundation for Health, Grosse Pointe Park, MI. (ID - 17)

Background:
Stakeholders seeking to improve health and health care increasingly recognize that low health literacy (HL) contributes to poor health, health disparities and gaps in care. Yet, screening individuals for HL is cumbersome, and local population-level estimates of HL that could inform priorities for community intervention are not readily available. We have developed a population-based approach to identify geographic areas with a high concentration of individuals with low HL (i.e., 'hot spots') where interventions targeting low HL populations might be most efficient and cost effective.

Methods:
We analyzed data from the 2003 National Assessment of Adult Literacy (NAAL) to develop two predictive models of HL. We used linear regression to predict mean HL scores and probit regression to predict the probability of an individual having 'above basic' HL proficiency. Predictors were measured to conform to Census and other readily available population data. These included gender, age, race/ethnicity, educational attainment, poverty status, marital status, language spoken in the home, residence in a metropolitan statistical area (MSA) and length of time in U.S. Our model coefficients can be applied to census data to estimate the mean HL score and the percent with above basic HL for small geographic areas, which can then be mapped. We are currently developing these maps into an interactive web-based tool and incorporating Missouri HEDIS and BRFSS data to help stakeholders identify overlapping 'hot spots' of both low quality care and low HL.

Results:
All variables except MSA were statistically significant, with lower educational attainment being the strongest predictor. Our linear regression model and the probit model accounted for about 30% and 21% of the variance in health literacy scores respectively, nearly twice the variance accounted for by either education or poverty alone. Models did not differ significantly by age or region of the country, and the confidence intervals demonstrate that they discriminate low HL areas from those with low income or education alone.

Conclusion:
Multivariable models permit a more accurate estimation of health literacy than single item predictors and can be applied to readily available administrative population, health plan, or census data to produce estimates of average health literacy. Further, the development of an easy to use, interactive web based tool to identify localized 'hot spots' where poor quality care and low HL coexist can help providers, health plans, public health officials, community leaders and other stakeholders identify communities that would benefit most from appropriate, targeted interventions to address poor quality care and outcomes related to low HL.

Oral Health Literacy Rates Among WIC Caregivers. Jessica Lee[1]; Diane Baker[1]; [1]UNC School of Dentistry, Chapel Hill, NC. (ID - 27)

Background:

According to the 1992 National Adult Literacy Survey, 25% of US adults are functionally illiterate. Because health information is frequently provided at above the tenth grade level, health messages are not reaching low literacy patients, jeopardizing their health status. Low literacy has been found by researchers to have a detrimental effect on general health and the use of medical services. Evidence from research in medical settings consistently highlights the importance of comprehension and literacy for patient compliance and increased positive health outcomes. Although much is known about medical health literacy, there are no studies that have systematically studied oral health literacy. To date there are no studies that report dental health literacy levels in a public health population.

This research examines the oral health literacy among participants in a large comprehensive public health program: Women, Infant and Children (WIC). Specifically, we will examine the dental health literacy rates among a low income, high risk population.

Methods:

A non-randomized cross-sectional IRB approved study design was used to determine Oral Health Literacy rates among WIC caregivers. Nine sites in seven North Carolina counties were selected for this investigation using the following criteria: 1) geographic region, 2) rural/urban make-up, 3) population demographics, 4) very active WIC clinics and 5) established working relationship with the UNC investigators. Two trained interviewer recruited child-caregiver dyads enrolled in WIC. The caregivers were screened and asked if they would answer up to 9 screening questions to determine if they were eligible to participate in the study. If eligible they were asked to participate in a 30 minute interview and receive a $20 gift card to a local retail store. The survey instrument consisted of the following components: 1) Background Demographic Information, 2) Dental Health Questions 3) Oral Health Impact Profile 4) Child's Dental Health Questions, 5) Dental Behavior Questions, 6) Early Childhood Oral Health Impact Scale, 7) The General Self-Efficacy Scale 8) The REALD-30 Dental Health Literacy Assessment Tool, and 9) The Newest Vital Sign Health Literacy Assessment Tool. For purposes of this presentation we will focus on health literacy rates.

