



ORIGINAL ARTICLE

# The Influence of Media Communication on Risk Perception and Behavior Related to Mad Cow Disease in South Korea

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Received: June 23, 2013

Revised: June 25, 2013

Accepted: June 25, 2013

**KEYWORDS:**

mad cow disease,  
media,  
media credibility,  
risk communication

**Abstract**

**Objectives:** The purpose of this study was to ascertain the influence of media communication on risk behavior related to mad cow disease (MCD).

**Methods:** Mothers of elementary school students in Seoul were recruited as the survey participants of this study.

**Results:** Media reports affected risk behavior related to MCD. Also, knowledge and attitude toward MCD affects risk behavior.

**Conclusion:** Risk-related information provided by the media should maintain consistency and objectivity. For effective risk communication, there should be an open communication between the government and public, experts, and related industries, who should all collaborate.

## 1. Introduction

Public health and safety have been threatened with recent incidents such as foreign substances in foods, outbreaks of mad cow disease (MCD), melamine, and H1N1 virus. These incidents have led to public distrust and insecurity about food safety. At the same time, these incidents provide an opportunity to bring food safety to the attention of the public. At the time of each food-related incident, media reports and the government's way of handling these incidents caused a negative effect on consumer awareness. The consumers began to question food safety [1]. When MCD started from imported United States (US) beef, one media report

escalated it to a mad cow panic. Myths about MCD spread through the Internet and news about it on television (TV) had a tremendous influence on adolescents. The general worry and fear among the public led to candlelight vigils, expressing distrust of the government and objection to the way the issue was being addressed. According to previous studies [2–5], negative reports by the media on food-related incidents had an adverse impact, which are far stronger than that generated by positive reports.

With an increasing number of food incidents and rise in public interest on the issue, there is a need for risk communication to serve the purpose of readily delivering accurate information to the public. Risk

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communication resolves the differences in knowledge between experts and myths spread by nonexperts by conveying to the public accurate information in a timely manner. Especially during national emergencies, the government must provide the public with accurate information to assure the public and to establish trust. To maximize risk communication, we must first analyze how the public obtains information and which media primarily influence their risk perception. After figuring out the information channels, the effective way to communicate can be decided to reduce risk amplification. In Korea, not only is there a lack of risk communication but no established public guidelines exist.

Most of the MCD studies that focus on risk perception and behavior were done overseas, usually in European countries. In Korea, analysis of MCD-related reports [6–9], study on media use experience related to MCD [10], and study on the perception of MCD as an illness [11] have been done. However, risk perception of and behavior toward MCD have not been explored previously. Therefore, we sought to investigate the factors that influence risk behavior on MCD to establish a framework for risk communication.

## 2. Materials and Methods

### 2.1. Survey sample and data collection

The survey participants for this research were mothers of the elementary school students in Seoul. We chose this group for our study because they are especially interested in their children's health and safety, they purchase and cook food, and supervise the overall dietary needs of their children. All the elementary schools in Seoul are divided into north (Kangbuk) and south regions (Kangnam). Taking into consideration the percentage of public and private schools, we made the final choice of participants using cluster-stratified sampling. The survey participants' school and class were chosen based on convenient sampling. The surveys were distributed and collected from December 7, 2009 to December 18, 2009. A total of 750 questionnaires were distributed and 675 (90% response rate) responses were received. From these 675 responses, 33 invalid responses were excluded and a total of 642 (95.1% of returned surveys) responses were included in the analysis.

### 2.2. Instruments

#### 2.2.1. Government credibility

Government credibility is the degree of trust that individuals have toward the government [12]. In this study, we determined the results using the five-item NES criteria [13]. The five items are: (1) "I believe that the current government policy is correct"; (2) "Government is working toward the public's benefit and not its own"; (3) "Government is properly managing the taxes"; (4)

"People who manage government are smart people who know that what they are doing"; and (5) "I think those who manage government are honest". These items were rated based on a five-point Likert scale: "strongly disagree"; "disagree"; "neither disagree nor agree"; "agree"; and "strongly agree". Credibility was high (Cronbach  $\alpha = 0.87$ ).

#### 2.2.2. Media credibility

Media credibility is an awareness and trust of different media depending upon each medium's characteristics such as media organization or reported content [14]. This study determines the results using Meyer's five-item criteria [15]: (1) trust; (2) accuracy; (3) fairness; (4) completeness; and (5) unbiased. For each of the three media (TV, Internet, and newspaper), five items based on a five-point Likert scale were used for measurement. Higher points equal high credibility (Cronbach  $\alpha$ ). Credibility was high with 0.89 for TV, 0.91 for newspaper, and 0.92 for Internet.

