Using Word Clouds for Risk Perception in the Field of Public Health – the Case of Vector-Borne Diseases

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Abstract – Due to environmental and socio-economic changes, emerging zoonotic diseases will be an increasing challenge for public health in Europe. The risks and the consequences triggered by vector-borne diseases (VBD) for public health in Europe are just starting to emerge in public awareness. This is clearly shown by recent events such as Chikungunya in Italy and the spread of Crimean-Congo haemorrhagic fever (CCHF) in Europe. The EU-funded project ‘Biology and control of vector-borne infections – EDENext’ is dedicated to these diseases that are transmitted by vectors such as mosquitoes, ticks, etc. Within EDENext a holistic, transdisciplinary public health approach towards vector-borne diseases was developed. It defines the term ‘Public Health’ in the scope of this project and suggests a re-conceptualisation of public health by adapting the risk governance framework developed by the International Risk Governance Council (IRGC) for this purpose. The IRGC approach is distinguished from more classical risk governance approaches, inter alia, by an explicit inclusion of a systematic concern assessment (of public concerns and perceptions) as the other part of risk appraisal that is scientific risk assessment. This innovative risk governance approach towards public health will be introduced and exemplified in Germany by the hantavirus disease that is transmitted via rodents. This paper shows first results of a risk perception study based on focus-group discussions with the general public in three endemic regions in Germany. With the method of word clouds first risk associations of focus groups participants are visualized, in order to capture various risk perception patterns of the hantavirus.

Keywords – risk governance, public health, risk perception, risk communication, vector-borne diseases, word clouds

1. Introduction

Environmental and socio-economic changes mean that emerging diseases, particularly vector-borne diseases, will become an increasing challenge for the risk governance of human and veterinary health in Europe and in the world as a whole. The risks and the consequences triggered by vector-borne diseases for (veterinary) Public Health in Europe are just starting to emerge in public awareness. The European project ‘biology and control of vector-borne infections in Europe’ (EDENext) brings together 46 partner teams from 22 countries in a health-focused project under the European Commission’s 7th Research Framework Programme to investigate the biological, ecological, epidemiological and social components of vector-borne infections. One task within the EDENext project is the improvement of VBD risk governance of Public Health with a systematic approach for analysing, assessing, managing and communication of VBD. In order to meet the new challenges of Public Health, a re-conceptualization of Public Health is suggested and outlined within the EDENext “White Paper: Public Health and Vector-Borne Diseases. A New Concept for Risk Governance” (2012, see also: Schmidt et al 2013). A general model, the so-called ‘Risk Governance Framework’, which was developed and proposed by the International Risk Governance Council (IRGC), is adapted, applied and operationalized for the first time to Public Health. The proposed EDENext risk governance model for Public Health will be exemplified by the mice transmitted hantavirus disease in Germany.
2. Risk perception of the hantavirus in Germany

2.1. Theoretical framing: IRGC Risk Governance Framework

The International Risk Governance Council (IRGC) is a privately funded, independent non-profit organisation that was founded in 2003 and is based in Lausanne. Its mission is to support governments, industry, non-governmental organizations and other organizations in their efforts to deal with major and global risks facing society and to foster public confidence in risk governance. In 2005 the IRGC published its first White Paper on 'Risk Governance: Towards an Integrative Approach'. The IRGC framework model encompasses five elements (IRGC 2005, 2008): (1) Pre-assessment, early warning and 'framing' of the risk; (2) appraisal (combining scientific risk assessment and concern assessment); (3) characterisation and evaluation; (4) management and (5) communication of a risk. The model shall assist decision-makers in preparing decisions that are characterised by scientific uncertainty, complexity and ambiguity – also known as systemic risks (Renn et al., 2001, IRGC, 2008). The model was designed to be compatible with competing risk analysis approaches, although it puts particular emphasis on the aspect that risk assessment should not just include scientific risk assessment, but also include a systematic analysis of public concern and perceptions. However, this model had not been applied so far to Public Health. The Public Health group within EDENext has done so and addressed questions such as: What does the IRGC framework mean for Public Health? How can the different phases be conceptualised for Public Health? This task has been performed by the EDENext project and the results of this approach are shown in the EDENext White Paper (2012) (see also: Schmidt et al 2013). This article will address the importance of taking into account risk perception of the public in Public Health decision-making.

2.2. EDENext public health definition

EDENext follows a holistic, interdisciplinary and multi-level approach towards Public Health: “Public Health is concerned with questions of prevention, rather than healing and it is concerned with health on a population-level rather than on an individual level. Moreover, it is concerned with the facilitation of health equity in the society through the mobilisation of political, social and economic resources. Hence, Public Health considers various determinants of health, such as ecological environment, political structures, socio-cultural patterns, economic living and working conditions, social and community networks or individual lifestyle factors” (Schmidt et al 2013).

