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A tale of two health literacies: public health and clinical approaches to health literacy

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SUMMARY

Public health concerns underlie a considerable portion of the global burden of disease, increasing the utility and need for promoting and assessing the knowledge about public health issues. Health literacy is generally agreed upon as a means to find, understand, analyze and use information to make better decisions about health and to ultimately reduce inequities in health. A public health literacy knowledge scale was tested in China, Mexico, Ghana and India. A somewhat unexpected finding, which was that experts 'scored' less on the scale than the general public, led to consideration of differences between clinical and public health approaches to health literacy and their implications. These differences in perspective, for instance consideration of single case effects versus impacts at the societal level, pose significant challenges to developing and assessing health literacy. We suggest that a comprehensive approach to health literacy will include both clinical and public health approaches.

Key words: clinical information; facts for life; health literacy; public health; scale development

INTRODUCTION

The field of health literacy emerged in the 1980s and 1990s. This attempt to bridge the multiple disciplines addressing health and literacy faces significant challenges. For example, both health and literacy are differently defined within and across those disciplines and sociocultural contexts. Perhaps most striking are the differences between a clinical and a public health orientation to health literacy research and practice.

The clinical approach to health literacy developed mainly within the United States to help physicians better communicate their prescriptions and to help patients better understand and comply with treatment regimens. This work tends to characterize health literacy as a problem that patients have and physicians need to overcome. This orientation underpins development of the most known metrics of health literacy, such as the various versions of the Rapid Estimate of Adult Literacy in Medicine (REALM) (Davis *et al.*, 1991), the Test of Functional Health Literacy in Adults (TOFHLA) (Parker *et al.*, 1995) and the recently developed newest vital sign (Weiss *et al.*, 2005), as well as attempts to develop single or multiple-item screening devices (Chew *et al.*, 2004; Wallace *et al.*, 2005). However, none of these are considered comprehensive measures of health literacy (Rogers *et al.*, 2001; Baker, 2006).

Researchers working with a public health approach to health literacy often work and

publish in international health and development contexts; the history of health literacy articles in this journal provides many excellent examples (Nutbeam, 2000; Kickbusch, 2001; Ratzan, 2001; St Leger, 2001; Zarcadoolas *et al.*, 2005). This work explicitly connects health literacy with health promotion and social marketing of public health interventions (e.g. the use of insecticide-treated bed nets to prevent malaria) and connects health literacy with education and empowerment, often from a Freirian perspective on adult education and literacy (Freire, 1980). This orientation views health literacy as an issue equally important in the public sphere and in health-care settings (Rudd, 2003).

Although the clinical approach has aggressively pursued development of diagnostic tools of health literacy for clinical settings, the public health approach has made more progress in the development of conceptual frameworks and theories of health literacy. This article reports on an initial attempt to begin creating a measure based on the public health approach to health literacy. A brief discussion on the putative links between literacy, knowledge and health, from both clinical and public health approaches, provides a useful background for this effort.

HEALTH LITERACY: THE ROLE OF KNOWLEDGE

The diffusion and use of knowledge in society is arguably one of the most important factors in improving health outcomes. However, although knowledge is often considered a prerequisite for change in attitudes and behaviors that lead to better health, that relationship is not always direct, positive, linear or even necessarily present (Galli, 1978; Azjen and Fishbein, 1980; Durant *et al.*, 1992; Dierkes and von Grote, 2000). Especially since the 1990s, health literacy has emerged as an independent research field that shows potential to further our understanding of those complex relationships.

However, most health literacy metrics primarily focus on fundamental literacy skills in a clinical context, such as the TOFHLA, or do not address possession of knowledge but focus on pronunciation of clinical and medical terms, such as the REALM. This is in sharp contrast to the range of skills a public health approach defines as health literacy. For example, the TOFHLA focuses on skills such as the ability to read an appointment slip and medication labels, whereas a public health literacy approach includes the ability to successfully evaluate and select from competing sources and types of information as important skills.

