EVIDENCE BASED PUBLIC HEALTH POLICY AND PRACTICE

Participative risk communication in an industrial village in Sardinia

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J Epidemiol Community Health 2007;61:122–127. doi: 10.1136/jech.2005.043513

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Accepted 13 June 2006

Objective: In Italy the law on industrial risk has emphasised the necessity of building a local information process to answer people's questions on safety and provide greater community participation in risk management. The aim of this research is to analyse the local population's ideas and expectations of a participatory approach in risk management in order to design a risk communication programme based on health promotion principles.

Design, setting and participants: The study was carry out in Portoscuso (Italy), an industrial district. A questionnaire was administrated through home interviews to 147 citizens.

Main results: Six risk management styles were identified on the basis of citizens' trust in the different stakeholders. Additional parameters (importance of information, organisations they would trust to get information on industrial risks, preferred risk communication methodologies) were analysed according to the management styles.

Conclusions: On the basis of these elements, a multi-approach strategy could be proposed. Each management style can have different roles. A programme of public forums could involve citizens with an interactive approach, interactive courses could involve citizens with a semi-participative approach, and leaflets and booklets could inform citizens oriented towards unidirectional communication. The participative process should always be open to new contributions from citizens who are not directly involved, and should allow for flexibility in the form and nature of partnership, as well as the details of implementation.

Industrial settlements represent, particularly in deprived regions, a main source of employment and economic development, and therefore working people and their families are often inclined to defend them. At the same time residents are often concerned with the risks to health and environment linked to these settlements, and this often generates strong conflicts within the population and with the agencies charged with health and environmental protection. A series of potentially catastrophic errors and accidents since the 1950s provided the public with the signal that technology is "out of control" (for example, Seveso in 1976 and Chernobyl in 1986).¹

In Italy the directive known as Directive Seveso (Directive 82/501/EEC) has emphasised the necessity of building a local information process to answer people's questions on safety and health care and provide greater community participation in risk management. According to the law, workers and citizens, exposed to industrial risk, have to be informed about risk exposure and the behaviour to adopt to avoid industrial accidents.² In spite of this, community involvement was low, and this does not facilitate mutual trust among citizens, public agencies and industry. A crucial role is played by the government: according to the Italian Constitution, the responsibility for health and environmental protection is shared among national, regional and local government, with the state mainly responsible for defining rules and the region for organising actions. Both the state and the region have at their disposal technical boards, such as the National Institute for Health, and Local Health Agencies. The mayor is the local authority for health.³

In order to involve citizens it is necessary to consider their risk perception. Slovic, Sjöberg and others identified several factors that influence people's risk perception. Some factors are strongly related to psychological, cultural and social elements such as personal knowledge, control, voluntariness and trust.^{4–6}

The Cultural Theory, described in 1978 by Mary Douglas as an instrument for comparing the morphology of societies, aims to explain how people perceive and interact within the world around them.⁷ The cultural and social determinants are defined as perceptual filters by Douglas and Wildavsky in their Cultural Theory that specifies four types of people: egalitarian, individualistic, hierarchic, and fatalistic. From this general enunciation, Thompson defined the concept of "way of life" as a combination of social relation and cultural bias.⁸ A number of ways of life are described, on the basis of lifestyles, interpersonal and social relations, interaction with the physical environment, vision and the importance of social rules. These aspects influence people's risk perception, their attitude towards nature, and consequently their behaviour.⁹

In this paper we consider Portoscuso, an important industrial district located along the southwest coast of Sardinia, situated very closely to houses (about 2 km) and active in the chemical, electrochemical, fusion and rolling, and thermoelectric fields responsible for a number of different emissions in the environment. With Decree of the President of the Council of Ministers (DPCM; 23.04.1993), Portoscuso was included in the 15 areas throughout the country declared by the Italian Ministry of the Environment as at "high risk of environmental crisis".¹⁰ Many environmental and epidemiological studies, including health status screening, were performed in this area because of the growing concerns of citizens and the local health service about the health risks associated with the industrial development.^{11–13}

These studies never generated effective risk communication processes involving people in decision making. A traditionally paternalistic approach was used as a risk communication model, and community participation was never considered as a main component of risk management.