#### 2.2.3. Parent health locus of control

For measuring parent health locus of control (LOC), the parent health LOC scale developed by DeVellis [16] was used. Parent health LOC means that a parent has an influence on their children's health. To check the construct validity of parent health LOC, principal component analysis was performed. The analyzed results were divided into five items: (1) "I can do a lot to prevent my child from getting hurt"; (2) "I can do a lot to prevent my child from getting sick"; (3) "My child's safety depends on me"; (4) "I can do a lot to help my child stay well"; and (5) "I can do a lot to help my child to be strong and healthy". The parent health LOC is based on a five-point Likert scale. Higher points mean that the parent has a great effect on their children's health and credibility was high (Cronbach  $\alpha = 0.85$ ).

#### 2.2.4. Risk perception of MCD

Risk perception is measured by subjectively estimating the possibility of a certain risk or danger and the degree of interest that can arise from that danger [17]. In other words, risk perception is how people think about and consider a certain factor as being dangerous. This study used the five-item model of Slovic et al [18]: (1) newness; (2) involuntariness of risk; (3) dread; (4) severity of consequences; and (5) catastrophic for measurement, based on a five-point Likert scale. Higher points mean higher risk perception. Credibility was high (Cronbach  $\alpha = 0.82$ ).

#### 2.2.5. Knowledge of MCD

MCD is a transmissible neurodegenerative disease of cattle, and is a common name for transmissible spongiform encephalopathy or bovine spongiform encephalopathy. In this study, we attempt to provide an explanation for the cause of MCD and the route of

transmission by using a 10-item questionnaire. A total of 10 questions on a 3-point scale (“correct”, “incorrect”, and “do not know”) were administered to the participants: a “correct” answer was given 1 point, “incorrect” and questions answered with “do not know” were given 0 points. Points range from 0 to 10, and a higher score meant the participant had a better knowledge of MCD.

### 2.2.6. Involvement in MCD

Sherif and Cantril’s [19] description of “involvement” means an individual’s degree of perceived relevance or consequences [20,21]. This study will use the criteria of Cameron and Yang [22] to measure involvement. Involvement in MCD is composed of five items: (1) “MCD is an extremely serious problem for the Korean people”; (2) “MCD will have great impact on the country’s future”; (3) “MCD is extremely serious for me personally”; (4) “MCD will have great impact on my future”; and (5) “I am susceptible to MCD”. Involvement was measured on a five-point Likert scale and higher points mean higher involvement. Credibility was high (Cronbach  $\alpha = 0.87$ ).

### 2.2.7. Risk behavior

In this study, risk behavior means consumption behavior regarding beef. Consumption behavior means any human consumption behavior to fulfill personal urge. This study focuses on the decreased consumption of beef (Korean and all imported beef including Australian, New Zealand, Canadian, and US beef) and decreased consumption of imported US beef in the past year. Past year’s decreased beef consumption is the dependent variable in the average amount for the two items: decreased the number of dining out (beef) in the past year and decreased the consumption of beef in the past year. A five-point Likert scale was used for assessment. Higher points indicate a decreased consumption of beef.

## 3. Results

### 3.1. Socio-demographic characteristics

The respondents’ socio-psychological characteristics (age, education level, household income, and parent health LOC) and socio-political characteristics (political inclination and government credibility) were collected. In terms of age, 48.9% were <40 years and 50.8% were  $\geq 40$  years, showing similar distribution. As for education level, 78.2% of the participants had college education or higher and 21.8% had completed high school education or less. In terms of household income level, 44.2% had incomes of 3,000,000–5,000,000 won, 38.0% had incomes of  $\geq 5,000,000$  won, and 17.1% were from >3,000,000 won income families. The average of parent health LOC was  $3.53 \pm 0.63$ . For political inclination, 42.4% were neutral, which was the highest, followed by 24.8% favoring conservatism and 24.8% preferring the liberal view. The average for government credibility was  $2.27 \pm 0.62$  (Table 1).

### 3.2. Media experience related to MCD

After examining the media that dealt with MCD-related reports, TV had the highest audience of 76.4% among the participants, followed by the Internet with 16.4% and then newspaper with 7.2% attention. MCD-related media-viewing experience was examined. MBC’s current events program *PD Notes* episode entitled, *US Beef, Is it Safe from Mad Cow Disease?* was aired on April 28, 2008 and 63.4% responded that they watched this episode. In another research about the viewing experience of the video *Downer Cow* on the Internet, 91.0% responded that they watched this video clip. Responses indicated that TV enjoyed the highest credibility, followed by newspaper, and Internet. When the respondents were asked to evaluate the media on five parameters (trust, accuracy, fairness, completeness, and unbiased), TV scored the highest (Table 2).

