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Mass media health information: Quantitative and qualitative analysis of daily press coverage and its relation with public perceptions

Annalaura Carducci [a,*], Simona Alfani [b], Manuela Sassi [c], Alessandra Cinini [c], Andrea Calamusa [b]

[a] Department of Biology, University of Pisa, Pisa, Italy
[b] Department of Biology, Health Communication Observatory (OCS), University of Pisa, Pisa, Italy
[c] Institute for Computational Linguistics (ILC) "Antonio Zampolli", National Research Council, Pisa, Italy

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ABSTRACT

Objective: This paper describes the methods followed by the Pisa University *OCS* for collecting, storing and analyzing all health-related articles and database contents. Moreover, an example population survey on the topic of food safety based on such analysis is shown.
Methods: Articles published each day since 1999 in Italy's three most popular newspapers are collected and stored in a Data Base Text; on these articles quantitative and qualitative analyses were conducted. On the basis of these results as well as of epidemiological data, a questionnaire survey was carried out about sources of information, knowledge and risk perception of citizens regarding food safety.
Results: On a total of 24,434 articles on all health topics, 18% regarded food related hazards: their evolution over time showed peaks on BSE, avian flu and dioxin.

A large proportion of the people surveyed declared having changed their food habits, at least temporarily, as a consequence of media information. Most get their information on food safety mainly from television. Most respondents remembered having previously heard news on BSE, avian flu and dioxin, but did not recall having heard of listeriosis, brucellosis or typhoid fever.
Conclusions: Newspapers articles facing food related hazards tend to be alarming thus affecting the citizens risk perception. On the other hand people often ignore how to manage their own food safety in a practical way.
Practice implications: Analysis of media messages can help to evaluate and correct the negative effects that may result in wrong information.

1. Introduction

Today more than ever, health is one of the main topics covered by the mass media. Obviously, good health is a prime concern for all of us, and its attainment and maintenance involve many and varied aspects, including economic ones. Thus, the public finds itself immersed in a veritable sea of health-related news from many different sources, often without the means to discern what is really useful or important, or understand the true significance of the intended messages, or even appraise their accuracy [1–4]. Many population surveys have recognized the mass media as the main source of public health information [6,7]. The impact of this coverage on citizens' knowledge, perceptions and attitudes can be analyzed from two perspectives: its great power to disseminate information and form public opinion and the potential for distortion from useless or inaccurate information [5–9]. Such effects stem not only from potential information overload, but also from poor information quality, in terms of correctness, reliability, understandability, usefulness, balance and independence, which people are often unable to evaluate due to limited health literacy. In crises or emergencies, the mass media may create a "communications storm", which shifts attention to a single health problem, such as AIDS, SARS, BSE, or avian flu [10,11]

Quantitative and qualitative analyses of mass media messages over the time can be a useful tool to evaluate their possible effects on public perceptions and behaviors. To this end, the Pisa University *OCS* (*Osservatorio della Comunicazione Sanitaria* = Health Communication Observatory) has collected and stored in a DBT (Data Base Text) all health-related articles published each day since 1999 in Italy's three most popular newspapers for quantitative and qualitative analyses. This paper describes the methods followed for collecting, storing and analyzing these articles and using the results to design questionnaire surveys on information sources, knowledge, attitudes and risk perception of citizens. To explain this methodology as example food safety related issues were investigated both with article analysis and questionnaire survey.

* Corresponding author at: Department of Biology, University of Pisa, Via S. Zeno 35/39, 56127 Pisa, Italy. Tel.: +39 0502213644; fax: +39 0502213647.
E-mail address: acarducci@biologia.unipi.it (A. Carducci).

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2. Methods

2.1. Newspapers analysis

Health articles published online in the three daily newspapers, *La Stampa* [24], *Il Corriere della Sera* [25] and *La Repubblica* [26], are selected manually for health-related content by trained staff. The collected articles are stored in DBT [12], software created by CNR (Consiglio Nazionale delle Ricerche) of Pisa that offers various text analysis features, such as word and string searches in order to obtain absolute and relative frequencies and identify synonyms and contexts.

Using lists of keywords (including adjectives, nouns and verbs) concerning the issue addressed, subsets of articles on specific subjects can be created from the overall corpus.

On these subsets quantitative analysis can be performed to obtain the absolute and relative frequencies of articles on a topic and the evolution over time. This enables comparisons of such data on different subjects and identification of information peaks related to particular events like food alarms.

