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Norwegian health journalists' ability to report on health research: A concern to science education ?

Abstract

Newspaper reports of the recent health science research might be important in health promotion and for the readers' achievement of health literacy. However, such reports are often scientifically deficient and inaccurate. Through the use of a questionnaire and in-depth interviews, Norwegian newspaper health journalists were asked about their educational background, reporting ability and improvement needs, what their sources of health news normally are, and what counts as news – and why. The results showed that none of the health journalist questionnaire respondents (N = 20) had any qualification in the health or biological sciences. Most journalists expressed restricted knowledge of statistics and of the discourse of science, and many journalists stated a need for the improvement of their critical evaluation skills of health claims. The two journalist interview informants expressed that commercial communication bureaus were increasingly applied as sources of health research reports, and the selected health news must contribute to sales-success for the newspapers. To critically select and evaluate the health news from the various sources, health journalists in Norway probably need to improve their knowledge of biological science and statistics, as well as their critical thinking skills and critical health literacy. It is argued that in these improvement approaches, the journalists reporting on health might benefit from learning about the “nature of science.” Results are discussed in a science education perspective.

BACKGROUND AND QUESTIONS

The mass media (e.g. newspapers and web sites) provide the Western public with significant amounts of health information, but not all published health claims in the press are scientifically based. Press coverage of health stories are often inaccurate, superficial, or sensationalized (Klaidman, 1991; Wilkes, 1997). Scientists blame this problem on the press, claiming that reporters are careless about how they present the news. Reporters accuse the research community of obstructing, misguiding, or even failing to alert the press of important findings (Wiltse, 1992; Wilkes, 1997). In the American study by Hartz and Chappel (1997) it was shown that 77% of the studied science reporters did not quite understand the complexities of the scientific subjects they wrote about. Insufficient reporting on health issues can lead people to make misguided choices that may put their health at risk or influence policymakers to adopt inadequate or harmful laws, regulations, or politics (Norris & Phillips, 1994; Voss, 2002).

Traditionally, not all journalists are trained in the subjects they cover, and many have expressed that they want such training (McCleneghan, 1997; Voss, 2002). Voss showed that 83% of the studied journalists had received no training for covering health news. Vital skills for health journalists may include understanding complex health issues, finding reliable sources, presenting the social context of the research, producing balanced stories on deadlines, as well as interpreting statistics of the health research reports aimed at newspaper rewriting.

Much effort has been taken on the media's responsibility for replacing the sensational, "miraculous" and "breakthrough" health research coverage with a more balanced and accurate picture of the news (Lindenmann, Lyon and Nickelsberg, 1997; Myers, 1996). Studies have been conducted to determine the content and structure of health-related articles in newspapers (e.g. Mallow, 1991; Korpan, Bisanz, Bisanz, and Henderson, 1997; Pettersen and Solberg, 2003). Authors of popular press articles seem to include information about who conducted the study and the practical applications of the research, but they often omit information about methods and procedures used to conduct the research. Health journalists' requests for information to evaluate health news can be seen as a reflections of what educators have taught them – or failed to teach them – in the area of scientific evaluation skills.

However, health journalists' ability to succeed in the performance of scientific evaluation of health claims probably depends on their knowledge of biological science and statistics, as well as critical thinking skills and critical health literacy. Critical thinking can be defined as the intellectually disciplined process of actively and skilfully conceptualising, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action (Scriven and Paul, 1992). To achieve critical health literacy, teaching approaches should build individuals' capacity to think critically and equip them with skills to distinguish fact from opinion and to analyse health information carefully (Nutbeam, 1999).

Health journalists' achievement and appliance of biological science and statistical knowledge, critical thinking skills, and critical health literacy, might have a positive influence on the quality of the health news reporting process. However, there is little research information about from *which sources* the health journalists receive the health news, and *what counts* as newspaper health news. "Science in the media", as people call it, might represent the combined results of researchers' degree of "successfulness" in the process of mediating their findings to the media, and the journalists' interpretation and filtration of research results in the reports of interest, as well as the editors' final selection of stories (Wellington, 1991). Holliman, Trench, Fahy, Basedas, Revuelta, Lederbogen, and Poupardin (2002) have shown that few newspaper science stories were based on material published in scientific journals, while syndicated agency material and government reports were frequently applied as the sources of the news.