Results:

Over a 12 month period 1339 subjects were enrolled and interviews completed. These subjects were 7% Hispanic, 34% White non-Hispanic, 40% African American, and 19% American Indian. The education distribution were as follows: 24% had less than a high school education, 39% had completed high school, 20% had some technical or community college, 5% had an associate degree, 8% had some education from a 4-year college, 4% had a 4-year degree, and less than 1% had post graduate education. The mean overall health literacy level was a 15.1 (0=lowest literacy; 30-highest literacy). The WIC health literacy rates varied by county from 47% to 58% on the REALD-30 Dental Health Literacy Assessment and from 45% to 63% on the Newest Vital Sign Health Literacy Assessment.

Conclusions:

More research and interventions must be done to reduce the risks and increase the oral health literacy of this population.

Does Health Literacy Mediate Effects Of Education And Race On Self-Rated Health?

Hyunjoon Park[1], Mathew Creighton[2]. [1]University of Pennsylvania, Philadelphia, PA; [2]Princeton University, Princeton, NJ. (ID – 28)

BACKGROUND

There has been a growing interest in the role of health literacy in overall health outcomes and also in the extent to which health literacy contributes to educational and racial disparities in health. However, most existing literature of health literacy has studied patients in hospitals or other medical settings. Very little known is about the association between health literacy and health outcomes among general population. In addition to the direct effect on health outcomes, the mediating role of health literacy in explaining health disparities by education and race is worth serious consideration. Assessing the extent to which health literacy mediates the effects of education and race on health outcomes, especially in comparisons to other factors known to contribute to health disparities such as health behaviors and social support, will extend the existing knowledge of mechanism by which health disparities occur.

Using data from the 2003 National Assessment of Adult Literacy (NAAL), we address three questions: 1) Is health literacy associated with health, specifically self-rated health, controlling for major socioeconomic characteristics such as education, income, and health insurance?; 2) Does health literacy explain educational differentials in self-rated health status?; and 3) Does health literacy account for black-white differences in self-rated health status?

METHODS

NAAL is the first national assessment that has a separate component of health literacy in addition to general literacy skills for 18,102 adults representing all US adults aged 16 or older living in households. We restrict our analysis to those aged 25 or older who have mostly completed their educational careers. The NAAL assessment measured literacy directly through individual's performance on tasks that represent a range of literacy activities that adults are likely to face in their daily lives. In NAAL, health literacy was measured on the item response theory theta (θ) scale that typically ranges from -3 to 3 (which can be transformed into a scale of 0-500 points).

RESULTS

Table 1 presents the results of four OLS regression models that predict self-rated health (ranged from 1 to 5). Model 1 shows the effects of education and race on self-rated health with age and marital status controlled. Model 2 additionally includes household income, employment status, and health insurance, while Model 3 includes health literacy into Model 1. The result for Model 3 shows that health literacy is independently associated with self-rated health. Introducing health literacy in Model 3 reduces the effects of educational attainment to the same degree as household income (employment status and health status) does in Model 2. It is notable that the black-white gap in self-rated health becomes negligible once health literacy is included in Model 3. In Model 4, the effect of health literacy remains significant after including all independent variables used.

CONCLUSION

Our results show that health literacy is positively associated with self-rated health, even after socioeconomic and demographic variables are taken into account. Our analysis, furthermore, provides evidence that health literacy accounts for a substantial fraction of the education and race effects on self-rated health.

