

Communicating Risk Information with Graphical Tools

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Abstract: Understanding risks can help patients make appropriate decisions. To make risk communication more effective, doctors need to understand how patients perceive information and what factors influence it. Some relevant research groups discovered that visual presentation such as graphics; illustration and pictures affect perceived risk, attitude and behaviour. It means that presentation in different ways will create different understanding of the risk for patients. In order for patients to be effective participants in the decision making process, they need information in a format that they prefer to help them making decisions. The purpose of this research was to investigate the effectiveness of a range of graphical tools on risk communication strategies at the medical professional and patient interface. This research collected and analyzed 16 presentation formats and interviewed 8 medical professionals in Taiwan to understand the way and the tools doctors used when they communicate with their patients. The initial findings of the presentation formats were: (1) numerical format often presented in proportions together with ratios or percentages; (2) diagram format used to reveal the difference between two data; (3) graphical format used meaningful figure to communicate. The results of the interview were: (1) oral format used mostly in Taiwan to avoid treatment debate, (2) graphical tools are useful, but not widely used in Taiwan.

Keyword: *risk perception, visual presentation format*

1. Introduction

As people's cognitions changed, the medical treatment has combined the "doctor-centered" and "patient-centered" methods, thus exchanging information freely and providing the best therapies. Actually, even "mutual participation," where the doctor and patient form a relatively equal relationship, is affected by the knowledge and educational level of the patients. For example, presenting the risks of

fatal abnormality to pregnant women is important in counseling prior to offering prenatal screening tests in Taiwan. These risks must be balanced against the risks of harm caused by diagnostic investigations. This often means that patients and professionals are faced with difficult judgments. If the patient cannot understand the risk information, or the doctor cannot communicate with the patient in colloquial language, their relation is not really equal. The favourable doctor-patient communication is a necessary part during the cure. Good communication would have a positive influence on the patients, and would contribute to the medical decision making.

Lundgren and McMakin (1998) found out that patients might show the following emotions during risk communication: (1) hostility/ provocation; (2) apathy; (3) suspicion; (4) different receptivity; (5) restriction in their study. John Paling (2006) also indicated that people are more sensitive to the involuntary, inevitable, incomprehensive, or antithetical statement against science, and are more sensitive to the unfamiliar, flip-flop, terrified, unfair, or uncontrollable risks. They always exaggerate their cognition of fear, which makes communication become more difficult. In order for patients to be effective participants in the decision making process, they need information in a format that they prefer to help them making decisions.

Effective communication is the basis for informed patient consent for many medical treatments. In particular the communication of computing risks is important to enable patients to make informed decisions about treatment options (Timmermans, Molewijk, Stiggelbout and Kievit 2004). Complex information must be combined to help them to make a decision whether to undergo further testing and how best to act on the results, often in time limited circumstances (Hinshaw et al., 2006). When people are trying to understand and make decisions about risk, they tend to see various aspects of the risk in visual formats (Lundgren and McMakin, 1998). The purpose of this research is to investigate the effectiveness of a range of graphical tools on risk communication strategies at the medical professional and patient interface.

2. Graphical Tools help risk communication

2.1 Different tools for risk communication

Research about the communication of risks has shown that the context and format in which they are presented affects people's perception and their subsequent decision (Timmermans, 2005). The use of verbal labels (e.g. "a great chance") for communicating risks appears to be less effective for clear explanation, because of the greatly differing interpretation of verbal labels of different people. Studies of risk information presentation showed that risks presented as frequencies were also perceived as higher than when the same risks were presented as percentages. It has been shown in other domains than the health domain that risks presented in frequencies lead to a more accurate risk perception and better decisions. Besides frequencies, other formats such as verbal scales, visual presentation of risk, scales that relate risks to more familiar issues are also proposed. However, there is little and contradictory evidence about the format that is most effective in communicating risks and which risk

format is preferred by counselees.

2.2 How graphical tools help risk communication

A good communication would have a positive influence on the patients, and would contribute to the medical decision making. However, the doctor-patient communication is more difficult than the common interpersonal communication. For example: (1) the information relation between the doctor and the patient is unequal; (2) the doctor learns the privacy of the patient; (3) what the doctor and patient faced might be an unknown problem (Lai, 2007), which makes their communication even more difficult.