Many graduates of upper secondary school in Norway may wish to become journalists, something they can achieve with or without formal journalism education at the college level (personal communication with a Norwegian journalist). Science education studies have shown that many pupils often read press science articles, the article issues might initiate classroom discussions, and contribute substantially to the learning of science (Norris and Phillips, 1994; Korpan, et al. 1997). An explanation of this might be that the press often prints stories about *socio-scientific issues*, to which the pupils are more likely to be confronted with in their everyday life than many scientific issues taught in school (Kolstø, 2001). However, the current (health) science issues presented in the media are most often examples of "science-in-the making" and not "ready-made-science" (Latour, 1987; Kolstø, 2001). Considering these observations in a science education perspective, it might be significant to reflect on how school science teaching can contribute to the obtainment of critical evaluation skills of health research reports for the coming health journalists' and the young news readers.

The study reported in this article has explored Norwegian health journalists' abilities and engagement in reporting on health news. These four research questions describe the aim of the study:

- What is the qualification of Norwegian newspaper health journalists?
- What are the Norwegian newspaper health journalists' perceptions about their skills in reporting health news?
- From which sources do Norwegian newspapers receive the health news?
- What counts as health news – and why?

A health journalist questionnaire and in-depth interviews of two health journalists were applied to attain answers to these questions.

MATERIAL AND METHODS

Development of the health journalist questionnaire

In order to address the first, second and third research question, a 27-items health journalist questionnaire¹ with fixed answer alternatives was developed. The responding health journalists' gender, age, working experience and educational background were recorded. Likert scale-valued (1 = to a very small extent; 2 = to a small extent; 3 = neither/nor; 4 = to a large extent, and 5 = to a very large extent) questions about health journalists' critical evaluation skills and improvement needs highly dominated the questionnaire. One college teacher of journalism and two teachers of The Master Programme in Nutrition, Health, and Environmental Sciences performed peer review and pilot test of the questionnaire respectively, which did not cause any major adjustments of this survey instrument.

Questionnaire administration procedure and response rate

Fifty-three Norwegian newspapers, which probably is equivalent to about 80 % of the total number of daily newspapers in Norway, were invited to participate in this study during spring 2003. The selection criteria were: (1) the papers had to be published at least six times a week, (2) the daily circulation of copies had to be > 1000. Twelve of the 53 invited newspapers replied that they did not have health journalists employed. These same newspapers rarely presented health news reports. A web-site questionnaire (QuestBack™, 2000) was sent by e-mail to the editorial offices of the 41 positive responding newspapers, and forwarded to the health journalists. Questionnaire guidelines and information about the aims of the study were included in the e-mail. All returned questionnaires were treated anonymously.

A total of 20 health journalists from 19 newspapers responded to the invitation (after four e-mail reminders), which corresponded to a response rate of 19/41, or 46 %. The national population of active newspaper health journalists is probably not known. Newspapers from 10 of the 19 national counties were represented in this study. (The population of Norway is about 4.5 million people, dispersed throughout 19 counties.)

Because of the non-probabilistic nature of the sampling procedure, and the rather low response rate, attempts at inferential statistics and generalizations of results have been avoided in the analysis of health journalist responses to the questionnaire.

Interviews

Separate in-depth interviews of two Norwegian capital newspaper health journalists were performed subsequently to the questionnaire survey analysis. These capital newspapers are placed

¹The questionnaire is available at: <https://www.questback.com/isa/qbv.dll/ShowQuest?Preview=True&QuestID=189632&sid=W15O9K>

among the three largest in Norway. The daily copies (> 250 000) are distributed nationwide, and both papers quite regularly present health news of various complexity and layout standards. National newspapers often reproduce these two major papers' health coverage in abridged versions (according to oral communication with one of the interview informants). The in-depth interviews were conducted to explore additional information to the questionnaire respondents' answers to the third research question, and exclusively to answer the fourth research question of this article. The interview guide contained only two questions, which had basically the same wording as the third and fourth research questions. However, probes and follow-up questions were often used during the interviews. Both interviews were performed face-to-face at the journalists' work places, and lasted about 30 minutes each.