The quality of each article is also assessed according to the following criteria, previously formulated by a multidisciplinary work group (Gruppo "Leggere Ascoltare la Salute") [10]: correctness–completeness, reliability, understandability, usefulness, balance and independence.

Correctness is given by accuracy (the absence of conceptual or terminological errors) and completeness (exhaustiveness). Given the complexity of some topics, such evaluation can only be made by qualified personnel with suitable documentation. Qualitative assessments are made by reading the article and noting any terminological and conceptual errors and/or missing information.

Reliability judgments are based on the sources for the article and their type. An accredited scientific or institutional source and bibliographical details may guarantee a certain reliability. If the source is indicated, it is classified into one of the four main categories: scientific journals, institutions, experts without specific institutional role, associations, others (firms, magazines, etc.).

Understandability is assessed based on the use of simple language and clear explanations of concepts and technical words. It would include measures of readability with respect to the literacy of potential readers and the clarity of the exposition. The former aspect is evaluated automatically by a DBT procedure which calculates the GULPEASE Readability Index via a formula which considers two variables: word length and sentence length in relation to the number of characters in a text [10,13,14]. Evaluating the clarity of the exposition is instead rather more complex, since it requires calibration to the level of reader literacy on health. Due to the technical obstacles, therefore, this aspect has not been assessed. However, we have assumed that a lack of completeness is indicative of a lack of clarity.

The usefulness of an article is based on the consideration of what information can serve to help readers enhance their knowledge and make informed choices regarding their health. Thus, qualitative evaluation of this parameter necessarily involves reading the article.

Balance regards the emotional tone of mass media messages, including the use of words with positive or negative connotations. Such evaluation is made both by reading the article and automatically searching for the alarming words most frequently used in health journalism, such as "terrifying" and "slaughter".

Independence is linked to the absence of hidden advertising or concealed agendas. The difficulty of evaluating this parameter objectively limits its application to cases where obvious commercial interests are identifiable [10].

The results of the evaluations of individual articles are indexed and coded in order to apply descriptive statistics. The data collected are entered into spreadsheets (MS Excel™).

2.2. Population survey

Based on the quantitative and qualitative results of the newspapers analysis, population surveys can be designed to assess the impact of mass media coverage on public knowledge, attitudes and risk perception, with regard to health topics.

Considering the example of food-safety related topics, the results of the quantitative and qualitative analyses of newspapers articles, in particular related to information peaks, as well as epidemiological data reported by national and European institutions [15–23], were used to draft a questionnaire which was then administered to 492 people at Local Health Units of Lucca and Pisa