This research aims to analyse population ideas and expectations towards a participatory approach in risk management, in

Table 1 Characteristics of the studied sample

	Male		Female	
	n	%	n	%
Sample (18–70 years)	69	47	78	53
Average age	43		45	
Marital status				
Single		32		23
Married/partner		63		68
Divorced/Widow(er)		5		9
Education level				
Compulsory education or less		56		51
High school or more		44		49
Job				
Housewife				46
Worker		40		4
Administrative employee		16		25
Student		6		8
Trader		7		4
Entrepreneur		12		
Retired		19		5
Unemployed				8

order to design a programme based on health promotion principles. Health promotion is the process of enabling people to increase control over, and to improve, their health. At the heart of this process is the empowerment of communities, giving them ownership and control of their own endeavours and destinies to enable people to take control of those things which determine their health.^{14 15}

Health promotion is not just the responsibility of the health sector.¹⁴ According to Rifkin all stakeholders in the industrial area should be involved in a social process, actively pursuing identification of their needs, taking decisions and establishing mechanisms to meet these needs.¹⁶

Participatory decision-making approaches have also been suggested as a means of designing, selecting and implementing policy alternatives that are more likely to be widely accepted by a variety of interested and affected parties.¹⁷ Public participation should therefore become an integral component of the decision-making process regarding industrial or technological risks. Despite a growing literature on community participation many questions about implementation and success indicators remain unresolved, including the range and types of participation existing within a specific population. Very few attempts have been made to examine the prevalence of participation and to describe the patterns of participation across a population.^{18 19}

The present article explores lay people's confidence in public and private agencies (local authorities, ecology groups (green), territorial technical services, trade unions, industry, experts, citizens) involved in industrial risk management, and suggests a methodological approach to classify people's attitudes towards participation in risk management. These attitudes are analysed according to age, gender, and educational level. Possible associations with communication channels are also described.

MATERIALS AND METHODS

The survey was carried out in 2002 in Portoscuso, a small rural village with 5392 inhabitants (2674 men, 2718 women), far from the main urban areas.

The sample consisted of 206 citizens aged between 18 and 70 (out of a total of 4099 inhabitants aged between 18 and 70; 2068 men and 2031 women), selected through a systematic random procedure by sex and age from the municipal register of Portoscuso. (Even though they were enrolled in the

municipal register, 30 subjects from the sample did not actually live in the town, and were therefore excluded from the survey.)

The selected citizens (176 people) were informed about survey aims and methods through a letter signed by both the University and the Mayor of Portoscuso. Each potential respondent was later contacted by phone: 11.9% were not traced; 19.9% did not agree to participate (45.8% not interested, 31.4% lack of time, 11.4% distrust in the survey usefulness, 11.4% personal problems not related with the research).

Those who refused to participate in the survey were substituted by the person immediately following in the register list, sorted by gender and age. In 50% of the cases even the substitute was not traced or refused to participate in the survey. Overall, 147 citizens (85.1% of the sample) agreed to the survey.

The questionnaire was administrated through home interviews, by prior appointment; during the interview the researcher helped interviewees to understand the issues. Answers were later stored anonymously. The interviews were carried on by university researchers, fully involved in all phases of survey planning and implementation, in order to guarantee homogeneity.

A questionnaire including 19 questions was used. The questionnaire was analogous to the one used by our Department in the same area in 1998, developed according to a methodology tested and validated in similar surveys.²⁰ The questionnaire included a section concerning social and demographic data (age, gender, education level, employment) (table 1).

In this paper only the questions about risk management, information sources, communication tools, and importance of information are analysed.

A number of "risk management styles" were identified on the basis of the answer to the question "To what extent would you trust the following organizations with management of risks arising from industrial activities?" Six organisations were listed: lay people, green, trade unions, experts, health service, industry. The possible answers were "high", "low", "nothing" (no trust), "I do not know". For the analysis the answers "low", "nothing", "I do not know" were considered jointly as low.

For the analysis lay people are considered alone, green and trade unions are grouped in the category "NGO" (non-governmental organisation), local health services, industry, experts in the category "professionals".

The power balance in decision making among these three categories (professionals, NGOs and lay people) was always considered the crucial challenge of health promotion and represented the basis for the main participation ladders.^{21 22} Green and trade unions are the only NGOs active in the local context. Green have played an important role in the action for environment protection, and trade unions were involved in the defence of the employment conditions. NGOs can consist of community members to improve their own situation, but also by outsiders who are trying to serve people's interests. Often NGO members have professional skills and sometimes a full-time involvement in their organisation, playing an intermediary role between the people and the professionals.²³

The "risk management styles" were identified on the basis of citizens' high trust or low trust in the three main categories.