Table 1. Regression Analysis of Self-rated Health by Health Literacy

	M1	M2	M3	M4
Education (vs. LT high school)				
High school	0.481 ***	0.317 ***	0.320 ***	0.220 ***
	(0.051)	(0.047)	(0.039)	(0.037)
Some college	0.737 ***	0.471 ***	0.459 ***	0.301 ***
	(0.054)	(0.050)	(0.049)	(0.046)
College or above	1.049 ***	0.667 ***	0.653 ***	0.427 ***
	(0.058)	(0.053)	(0.060)	(0.053)
Race/Ethnicity (vs. white)				
Black	-0.178 ***	-0.08 *	-0.022	0.020
	(0.036)	(0.035)	(0.032)	(0.032)
Hispanic	-0.087	-0.023	0.011	0.037
	(0.056)	(0.052)	(0.052)	(0.049)
Other	-0.129	-0.055	-0.053	-0.011
	(0.070)	(0.063)	(0.057)	(0.057)
Age (vs. 25-39)				
40-49	-0.177 ***	-0.201 ***	-0.126 **	-0.159 ***
	(0.035)	(0.033)	(0.041)	(0.039)
50-64	-0.399 ***	-0.363 ***	-0.314 ***	-0.299 ***
	(0.041)	(0.041)	(0.042)	(0.044)
65 or older	-0.605 ***	-0.291 ***	-0.398 ***	-0.158 **
	(0.048)	(0.051)	(0.047)	(0.051)
Male	-0.040	-0.099 ***	0.020	-0.050
	(0.024)	(0.024)	(0.026)	(0.026)
Married	0.158 ***	-0.007	0.108 ***	-0.013
	(0.027)	(0.026)	(0.027)	(0.025)
Household income		0.072 ***		0.059 ***
		(0.005)		(0.005)
Currently employed		0.365 ***		0.350 ***
		(0.034)		(0.032)
Having health insurance		-0.016		-0.026
		(0.038)		(0.031)
Health literacy			0.261 ***	0.197 ***
			(0.026)	(0.026)
Constant	3.209 ***	2.628 ***	3.341 ***	2.813 ***
	(0.055)	(0.069)	(0.046)	(0.059)

N = 11,193   *** p < .001   *** p < .01   *** p < .05   ^ p < 0.1

Cardiovascular Health Perceptions among a Deaf Linguistic Minority. Michael McKee; Nancy Chin; Jessica Cuculick; Deirdre Schlehofer; Scott Smith; Matt Starr. (ID - 38)

Background:
Persons who are culturally Deaf and use American Sign Language (ASL) as their primary language are an understudied group at high risk for poor health literacy with regard to health promotion and disease prevention, with limited data on their awareness of cardiovascular risk factors and risk reduction behaviors. For Deaf ASL users, both hearing loss and a different language create significant barriers to their access to healthcare and health information.

Methods:
Prior to the development of an intervention targeting this group, we convened four focus groups in Rochester, NY with a total of 22 deaf participants. The objective was to learn more about the facilitators and barriers to cardiovascular risk-reducing behaviors and perceptions of cardiovascular health among members of this linguistic and cultural minority group. Focus groups were conducted in ASL by deaf moderators using video recording to document participants' input. A bilingual deaf transcriber both translated and transcribed the videotapes into English. For accuracy purposes, the research team reviewed the videotapes to verify the translation and transcription of the data. The research team reviewed the transcripts to identify recurrent themes under the five domains drawn from social marketing theory: knowledge, barriers, facilitators, practices, and information dissemination.

Results:
The participants involved in the four focus groups were generally well-educated (13 of 22 participants had a college education or higher), overweight or obese (16 of 22 participants had a BMI $\geq$25) and mostly female (13 of 22). Despite a high educational achievement level among most participants, there were a number of key health knowledge gaps discovered in the focus groups. While their awareness of heart disease symptoms and the importance of exercise was high, participants in the focus groups showed limited knowledge of diabetes, stroke and high blood pressure. A key facilitator of risk reduction was social support among their Deaf community members for stress relief and health information exchange. To compensate for challenges in accessing health information designed for English language audiences, participants relied on friends and families for health information, leading to distorted perceptions of cardiovascular risks. Awareness about nutrition and medications varied by the participants' educational level.

Conclusion:
Many of the participants as a result had superficial cardiovascular health knowledge that was easily distorted. This appeared to reduce effective risk reduction behaviors among the participants. It also increased reliance in obtaining health information through anecdotal stories shared by friends and families. For some of the stories shared by the participants at the focus groups, distortion of health information was common. This may be reflective to the group's poor health literacy secondary to reduced access to reliable health information that is required to correct any inaccuracies they may have learned. The findings support the need for language-accessible cardiovascular health information that can improve health knowledge among ASL users. Risk reduction programs designed in a group format could take advantage of the social closeness of the Deaf community to reduce risk.