Although the concept of health literacy remains subject to varying definitions and conceptual approaches, both clinical and public health approaches tend to focus on some aspect of an individual's ability to find, understand, evaluate and put information to use to improve decision making related to health and, ultimately, improve health and/or reduce inequities in health. For instance, Healthy People 2010 in the United States defines health literacy as the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions (USDHHS, 2000). A US Agency for Health Research Quality effort limits that definition to 'patients' ability' (AHRQ, 2007). An American Medical Association (AMA) committee on health literacy defined health literacy as a constellation of skills, including the ability to perform basic reading and numerical tasks required to function in the health-care environment (Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999). Kickbusch and Maag (Kickbusch and Maag, 2006) offer a context-driven definition of health literacy as 'the ability to make sound health decision[s] in the context of every day life – at home, in the community, at the workplace, the health-care system, the market place and the political arena. It is a critical empowerment strategy to increase people's control over their health, their ability to seek out information and their ability to take responsibility'. Researchers in Canada have offered a somewhat parallel definition of health literacy as 'people's ability to find, understand, appraise and communicate information to engage with the demands of different health contexts to promote health across the life-course' (Kwan *et al.*, 2006). Finally, Zarcadoolas *et al.* (Zarcadoolas *et al.*, 2005) offer an inclusive and operational definition that neither limits nor conflicts with others by defining health literacy as 'the wide range of skills and competencies that people develop to seek out, comprehend, evaluate, and use health information and concepts to make informed choices, reduce health risks, and increase quality of life'.

Across most definitions, but not reflected in existing measures, health literacy is somehow related to the possession of knowledge about health. Health literacy is thus a skill-based process individuals can use to identify and transform information into knowledge. This communication process inherently involves decoding a symbol system such as printed words, spoken language or visual elements and placing that information into a useful context. DeWalt and Pignone's (DeWalt and Pignone, 2005) finding reinforces the strength of this core function of health literacy as only two of 16 reviewed studies did not find a statistically significant relationship between the measures of literacy or health literacy and knowledge.

However, the clinical and public health approaches to health literacy offer differing conceptualizations of the relationship between knowledge and health literacy. This difference reflects the core activities in clinical and public health contexts. Much of the clinical encounter is focussed on obtaining information about and from the patient, whereas public health work focuses on delivering information such as knowledge of safe sex practices, abstinence to prevent HIV/AIDS or the use of oral rehydration solution to prevent dehydration from diarrhea. The public health approach to health literacy sees acquisition of health knowledge as an integral part of health literacy rather than a separate outcome (Nutbeam, 2000; Kickbusch, 2001; St Leger, 2001; Zarcadoolas *et al.*, 2006). Alternatively, Baker (2006) argued from a clinical perspective that knowledge is a resource in individuals that 'facilitates health literacy but does not in itself constitute health literacy'. This sort of difference in conceptualization contributes to an increasingly well-recognized health literacy measurement issue as, especially from a public health literacy perspective, current measures assess only limited aspects of health literacy (reading and, more rarely, limited numeracy skills) (Rogers *et al.*, 2001; Kelly, 2004; Nielsen-Bohlman *et al.*, 2004; Schwartzberg *et al.*, 2005; Baker, 2006).

Firmly grounded in a public health perspective, Nutbeam (Nutbeam, 2000) theorized health literacy as an outcome of health promotion and explicitly placed knowledge into a model of health literacy by defining functional health literacy as a basic understanding of factual health information. Nutbeam defines two further levels to health literacy: interactive health literacy and critical health literacy which, respectively, reflect cognitive, literacy and social skills helping individuals interact and the ability to critically analyze and apply health information to gain control. Although Nutbeam's levels have not been extrapolated into a metric of health literacy, St Leger (St Leger, 2001) provides a thorough discussion of the levels in an educational setting and also explicitly places knowledge at the functional level of health literacy.

Abel (Abel, 2007) conceptualized knowledge as the core of health literacy by describing health literacy as a 'knowledge-based competency for health promoting behaviors'. This work is clearly grounded in a public health perspective by, for instance, incorporating an awareness of a distinction between lay knowledge and clinical models that invariably prioritize scientific knowledge and by arguing for the importance of health literacy in addressing the inequitable distribution of health opportunities. Finally, Zarcadoolas *et al.* (Zarcadoolas *et al.*, 2005, 2006) provide a comprehensive approach to health literacy that includes a public health perspective by identifying fundamental, scientific, civic and cultural domains of health literacy and defining the acquisition, understanding, evaluation and use of knowledge as an integral component of health literacy.

