심포지엄 2) 한국에서 석면의 과거, 현재 그리고 미래: 위험성 정보 교환의 관점에서

The Past, Present and Future of Asbestos in Korea: Aspects of Risk Communication

Kangyoon Kim
INNOENVI Expert Community Co. Ltd.

1. INTRODUCTION

Asbestos has recently been one of big public health issues in many countries. Risk communication plays an important role in risk assessment for asbestos.

The National Research Council(NRC) defines risk communication as "an interactive process of exchange of information and opinion among individuals, groups, and institutions." The definition includes "discussion about risk types and levels and about methods for managing risks." Specifically, this process is defined by levels of involvement in decisions, actions, or policies aimed at managing or controlling health or environmental risks.

Risk communication(RC) is a complex, multidisciplinary, multidimensional, and evolving process of increasing importance in protecting the public's health. Public health officials use RC to give citizens necessary and appropriate information and to involve them in making decisions that affect them - such as where to build waste disposal facilities.

In its most familiar form, RC is associated with dialogue in environmental health decision-making about such community issues as air pollution, hazardous waste sites, lead, pesticides, drinking water, and asbestos. Risk communication can also help promote changes in individual behavior such as in informing homeowners about the need to check for indoor radon or lead-based paint. Actually, many people is overcome with a nameless fear for asbestos at schools, public places such as subway or asbestos presumed mines, because of mass media.

In this study, Korean research and surveys about asbestos performed until now was thoroughly reviewed. Furthermore, risk communication for asbestos was discussed, based on other countries's experiences and strategies, to establish the future strategy for Korean workers and public to perceive appropriate information about asbestos.

2. METHODS

This study was performed to be based on literature reviews as follows.

1) Asbestos-related studies in Korea
2) Risk communication for workers and public
3) Strategy of risk communication
4) Benchmarking for asbestos risk communication

3. RESULTS & DISCUSSIONS

Asbestos is a group of minerals with long, thin fibrous crystals. The word "asbestos" is derived from a Greek adjective meaning inextinguishable. The Greeks termed asbestos the "miracle mineral" because of its soft and pliant properties, as well as its ability to withstand heat.

Asbestos became increasingly popular among manufacturers and builders in the late 19th century due to its resistance to heat, electricity and chemical damage, its sound absorption and tensile

strength. When asbestos is used for its resistance to fire or heat, the fibers are often mixed with cement or woven into fabric or mats. Asbestos is used in brake shoes and gaskets for its heat resistance, and in the past was used on electric oven and hotplate wiring for its electrical insulation at elevated temperature, and in buildings for its flame-retardant and insulating properties, tensile strength, flexibility, and resistance to chemicals.

The inhalation of asbestos fibers can cause serious illnesses, including mesothelioma and asbestosis. Since the mid 1980s, many uses of asbestos are banned in many countries.

3.1 Health effects of asbestos in Korea

Major health problems associated with asbestos exposure are: 1) Lung cancer, 2) Asbestosis (a noncancerous lung disease), 3) Mesothelioma (a cancer of the chest and abdominal lining).

Some medical studies have suggested that exposure to asbestos is also responsible for some cancers of internal organs including esophagus, larynx, oral cavity, stomach, colon and kidney.

Table 1. Fatal occupational asbestos disease form Jan. 2000 to Aug. 2006 in Korea.

Year	Total	'00	'01	'02	'03	'04	'05	'06. 8
Total	43 (100%)	4	2	3	14	4	10	6
Occupational disease	7 (16%)	-	-	1	2	1	2	1
Death	36 (84%)	4	2	2	12	3	8	5

3.3.1 Asbestos-related studies in Korea

① Paik NW & Lee YH (1991): Characterization of Worker Exposure to Airborne Asbestos in Asbestos Industry

Industry	No. of sample	Asbestos concentration(f/cc)	
		GM	Range
Textile industry	16	3.11	0.10-17.30
Brake-lining manufacturing industry	18	0.68	0.08-3.08
Slate manufacturing industry	58	0.52	0.04-4.75
Automobile maintenance shop	51	0.27	0.01-7.28

② Oh SM et al.(1993): AStudy on Worker Exposure Level and Variation to Asbestos in Some Asbestos Industries