Assessing literacy in a low-income, African American clinic population to facilitate improving health education interventions Caitlin N. Wolak,[1]; Sheryl Burt Ruzek [1]; Sarah Bauerle Bass [1]; Thomas F. Gordon [1] ; [1]Temple University, Philadelphia, PA. (ID - 39)

Objectives:
To assess literacy levels and screening perceptions of low income, African American patients in a large, urban teaching hospital using the REALM-R, which was developed to assess adult literacy in clinical settings. Data were collected and used to develop a more effective colorectal cancer screening educational tool for patients and an educational module for resident education.
Methods:
All age-eligible patients (50-75) in the clinic who agreed to participate were administered the REALM-R over an 8 week period in 2008. Patients were asked to pronounce up to 11 words, the first three of which are not scored. If the patient was unable to pronounce three or more words, the patient is classified as at risk of having very low literacy. The test takes less than 2 minutes to administer and score. Patients were also asked to report the highest level of education they had completed.
Results:
We recruited 117 patients who self-reported the highest level of education completed. Their actual literacy was lower than clinic staff expected. Although 52% of the sample reported having graduated high school or higher, 90% of patients had literacy levels on the REALM-R below a 6th grade reading level. Of these individuals, 48% were unable to pronounce more than 3 out of 8 words on the REALM-R indicating very low literacy levels. Five patients who completed the interview on perceptions of screening refused to complete the REALM–R citing not having their glasses or not being able to see the text, which are common indicators of the inability to read.
Conclusion: Health professionals need to be aware that even people who have completed some high school may have very limited literacy in many settings. While some patients are perceived as apathetic about their health, data suggests that they do not understand the health information that they are given. Health education, both written and oral, needs to address the literacy levels of specific target populations

THEMATIC AREA – READABILITY

A 5-Step Methodology for Conducting Literacy Evaluation and Adaptation of Patient Health Education Materials.

Felicia Hill-Briggs[1] Ogechi Dike[2]; John Hopkins University School of Medicine, Baltimore, MD (ID - 31)

Background:

Health literacy assessment tools and research have demonstrated that health literacy is strongly associated with literacy, suggesting that low literacy solutions must be a component of health literacy solutions. The 2003 National Assessment of Adult Literacy (NAAL) found that 43% of US adults fall within the lowest literacy ranges of *Basic* and *Below Basic,* with 67% of African Americans, 74% of Hispanics, and 61% of adults age >65 falling within these lowest ranges of literacy. Prior research by the research team has demonstrated that literacy-adapted patient education improves patient knowledge, understanding, and retention of health information. Yet, many publicly disseminated patient education materials do not meet the current recommended reading grade level of <5th grade.

Purpose:

To examine utility and reliability of a replicable methodology for assessing and adapting readability characteristics of written materials for low literacy. Utilizing the methodology, the study aimed to: (1) conduct literacy evaluations to determine readability statistics of a set of widely disseminated Johns Hopkins Medical Institution patient education documents, (2) determine inter-rater reliability for the literacy evaluation method, and (3) adapt the patient education documents to meet recommended consensus criteria for low-literacy patient education materials.

Methods:

A 5-step process was used to evaluate and adapt a set of nine diabetes patient education documents, averaging 1,063 words each, to meet a reading level of <5th grade. Primary criteria evaluated and adapted at the document, paragraph, and sentence levels were: 1) <5th grade reading level 2) <5% passive active voice 3) <15 words per sentence 4) ≤5 characters per word 5) no scientific jargon or unexplained medical terminology. The majority of readability statics were calculated in Microsoft Word 2003, which also determined the Flesch-Kincaid reading grade level. Two independent raters conducted literacy evaluations. Inter-rater reliability (Cronbach's alpha statistic) was calculated at the document level for each original and literacy-adapted document.

