Risk assessment and risk communication in environmental health in Poland

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References

Efficient prevention activities can reduce disease, caused by environmental factors as well as costs to the health-care system, but it is impossible without understanding by the society of when, where, how and why exposures occur. Physicians and other health-care professionals may have an important role to play in communication of these potential dangers as the public requires information from knowledgeable and trusted sources about environmental risks and methods to avoid them. Epidemiological study in Poland shows that the health risk awareness in the society is not satisfactory and improvement of communication processes is essential to reduce individual risk factors.

**Introduction**

Health problems related to the environment have become a major source of concern on an international basis and it has been suggested that insufficient actions have been taken with regard to potential medical problems caused by environmental factors. Estimates recently updated by the World Health Organization (WHO) for its 193 Member States indicate that 24% of the human disease burden, measured as 'healthy life years lost', and 23% of premature mortality may be attributable to environmental factors. It has also been reported that over 40% of the global burden of disease attributed to environmental factors affects children under 5 years of age, though that group accounts for only ~10% of the world population. Each year, at least three million children under the age of 5 years reportedly die due to environment-related diseases. Mortality from pediatric acute respiratory infections is estimated to exceed two million for children under the age of 5 years, with as much as 60% attributed to environmental conditions. That estimated contribution to disease burden, while large, is likely to be a conservative estimate because evidence is incomplete for many diseases.

Evolving knowledge about interactions between the environment and health can be used to develop effective preventive public health strategies to reduce risks and to better communicate with potentially affected groups. More efficient prevention activities can reduce disease, as well as costs to the health-care system. In that context, the public requires information from knowledgeable and trusted sources about environmental risks and methods to avoid them. Physicians and other health-care professionals may have an important role to play in communication of these potential dangers. Improving communication processes among patients and health-care professionals can act to reduce individual risk factors. However, many medical professionals have limited formal training in the field of environmental medicine, and may be hesitant to take on the role of risk communicator. Thus, both the environmental medicine training as well as the methodology of environmental risk communication should be incorporated or augmented in medical studies curricula. The US Agency for Toxic Substances and Disease Registry (ATSDR) has developed tools for medical professionals to assist with achieving the goal of improving environmental risk communication skills, including Case Studies in Environmental Medicine, Grand Rounds in Environmental Medicine, and the Paediatric Environmental Health Toolkit.

If environmental and health institutions are to effectively disseminate environmental information to communities, they must understand what community members know about environmental risk, and which risks they perceive to be problems for their health. They must also learn how communities obtain information about environmental risks.

A recent large-scale investigation was conducted on behalf of the European Union (EU) in Poland to indicate if the awareness of environmental risk in the society in polluted areas is satisfactory and the health risk communication could be improved in the interest of effective prevention of environmental disease. Two cities [Dabrowa Gornicza (DG) and Katowice (KTW)], from Upper Silesia, a region in Poland with severe local pollution impacts, were selected for studies during 2006–08. DG, and seven other big cities in the region were classified by Wcislo et al. (2002) as cities with high environmental hazards which may cause visible threats to public health. The region is characterized by higher incidence of many diseases, and long-term exposure of the population to heavy metals and other pollutants has been the subject of intensive study in the region.

The focus of this study was to explore the society awareness of environmental health risks in Poland and to suggest additional preventative services to improve public health.

**Methods**

In the EU project, awareness of environmental risk was explored through a questionnaire and door-to-door survey of 2491 residents in DG and 580 residents in KTW (total population of DG is 128 025 and KTW is 307 179 people). It was done by trained public health students. The study questionnaire assessed knowledge and the source of information as well as evaluation of environmental health risks and individuals’ attitudes towards a number of environmental and other health-related issues.

**Results**

Respondents were asked which environmental factors have the greatest influence on health and which sources of information about environmental risk they considered to reliable and persuasive (table 1). A majority of respondents (55%) believe that the environment may cause serious disorders or premature mortality. Nevertheless, it appears that they do not indicate environmental hazards properly in the place where they live. Only a few individuals were aware of the indoor environmental risk thus indoor pollution contribute considerably to overall human exposure.