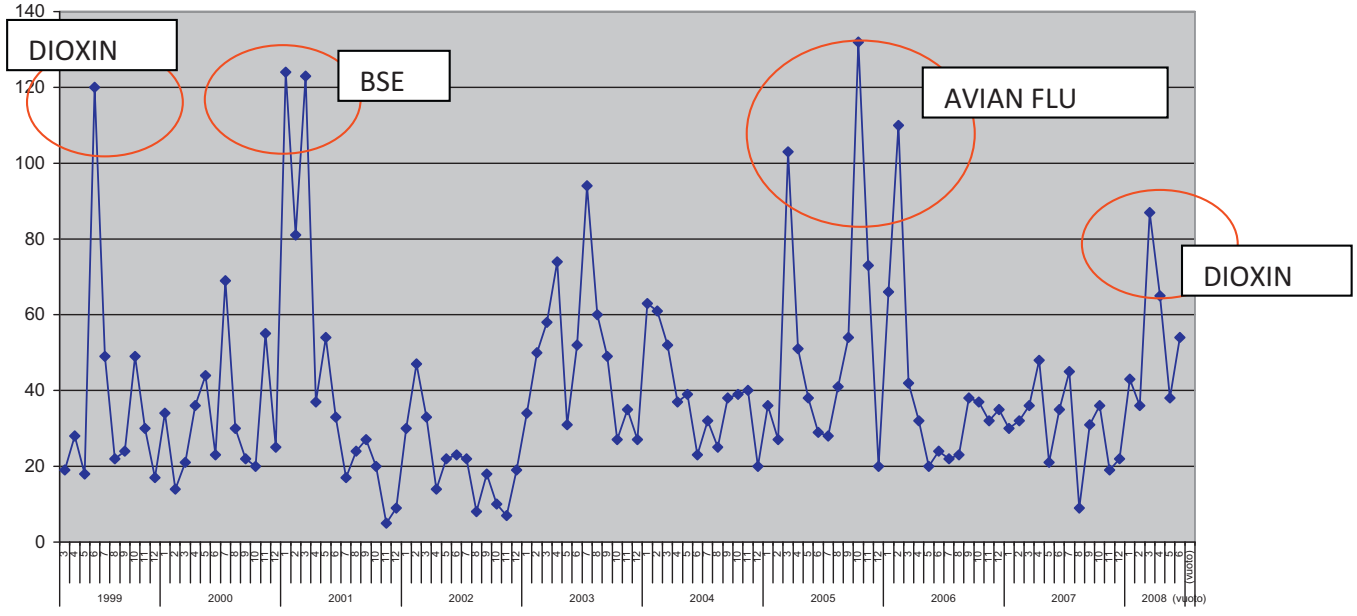

Fig. 1. Number of articles on health topics for each month, since 1999–2008.

Table 1
Have you ever heard from the media on these topics?

Topics	% yes tv	% no tv	OR (Cl 95%)
Salmonellosis	74.1	69.6	1.1 (0.6–1.8)
Typhoid fever	28.2	30.4	0.8 (0.5–1.3)
Hepatitis A	57.2	63.7	0.7 (0.4–1.1)
BSE	93.1	85.3	6.1 (2.7–13.5)
Avian flu	90.0	80.4	2.6 (1.1–6.6)
Brucellosis	22.8	31.4	0.4 (0.2–0.6)
Dioxin	80.3	82.4	0.5 (0.2–1.2)
Listeriosis	20.8	22.5	0.8 (0.5–1.4)
Botulism	61.0	65.7	0.6 (0.4–1.1)
GMO	80.0	73.5	1.3 (0.7–2.4)

% yes tv, % of the sample who heard on these topics and who mentioned tv as main source of news on food safety; % no tv, % of the sample who heard on these topics and who did not mention tv as main source of news on food safety; OR, Odds Ratio.

and a shopping center in Pistoia. The questionnaire was structured in 4 sections: (a) food risk perception; (b) media impact after food alarms on risk perception; (c) confidence in institutions for food risk communication; and (d) food risk knowledge.

The answers to the questionnaire were also entered into spreadsheets (MS Excel™) and descriptive statistics (% of answers) were calculated. To assess the association between the citizens remember of some etiologic agents and their mention of tv as main source of news on food safety, the Odds Ratio was conducted.

3. Results

Quantitative analysis of newspapers articles from 1999 to 2008 provided epidemiological data on food-borne disease, revealing several information peaks definable as "communication storms".

The quantitative analysis was conducted on a total of 24,434 articles on all health topics, of which 4436 (18%) regarded food, their evolution over time showed four major peaks: one regarded BSE, one avian flu and two dioxin (Fig. 1). The articles within the peaks were then analyzed qualitatively, and it was found that 32% either contained errors or were incomplete, 19% failed to report any information sources, 43% were deemed of no aid to citizens in their decision-making, 95% were difficult to read for people without a higher education, 37% used alarming words, and 16% appeared biased by some interest group.

Not surprisingly, people's awareness of the food risk factors reported in the media storms appeared to be greater than that regarding many other issues of greater epidemiological consequence [16,17,19,20,22]. A large proportion of the people surveyed declared having changed their food habits, at least temporarily, as a consequence of media information (70% for BSE, 60% for avian flu and, 70% for dioxin). Most respondents remembered having previously heard news on BSE (92%), avian Flu (90%) and dioxin (83%), but did not recall having heard of listeriosis (76%), brucellosis (69%) or typhoid fever (66%). Most get their information on food safety mainly from television (18%) or from television and newspapers (34%). Television as information source was significantly related with memory of BSE and avian flu (Table 1). Various questions were aimed at evaluating knowledge of various aspects of food safety, and although the respondents answered most correctly, the percentages of correct answers were quite low regarding listeriosis (22.33%) and botulism (34.28%).

4. Discussion and conclusion

4.1. Discussion

Appropriate risk perception is crucial for developing proper awareness, which in turn leads to well-informed decisions and hence to the adoption of suitable preventive behaviors [5–7]. All too often, the media instead focuses its attention on a single topic, in some cases producing real media alarms. Concerning food, for example, media attention focused on BSE, avian flu and dioxin in food, although epidemiological data reveal the associated risk to be meager. Contrariwise, little news or coverage appeared on listeriosis, brucellosis and typhoid fever – diseases still quite widespread throughout Italy. Such findings highlight the disparity between the news that "sells" (sensational and even alarmist) and news that "doesn't sell" (those involving already known and unalarming illnesses).