NGOs are accredited with high trust if green *or* trade unions are accredited with high, with low trust if both green *and* trade unions are accredited with low.

Professionals are accredited with high trust if local health services *or* industry *or* experts are accredited with high, with low trust if local health services *and* industry *and* experts are all accredited with low.

Table 2 Risk management styles according to gender, educational level and age class

	FPM	SPM P-Lay	SPM-NGO	PDM	SMM	NTM	p Value
n (%)	49 (33%)	15 (10%)	29 (20%)	29 (20%)	15 (10%)	10 (7%)	
Gender							
Male	30%	12%	19%	26%	9%	4%	0.45
Female	36%	9%	21%	14%	11%	9%	
Age class							
18–30	26%	6%	21%	29%	9%	9%	0.86
31–50	36%	9%	20%	20%	9%	6%	
51–70	34%	14%	19%	14%	12%	7%	
Education level							
Low	35%	11%	18%	18%	8%	10%	0.41
High	31%	9%	22%	22%	13%	3%	

The groups were formed as described in the dendrogram of figure 1:

- Citizens who declare high trust in lay people, NGOs and professionals form Full Participative Management (FPM);
- Citizens who declare high trust in lay people and NGOs, but low trust in professionals form Self Mobilization Management Lay & NGO (SMM-Lay & NGO);
- Citizens who declare high trust in lay people and professionals, but low trust in NGOs form Semi Participative Management Professional Lay (SPM-Lay);
- Citizens who declare high trust in lay people but low trust in NGOs and professionals form Self Mobilization Management Lay (SMM-Lay);
- Citizens who declare low trust in lay people, but high trust in NGOs and professionals form Semi Participative Management Professional-NGO (SPM-NGO);
- Citizens who declare low trust in lay people, high trust in NGOs, and low trust in professionals form Self Mobilization Management NGO (SMM-NGO);
- Citizens who declare low trust in lay people and NGOs, but high trust in professionals form Professional Delegate Management (PDM);
- Citizens who declare low trust in lay people, NGOs and professionals form No Trust Management (NTM).

The groups SMM Lay & NGO, SMM Lay, SMM NGO declare low trust in professional and high trust in lay people and/or NGOs. Because of this similarity and of the small number of responders they were grouped in one style defined as SMM. These management styles fit with the Cultural Theory groups cited in the introduction.

The FPM and SPM-Lay groups are related to the Egalitarian group, which includes people who fear anything that may increase social inequalities. They stretch to being sceptical

towards experts' knowledge because of the suspicion that expert might misuse their authority. Egalitarians see nature as fragile and vulnerable to human actions. They believe everyone must be involved in decisions and risk management and assert that risk management "should be a consensual activity".⁹

The PDM are connected with the Hierarchist group, who emphasise "the natural order" of society and have high trust in experts' knowledge and in institutions and government. In their vision nature is self-preserving until a point beyond which there are dramatic consequences. They accept risk above all if the decisions are justified by the government and experts and think that lay public is not able to participate in risk management process. The SPM-NGO group is also linked with the hierarchism approach but also include green among experts.

The SMM (Lay & NGO, Lay, NGO) can be related to Individualists who fear all things that can limit their freedom. Politically they support liberalism, do not like impositions from government or higher authorities, but they want to be free to decide as they will. Risks are opportunities to take advantage of as long as they do not limit their freedom. They assert that people are self-governing.

The NTM are related to the Fatalist group. The fatalists are marginally involved in social life, and quite indifferent about social risks (which are assumed to be unavoidable), they do not trust in personal autonomy and there is no possibility to do anything. "They accept risk as given".

The management styles are described according to gender, educational level, and age class.

An additional series of questions analyses, according to the risk management styles, the attitudes of citizens towards specific risk communication tools and the importance of receiving information about industrial risk.

1. Whom would you address, from organisations on the list, to obtain information on risk arising from industrial causes, and to what extent for each of them? (General practitioner

Figure 1 Identification process of the management styles.

