

Health Literacy Training for Public Health Nurses in Fukushima: A Case-Study of Program Adaptation, Implementation and Evaluation

JMAJ 57(3): 146-153, 2014

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Abstract

Health literacy comprises not only an individual's ability to gain access to, understand and use health information, but also health care providers' ability to make health information accessible and usable. The Fukushima nuclear accident has posed challenges related to the communication of radiation-related health information. Public health nurses are gatekeepers of community health in Japan, and have primary responsibility for communicating this complex information about science and risk to lay members of the community. A health literacy training program was designed to augment communication skills of participating nurses with two primary goals: changing communication practices and norms among public health nurses, and improving access to information for community residents. Training content incorporated an overview of health literacy skills (including numeracy), processes for assessing written materials and visual displays, as well as guidelines for text improvement. The workshop was spread across two days with two-hour sessions each day. A proximal post-training evaluation survey was conducted, followed by a more distal one-month follow-up evaluation to assess the application of learned skills in practice. Twenty-six nurses in Fukushima City attended the first trial. Post-training evaluations were highly positive, with agreement from 85-100% of participants on the appropriateness and usefulness of the workshop. During a one-month follow-up, the nurses reported applying new knowledge and skills to develop written materials. However, they faced difficulties sharing their new skills with colleagues and challenges changing work norms. Participants also encountered difficulties using graphics and explaining risks in practice. This paper highlights the importance of providing health literacy training opportunities for professionals to strengthen health system's ability to accessible information and services. This program also serves as important reference for future disaster management efforts.

Key words Health literacy, Fukushima nuclear accident, Education, Public health nurses

Introduction

According to the World Health Organization,¹ "health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health." Health literacy not only manifests in people's ability to interpret health information, but also extends to preventive

behaviors and health consequences including hospitalization and mortality.² Although the World Health Organization's definition only makes reference to individual skills, a broader concept of health literacy has been emerging³—one that includes attention to health care providers' roles in making health information accessible and understandable [USDHHS, 2010].⁴ The US National Action Plan to Improve Health Literacy delineated goals focused on developing and

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disseminating health information that is accurate, accessible, and actionable.

In Japan and many other nations outside North America, the concept of health literacy has gained attention only in recent years.⁵ A quick search of publications using PubMed with the following search string, “health literacy AND Japan,” yielded 30 hits, with the earliest article dated 2001. Nearly one third of these publications reported the development of new Japanese tools to assess health literacy levels of individuals, while none focused on the provider. Although the scope of health literacy research in Japan has been expanding, its importance surged after the catastrophic Fukushima nuclear accident, as scientists and health care professionals encountered significant challenges to communicate radiation-related health information to the community.

Our recent post-disaster study among public health nurses in Fukushima City delineated how public health nurses’ recognized the responsibilities and needs to improve their communication skills to better transfer scientific knowledge and information to the community.⁶ During parental counseling of mothers, the nurses recorded that mothers were concerned with differences in risk perception among their family members, and asked technical questions that were related to radiation. We further demonstrated that the differences in risk perception within the family were associated with mothers’ depressive symptoms.⁷ These data triangulate to suggest an association between mental health and the degree of understanding of health information in the face of disaster. Thus, improved access to health information may help to alleviate people’s anxiety and concerns in a disaster setting.

Aiming to improve the comprehensiveness of information provided through public health nurses and their community activities in Fukushima City, a health literacy training for nurses was planned, implemented and evaluated. The training was adapted from Rudd’s “Eliminating Barriers-Increasing Access Workshop.”⁸ The training program was designed to help health professionals understand the gap between professional knowledge—including terms and concepts, and the public’s understanding of health and science related information. Studies have documented how the terminologies and scientific concepts health professionals learn from their training are unfamiliar to the general public, and

how these professionals could benefit from health literacy training in order to interact more appropriately with their clients.⁹ Likewise, this workshop was designed to help health professionals recognize and bridge the gap. This case study also illustrates the importance of adaptation rather than adoption. Here, a model developed with a Western perspective was modified in accordance to the cultural and specific needs of a professional group of nurses in Fukushima City. It is hoped that this report can inform future trainings in Fukushima and other disaster settings so that initiatives related to health literacy can be implemented using a culturally sensitive approach.