It has been shown in other domains than the health domain that risks presented in frequencies lead to a more accurate risk perception and better decisions. Besides frequencies, other formats such as verbal scales, visual presentation of risk, scales that relate risks to more familiar risks are also proposed to communicate risks. However, there is little and contradictory evidence about the format that is most effective in communicating risks and which risk format is preferred by counselees. The graphical displays were used to affect risk perceptions and other outcomes focusing on risk ladders, stick or facial displays, line graphs, dots or marbles, pie charts and histograms (Lipkus, and Hollands, 1999). Risk can also be communicated through the use of graphical elements and relatively little text to carry simple risk messages. Graphical displays have been used to affect risk perceptions and other outcomes focusing on risk ladders, stick or facial displays, line graphs, dots or marbles, pie charts and histograms (Lipkus and Hollands, 1999). Paling (2006) even developed a Paling Palette to communicate risk information with patients which allows the presentation of risk graphically and is designed to make the concept of “risk” more real and understandable.

3. Methodology

(1) Different risk communication tools survey

The collection of risk communication tools during the first stage consisted of a search for relevant articles in “ScienceDirect database” and “Google academic search engine website” with “risk communication” as the key word. In addition, medical institute websites related to “risk communication” were searched, and a total of 16 risk communication tools were found.

(2) In-depth Interview

Based on the literature review and the data we collected, there are two main themes for our interviewees: (1) the way and the tool when doctors communicate with their patients; (2) medical professions’ opinions and suggestions to graphical tools. We adopted purposive sampling to interview medical professions of different positions in National Taiwan University Hospital , Taichung Hospital, Department of Health, Executive Yuan, R.O.C. and China Medical University, and totally 8 interviewees in this research, including 1 hospital director, 1 advisor doctor, 1 Obstetrician/gynecologist, 1 intern, 1 nursing department chief , 1 nursing supervisor, 1 case manager and 1 secretary. The details of the interviewees were listed on table 1, every interview time is about 2 hours.

After arranging the interview time and location, we e-mail interviewees the interview themes and reference materials. Interviewers will explain research objectives in the first meeting time to make sure interviewees fully comprehend our research and give opinions of use.

Table 1: Details of 8 interviewees

Unit	Code	Position	Date (yy/mm/dd)
National Taiwan University Hospital	A1	Department of Obstetrics & Gynecology	08/Jan/28
China Medical University	B1	Intern	08/July/12
Taichung Hospital, Department of Health,R.O.C.	C1	Director	08/Aug/07
	C2	Advisor doctor	08/Sep/26
	C3	Secretary	08/Dec/29
			08/Sep/26
	C4	Nursing department chief	08/Dec/29
			09/Jan/22
C5	Nursing supervisor	08/Sep/26	
C6	Case manager	08/Dec/29	
		08/Sep/26	
			09/Jan/22

4. Results and Discussions

4.1 Risk communication tools analysis

We divided the 16 risk communication tools collected into 6 different catalogues; these were oral format, text format, data format, figure/table format, image format, and composite format.

(1) Oral format

Bryant and Norman (1980) found that even trained medical personnel can make enormous mistakes when encoding and decoding. Therefore, using objective tools could improve the communication between medical personnel and patients. However, misunderstanding still occurs during communication due to differences in people's recognition of the oral format. For example, the definition of the word "likely" can range from 25% - 75%, and the word "extremely rare" ranges from 0.001% - 10%.

(2) Text format

The literacy of the subjects needs to be taken into account. Highly professional or difficult medical terms, vague or unclear information should be avoided to minimize any adverse effect on the professional reputation of medical institutes and misjudgments by patients. If presented in direct narrative, it may difficult to imagine the proportional relationships. This kind of tool will give a false impression of precision (BVSDE, 2007, See Table2, No.A-01).

(3) Data format

Data format includes percentages, proportions, and ratios. Different formats may affect patients' assessment of risk. Two types of data are often used together. Most people have difficulty

understanding a data risk presentation method. Moreover, using the percentage format may make it difficult to refer to the correct object. It would be easier for people to understand if the involved group has been clearly identified. Yamagishi (1997) found that a consistent source of data makes it easier for patients to make judgments (See Table2, No.B-01, No. B-02).