### 3.3. Factors affecting beef consumption

To analyze the reasons for the decreased beef consumption in the past year, hierarchical multiple regression analysis was used. Decreased beef consumption in the past year is the dependent variable in the average amount for the two items, which acted as the index variable. As independent variables, socio-demographic characteristics, media use, and knowledge and attitude toward MCD were considered.

In Model 1 of regression analysis using socio-demographic characteristics as the only independent variable, the results showed that education level, parent

**Table 1.** Socio-demographic characteristics of the participants ( $N = 642$ )

Item	N (%)
Socio-psychological characteristics	
Age (y)	
<40	314 (48.9)
$\geq 40$	326 (50.8)
No response	2 (0.3)
Education level	
High school or less	140 (21.8)
College or higher	502 (78.2)
Household income (won)	
<3,000,000	110 (17.1)
3,000,000 – 5,000,000	284 (44.2)
$\geq 5,000,000$	244 (38.0)
No response	4 (0.6)
Parent health LOC (mean $\pm$ SD)	$3.53 \pm 0.63$
Socio-political characteristics	
Political inclination	
Conservative	159 (24.8)
Neutral	272 (42.4)
Liberal	118 (18.4)
Don’t know	92 (14.3)
No response	1 (0.2)
Government credibility (mean $\pm$ SD)	$2.27 \pm 0.62$

LOC = locus of control; SD = standard deviation.

**Table 2.** Media experience related to mad cow disease\* (N = 641)

Item	N (%)
Media experience	488 (76.4)
TV	
Internet	105 (16.4)
Newspaper	46 (7.2)
MBC's <i>PD Notes</i> <sup>†</sup>	
Yes	407 (63.4)
No	235 (36.6)
<i>Downer Cow</i> <sup>‡</sup>	
Yes	583 (91.0)
No	58 (9.0)

\*No responses were exclude; <sup>†</sup>The viewing experience of April 28, 2008's episode of *PD Notes* entitled '*US Beef, Is it Safe?*'; <sup>‡</sup>The viewing experience of downer cow on TV or the Internet.

health LOC, and political inclination of 1 (conservative = 1) had a significant effect. People with high school and lower education decreased beef consumption significantly compared to people with college education or higher. Those who think that they had an influence on their children's health and people with neutral or liberal political inclination decreased beef consumption compared to people with conservative political inclination. In Model 2, the media-use variables were added to the regression model and the final calculation increased by 0.054. From the variables that were significant from Model 1, the effect of education level remained the same whereas the effect of parent health LOC and political inclination of 1 disappeared. Age and government credibility were not significant in Model 1 but showed significance in Model 2. The older population tended to report decreased beef consumption in the past year. Those with low credibility of government decreased the consumption of beef in the past year. From the additional variables that were added, media 1, *Downer Cow* viewing experience, TV credibility, and Internet credibility were also statistically significant. The people who answered the Internet and newspaper as their choice of media compared to the people who responded with TV, the people who watched the *Downer Cow* UCC compared to those who did not, and those who had higher credibility for TV and the Internet decreased beef consumption in the past year. In the final model, variables for knowledge and attitude toward MCD were added and the final figures increased by 0.075. Among the variables from Model 2, education level and TV credibility maintained significance but the effect of age, government credibility, media 1, *downer cow* UCC, and Internet credibility disappeared. From the additional variables that were added, involvement in MCD and risk perception of MCD were shown to be statistically significant. The higher the involvement in MCD and higher the risk perception of MCD, beef consumption decreased in the past year (Table 3).

Overall, those with high school education or less compared to college education or higher, those with higher TV credibility, those with higher involvement in MCD, and those with higher risk perception of MCD consumed less beef in the past year. In this analysis, the variables that were used as independent variables explained the dependent variable by 19.2%. When examining the final figures, the variables for knowledge and attitude toward MCD explained the most with 7.5% meaning that these variables explained the dependent variable relatively more than other variables.