Methods

A health literacy training model posted online and rigorously piloted in the United States was adapted for use in Fukushima City. Five major components of the training protocol were modified to fit the Japanese public health setting: 1) project organization, 2) intervention tools, 3) practice sessions, 4) piloting, and 5) evaluation and planning for the future. Similar steps were undertaken in a previous study that culturally tailored a Western parenting support program into Japanese and Vietnamese settings.¹⁰

Project organization

The Fukushima Health Literacy program was incorporated into existing information-sharing meetings for public health organized by Department of Public Health and Gender-Specific Medicine Center at Fukushima Medical University. The information-sharing meetings started in 2011 as one of the post-disaster restoration activities,¹¹ and has been conducted regularly since then. The purpose of the meetings is three-fold—to improve knowledge and skills with regard to radiation and parenting support, to provide opportunities to share information among peer nurses, and to reduce anxiety and stress. Core project members consisted of one public health nurse and two physicians, who managed the meetings, gave lectures and facilitated discussions. In addition, guest lecturers and graduate students have been invited as facilitators.

Intervention tools

The model program developed by Rudd⁸ was

Table 1 Participants' self-evaluation of achievements toward training objectives in the follow-up survey

Statements	N (%) of 4 and 5 ^a		
	Total (N = 23)	Attended once (N = 13)	Attended twice (N = 9)
Workshop evaluation			
I gained confidence in assessing and revising written materials.	13 (59%)	7 (53%)	6 (67%)
I applied learned skills in practice.	16 (73%)	8 (62%)	8 (89%)
Self-evaluation of achievements			
Knowledge about health literacy			
I can explain health literacy needs.	19 (79%)	12 (92%)	7 (70%)
I can explain definition of health literacy.	9 (38%)	5 (38%)	4 (40%)
I can explain numeracy levels.	6 (26%)	4 (33%)	2 (20%)
I can explain people's health literacy level in Japan.	5 (23%)	3 (27%)	2 (20%)
Skills to assess written materials			
I can use Marker Method.	22 (92%)	12 (92%)	9 (90%)
I can use Obi-2.	8 (35%)	4 (33%)	4 (40%)
I can use SAM.	8 (35%)	4 (33%)	4 (40%)
I can use single-item screening of health literacy level.	7 (30%)	3 (25%)	4 (40%)
Skills to revise written materials			
I can write easy-to-read text.	13 (54%)	7 (54%)	6 (60%)
I can develop a leaflet step-by-step.	8 (33%)	4 (31%)	4 (40%)
I can develop easy-to-understand graphics.	6 (25%)	3 (23%)	3 (30%)
I can explain risk.	2 (8%)	0 (0%)	2 (20%)

^a A five-point Likert scale ranging from 'highly disagree' (1) to 'highly agree' (5) was used, and the numbers in the table are the summated frequencies of 'highly agree' and 'agree.' The total numbers of items do not add up to the numbers indicated in the top row due to missing data.

part of the Health Literacy Studies project at Harvard School of Public Health designed for public health professionals interested in improving health literacy in their practice. The initial focus was on assessing and improving written materials. Major components of the workshop were introductions with ice-breaking activities, an introduction to health literacy, instructions for and hands on experience with assessment tools, review discussions, and training evaluation. The facilitator's guide is published online.⁸

We modified the training content to fit with local context and to incorporate tools appropriate for Japanese language and risk communication issues specific to Fukushima. Firstly, we searched for Japanese tools to assess written materials and individuals' health literacy level. As a substitute of SMOG (Simple Measure of Gobbledygook) to assess readability, we selected a free online tool named Obi-2.¹² The original workshop included Suitability Assessment of

Materials (SAM), a comprehensive assessment tool of written materials. To fulfill this component, a version translated by Noro adapted to Japanese materials was chosen,¹³ and permission was obtained for use in the workshop. We also identified a Japanese version of single-item assessment of health literacy level of patients.¹⁴ Secondly, we searched for guidelines to improve Japanese text and found Sasaki's study to list practical instructions.¹⁵ Thirdly, in order to provide tips for communicating risk information—of particular importance in health communication in Fukushima, we referred to Apter's numeracy levels¹⁶ and Woloshin's guidelines.¹⁷

Other techniques taught in the training (listed in **Table 1**) were: an assessment method asking readers to mark difficult words and phrases ("Marker Method"),¹⁸ instructions to improve graphics,¹⁹ and step-by-step procedures to develop a leaflet.²⁰

Table 2 shows the overall structure of the

Table 2 Content of the health literacy training program in Fukushima City

First session	Second session	Follow-up survey
1. Ice-breaking activity	1. Review quiz	1. Review of one-month application
2. Lecture	2. Lecture	2. Training evaluation
• General background of health literacy	Techniques to improve;	3. Distribute additional information leaflet about tips to apply health literacy in practice
• Instructions to use material assessment tools	• Text	
3. Exercise	• Graphics	
• Assessment of an assigned written health material	• Risk presentation	
4. Training evaluation	3. Exercise	
5. Homework	• Revision of their own materials that they had assessed as homework	
• Assessment of materials that participants themselves developed	4. Training evaluation	
	5. Homework	
	• Apply learned knowledge and skills in practice	

program. A three-day training was initially recommended, but due to the intense work schedules of public health nurses who are continuing to undertake post-disaster restoration activities, the duration was shortened to two days with a follow-up survey. Each session lasted two hours, and a follow-up was conducted one month later. The session structure followed Rudd's original workshop plan, which consisted of lectures, exercises and discussions.