(4) Figure/table format

Figure/table format is the most widely used risk communication method. It can be easily memorized or understood, and can reduce the cultural and language gaps. Relevant contents can be connected by colours, sizes, shapes and alignments to make them comparable. It is found that most patients prefer the presentation of multi-risk communication, as compared to single risk communication (James & Stephen, 2008). A table format can show the differences and comparisons between 2 types of data, however, not the overall relationship (See Table2, No.C-01~No.C-04).

(5) Image format

In general, an image format may attract more attention, and be easily understandable (Sevilla, 2002). However, Timmermans et al. (2004) found that fewer patients would choose surgery when image format risk communication is adopted compared to other presenting methods. This result suggests that an image format presentation is not better than other presentations. An image format makes the information more understandable. As mentioned in previous studies, if there are 2 image format presentations: abstract image and portrait image, females prefer concrete presentation because they think it is easier to understand (See Table2, No.D-01~No.D-06).

(6) Composite format

According to most experiments, the risk presentation method of combining data and images helps the understanding of risk. However, whether the patients perceive the correct information is debatable (Timmermans, 2005). The risk communication method of combining image and data formats is recommended in many studies (See Table2, No.E-01~No.E-03).

As for expression, 6 catalogues (oral format, text format, data format, figure/table format, image format, and composite format) were considered.

(1) Oral format may cause misunderstandings easily.

(2) Text format often describes the risk data directly or makes a comparison with our familiar activities.

(3) Data format: Uses percentage, proportion, ratio, and always adopts two kinds of data simultaneously.

(4) Figure/Table format:

- a. The expression manner of bar charts C-02 and C-04. These two tables are different in bar thickness, colour, and spacing.
- b. It is easy for viewers to compare the data, but not the overall relationship.

(5) Image format:

- a. D-01 and D-02 use a random arrangement, which is more suitable for practical situation; D-04,

D-05 and D-06 use a consecutive arrangement, which makes it easy to find the proportional relations. The icons in D-06 are arranged as a block and touching each other, viewers may treat it as a complete section, and it is easy for them to compare.

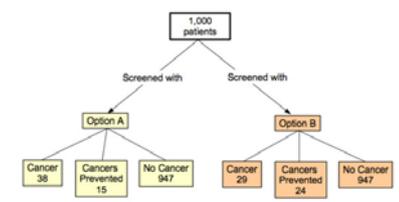
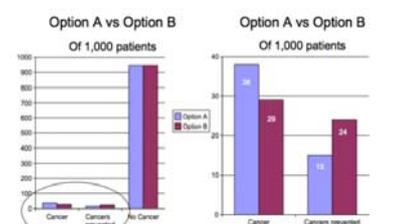
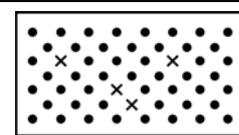
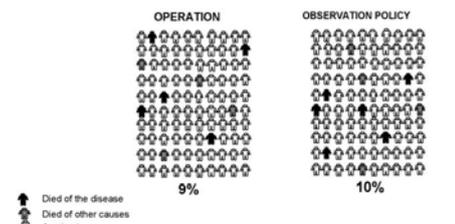
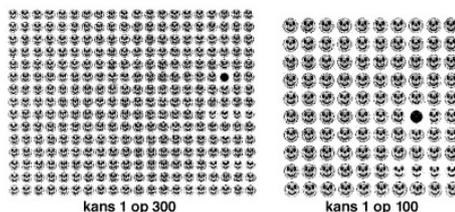
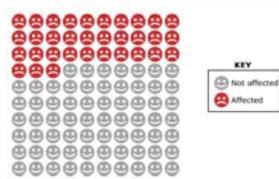
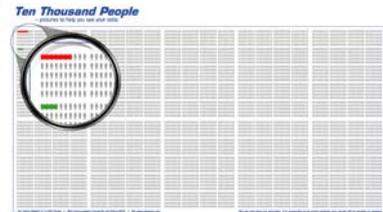
b. D-01 uses abstract symbols of “●” and “X”; D-02 and D-05 uses a whole human body; D-03 and D-04 use a human face, D-06 uses portrait expressed in cartoon mode. According to previous findings, females prefer concrete expression which is easy to understand. But the representations are different, so we can carry out an in-depth study on the pictorial model to learn whether readers would generate different perceptions.