Type of Industry	No. of Samples	No. of Workers					
		< 50		50 ≤		Total	
		GM(GSD) f/cc	Range f/cc	GM(GSD) f/cc	Range f/cc	GM(GSD) f/cc	Range f/cc
Textile	40	1.60(1.63)	0.15-6.10	0.30(2.63)	0.07-1.55	1.42(1.89)	0.07-6.10
Brake Lining Manufacturing	122	0.22(4.13)	0.08-2.42	0.18(2.36)	<0.01-2.67	0.19(3.07)	<2.67
Slate	11	-	-	0.08(2.75)	0.02-0.67	0.08(2.75)	0.02-0.67

③ Choi CG et al.(2002): Exposure Level of Releasing Asbestos during Building Destruction Work

Type of sampling	Jobs	No. of samples	Airborne asbestos concentration(f/cc)			No. of over NIOSH REL (%)
			GM	GSD	Range	
Personal air sampling	Preparation	6	0.048	2.114	0.027-0.166	1(16.7)
	Roof removal	23	0.047	1.658	0.018-0.117	1(4.4)
	Destruction	9	0.067	3.169	0.014-0.419	3(33.3)
	Sub-work	8	0.055	2.045	0.015-0.132	2(25.0)
	Driver	6	0.069	2.359	0.030-0.368	1(16.7)
Area sampling	Parking office	8	0.033	3.713	0.002-0.131	1(12.5)
	Institute	19	0.052	2.151	0.007-0.161	4(21.1)
Total		79	0.053	2.458	0.002-0.419	13(16.5)

④ Non-occupational asbestos-related studies

Authors(year)	Method	Results(f/cc)	Sampling sites
Yoo & Kim (1989)	PCM	Indoor 0.002	Central City of Seoul (Choongmu-ro, Cheonggyecheon, namgajwadong, Banpo, Sungsu)
Yu(1993)	PLM, XRD, SEM/EDXA	Indoor 0.001-0.0084	Sprayed on ceiling or wall for soundproofing/fireproofing
Moon & Kim (1994)	PCM	Parking lot of underground 0.0208	8 parking lots
Kim(1995)	PCM	Parking lot of underground 0.0063-0.0068	20 parking lots
Yu & Kim (1996)	TEM/EDX	Parking lot 0.0048 Indoor 0.0040 Outdoor 0.0018	14 buildings with friable surfacing materials.
Seoul City & MOL(2001)		Area 0.0018 Personal 0.0078	9 Seoul subway stations, 8 Seoul subway stations & 6 Busan subway stations
Yoo(2002)	TEM/EDX	Airborne 0.0038 Maintenance work (asbestos removal) 0.0056 Maintenance work (equipment installing) 0.0031	10 Seoul subway stations
Kim(2003)	TEM	Building with asbestos 0.0044 Building without asbestos 0.0057	20 public buildings

3.2 Risk communication for workers and public

Risk communication is a relatively new field. In the mid-1980s, RC became recognized as a necessary component in risk management and community decision-making in environmental and occupational health as the Nation faced mounting concern over toxic wastes, nuclear power plants, and hazardous materials. Since the first national conference on risk communication in 1986, the RC field has matured and gained greater interest and attention among agencies, policy-makers, the media, and the public.

Risk communication has grown out of the work in methods for estimating risk to humans exposed to toxicants and in research directed to how individuals perceive risk. In 1983 the NRC's Risk Assessment in the Federal Government: Managing the process provided the framework for improving risk assessment. In 1986, the U.S. Environmental Protection Agency(EPA) established its guidelines for carcinogen risk assessment, the first Federal agency to do so. Three years later the NRC published improving risk communication, describing the basis for successful risk communication.

3.3 Strategy of risk communication

3.3.1 Principles of Risk Communication(Covello & Allen, 1988)

There are seven cardinal rules for the practice of risk communication, as first expressed by the U.S. Environmental Protection Agency and several of the field's founders:

- Accept and involve the public as a legitimate partner.
- Plan carefully and evaluate your efforts.
- Listen to the public's specific concerns.
- Be honest, frank, and open.
- Coordinate and collaborate with other credible sources.
- Meet the needs of the media.
- Speak clearly and with compassion.

3.3.2 Factors Influencing Risk Perception(Lum & Thinker, 1994)

People's perceptions of the magnitude of risk are influenced by factors other than numerical data. Risks perceived to ... are more accepted than risks perceived to ...

- Be voluntary/Be imposed
- Be under an individual's control/Be controlled by others
- Have clear benefits/Have little or no benefit
- Be fairly distributed/Be unfairly distributed
- Be natural/Be manmade
- Be statistical/Be catastrophic
- Be generated by a trusted source/Be generated by an untrusted source
- Be familiar/Be exotic
- Affect adults/Affect children

3.3.3 Communicating With the Public: 10 Questions To Ask

- Why are we communicating?
- Who is our audience?
- What do our audiences want to know?
- What do we want to get across?
- How will we communicate?