#### 4. Discussion

We found that socio-political characteristics affected risk behavior of the respondents. This agrees with the result that government credibility, political inclination, and political characteristics affect risk perception [11,23–25]. When the decreased beef consumption and

**Table 3.** Results of hierarchical multiple regression analyses toward beef consumption

Item	Model 1 β	Model 2 β	Model 3 β
Socio-psychological characteristics			
Age	0.05	0.08*	0.07
Education level (College and higher = 1)	-0.15 <sup>‡</sup>	-0.13 <sup>†</sup>	-0.13 <sup>†</sup>
Household income (≥5,000,000 won = 1)	-0.07	-0.06	-0.06
Parent health LOC	0.08*	0.04	0.01
Socio-political characteristics			
Political inclination 1 (Conservative = 1)	-0.12*	-0.09	-0.06
Political inclination 2 (Neutral = 1)	-0.00	-0.01	-0.02
Government credibility	-0.07	-0.11 <sup>†</sup>	-0.05
Media use			
Media 1 (TV = 1)		-0.11*	-0.08
Media 2 (Newspaper = 1)		-0.05	-0.03
<i>Downer Cow</i> UCC (Yes = 1)		0.09*	0.07
TV credibility		0.15 <sup>†</sup>	0.12*
Internet credibility		0.11*	0.06
Newspaper credibility		0.01	0.01
Knowledge and attitude			
Knowledge of MCD			-0.06
Involvement in MCD			0.18 <sup>‡</sup>
Risk perception of MCD			0.12*
R <sup>2</sup>	0.06	0.12	0.19
R <sup>2</sup> change	—	0.05	0.08
F	5.93 <sup>‡</sup>	6.27 <sup>‡</sup>	9.10 <sup>‡</sup>

\* $p < 0.05$ . <sup>†</sup> $p < 0.01$ . <sup>‡</sup> $p < 0.001$ . LOC = locus of control; MCD = mad cow disease; UCC = user created contents.

decreased consumption of imported US beef were compared, in the case of US beef, socio-political characteristics and media use experience had an impact. Second, results of this study showed that media affect risk behavior. This corresponds with the existing research that shows effect on risk behavior of media reports [3,26,27]. Third, knowledge and attitude of MCD also influences risk behavior. The higher the knowledge of MCD, the less likely people were to decrease consumption of imported US beef. This suggests that having proper knowledge would reduce excessive fear or worry and have a less negative image on US beef. But, our analysis results show that knowledge of MCD was very low overall. Therefore, scientific and objective facts must be delivered so that people get access to accurate information. As people thought that MCD affects our society and selves, people decreased consumption of US beef, which suggests that people who are more involved in MCD are more sensitive about MCD and have negative thoughts toward the government. Also, the research result agrees with prior studies showing that with higher risk perception consumption of US beef was lower [28–30]. Therefore, to bring change in behavior, the knowledge and attitude of individuals must be understood and scientific and accurate information should be provided to help them develop a right attitude.

There are few findings of this research. First is the importance of the media's effect on providing health-related information. The media's primary role is to provide the information to the public. At the time of the MCD incident, one current events program's report affected the public's perception and behavior greatly. Therefore, media should act with responsibility, report the truth, and keep their reports objective and fair. Also, rather than reporting a one-sided story, they should consider delivering a balanced report taking into account many viewpoints. To accomplish this objective, the media should have in place a system or a verification process to filter through incomplete truth and distorted facts.

Second, in the case of the MCD incident, we found out that socio-political factors such as political inclination and government credibility greatly affected the situation. Therefore, when implementing a governmental policy, all information should be accurately and quickly communicated to the public through a clear process. Also, in the case of potential emergency, the government should disseminate information on preparation plans to the public to build credibility. Maintaining visibility during disaster management, encouraging the public's surveillance and participation, and providing more participation for the public in its efforts will increase government credibility [31].

Third, we found out through the MCD incident that effective communication to the public is crucial. When the beef imports from the US resumed, there was a lack

of public agreement and open communication. Also, despite the differences in risk perception between experts and the public, it was not even considered necessary to get public consensus. Risk communication is a way to settle the differences between experts and the public by providing accurate and quick communication and highlighting countermeasures to offset anxiety. In other countries, such guidelines for risk communication have already been developed [32–38]. For effective risk communication during a health emergency, there should be open communication between the government and public, experts, and related industries. Also, risk communication should not be managed by one single institution but should be done in collaboration with media, health experts, government, and related industries. A health expert must deliver accurate, scientific, and trustworthy information. The government management must analyze the public's level of risk perception and know what kind of information the public wants and should deliver this information through appropriate media. Depending on each situation, the media must create effective messages, maintaining objectivity and fairness. Moreover, the media should provide accurate and consistent information to address fear of the public. If this system is established, effective measures can be undertaken in future emergencies.

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