Pilot sessions

Prior to the first trial, two practice sessions were held to concretize the training flow and adequacy of training materials. In both practice sessions, 2-3 graduate students and a teaching staff of Department of Public Health participated. Training materials were revised based on their feedback. In addition, preparatory meetings were held with facilitators.

The first session was conducted in the early fall of 2013 and the second session one month later. The follow-up survey questionnaires, along with additional information leaflets on health literacy, were distributed to all participants a month after the second session. The training took place at Fukushima City Health and Welfare Center. There were 39 nurses working at the center, and all except those assigned to duties during the conduct of the workshop attended.

Evaluation and planning for future

At the end of each session, we asked participants

to fill out a course evaluation form. There were six evaluation indicators related to adequacy of teaching materials, time allocation, facilitation, knowledge gain and practicality of the lecture and exercises. Possible responses were formulated according to a five-point Likert-scale, ranging from "highly disagree" (1) to "highly agree" (5). Similar methods of assessments has been used in our previous studies.¹⁰

In the follow-up survey, we asked participants whether they have gained confidence in assessing and revising materials, applied learned skills in practice, and further assessed their achievements toward 12 specific training goals. Out of which, four items were about basic knowledge of health literacy, four on material assessment, and four on material development. In addition, we asked participants to describe their applications in daily practice, barriers in applying learned skills, what they wanted to learn further, and what they have planned for the city's community health activities. These training goals and additional follow-up questions were developed through discussions between the first author and the workshop developer (the second author).

Quantitative data was analyzed using STATA statistical software, version 10 (Stata Corporation, College Station, TX). Qualitative data was analyzed by the first and third authors by referring to Carey and colleagues' coding and intercoder agreement methods.²¹ A code list was first developed by the first author, and text data

Table 3 Participants' session evaluation at the end of first and second sessions

Statements	N (%) of 4 and 5 ^a	
	First session (N = 15)	Second session (N = 21)
Teaching materials were appropriate.	14 (93%)	21 (100%)
Time allocation was appropriate.	13 (86%)	21 (100%)
Facilitation was appropriate.	15 (100%)	21 (100%)
I gained knowledge about health literacy.	14 (100%) ^b	20 (95%)
What I learned from lecture is useful for health activities.	15 (100%)	21 (100%)
What I learned from discussion is useful for health activities.	15 (100%)	21 (100%)

^a A five-point Likert scale ranging from 'highly disagree' (1) to 'highly agree' (5) was used, and the numbers in the table are the summated frequencies of 'highly agree' and 'agree.'

^b There was one missing answer.

was categorized individually by the two authors independently. The first author then compared the results by calculating agreement proportions. During this process, the number of codes was reduced by combining the ones with similar context to ensure categorizations that were more accurate. Rates of agreement were high, ranging from 80-84%, although it was low (43%) in terms of nurses' planned community health activities. As such, the data set was reviewed carefully, with consensus achieved with the third author subsequently, and the agreement reached 71%. Plans for the future were discussed with chief nurses, facilitators and the workshop developer.

Ethical consideration

The study was conducted in collaboration with the Fukushima City Health and Welfare Center. All data were anonymous in accordance with Ethical Guidelines for Epidemiological Research issued by the Ministry of Education, Culture, Sports, Science and Technology and the Ministry of Health, Labour and Welfare. Since anonymous data with no identifiers was used, an ethical review at the Fukushima Medical University was waived.

Results

Seventeen public health nurses attended the first session, and 22 attended the second session. The follow-up materials were distributed to a total 26 nurses, who attended at least one of the training sessions.

Quantitative assessment

Table 3 shows results of session evaluation by participants. Response rates of the first evaluation was 88% (15/17), and 95% (21/22) for the second evaluation. Over 85% of respondents agreed to all statements on the appropriateness and effectiveness of both sessions.