Table 3 Approval rating for information source on industrial risk according to the management style

	Management style						p Value
	FPM	SPM-Lay	SPM-NGO	PDM	SMM	NTM	
Number	49	15	29	29	15	10	
Information source							
GP	67%	53%	66%	55%	53%	30%	0.25
Teachers	27%	0%	28%	14%	7%	0%	0.04
Experts	88%	80%	93%	93%	47%	30%	<0.005
Green	84%	27%	72%	38%	47%	20%	<0.005
Journalists	24%	13%	21%	3%	13%	0%	0.12
Political parties, trade unions	10%	7%	10%	0%	0%	0%	0.32
Industry workers	78%	67%	76%	31%	47%	40%	<0.005
Citizens' association	76%	47%	38%	17%	60%	0%	<0.005
Industrialists	10%	0%	17%	3%	7%	0%	0.25
Local government	43%	13%	52%	45%	13%	0%	<0.005
Health services	67%	53%	76%	66%	27%	0%	<0.005

(GP), teacher, expert, green, journalist, political party and trade unions, industry workers, citizens' association, industrialists, local government, local health service. Possible answers: high, low, nothing, I do not know for each one.)

2. To what extent in your opinion is giving information to local citizens an effective action for risk reduction? (Possible answers: high, low, nothing, I do not know.)

3. In which way would you prefer to obtain information? (Public forums, leaflets, television programmes, press, courses. Possible answers YES or NO for each one.)

The answers "low", "nothing", "I do not know" for analysis were considered jointly as "low". The approval rating was calculated as relative frequency of the answer "high" for question 1 and "yes" for question 3.

Chi square test was used for statistical analysis. In consideration of the large number of performed tests the level of significance was fixed at 0.005.

RESULTS

As previously defined and as indicated in table 2, SMM-Lay & NGO (4 citizens), SMM-Lay (6 citizens) and SMM-NGO (5 citizens) were grouped in one style, defined as SMM.

Thirty three per cent of citizens are oriented toward FPM involving all stakeholders in risk management, 10% towards SPM-Lay involving lay and professional, 20% towards SPM-NGO involving NGOs and professional, 20% towards PDM involving only professional, 10% towards SMM involving NGOs, 7% towards NTM not involving any stakeholder with high trust. The management styles are not influenced by gender, age class, and education level (table 2).

Table 3 analyses the approach to different information sources according to the six risk management styles. The *approval rating* is significantly influenced by the style for a number of information sources. Experts and health services are more important for FPM, SPM-Lay, SPM-NGO, and PDM, industry workers for FPM, SPM-Lay, and SPM-NGO, local government for PDM, FPM, and SPM-NGO. Green are preferred by FPM and SPM-NGO. Citizens associations are highly accredited by FPM and SMM, and to a lesser extent by SPM-Lay and SPM-NGO.

Keeping local citizens informed about industrial risk is considered an effective action for industrial risk control particularly by FPM, SPM-Lay, and NTM (table 4).

Table 5 analyses the importance of different communication channels according to the six risk management styles. The *approval rating* is significantly influenced by the style only for the public forum category ($p \leq 0.005$), which was chosen more by FPM (94%) than by the other groups (55–70%).

DISCUSSION

The introduction of a participative approach in risk management is perceived as new by community members, generating—according to Rogers' theory on diffusion of innovation—well-known differences between people who readily adopt innovations and those who play a waiting game.²⁴

So it is important to recognise the diversities existing within a community and its variety of social dynamics. A community can be made up of many different groups of people, and not all these groups share the same goals and motivations, and sometimes not even the willingness to become involved in a health promotion action.²³ It has been particularly shown that different groups within society have differing perceptions of the risk from the same hazard.²⁵ Consequently, realising a participatory decision-making process requires a deep knowledge about lay people's orientation towards the intersectoral collaboration approach, in order to define the level of participation desired, and to facilitate the diffusion of the participative approach.

Our research highlights the extent of the different categories from FPM, already motivated towards participation, to PDM and NTM, who do not express any interest in being involved. Our data show that in a village with an important environmental crisis two thirds of the population are oriented towards a partnership between citizens (and/or NGOs) and professionals, and only 20% agree that citizens relinquish all control. These results are confirmed by the interest, particularly among FPM, for lay information sources and interactive communication channels. The high willingness of participation could have been fostered by the long and common experiences of economic and environmental crisis.