The public health approach to health literacy presents a solid basis for the development of a public health literacy knowledge scale. As most existing measures of health literacy are clinically oriented and lack a public health component, a public health literacy knowledge scale offers an opportunity to advance the study of health literacy directly in line with Kickbush's call for developing measures of health literacy that at least in part 'reflect health literacy in terms of knowledge' (Kickbusch, 2001).

Methodology

Choosing which knowledge about public health issues to include is clearly a primary issue. To address such concerns of content validity, we turned to a body of information called the 'Facts for Life'. The Facts for Life are health research validated knowledge vetted by a range of public health professionals working in a variety of international contexts. A collaborative process among the major international organizations—UNICEF, WHO, UNESCO,

Table 1: Approaches to validity and reliability used

Reliability and validity type	Result
Face and content validity	
Expert consultation	Conducted
Participant feedback	Conducted
Flesch-Kinkaid readability assessment	7th grade
Construct validity	
Hypothesis 1: Individuals will score higher on the public health knowledge scale than on the science literacy scale	Accepted[a]
Hypothesis 2: There will be a positive, but weak, correlation between scores on the public health knowledge scale and the science literacy scale	Accepted (Pearson's correlation, 0.391)
Discriminate validity	
Only accept statements with >20% correct responses	Conducted
Hypothesis 3: Expert groups will score higher than the general public	Rejected[a] (experts average 12.6; public average score 13.8)
Hypothesis 4: Country-level data will reveal significant differences between countries	Accepted[a]
Reliability—internal consistency	
Only accepted statements with item-total correlation (Pearson's *r*) of over 0.20	Conducted
Cronbach's alpha/KR-20—prefer between 0.70 and 0.90	Acceptable Cronbach's alpha = 0.7973
Reliability—test–retest method	
Test–retest (kappa coefficient)—expect between 0.60 and 0.70	Acceptable kappa 0.67–0.89

[a]Significant at the 0.01 level.

UNFPA, UNDP, UNAIDS, WFP and the World Bank—developed the Facts for Life. Thirteen 'essential Facts for Life messages' cover the topics of: timing of births; safe motherhood; child development and early learning; breastfeeding, nutrition and growth; immunization; diarrhea; coughs, colds and more serious illnesses; hygiene; malaria; HIV/AIDS; injury prevention; and disasters and emergencies (UNICEF *et al.*, 2002). For instance, in relation to safe motherhood, one factual statement is 'All pregnant women should visit a health worker for prenatal care, and all births should be assisted by a skilled birth attendant. All pregnant women and their families need to know the warning signs of problems during pregnancy and have plans for obtaining immediate skilled help if problems arise'.

Initially, we developed 18 preliminary statements on the basis of the Facts for Life in consultation with experts working on international organizations' programs related to the different topical areas. These and health-related statements drawn from existing measures of general science literacy (Miller, 1998) were tested as part of a larger survey effort coordinated by the World Health Organization in cooperation with independent local partners in Mexico, China, Ghana and India. Data were analyzed independently of the larger WHO project.

The approaches taken to address validity and reliability are reported in Table 1. Participants in this preliminary study are not statistically representative of the populations they are drawn from. However, as an aggregate group, the participants represent a wide range of life experiences in a variety of settings that allows validity and reliability testing (Table 2).

RESULTS

As the primary goal is to develop a valid and reliable public health literacy knowledge scale that performs acceptably well at the population level, priority in analysis and reporting of results is given to the aggregated data. In the aggregate, 75% of the responses to the Facts for Life derived statements were correct on average. The poorest overall performance on statements derived from the Facts for Life was in response to 'Coughs and colds only get better with medicine', where less than half (41%) of the participants responded correctly that the statement is false. Four of the Facts for Life statements received a correct response rate ≥90%—those relating to benefits of women visiting a health worker when pregnant, children learning by playing, need for specialist care for children

Table 2: Demographics of participants

	Sex (%)		Urban or rural residence (%)		Average age	Average years of formal education	Average household income[a]	*N*
	F	M	U	R				
Mexico	66	34	99.5	0.5	32	11	314	200
China	52	48	48	52	47	8	1,570	220
Ghana	43	57	94	6	32	16	1.64	204
India	56	44	98	2	37	15	4,181	205
All	54	46	85	15	37	12.5	1,517	829

[a]For 2002, in US dollar.