4.2. Conclusions

When combined with carefully targeted population surveys, continuous monitoring of health messages in newspapers and their quantitative and qualitative analysis can indeed be useful to study the impact of mass media on public perceptions, attitudes and knowledge. Moreover, by studying media-announced "pandemics", we may also be able to predict the reactions that they will elicit in citizens, and perhaps amend such effects by preventing and correcting errors and misrepresentations.

4.3. Practice implications

Though generally recognized the impact of the mass media on citizens' knowledge and perception of health risks is rarely studied as a specific means to promote public wellbeing. Application of the methodology described herein could provide an instrument to better define, measure and perhaps control such impact.

4.4. Relevance of our study for the methodology of communication in health care

The study of the different points and actors of the health communication chain could be useful to draw guidelines for information providers, as well as tools for consumer evaluation and choice.

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Conflict of interest

The authors have no actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within three years of beginning the submitted work that could inappropriately influence, or be perceived to influence, their work.

References

[1] Nelkin D. Selling science: how the press covers science and technology. New York: WH Freemen; 1995.
[2] Rodford T. Influence and power of the media. Lancet 1996;347:1533–5.
[3] Moore M. Health risks and the press: perspectives on media coverage of risk assessment and health. Washington: The Media Institute; 1989.
[4] Nelkin D. An uneasy relationship: the tensions between medicine and the media. Lancet 1996;347:1600–3.
[5] Primary sources of health information: comparisons in the domain of health attitudes, health cognitions, and health behaviors – Mohan J. Dutta-Bergman Health Communication 2004;16:273–8.
[6] Carducci A. Alfabetizzazione sanitaria: le parole che aiutano il cittadino nelle scelte [Health literacy: the words that help the citizens in the choices]. Atti convegno "Malati di parole. L'informazione e la comunicazione come terapia"; 2007, p. 83–5.
[7] Calamusa A. Dalla salute comunicata: le parole che configgono, le parole che affliggono, le parole che illudono [From health communicated: words that

conflicting, words that plague, words that deceive]. Atti del convegno "Malati di parole. L'informazione e la comunicazione come terapia"; 2007, p. 63–2.
[8] Renn O. Risk perception and communication: lessons for the food and food packaging industry. Food Addit Contam 2005;22:1061–71.
[9] Trautman TD. Risk communication – the perception and realities. Food Addit Contam 2001;18:1130–4.
[10] Carducci A, Calamusa A, Gruppo Leggere Ascoltare la Salute. La comunicazione di massa sulla salute. Educazione sanitaria e promozione della salute [The mass media on health. Health education and health promotion] 2003;26:67–9.
[11] Canino L, Candiracci C, Caretta A, Cobianchi V, Pagnin A, Prandi M. Il caso Di Bella nella televisione e nella stampa italiana.The Di Bella case on television and in the Italian press RAI-ERI; 2000.
[12] Picchi EDBT. A textual data base system. In: Cignoni L, Peters C, editors. Computational lexicology and lexicography. Special issue dedicated to Bernard Quemada. II, Linguistica Computazionale, vol. 7; 1991, p. 177–5.
[13] Lucisano P, Piemontese ME. Gulpease: a formula to predict readibility of texts written in Italian Language, vol. 3. Brescia (Italy): School an Town, La Nuova Italia; 1988. p. 110–40.
[14] Daghio M, Fattori G, Ciardullo AV. Assessment of readability and learning of easy-to-read educational health materials designed and written with the help of citizens by means of two non alternative methods. Adv Health Sci Educ Theory Proct 2006;11:123–32.
[15] Giancarlo Sturloni La paura vien mangiando – Comunicare il rischio alimentare The fear comes from eating – Communicating food risk J Sci Commun 2003;JCOM 2.
[16] CeRRTA Le tossinfezioni alimentari: un problema di sanità pubblica [The food-borne diseases: a public health problem]. Rapporto; 2002–2006.
[17] EFSA, ECDC. The community summary report; 2006.
[18] Eurobarometer risk issues; 2006.
[19] European Commission DG Environment. Compilation of EU Dioxin exposure and health data; 1999.
[20] Regione Toscana, SST, AUSL 11. I S.I.A.N. Toscana fra sicurezza alimentare, prevenzione e promozione della salute [The S.I.A.N. in Tuscany between food safety, prevention and health promotion]; 2006.
[21] The Rapid Alert System for Food and Feed (Rasff): annual report; 2007.
[22] www.epicentro.iss.it.
[23] www.ministerosalute.it.
[24] www.banchedati.ilsole24ore.com.
[25] www.corriere.it.
[26] www.repubblica.it.