The transcripts of both interviews were analysed separately by qualitative research methods described by Kvale (1996): The process of analysis and development of categories were performed in four steps; (1) inspection of transcribed interviews, (2) coding: identifying views and opinions, (3) memoing: descriptions of tentative interpretations, and (4) developing and adjusting categories (e.g. "the health news sources" and "what counts as health news"). Three master students of Nutrition, Health, and Environmental Sciences assisted in the coding of the recorded answers and the interview transcripts. There were no interpretive discrepancies between coders during this process.

RESULTS

Questionnaire results

Demographics of the health journalist questionnaire respondents

Table 1 shows demographics of the 20 responding health journalist respondents. Nine and 11 were female and male health journalists, respectively. Most journalists were in their forties and fifties, and 16 had more than 11 years of experience in journalism. Twelve journalists had participated in newspaper health news coverage practices for more than six years. However, only nine journalists used more than 50 % of their working hours to cover health issues, whilst 11 journalists used less than 25 %. Twelve and six journalists were employed in newspapers, which have a daily circulation of 4000-50000, and 100 000-250 000 copies, respectively.

The sources of health news

Answers from the responding journalists indicated that the editorial offices quite frequently receive health news reports from various sources (4-15 reports a day indicated by 10 of the 20 responding journalists). In a decreasing order, these were the most frequently recorded sources selected from the list of fixed answer alternatives: Pharmaceutical industries (25%), Norwegian commercial communication bureaus (17%), healthy food companies (17%), comparative-alternative medicine practices (16%), international commercial communication bureaus (13%), and university/college research units (12%). However, six of the 20 respondents (30%) answered that they "largely" investigated and wrote reports on health issues themselves.

The explored health journalists' qualification, reporting ability and improvement needs

In table 2, the 20 responding health journalists' educational background is shown. Interestingly, none of these journalists were educated in the health or the biological sciences. However, eight journalists have a social science background. Ten have taken courses in journalism, and five have completed a journalism education at the college level. This implies that 15 of the 20 respondents have some education in journalism. The use of fixed answer alternatives and the "multiple single-select" function of the questionnaire computer program (QuestBack, 2000) demonstrated that the respondents have combined qualifications, as shown in table 2.

Table 1. Demographics of the responding health journalists and the daily circulation of copies of the participating newspapers.

Gender		Age		Years of experience in journalism		Years of experience in covering health news	
Male	Female	Age groups	n	Years	n	Years	n
11	9	20 - 30	3	0 - 2	2	0 - 2	6
		31 - 40	5	3 - 5	1	3 - 5	1
		41 - 50	6	6 - 10	1	6 - 10	5
		> 50	6	11 - 20	8	11 - 20	6
				> 20	8	> 20	2

Percentage of working hours spent on covering health news		Daily circulation of copies	
%	n	Copies	n
1 - 24	11	< 4000	1
25 - 49	0	4001 - 10000	4
50 - 74	1	10001 - 50000	8
75 - 99	6	50001 - 100000	1
100	2	100001 - 250000	2
		> 250000	4

Table 2. The 20 responding health journalists' educational background.

Qualifications	Frequencies n
High-school	11
Complete college education in journalism	5
Courses of journalism	10
Bachelor degree (or courses) in the Health Sciences	0
Master degree in the Health Sciences	0
Bachelor degree (or courses) in the social sciences	6
Master degree in the social sciences	2
Bachelor degree (or courses) in the biological sciences	0
Master degree in the biological sciences	0
PhD	0

The 20 health journalists were asked seven Likert scale-valued questions about their self-perceiving reporting skills and possible improvement needs, and their answers to the questions are shown in figure 1. On the assumption that there was no important difference in meaning when respondents either answered “to a very small extent” or “to a small extent”, or “to a large extent” or “to a very large extent” respectively, the corresponding 1+2 and 4+5 Likert-valued answers were collapsed and recoded into two “dichotomised” values, which were labelled “limitedly” and “largely”.