Table 3: Public health literacy knowledge scale

Public health literacy knowledge scale
For a healthy pregnancy and birth, all pregnant women should visit a health worker before the baby is born (T)
Births that are not assisted by a skilled birth attendant are as safe as births that are assisted by a skilled birth attendant (F)
It is normal if children below the age of 1 year weigh the same over a 2-month period (F)
Children who are vaccinated are protected from dangerous diseases (T)
Overall, vaccination has more risks than benefits (F)
Children learn a lot by playing (T)
Most injuries and accidents cannot be prevented (F)
If a child is breathing rapidly or has difficulty breathing, the child should be taken immediately to a health-care provider (T)
Many diseases can be prevented by washing hands before touching food (T)
Using condoms when having sex can prevent the spread of AIDS (T)
Using mosquito nets helps prevent malaria (T)
Exercise helps prevent heart disease (T)
Coughs and colds only get better with medicine (F)
It is the father's gene that decides whether the baby is a boy or a girl (T)
Antibiotics kill viruses as well as bacteria (F)
Cigarette smoking causes lung cancer (T)
All bacteria are harmful to humans (F)

experiencing difficulty in breathing and the importance of hand washing to prevent diseases.

A final scale consisting of 16 statements emerged after the removal of statements with an item-total correlation <0.20, statements whose removal increased Cronbach's alpha and statements with a correct response rate $<20\%$. Cronbach's alpha for the final public health knowledge scale is 0.7973 for the aggregated data of all countries (Table 3). Test–retest kappa values ($N = 50$) for the scale statements are also acceptable, ranging from a high of 0.89 from Mexico to a low of 0.67 from China.

A before-testing prediction was that the public health knowledge scale would receive significantly higher levels of correct responses from experts such as health researchers and health service providers in comparison to the sample drawn from the public. In a complementary aspect of the overall project, 357 individuals identified as either health researchers or health service providers responded to the same statements. A *t*-test comparison of the mean scores revealed significant differences between the experts and the public sample at the 0.01 level. The average score for experts was 12.6 with a standard deviation of 3.7. For the public, the average score was higher at 13.8 with a standard deviation of 2.5. Country-level data reveal that the lowest performance of experts was in China, but that Mexico experienced the same unexpected relationship. The performance of both groups from Ghana was similar, and only in India did experts offer more correct responses than the public. The data do exhibit a significant difference between the two groups as expected, but not always in the direction predicted.

DISCUSSION AND CONCLUSION

We clearly did not expect that experts would perform less well than the public. This surprising finding was noted by the country partner in China, where expert responses were the poorest, who speculated that 'We wonder if respondents did not understand the meaning of the questions or they responded carelessly'. However, in China and other countries, these statements were not reported as being too difficult to understand for a majority of the public participants. Therefore, we must discard the suggestion of experts not understanding the statements.

Experts, who may resist being 'tested', may have not paid adequate attention to the content

of the questions. However, the level of attention expert participants gave the statements is impossible to accurately assess as the expert component was not administered in-person. The public version, however, was administered face-to-face so that difference in methodological approach may somewhat account for this result. For instance, despite cautions and instructions to avoid this, interviewers may have inadvertently provided clues to participants in the public samples.

Another possible explanation is that expert status is often accompanied by a higher awareness of scientific uncertainty that could reduce willingness to accept an unambiguous true–false statement, reflecting a paradox between scientific uncertainty and definitive knowledge assessment that exists across the science and public interface.

Further, physicians in the expert sample certainly have individual experiences that contradict the statements based on population-level outcomes (and some experts involved in this study cited personal examples of these cases). For example, healthy births have occurred without the presence of a health worker just as there are individuals who have smoked without developing lung cancer. Those local realities, however, do not refute the truth or validity of the scale statements. We find this possible explanation intriguing as it may well reflect the differing clinical and public health perspectives that influence the field of health literacy.

The public health literacy knowledge scale inherently prioritizes the knowledge about population level health outcomes versus a clinical emphasis on individual outcomes. Zarcadoolas *et al.* (Zarcadoolas *et al.*, 2006) explicitly identify the ability to understand the relationship between individual and public health as an important health literacy skill. A primary example of this health literacy skill in action lies in the success of efforts to reduce smoking rates through the communication of scientific evidence of the negative impacts from exposure to second-hand smoke. However, the first use of this newly developed public health literacy knowledge scale highlights some potential difficulties in assessing clinical and public health literacies in practice.