Results:

Inter-rater reliability for the literacy evaluations ranged 0.99 – 1.00 for all original and adapted documents. Prior to low-literacy adaptation, 30% of the original documents met 2 of 5 low-literacy criteria, 30% of the original documents met 1 of 5 criteria, and 30% met none of the criteria. Reading grade levels for the original documents ranged from 8.6 - 12.3. Fewer than half of the original documents met the criterion of <5% passive voice. Number of words per sentence ranged from 17.0 - 22.2, and number characters per word ranged from 4.5- 5.5. Upon completion of low-literacy adaption, all documents met the 5 consensus criteria, and reading grade levels for the adapted documents ranged from 2.7- 4.6.

Conclusion:

Adaptation of patient health education documents to a <5th grade reading level, while preserving content, was feasible. The 5-step method for literacy evaluation and adaptation has proven to be a systematic approach to achieve primary consensus criteria addressing literacy demand. This methodology may prove effective for a wide range of written patient education materials.

Readability of Consent Forms for Organ Transplantation and Donation. Gordon, Elisa J.[1], Bergeron, Ashley[1], McNatt, Gwen[1], Wolf, Michael S. [1]Northwestern University, Chicago, IL. (ID – 63)

Purpose: Informed consent is both an ethical obligation and part of the requirements for Medicare certification of transplant centers. Patients' comprehension of consent forms is undermined when written at high reading levels. We investigated the reading levels of informed consent forms for adult organ transplant candidates and living donors across organ transplant centers in the US.

Methods: All active UNOS member transplant centers (TXC) performing adult organ transplants were contacted via email to request consent forms (CFs) between February 2009-July 2009. The response included CFs at several phases of the transplant process: (a) evaluation and/or listing for organs (kidney, liver, pancreas, heart/lung, intestine), (b) evaluation of living donors (kidney and liver) (OD), (c) accepting organs from donors with certain risks (i.e., ECD, CDC-defined high risk donors, DCD), and (d) the actual transplant surgery procedure. CFs were analyzed using 3 measures of reading level: Lexile Measure, Flesch-Kincaid Grade Level, and Gunning Fox. Lexile values translate to corresponding reading grade levels. Flesch-Kincaid Grade Level provides a reading score that correlates with grade level. Gunning Fog Index measures the average number of words per sentence, and the length and difficulty of words, and correlates with the hypothetical number of years of full-time education needed to comprehend the text. CF reading levels were compared to transplant center volume and UNOS Region.

Results: Of active TXCs contacted (N=209), 62 (29.7%) sent their CFs. All UNOS Regions were represented, though Region 5 (Arizona, California, Nevada, New Mexico, Utah) represented greater participation than the other Regions. Reading levels were high for all types of CFs, ranging between 10th grade and college levels (Table 1). Lexile measure for surgical CFs was negatively correlated to transplant center volume (r=-0.783; *P*=0.003); all other CFs were unrelated to transplant center volume or UNOS Region. Thus, the larger the transplant patient volume, the lower the readability; this may be due to the amount of resources available to larger centers to devote to preparing educational materials at lower reading levels. There was no difference in reading level by organ type.

Table 1. Reading levels of consent forms used for Kidney Transplant Recipients and Donors

Consent Type		Lexile Measure	Flesch-Kincaid Grade Level	Gunning Fox Index
	N	Mean (SD)	Mean (SD)	Mean (SD)
Transplant Evaluation & Listing	165	1354L (205.2)	10.8 (1.6)	14.6 (1.8)
Organ Donation	72	1384L (189.2)	11.1 (2.3)	15.2 (2.6)
High Risk Donor Organs	44	1416L (308.2)	10.5 (2.4)	13.8 (2.7)
Transplant Surgery/Anesthesia	13	1499L (245.8)	12.0 (2.2)	16.6 (2.5)

Conclusions: Organ transplantation evaluation and listing, donation, high risk donor organ acceptance, and surgical consent forms were written, on average, at the 12th grade reading level. Greater efforts are needed to reduce reading level of consent forms to a 5th - 8th grade reading level to ensure patient comprehension necessary for adequate informed consent.