"In your health journalist practice":

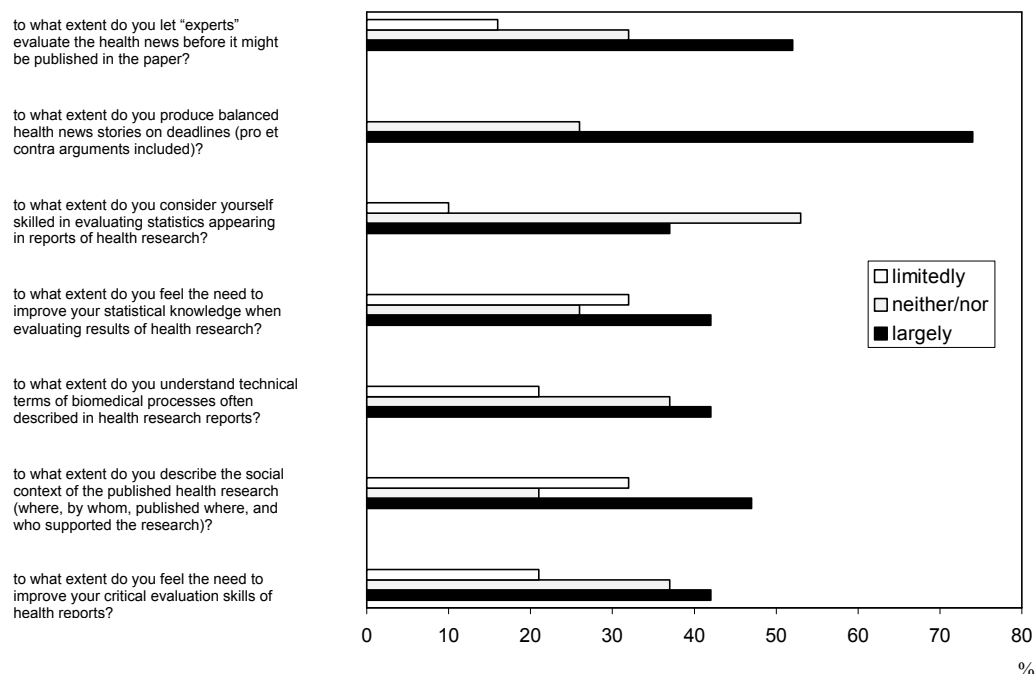


Fig. 1. The health journalists' (N = 20) perceived skills in reporting health issues.

About half of the respondents mentioned that they regularly contacted experts for validity reviews on the health research reports. Nearly three quarters reported to produce balanced stories on deadlines, extensively. Ten percent were not confident about understanding statistics, and 53 % were "moderately" confident. 42 % of the entire sample would like to improve their statistical knowledge and skills. One fifth of the respondents seemed to have problems with understanding the technical terms of science (e.g. formulas, concepts and the scientific discourse), which is often applied in health research reports. About one third did not provide descriptions of the social context of the health research. Interestingly, 42 % wanted to improve their evaluation skills of health claims, whilst 37 % were moderately confident about their skills. To six of the seven questions, there were no major difference in answers between the journalism-immersed respondents (n = 15), and the ones who were not (n = 5). However, as many as 78 % of the journalists in the first group expressed that they "largely" needed to improve their critical evaluation skills of health claims, as opposed to only 20 % of the journalists in the second group.

Interview results

Both interview informants were females in their forties. They have completed college education in journalism, and had more than six years of health journalist working experience. None of them had any college-level qualification in the health or the biological sciences.

Sources of health news

The two interviewed health journalists conveyed that a number of national commercial communication bureaus have entered the health-mediation market lately. Various institutions use these bureaus (e.g. medical and pharmaceutical industry, private clinics, and health research units) to promote their health issues to the media. The interviewees, denoted HJ1 and HJ2, describes it this way:

Most of the news agencies act professionally, but some of them can be very “pushy”. These people are often former journalists, who know all the ropes (HJ-1).