Table 4 Percentage of citizens who considered relevant keeping local people informed

Management style	FPM	SPM-Lay	SPM NGO	PDM	SMM	NTM	p Value
Keeping local citizens informed is of high importance	81%	80%	46%	43%	60%	89%	<0.005

Table 5 Approval rating for communication channels about industrial risk according to management style

	Management style						p value
	FPM	SPM-Lay	SPM-NGO	PDM	SMM	NTM	
TV	88%	80%	97%	83%	80%	100%	0.32
Leaflets	76%	73%	76%	79%	80%	50%	0.57
Press	82%	67%	93%	76%	60%	60%	0.08
Courses	76%	87%	59%	72%	60%	70%	0.41
Public forum	94%	60%	66%	55%	73%	70%	<0.005

The presence of different attitudes towards participation is normal in health promotion actions that usually do not begin as a collective effort but, on the contrary, arise mostly by a group of interested and motivated individuals.²⁶

Citizens oriented towards FPM and SPM-Lay—both highly motivated towards participation—can play the role of early adopters in the risk communication programme, and facilitate, through a snowball effect process, the involvement of the less active community members.²⁷ The experience of several projects showed that the visibility of the activities and outcomes, and the visibility of the participants' contribution had an increasing spin-off in terms of participation.²⁸

A main determinant of public participation is the relationship between community and government. The encounter between these stakeholders is not always easy, and often generates conflicts between the “national interest” and local expectations. In Italy, the experience of recent years has highlighted how the mobilisation of the local community had often played a crucial role in conflict, stopping or slowing national initiatives perceived as dangerous for local health (national site for nuclear sewage in Basilicata region, new railway in Piemonte region). In Sardinia recent history is characterised by an important number of these conflicts (defence of mines, fight against military settlements) with both victories and defeats.

In Italy, and particularly in Sardinia, the attitude to participation does not appear to be associated with confidence in the government (which is generally low), but more with the sense of self-esteem and confidence in local community and local leaders, including professionals.²⁹ Also in our research the number of citizens who do not trust in any stakeholder (NTM) is very low, and the discrimination is more between participation and delegating to the experts.

In this situation coalitions of professionals and lay people can represent an appropriate and realistic strategy for the community's empowerment, and a strong actor in the competition with external economic and political forces.¹⁵

Communication is of great importance in terms of facilitating community involvement. Specific information sources relate more closely to each risk management style, analogously to what is described for the particular stages of adoption in Rogers' theory on diffusion of innovation. Mass media play an important role in the less participative groups, who are cautious about involvement, and concerned with information and awareness. Mass media are considered less relevant in the later stages, when interpersonal sources such as known experts and peers become far more important: in our research public forums were considered essential by FPM.³⁰

On the basis of these elements, a multi-approach strategy could be proposed.³¹ A programme of public forums could potentially involve citizens, oriented towards FPM (33%), and represent a good basis for a shared decision-making process. Citizens oriented towards SPM-Lay could probably be involved in public forums through a process of interactive courses. A

unidirectional communication programme, based on leaflets and booklets, can complete the programme in order to also keep informed those citizens oriented towards a more passive risk management approach (PDM, SPM-NGO, NTM). Leaflets can be used both to communicate experts' views, and to present the results of the participative process. The participative process must always be open to new contributions from citizens who are not directly involved, and should allow for flexibility in the form and nature of partnership, as well as the details of implementation (that is, timelines, decision-making policies and evaluation). Anyway, the spread of an innovative approach can be slow, and we have to realise that it takes time to reach the more sceptical citizens.³¹

What is already known

- Many epidemiological studies, including health status screening, were done in industrial areas because of citizens' and local health services' growing concerns about the health risks associated with industrial development. These studies did not generate effective risk communication processes involving people in decision making.
- Realising a participatory risk communication programme requires in-depth knowledge about lay people's orientation towards the intersectoral collaboration approach, in order to define the level of participation desired.
- Very few attempts have been made to examine the prevalence of participation and describe patterns of participation across a population.

What this paper adds

- This research identified population ideas and expectations towards a participatory approach in risk management. On the basis of these elements it is possible to realise a risk communication programme based on health promotion principles.

Policy implications

- This research identified population ideas and expectations towards a participatory approach in risk management. On the basis of these elements it is possible to realise a risk communication programme based on health promotion principles.

The method proposed in this paper can represent a rapid appraisal tool to define people's opinions towards the involvement of specific stakeholders. This research took place in a community where awareness of the environmental risks is probably high, and therefore the results are specific to this area. However, in our opinion, the proposed methodology can be valid for different settings in order to highlight people's approaches towards participation, and to identify the more appropriate mobilisation strategies and communication channels.

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Research project financed by Sardinian Regional Government.

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