2.3. Study design

EDENext is examining the risk perception and risk communication of two VBDs: hantavirus disease, a disease transmitted by mice, and Crimean-Congo hemorrhagic fever, transmitted by ticks, in five countries: Macedonia and Turkey for the Crimean-Congo hemorrhagic fever and Finland, France and Germany for the hantavirus disease. In all countries the top-down approach in regard to risk communication is examined by conducting in-depth interviews with experts from responsible risk management institutions and organisations, such as ministries in charge and public health organisations as well as stakeholders concerned with the respective VBD (such as health insurances, professional organisations of farmers, pest controllers, etc.). The risk communication approach is complemented by comprehensible literature research on that topic in each country. In the following, the focus will be laid on the hantavirus risk perception of the concerned public in Germany: how do they perceive the risk, what do they know about the risk and what kind of coping strategies will they apply to handle and, potentially, prevent the risk? The risk perception study with the public was performed by using focus group research as a qualitative tool. Three focus groups with 10-12 persons were held in Germany in three different endemic regions, based on a semi-structured topic guide. Qualitative research is explorative in its character and allows addressing questions about beliefs, motives and reasons for a particular behaviour, which was particularly useful for our research interest. Within the focus groups one emphasis was to acquire first risk associations of the participants towards the hantavirus in order to capture various risk perception areas and to facilitate the discussion. To get a first impression about different patterns on risk perception and their importance in relation to each other we used the method of word clouds. Its basic idea is the visualization of keywords or terms mentioned by the participants according to their quantity in relation to others. To our knowledge it has not been used so far for risk perception purposes. All interviews were recorded and transcribed and the conducted data were investigated by using the MAXQDA software for qualitative data analysis.

2.4. Epidemiological situation and preventive actions of hantavirus in Germany

Hantavirus is transmitted via inhaling aerosols of bank vole droppings carrying the virus. The most common and PH relevant hantavirus in Germany is the Puumalavirus. Hantavirus can trigger nephropathia epidemia (NE) in humans, a flu-like disease that can lead to acute renal failure. There is no vaccination available yet. Therefore, the promotion of adequate protection measures, such as wearing a breathing mask during sweeping activities or to ensure adequate ventilation during clean-up work in the attic or garden sheds, plays a central role in prevention campaigns. Since 2001, when the hantavirus has become a notifiable disease in Germany, over 8000 cases of hantavirus have been reported. Considerable fluctuations in the prevalence over years could be observed. Peak years were 2007 (1688 cases), 2010 (2017 cases) and, the highest peak 2012 (2769 cases). Moreover, there are endemic and non-endemic counties within the 16 German states meaning that preventive risk communication strategies have been introduced by health authorities on the county or
Due to the fact that health policy is the responsibility of the states, a variety of different risk communication strategies could be detected ranging from warning signs in urban forests up to information campaigns in cooperation with the local media (radio or newspapers) or the distribution of information sheets via general practitioners.

2.5. First associations with the hantavirus in the German focus groups

To facilitate the discussion and to get an impression about different risk perception patterns, the first question addressed to the participants was: 'What are your first associations regarding the hantavirus or mice transmitted diseases?' Participants were then provided a collage composed of newspaper headlines from the respective local newspaper. The headlines referred to news reporting on previous Hanta outbreaks in this region, including photographs also, if available, acquired from the local newspaper. Figure 1 shows the quantified first hantavirus risk associations in endemic German regions by focus group participants.

We can distinguish within the word cloud and figure 1 four different areas of associations: (a) risk factors, (b) protective measures, (c) ways of transmission and (d) persons who felt uninformed (lack of knowledge). (a) Risk factors should be further distinguished between (i) the agent of the disease (mice or, more precise, bank voles and their excrements); (ii) environmental risk factors (including: wood, countryside, nature, shed, wind, and summer) and (iii) risk behaviour (including: cleaning, gardening, and eating outdoors). (b) Protective measures include hygiene, breathing mask and gloves. (c) Ways of transmission were mentioned as follows: dust, inhale, and touch. (d) Persons who reported to be uninformed were subsumed as ‘no information about risks’. For obvious reasons, the disease agent, or rather vector, mice and the more specific term bank vole were the most mentioned association with this rodent-borne disease. However, surprisingly, the fact that this disease is transmitted via aerosols of the excrements was hardly mentioned by the participants. Environmental risk factors such as wood and sheds were frequently mentioned, which indicates that some knowledge and sense of risk about the VBD is already available in the examined endemic regions. The most frequently mentioned association in regard to risk behaviour, cleaning (of sheds, attics, etc.) also shows sensibility for the most relevant risk factors known from epidemiological studies. Overall the protective measure breathing mask was mentioned second most frequently after the agent mice. This already shows that official information campaigns were recognized by the public of endemic regions as these campaigns basically focus upon...
breathing masks as one of the most important protective measurements. Although the infected excrements were hardly mentioned, several participants recalled inhalation of the dust as one major way of transmission of the agent. Throughout all groups some participants mentioned their personal ignorance about VBD risk factors in common.

3. Conclusion

We can conclude that the risk perception of the general public in regard to health related issues, here the hantavirus, includes different and distinguishable elements which should all be taken into consideration when risk perception is concerned: risk factors, protective measures, known ways of transmission and the feeling of not being (properly) informed. This shows that risk perception is intrinsically bound to knowledge and ignorance of a given risk: Risk factors have to be known in order to be remembered and the same applies to protective measures and potential ways of transmission. Ignorance, expressed as a feeling of not being properly informed, is also an important element which influences the risk perception of the public. It was also shown that the word cloud tool, not yet used for risk perception research, is an easy to use and effective way for visualization of the perception of risk. Meaningful risk communication (or health communication) strategies can only be established on consolidated knowledge of the risk perception of the public and its stakeholders, including what they know and what they don’t know. This is particularly relevant when health is concerned, as the risk perception of the public has a high potential to prevent a given risk, the infection or disease, and to influence the effectiveness of Public Health interventions. The EDENext risk governance concept for Public Health provides a systematic and holistic approach to be used by Public Health authorities in order to facilitate management of (emerging) health risks for the public today and in the future.

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References


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