· How will we listen?
· How will we respond?
· Who will carry out the plans? When?
· What problems or barriers have we planned for?
· Have we succeeded?

3.4 Benchmarking for asbestos risk communication(Case Study)

Accidental Exposure to Asbestos at a Nursery School was the title of the paper presented by Dr. Iwao Uchiyama, from Kyoto University.

The exposure of infants and young children to sprayed asbestos which took place at Nursery School "S" in Bunkyo City, Tokyo in 1999 occurred during renovation work. Three months before work began, parents were told that "asbestos was not used in this nursery school;" unfortunately, this turned out not to be the case and within days of work beginning, they were told that although the presence of sprayed asbestos on the school ceilings had been confirmed, this material had not been touched by the building work. This was also not true. The constant misinformation fed to parents increased their distrust of the authorities and escalated the situation.

The parents requested that air measurements be taken and two weeks after work began the indoor level of asbestos was 0.65f/l or, as the authorities said, the same level as that along the highway. Throughout this period the authorities continued to deny the need to remove all the asbestos from the school; one month after work began, they admitted that this removal work was necessary. By this time, the administration had lost the trust of the parents. The parents mobilized and a School's Asbestos Health Committee which included parents, representatives of the local authority, a doctor and a member of a trusted NGO, was set up by the City Government. All the committee meetings were open to the public; an interim report was available and feed-back from the public was incorporated into the final report which proposed that the health of all the exposed children be followed up throughout their lifetimes. Lessons to be learned from this affair include the need to make accurate information available promptly to all concerned and the importance of appointing a specialist risk communicator.

4. CONCLUSIONS

Effective risk communication requires recognition by policy makers that there are risk perception implications in what they do, that communication is not just what they say and how they say it. Setting a threshold for acceptable exposure to a pollutant, allowing or disallowing a product or process, requiring or not requiring labeling -indeed all risk management decisions- have risk communication meaning and impact. At the most senior level, government agencies must consider the risk perception and communication implications of their actions as policy choices are being made. Risk communication must be thought of as more than just press releases, news conferences, and public service campaigns. It is substance, not just spin.

Some call this pandering to irrationality and emotion, and suggest instead that a benevolent technocracy should be empowered to manage societal risk in order to ensure intelligent, rational and effective policies. But this fails to recognize the sensitive and pivotal issues of trust and control. Even the most benevolent process, if removed from the input of citizen values, will feel like one over which the public has too little control, and will not likely be trusted.

The policies of such a process are more likely to provoke resistance than support. Further, the

very idea of such a rationality-based technocracy fails to accept that risk perception is at least as much an affective and intuitive process as it is analytical, and that fear itself, either too much or not enough, is a significant risk that also must be factored into decisions about public and environmental protection.

Risk communication, informed by the insights of risk perception, is a powerful yet neglected tool in helping people make more informed and ultimately healthier choices for themselves. More informed individual decision making will in turn free the leaders of social institutions to make reasoned risk management choices that will maximize public and environmental health with the most efficient use of limited resources.

REFERENCES

Choi, C.G., C.N. Kim, N.G. Lim, Y.-M. Roh, and J. Roh (2002) Exposure level to releasing asbestos during building destruction work, J Kor Soc Occup Environ Hyg, 12(3), 195-201.

Covello, V.T. and F.H. Allen. Seven Cardinal Rules of Risk Communication. U.S. Environmental Protection Agency, Washington, DC, April 1988, OPA-87-020.

Lum, MR, T.L. Tinker (1981) A Primer on Health Risk Communication Principles and Practices. Washington, DC: U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. 1994. Adapted from Acceptable Risk by Baruch Fischoff, Sarah Lichtenstein, Paul Slovic, Stephen Derby, and Ralph Keeney. New York: Cambridge University Press.

Oh, S.M., Y.C. Shin, D.Y. Park, D.U. Park, and K.C. Chung (1993) A study on worker exposure level and variation to asbestos in some asbestos industries, Kor. Ind. Hyg. Assoc. J., 3(1), 100-109.

Paik, N.W. and Y.H. Lee (1991) Characterization of worker exposure to airborne asbestos in asbestos industry, Kor. Ind. Hyg. Assoc. J., 1(2), 144-153.