Each week, I receive about five or 10 phone calls from news agencies, who want to “sell” me health news (HJ-2).

Journalists quit their newspaper jobs and start working in the news agencies (HJ-2).

One of the health journalists criticized the news agency people for pretending to be objective:

What makes things a bit difficult for us, who really want to give any health report a fair trial, is whether the “objective attitude” of the news agency people is just in disguise of the real truth; that they’re reporting results from a rather small-scale study, or is it just a highly subjective health claim. The one who calls doesn’t tell us who is paying him (HJ-2).

On the other hand, lobbying health issues might have an unwanted effect on health journalists; their scepticism towards news agencies could cause rejection of valuable health news:

Rejection of interesting material has actually occurred just because we were too sceptical about the source. Everyone who is into the news agency business right now should be aware of this tendency (HJ-2).

However, if you are too sceptical about the sources of health news it could probably make journalist work rather complicated:

Nowadays, you are under influence by all kinds of media. One cannot be sceptical about everything all the time (HJ-2).

The interviewed health journalists expressed that before they published any health news, the information must be validated, especially when the news were so-called “big and controversial”:

Our sources check almost all stories beforehand. We seldom receive critical comments from “the experts” on our published stories (HJ-1).

To picture reality, we are instructed to collect information from different sources (HJ-2).

WHAT COUNTS AS HEALTH NEWS - AND WHY

According to the interviewed journalists, the newspaper editor normally decides which current health issues that should come into focus. However, these health-foci must sell papers. “Death and depravation” and “women’s sex-life” are probably two potential sales-success topics:

Death and depravation sell! We must be commercial; that’s how we make our living (HJ-1).

From now on, we will frequently print stuff about cancer; at least once weekly cover story, actually (HJ-1).

Women’s sex-life sells! Health news that attracts women’s attention is commercially interesting. Therefore, we try to “feminize” the paper’s health issues (HJ-1).

When presenting health news topics, the use of personal narratives is effective:

Tabloids normally use a testimony as the story introduction – it works better that way, pedagogically. People prefer reading stuff which contains in detail descriptions of individuals' real life experience – that really attracts readers' attention (HJ-1).

One of the informants told that the news audience might expect tabloid coverage of health issues:

I believe most people are getting used to – or even expect sensational headlines from the tabloids. Besides, people react rather differently when the health news is the cover story, and when it's put somewhere inside the paper (HJ-1).

This informant also mentioned that the smaller health news briefs are quite often presented in accordance with the original text. However, when journalists have to leave out words because of space limitation, the deletion of words is possibly performed subjectively. Most journalists might truly be aware of the news brief content deficiencies (; lack of scientific topic codes), but the informant believed that health care professionals were trained to expose such deficiencies:

If significant text-material has been deleted, the health journalists have surely not done it deliberately to hold back information on the research. However, the printed news briefs do not regularly contain incorrect information. The news briefs might sometimes be scientifically deficient, alright, but I believe the health care professionals are able to expose these deficiencies (HJ-2).

In sum, the following six issues emerged from my interpretations of the interview answers:

- (1) Former newspaper journalists, who now work in commercial communication bureaus (CCB), are eager to "push" health news to the papers.
- (2) The evaluative scientific contents of the CCBs' health reports might be limited.
- (3) The health journalists themselves might leave out evaluative scientific information from the CCBs' health reports.
- (4) Although health journalists might be generally sceptical about the CCBs, it is not possible to always ignore the CCBs' offers.
- (5) Health issues must have a potential for newspaper sales-success in order to be published.
- (6) Female newspaper readers might be the target group for health.

DISCUSSION

Questionnaire results of this article showed that none of the health journalist questionnaire respondents had any qualification in the health or biological sciences. Most journalists expressed restricted knowledge of statistics and of the technical terms applied in health research reports, and many journalists required improvement of their critical evaluation skills of health claims. The most important information gathered from the two journalist in-depth interviews was: a) Commercial communication bureaus are increasingly applied as the immediate sources of health news, and came second (and fifth) on the health journalist questionnaire respondents' ranking list, b) the paper versions of selected health news often (and deliberately) do not contain much evaluative scientific information, c) the health news stories must preferably contribute to sales-success for the paper, and d) female readers seem to be the target group of the health stories. In the following sections, some specific findings are discussed.