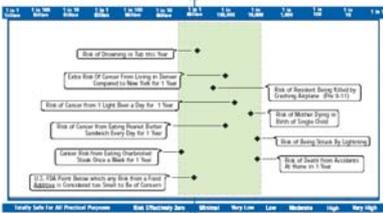
(6) Composite format:

E-01, E-02 and E-03 adopt proportions and some familiar risks. E-01 also adopts the concept of assembly; E-02 lists the clinical diseases; E-03 also uses the assistance of word descriptions to help the viewers with comparison.

Table2 : The 6 catalogues of risk communication tools collected in the research

Format	No.	Tools	Descriptions																					
Text	A-01	<table border="0"> <tr> <td style="vertical-align: top;"> <u>Activity</u> Smoking 1.4 cigarettes Spending 1 hour in a coal mine Living 2 days in New York or Boston Travelling 10 miles by bicycle Flying 1,000 miles by jet Living 2 months in Denver (rather than New York) One chest X-ray in a good hospital Eating 40 lbs. of peanut butter Drinking 30 12-oz cans of diet soda Living 150 years within 20 miles of nuclear power plant </td> <td style="vertical-align: top;"> <u>Cause of Death</u> Cancer, heart disease Black lung disease Air Pollution Accident Accident Cancer (cosmic radiation) Cancer (from radiation) Liver cancer (aflatoxin B) Cancer (from saccharin) Cancer (from radiation) </td> </tr> </table>	<u>Activity</u> Smoking 1.4 cigarettes Spending 1 hour in a coal mine Living 2 days in New York or Boston Travelling 10 miles by bicycle Flying 1,000 miles by jet Living 2 months in Denver (rather than New York) One chest X-ray in a good hospital Eating 40 lbs. of peanut butter Drinking 30 12-oz cans of diet soda Living 150 years within 20 miles of nuclear power plant	<u>Cause of Death</u> Cancer, heart disease Black lung disease Air Pollution Accident Accident Cancer (cosmic radiation) Cancer (from radiation) Liver cancer (aflatoxin B) Cancer (from saccharin) Cancer (from radiation)	Risks "Estimated to Increase the Annual Chance of Death by 1 in one Million" .The left column of Table 2 means the voluntary activities; right column is talking about the involuntary risk (Wilson, 1979)																			
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Data	B-01	<table border="1"> <thead> <tr> <th>Mother's age</th> <th>Chance of Down syndrome (proportions)</th> <th>Chance of Down syndrome (ratios)</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>1:1528</td> <td>6.5 out of 10,000</td> </tr> <tr> <td>25</td> <td>1:1351</td> <td>7.5 out of 10,000</td> </tr> <tr> <td>30</td> <td>1:909</td> <td>11 out of 10,000</td> </tr> <tr> <td>35</td> <td>1:384</td> <td>26 out of 10,000</td> </tr> <tr> <td>40</td> <td>1:112</td> <td>89 out of 10,000</td> </tr> <tr> <td>45</td> <td>1:28</td> <td>357 out of 10,000</td> </tr> </tbody> </table>	Mother's age	Chance of Down syndrome (proportions)	Chance of Down syndrome (ratios)	20	1:1528	6.5 out of 10,000	25	1:1351	7.5 out of 10,000	30	1:909	11 out of 10,000	35	1:384	26 out of 10,000	40	1:112	89 out of 10,000	45	1:28	357 out of 10,000	Chances of giving birth to a child with Down syndrome in proportions and in ratios for different maternal ages (Timmermans, 2005)
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	B-02	<table border="1"> <thead> <tr> <th></th> <th>Chance in percentages</th> <th>Chance in frequencies</th> </tr> </thead> <tbody> <tr> <td>Age-related chance on Down syndrome</td> <td>0.4%</td> <td>4 out of 1000</td> </tr> <tr> <td>Chance on a positive screening test if pregnant with a child with Down syndrome</td> <td>76%</td> <td>3 out of 4</td> </tr> <tr> <td>Chance on a positive screening test result</td> <td>20%</td> <td>200 out of 1000</td> </tr> <tr> <td>Chance on being pregnant with a child with Down syndrome when having a positive screening test result</td> <td>1.5%</td> <td>3 out of 200</td> </tr> </tbody> </table>		Chance in percentages	Chance in frequencies	Age-related chance on Down syndrome	0.4%	4 out of 1000	Chance on a positive screening test if pregnant with a child with Down syndrome	76%	3 out of 4	Chance on a positive screening test result	20%	200 out of 1000	Chance on being pregnant with a child with Down syndrome when having a positive screening test result	1.5%	3 out of 200	Chance on giving birth to a child with Down syndrome of a pregnant woman 38 years old and a positive screening test result (Timmermans, 2005)						
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Figure/ Table	C-01		The pie chart format shows the flu proportion of each season, it's also an easy way to help patients to compare different data.																					
	C-02		This bar chart of breast cancer shows the distribution of woman with breast cancer.																					