The differences in perspective between health literacy at an individual level and at the level of public health pose significant challenges to developing and assessing health literacy. 'Facts' on which public health interventions are based may not hold true in every individual case and only do so in the aggregate or long term. For example, in the previously mentioned 'fact' that for safe births, all pregnant women should visit a health worker for prenatal care, and all births should be assisted by a skilled birth attendant, it is not necessarily the case that every birth attended by a skilled birth attendant will have positive outcomes or that births not so attended will always have negative outcomes.

In this context, questions the field of health literacy faces include identifying what health literacy skills can bridge the gap between expert-based risk assessments and risk as perceived within a community? How can shared understandings of complex concepts such as probability and relative risk be constructed? For instance, how will individuals react, and how should experts respond, when the mass media frames an issue substantially different from how scientific evidence is framed in the technical literature? Consider mass media accounts of links between the MMR vaccine and autism. One research study found that although nearly 70% of the media coverage identified a possible link, only 25% of the coverage mentioned the research that produced that link, only 37% mentioned the MMR vaccine is viewed as safe, and that 'Attempts to balance claims about the risks of the MMR jab tended merely to indicate that there were two competing bodies of evidence rather than offer more substantive evaluations of the case for or against a link' (Hargreaves *et al.*, 2003).

Another important task is to determine what role health literacy can play in addressing the gap between a primary focus of bioethics in medical care and human research on individual interventions and effects and the ethical implications of public health interventions and research aimed at social outcomes. What is considered 'good' at the public health level, need not necessarily be so at the level of the individual, or vice versa, and a balance needs to be achieved between the two concerns (Kass, 2001). This concern extends, for example, from ongoing questions of when and how to assess health literacy to balancing cost-effectiveness concerns as they vary across a range of individuals, groups and contexts (Coast, 2004). Assessing whether individualistic concerns hold sway over concerns for public health also can potentially be linked to social capital measures,

such as social cohesion and trust, as public health approaches to health literacy have done (Nutbeam, 2000; Zarcadoolas *et al.*, 2005; 2006).

All of these areas for suggested future research fully embrace the now well-accepted understanding of a 'two sidedness' to health literacy as it resides in the public and in healthcare professionals alike. As a primary challenge is to create shared meaning and ability to successfully communicate between health systems and individuals, this initial testing of this public health literacy knowledge scale did not set out to test the differences between the two health literacies. We cannot confirm or fully explore the implications of this potential conflict between clinical and public health literacies. If future research confirms this suspicion, the field of health literacy will need to focus on developing guidelines to help the public and health professionals successfully and ethically address both public health and clinical concerns.

An internationally valid and reliable scale to assess the level of public health literacy knowledge held by individuals seems to have been successfully developed. However, this work should be replicated in more countries, with larger samples and especially with samples more reflective of the diversity of the populations they are drawn from. Qualitative research to understand people's perceptions of individual and public health concerns and exploring linkages of these perceptions with social capital measures, such as social cohesion and trust, are additional areas of inquiry that could inform work in this area.

This public health literacy knowledge scale can serve as one component of a complete measure of health literacy. In the interim, this scale can meet the needs of researchers concerned with the relationships between knowledge and health and inform advocacy efforts to improve the flow of health information to promote healthy behaviors. This scale can also add a layer of analysis and enhance comparability across contexts and issues in research on the role of knowledge in preventing and treating individual diseases, conditions or health issues. Finally, if the political will were to emerge, this scale could be used as a core measure for national survey efforts investigating the relationship between knowledge and health similar to the U.S. National Science Board's and Eurobarometer efforts to assess changes and effects of science literacy in society.

Ultimately, we suggest that a comprehensive approach to health literacy will include both clinical and public health approaches. Although the academic literature seems to indicate an unproductive relationship between those perspectives to date, we urge the seeking of collaborative approaches versus arguing for the primacy of one approach over the other. Health literacy should be about improving health and reducing inequities by empowering both individuals and communities to make informed, and ethical, decisions about their health.

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