Health journalists' qualifications

In this Norwegian study, one might suspect the responding health journalists' poor qualifications in the health and the biological sciences to be a main reason for the many journalists' limited knowledge of the science discourse in health research reports. Minor emphasis on statistics in courses and college education in journalism might explain the majority of the journalists' wish to

improve their knowledge and skills in statistics. These findings are in accordance with results of the study by Voss (2002), who explored samples of American health journalists' (N = 115) perceived reporting ability. No significant differences in perceived ability were found with regards to training or newspaper size, but respondents with less experience reported higher perceived ability. Voss concluded that reporters' difficulty in understanding complex health issues and interpreting statistics might be an effect of inadequate training. Such training is probably not easily acquired through just on-the-job experience; reports of clinical trials, for instance, usually consist of detailed descriptions and presentations of the sampling procedure and the statistical tests applied. Such knowledge and appurtenant evaluation skills are probably exclusively achieved through courses in research methods, which should be part of the health journalists' qualification.

However, while specialisation in health journalism seems to be frequently available to students of journalism education in America, this is not the case in Norway. Until now, just brief college courses of health journalism have been the only offer to the health journalists in Norway (college teacher of journalism education in Norway; personal communication).

The health journalists' perception about their skills

Many of the responding health journalists seemed to be aware of their lack of proficiency, and they also seemed to want to improve their skills. It is especially noticeable that about 40 % of the respondents wanted to improve their statistical knowledge and critical evaluation skills of health reports. In the process of selecting and evaluating health research reports, health journalists' knowledge about the "nature of science" (NOS) might be significant. In broadest terms, the meaning of the concept NOS is those ideas someone has *about* science, rather than scientific knowledge: how the body of public knowledge called science has been established and is added to; what our grounds are for considering it reliable knowledge, and how the agreement which characterizes much of science is maintained (Driver, Leach, Millar & Scott, 1996). Although one of the informants believed that health care professionals were able to expose scientific deficiencies of health news, Pettersen and Solberg (2003) have demonstrated that students in their final year of Health Science educations in Norway made very few requests for important evaluative scientific information to highly scientific deficient news briefs about health issues. If considering this finding in a critical health literacy perspective, these students might not been taught *what* to request *for*, and consequently; they might not be satisfactory skilled in distinguishing scientific evidence-based health information from lay health claims. If this also is the case to many health journalists in Norway, it is probably critical. In my opinion, both present and future health journalists need knowledge about features of scientific research publications and the validity standards of scientific knowledge. One third of the respondents did not seem to describe the social context of the health news. The prestige and possible bias related to who did the research or funded it and where it was conducted or published, is also important evaluative information to the reader of health news. By adding evaluative scientific information to the news, improvement of the readers' critical health literacy might be a beneficial outcome.

As mentioned above; more than half of the journalists expressed they did not quite understand the technical terms of science in health research reports. Again, such understanding is probably not easily acquired through just on-the-job experience; the health journalists need some training in the health and the biological sciences to be on top of this issue.

The sources of health news

Most media consumers probably realize that the work of commercial communication bureaus' is serving somebody's interests. Therefore, the commercial communication bureaus' "pushing" of health research reports to the newspapers, is challenging. For the attainment of critical health literacy, it might be significant to inform the media audience about the *immediate* and the *primeval* sources of the news (e.g. the names of the news agencies and the research institutions, respectively). Detailed description of the social context of the conducted research, especially when the reported results have evolved from just one single study, might be appropriate. The typical news-

paper-phrase: “Researchers have demonstrated ...” does not necessarily imply that “The Truth” has finally arrived. The results should rather be mentioned as “science-in the-making” (Latour, 1987; Kolsto, 2001). Apparently, in any research community, dissension to research findings and conclusions is normal, which also pictures the NOS. The dissension in itself might explain the many reports of health science research generated in society – and each study truly aims to reveal “the truth”. The health journalists need to describe the intrinsic uncertainty of research results. If not, journalists’ account of any health research results as “facts” might still be the dominating health news message in the papers.