Table 1 shows results of participants' evaluations and self-evaluation of achievements toward training objectives in the one-month follow-up survey. The response rate of this evaluation was 88% (23/26). Fifty-nine percent gained confidence in assessing and revising written materials, and 73% had applied the skills they have learned in practice during the follow-up period. These proportions were higher among those who have attended both sessions. While 79% could explain health literacy needs, 92% could use the Marker Method, and 54% could write easy-to-read text, only 8% could explain risk in their practice.

Qualitative assessment

Table 4 shows the frequencies of codes. The component that received the most number of responses in the follow-up evaluation was the application of learned skills at the individual level, followed by barriers of application. The most common application of learned skills was in the form of health information/education materials. Besides technical issues, nurses voiced difficulties in sharing learned skills and changing work norms, in addition to time and staff constraints. Respondents recognized the need to further learn by practice and through repeated

Table 4 Frequencies of coded answers in the follow-up survey

Codes (Total N of respondents)	N ^a
Application of learned skills (19)	
Applied to health information/education materials	12
Will apply	6
Applied to other written materials	4
Application barriers (15)	
Technical difficulties to improve sentences, tables and graphs	10
Work place difficulties to share learned skills, change work norms, and time and cost constrains	7
Further learning (11)	
Need to continue learning by practicing and attending more training	6
Need to learn more skills in communicating scientific/technical information and verbal/motivational communication	5
Plans for municipal activities (7)	
Apply health literacy skills in health information/education	4
Work with community and different sectors	3

^a Codes were created from the open-ended responses from participants, and intercoder agreement was calculated as part of the analysis.

training.

In the review discussions, facilitators recommended that the training be repeated for city officers in different sectors involved in health promotion activities and in other regions. The city's public health nurses also suggested a plan to organize regular meetings among themselves to reinforce their health literacy knowledge and skills. In order to scale-up the present training, the workshop developer pointed out a need to train additional facilitators.

Discussion

According to a recent report of the Institute of Medicine's roundtable workshop on international health literacy efforts, no educational efforts targeting health professionals has been reported from Japan.²² Our presented case is likely be the first initiative in the country to take a step forward to build health literacy skills of health service providers in order to lessen the burden of community residents when gaining access to the health information they need. The scores for post-session evaluations, and self-evaluations of gained confidence in developing written materials were high. Participants in our workshop learned the importance of health literacy, gained confidence in involving commu-

nity residents using the Marker Method, and have applied the skills they have learned during the follow-up period.

The nurses have, however, raised major barriers in the application of their new competency. Specifically, they were difficulties in the sharing of newly learned skills, and changing of work norms at their workplaces. In the Institute of Medicine report, building capacity of public and health professionals, scientific evidence, and infrastructure were the three components highlighted as part of an inter-sectorial approach to strengthen the presence of health literacy.²² Henning and colleagues further described from a transnational perspective (one case was from Fukushima) how community workers' leadership is enhanced through skills development in combination with professional networking opportunities, and authorization and legitimization of their new tasks in health systems and policies.²³ Simultaneous efforts are thus needed to repeat the training for different sectors and regions that aim at a wider application of health literacy skills, and to involve stakeholders to incorporate initiatives related to health literacy into the health system.

Another issue to be solved was participants' extremely low scores in self-evaluations of their ability to use graphics and explain risks. The

most difficult challenge public health nurses in Fukushima face in the post-disaster phase is to communicate evidence on health risks of radiation exposure.⁶ Public health nurses are not only required to inform on scientific data, but also communicate their interpretations in layman terms.⁶ Among the various types of numerical information, probability and risk have been ranked as the most difficult concepts to understand.¹⁶ Previous reviews and randomized studies have therefore recommend risks or probabilities to be presented in terms of event rates rather than relative risk reduction, and to use pictographs or bar charts.^{24,25} Moreover, a focus group study in linguistics found that people's understanding of literacy and numeracy is interweaved with communication and interpersonal relationships with their service providers.²⁶ Health literacy training for effective risk communication between public health nurses and community is therefore recommended to balance technical and communication skills components.

This was a single trial of health literacy training, describing its planning, implementation and evaluation processes. More rigorous assessments in the long-term with a larger group of participants are needed to confirm the effectiveness of this newly built program. As requested by the nurses, we are planning to repeat the training in various regions in Fukushima. Despite the limitations, we believe that this first trial of a health literacy training launched after the Fukushima nuclear accident shows a practical way toward improving community health services in a challenging post-disaster situation.

Acknowledgments

This work was supported in part by the Japan Foundation for the Promotion of International Medical Research Cooperation (program planning), and the Fukushima Labor and Health Center (program implementation). Preliminary findings of the study were presented at the symposium co-organized by Japan Medical Association Research Institute and Science Council of Japan (February 22, 2014).

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