	C-03		The flow diagram (James and Stephen, 2008) can make viewer easily to understand the results of two different treatment options.
	C-04		This bar chart is designed to show the differences between 2 types of data, and is easy for viewers to compare the data, but not the overall relationship.
Image	D-01		Abstract image format
	D-02		Example of the risk formats (Timmermans, Molewijk, Stiggelbout & Kievit, 2004)
	D-03		The left picture shows a normal chance and the right picture shows an increased chance of being pregnant with a child with Down syndrome. (Timmermans, 2005)
	D-04		Treatment results of diabetes (Edwards, et. al, 2006)
	D-05		Paling Palettes (The Risk Communication Institute website, 2005)
	D-06		Successfully and not successfully cured of angina (Fagerlin A, Wang C, Ubel PA, 2005)

Composite	E-01		Community risk, words and numbers (Calman and Royston, 1997)
	E-02		The risk ladder (Andrew & Tony, 2008)
	E-03		The risk ladder (The Risk Communication Institute website, 2005)

4.2 Interview with the medical professionals

From the interviews, we can understand how doctors communicate with their patients and the use of communication tools. We note the summaries of the interviews below:

1. Oral/data format used mostly in Taiwan:

To avoid treatment debate, it is necessary to explain the patients' condition carefully. Doctors will explain the risks mostly in oral format before an operation and patients will be asked to sign a letter of consent to show their agreement. On the letter of consent, they may use words, statistics and tables to describe the operation risks.

“We use oral format mostly when we communicate with our patients”, said A1.

“Doctors will quote the statics from professional journal research to communicate risks with their patients and their families, and mostly in oral format”, said B1.

2. Graphical tools are useful, but not widely used in Taiwan:

During the medical treatment, visual images are used for health promotion, health education, patient management, and security management. Graphic tools could promote communication between doctors, doctor and patients, and patients. All interviewees agree that graphical communication tools can help patients understand medical information, some of them already have some graphical tools, but not used widely in Taiwan right now.

“At present, the hospital conducts the health education in multiple modes. During the disease management and the knowledge, the case manager also gives the patients some information based

on their requirements. The visual mode is frequently adopted. ", said C2.

3. How do graphical tools help now in Taiwan and in the future:

Currently, the hospital has selected diversified health education schemes to help the patients understanding their health conditions. The National Health Bureau has offered residents many preventative measures to help them understand their health conditions, and most hospitals only use these leaflets, pamphlets or posters to communicate with their patients. For disease management and understanding, the case manager also gives the patients some information based on their requirements, most case managers will adopt different tools to communicate with their patients, such as models, documents, tables and pictures. etc.

"The doctor-patient interaction is mainly conducted in verbal form, in most cases, the doctor can obtain plenty information from their communication. However, some visual tools are effective when communicating with the foreign brides. Therefore, we hope that some effective health education tools applicable to Taiwan can be develop", said C1.

5. Conclusion

With growing demands for risk information, there is an emerging need for health professionals to consider the importance of communicating risk information and identify effective methods for counseling patients and their families. Helping patients understand risks is a routine and critical responsibility for healthcare professionals. Patients' evaluation of performance and outcomes is strongly impacted by their feelings about their doctor's level of care and if they really understand their doctor's information.