Mammography Result Notification Letters: Can Most Women Understand Them? Erin N. Marcus[1]; Yanisa Del Toro[1]; Margaret Pereyra[1]; Ada Pat Romilly[1]; Maria Victoria Velasquez[1]; Monica M. Yepes[1]; Lee Sanders[1]; [1]University of Miami Miller School of Medicine, Miami, FL. (ID - 80)

Background

To prevent patients from being lost to follow-up, the 1998 Mammography Quality Standards Reauthorization Act requires that all licensed mammography facilities mail each patient a written summary of her mammogram report "in terms easily understood by a lay person." This project's goal is to assess the readability of the sample notification letters that many mammography centers use as a template for the letters they send patients about their results.

Methods

We analyzed the sample mammography result notification letters made available on the American College of Radiology (ACR) website, as well as those provided to imaging centers by two widely used mammography transcription services. To assess text readability, we used the Flesch Kincaid reading ease and grade level scales. A Flesch reading ease score of 60 or above and grade level score of 4th to 6th grade are usually considered acceptable for health materials. To assess document suitability, we used the Suitability Assessment of Materials (SAM). A score of >40 % is considered adequate. One-way analysis of variance with Bonferroni multiple comparison tests was used to assess differences in the primary outcomes by diagnostic category (as indicated by BI-RADS level) or by the source of the letter (ACR or the two services).

Results

55 letters were analyzed. The Flesch reading ease ranged from 25 to 61, with a mean of 42 (S.D., 7.9). The Flesch Kincaid grade level score ranged from 6.7 to 13.5, with a mean of 10 (S.D., 1.2). The mean SAM score was 29% (S.D., 2%), with a range of 24% to 38%. Reading ease, grade level, and SAM score did not vary significantly by diagnostic category. These primary outcomes did differ by source of letter ($p<0.05$), but none were in acceptable range.

Conclusion

The letters evaluated in this analysis were written at readability and suitability levels that are too difficult for many patients to understand. These findings suggest there is a need to develop means of communicating mammography results in a way that accounts for low health literacy.

Text cohesion and comprehension of written health information in older adults Chiung-ju Liu[1]; Susan Kemper[2]; [1]Indiana University of Indianapolis, Indianapolis, IN; [2]University of Kansas, Lawrence, Kansas. (ID - 85)

Background.

Text cohesion indicates the degree to which text content ties together. Text cohesion leads readers through the text by connecting ideas together. To increase older adults' ability to process and understand basic health information, text cohesion is an important factor in addition to readability, which is usually indicated by the length of words and sentences. The length of words and sentences is associated with reading grade levels. While many have suggested improve readability of written health information with low reading grade levels, little attention has been given to text cohesion. The current study aimed to examine: 1) how older adults' comprehension of common health-related written materials is affected by reading grade levels and text cohesion; and 2) how the comprehension is moderated by older adults' characteristics.

Methods.

Sixteen short, senior health-related passages were selected from online or print materials. These 16 passages varied in health topics, reading grade levels, and text cohesion.

One hundred and twenty-one community dwelling older adults (Mean age = 77) read these 16 passages. These passages were presented in random order to each participant. After reading each passage, 6 yes-no questions were given to assess comprehension. Multilevel modeling was conducted to analyze the data. Reading grade levels and text cohesion were the level-one units; older adults' working memory, verbal ability, prior knowledge, education, and age were the level-two units.

Results.

All participants benefited when low reading grade levels were combined with high text cohesion. Participants with small working memory capacity had more difficulty understanding passages written with low reading grade levels ($\gamma 11 = .06$, $p < .05$). Additionally, text cohesion and reading grade levels interacted with participants' verbal ability and age to affect their comprehension. Participants with low verbal ability or older than 77 years of age had difficulty understanding passages high in text cohesion and also high in reading grade levels ($\gamma 34 = .007$, $p < .05$; $\gamma 36 = -.006$, $p < .05$, respectively).

Conclusions.

Only lowering reading grade levels of written health information is not an effective strategy to improve older adults' ability to process and understand the information. Our findings indicate that health text written with low reading grade levels is difficult to understand, particularly for older adults with low working memory capacity. Health text written with low reading grade levels may omit critical connections among ideas as sentences by deleting causal and temporal subordinate clauses or phrases. Readers have to engage additional working memory capacity to understand it. Therefore, to ensure well understanding of health-related written information for older adults, health information writers must reduce reading grade levels without disrupting text cohesion.