Clearly, subjective reporting of health status is not always easy to reconcile with empirical observations. For example, in the study only 12% of respondents associated respiratory disease, allergies and headaches with environmental exposures. The respondents express an opinion that the outdoor environment exerts a major influence upon

<table>
<thead>
<tr>
<th>Factors having the greatest influence on health</th>
<th>Katowice people, n (%)</th>
<th>Dabrowa Gornicza people, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The state of environment indoors</td>
<td>25 (4.33)</td>
<td>29 (1.16)</td>
</tr>
<tr>
<td>The state of environment outside</td>
<td>198 (34.26)</td>
<td>1695 (67.77)</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>308 (53.29)</td>
<td>675 (26.91)</td>
</tr>
<tr>
<td>Genetic code</td>
<td>46 (7.96)</td>
<td>95 (3.80)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (0.17)</td>
<td>9 (0.36)</td>
</tr>
</tbody>
</table>

Table 1 Respondents’ opinions regarding factors having the greatest influence on health and the reliable sources of information

Source: E. Marchwinska et al., unpublished results from EU Project DROPS

Note: Percentages do not equal 100% as a result of respondents reporting reliability of more than one information source.
the health state; the indoor environment is regarded as the least
important (1.16% in case of DG and 4.33% of KTW). The indoor con-
centrations of respirable particulates, nitrogen dioxide, carbon monoxide,
formaldehyde are often much higher than outdoor concentrations. Every
third respondent reported that polluted air and the bad quality of
drinking water pose the greatest risk to health. Lifestyle factors are
considered important by 26.9 and 53.3% respondents of the DG and
KTW, respectively.

Discussion
The results suggest a need for enhanced social awareness of environ-
mental risks, and effective communication regarding these risks. Proper
education on environmental risks and health effects is essential. Parents
are effective teachers of health habits at home when prompted by health
educators. Education also may be achieved by the mass media and by
physicians. However, it seems that the influence of physicians or other
health-care professionals is underestimated or undervalued. Only 17% of
respondents in KTW and about 29% in DG consider a family doctor to be
an appropriate source of environmental health risk information (table 1).
It may result from poor communication between doctors and patients.

According to WHO, each year, about 1.5 million deaths are associated
with the indoor combustion of solid fuels; in the European Union (EU)
alone, combustion, chemicals from building materials and dampness
cause an annual loss of over 2 million years of healthy life due to
premature death or to chronic diseases, such as asthma and cardiovas-
cular diseases. People, spending an increasing amount of time indoors,
are exposed to pollutants generated outdoors that penetrate to the indoor
environment and also to pollutants produced indoors, for example as a
result of space heating, cooking and other indoor activities, or emitted
from products used indoors. The fact that the studied population does
not see the problem of indoor pollution is very disturbing as over 40% of
respondents declare having individual coal furnaces in their homes.

As Galvez et al. noted, paediatric health-care providers should be
prepared to communicate health risks of environmental exposures.
Clinicians are generally trusted and can play important roles as
educators, alert practitioners or advocates addressing health risks with
individuals and groups. The evolution of environmental risk
perception, risk communication and education about environmental
health suggests need for a system that more actively includes physicians
and other health professionals who have direct and intimate contact with
their patients, and who represent important sources of environmental
health knowledge for the public.

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Conflicts of interest: None declared.

Key points
- Evolving knowledge about interactions between the environment
  and health can be used to develop effective preventive public
  health strategies to reduce risks and to better communicate
  with potentially affected groups.
- The translation of research results connected environmental risk
  into interventions is required. It could be helped by educational
  materials for parents, health care providers and policy makers to
  improve the environmental health of local society, especially
  children.
- Physicians and other health care professionals, as a generally
  trusted groups can play important roles as educators of the en-
  vironmental risks and methods to avoid them but the environ-
  mental medicine training as well as the methodology of
  environmental risk communication should be incorporated or
  augmented in medical studies curricula.

References
1 Mori C, Todaka E. Establishment of sustainable health science for future generations: from
a hundred years ago to a hundred years in the future. Environ Health Prev Med
2009;14:1–6.
2 WHO. WHO country profile: Update of national data on the effects of the environment on
health. Issue 12, July 2009. World Health Organization (WHO) Department of Public
Health and Environment (PHE), 2009.
3 WHO. 3rd International WHO Conference on Environmental Threats to the Health of
4 Mathers C, Stevens G, Mascarenhas M. Global Health Risks. Mortality and burden of disease
5 ATSDR. Case Studies in Environmental Medicine. Available at: http://www2.cdc.gov/
atdsrce/AvailableActivities.asp (24 February 2010, date last accessed).
6 Wcislo E, Dutkiewicz T, Konczalik J. Indicator-based assessment of environmental hazards
and health effects in the industrial cities of Upper Silesia, Poland. Environ Health Perspect
7 Marchwinska-Wyrwal E, Dziubanek G, Skrzypek M, Hajok I. Study of the health effects of
long-term exposure to cadmium and lead in a region of Poland. Int J Environ Health Res
8 WHO. Regional Office for Europe: WHO guidelines for indoor air quality: selected pollutants.
9 Galvez MP, Peters R, Graber N, Forman J. Effective risk communication in children’s
10 Miller M, Solomon G. Environmental risk communication for the clinician. Pediatrics
2003;112:211–7.