Risk can also be communicated through the use of graphical elements and relatively little text to carry simple risk messages. In Taiwan, the numbers of foreign spouses increased, but only few of them can understand and read our languages. In order to make the dialogues between doctors and the foreign spouses easier, we should use the graphical tools to help their communication. Besides, there are more and more medical professions affirmed the usefulness of the graphical tools in Taiwan, but they still focused on the attractive outline design of posters, DMs or leaflets....Actually, graphical design could make complex data easy to understand, help the communication between doctors and patients, let patients understand their own health conditions and make appropriate medical decisions.

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References

- [1] Andrew S. & Tony A. (2008) Risk communication and anesthesia. The Royal College of Anesthetists (<http://www.rcoa.ac.uk/docs/section3-ifp.pdf>.2008/06/05)

- [2] Bryant, G.D. and Norman, G. R. (1980) Expressions of probability: words and numbers, *N. Engl. J. Med.* 302 p.411.
- [3] BVSDE(2007) : Communicating about Risks to Public Health: Pointers to Good Practice, (<http://www.bvsde.ops-oms.org/tutorial6/fulltext/pointers.pdf>,2008/06/05)
- [4] Calman KC, Royston GHD. Risk language and dialects. *Br Med J* 1997; 315: 939–942
- [5] Edwards, A., Thomas, R., Williams, R., Ellner, A. L., Brown, P., & Elwyn, G. (2006). Presenting risk information to people with diabetes: evaluating effects and preferences for different formats by a web-based randomised controlled trial. *Patient Education and Counseling*, 63, 336–349.
- [6] Fagerlin A, Wang C, Ubel PA(2005). Reducing the influence of anecdotal reasoning on people's health care decisions: is a picture worth a thousand statistics? *Med Decision Making*. 25:398–405.
- [7] Fortin, J. M., Hirota, L., Bond, B. E., Connor, A. M. and Col, N. F. (2001) Identifying patient preferences for communicating risk estimates: A descriptive pilot study, *BMC Medical Informatics and Decision Making* 1:2(<http://www.biomedcentral.com/1472-6947/1/2>)
- [8] Hinshaw, K, El-Bishry, G, Davison, S., Hildreth, A. J. and Cooper, A. (2006) Randomised controlled trial comparing three methods of presenting risk of Down's syndrome, *European Journal of Obstetrics & Gynecology and Reproductive Biology* (www.elsevier.com/locate/ejogrb 20/10/2006).
- [9] James G D, Stephen L (2008) Risk Communication Formats for Low Probability Events: an exploratory study of patient preferences. *BMC Medical Informatics and Decision Making* 2008, 8:14
- [10] Lai, C.W. (2007) Doctor-patient relationship and communication skills. Department of Health, Executive Yuan, R.O.C. Chi-Shan Hospital . (<http://www.chis.tpg.gov.tw/ftp/20060915023245.pdf>.2008/06/05)
- [11] Lipkus, I. M. and Hollands, J. G. (1999) The Visual Communication of Risk *Journal of the National Cancer Institute Monographs*, No. 25, 149-163
- [12] Lundgren, R. E., and A. H. McMakin. (1998), *Risk Communication: A Handbook for Communicating Environmental, Safety, and Health Risks*, Second Edition. Battelle Press, Columbus, Ohio.
- [13] Paling, J. (2006) Helping patients understand risks, The risk communication Institute.
- [14] Sevilla, C. (2002). *Information Design Desk Reference*. Menlo Park, CA: Crisp Learning.
- [15] The Risk Communication Institute (2005) : (<http://riskcomm.com/>,2008/06/05)
- [16] Timmermans, D. R. M, (2005) Prenatal screening and the communication and perception of risks, *International Congress Series*, 1279, pp. 234-243 (www.elsevier.com, 2008/06/05)
- [17] Timmermans, D. Molewijk, B. Stiggelbout, A. and Kievit, J. (2004), Different formats for communicating surgical risks to patients and the effect on choice of treatment, *Patient Education and counseling* 54, pp.255-263.
- [18] Wilson, R. (1979): "Analyzing the Daily Risks of Life" *Technology Review*, 81(4), 40-46.
- [19] Yamagishi, K. (1997) When a 12.86% mortality is more dangerous than 24.14%: implications for risk communication, *Appl. Cogn. Psychol.* Vol. 11 pp. 495-501