Many researchers highly disagree on the suggested solutions and causality of present health issues. The loud mode of expression often used by the researchers when showing their disagreement might sound rather offensive and hostile to uninitiated persons of the health science research community. However, these scientific discussions are essential to the validation process for establishing new scientific-based health knowledge. If the health journalists and the news audience are not informed by the journalists about this disagreement and the controversial side of health science research, mistrust in any scientific research activities and results might be the sad consequence.

What counts as health news – and why?

The desire for sales-success might be the main purpose of the newspapers’ health news coverage. Frequently presenting sensationalized versions of the same health topic – with the female audience as the possible target group – seems to be the strategy. In this approach, many health journalists’ willingness to apply critical and scientific evaluation skills, could be suppressed.

Newspaper coverage of health science issues – with its occasional portrayal of health research as a cutting-edge, dramatic activity – may be in conflict with a school health science curriculum, and with the perspectives from the philosophers of science and science educators aiming to convey a more accurate and enhanced picture of (health) science research activities (Korpan et al. 1997; Norris and Phillips, 1994; Pettersen and Solberg, 2003). However, there is no subject clearly addressing the teaching of the philosophy of science and research methods in Norwegian compulsory upper secondary school (Skolenettet, 2003). Education in these issues is only available to students in higher education. Therefore, one might suspect that many “on-the-job-experienced” health journalists and health news consumers do not have the sufficient knowledge about the NOS to evaluate health claims satisfactory. However, this possible weakness of health journalists in Norway does not discharge them for the responsibility to select and publish health news by scientific quality standards. If continuing to present reports of health science research as normative “facts”, the scientifically “illiterate” news audience might be harmed, especially if they tend to believe in every message, uncritically.

The concept “health freedom” is often used in politics and health practises to legitimise the right to publish non- and pseudoscientific health claims in the media (Jarvis and Barrett, 1995). However, the media must be aware of the consequences when covering pseudoscience, e.g. the use of theories that cannot be tested, the use of ad hoc hypotheses, the selective use of data, presenting anecdotes and myths as evidence, etc. (Sampson, 1995; Giuffre, 1997). Pseudoscientific activities are in contrasts with the NOS. When publishing pseudoscience in the media – in a scientific wrapping – it might undermine the status of serious scientific reports, which in turn might highly confuse the audience. By confronting both pseudoscientific and scientific texts in journalism education, the future health journalists’ skills in exposing pseudoscience and understanding of the discourse of science might be improved. This approach could have a sustainable effect on their scientific evaluation skills of health claims.

VALIDITY OF THE STUDY

In this report, the health journalist questionnaire was distributed to the newspaper editors’ office as an e-mail attachment. The relatively low response rate (46 %) could be explained by the anxiety

of in the invited newspaper health journalists' for not being totally anonymous when they answered this emailed questionnaire (although they definitely were). On the other hand, the journalists who "dared" to compromise themselves in this way might have been honest. Therefore, the reliability and the validity of the questionnaire results might be satisfactory. Since this study has included a rather limited number of journalist respondents, the use of sample statistics and results generalizations has been avoided. However, the results of this study probably demonstrate some trends and patterns which could be valuable to further research into the field of health journalism.

IMPLICATIONS FOR SCIENCE EDUCATION

Newspaper science may sometimes be in conflict with a formal science curriculum aiming to convey a more accurate picture of science. For making adequate interpretations of the newspaper health news messages, pupils have to use their knowledge in science and critical evaluation skills of health claims. Both qualities could, however, be improved if newspaper health news and health research articles were applied as teaching materials in the classroom, and the scientific topic codes mentioned earlier were requested in these materials by the pupils. Intrinsic to this approach, teaching pupils about the NOS and some essentials of statistics might be appropriate. This teaching approach should preferably be incorporated in science teacher education.

Another effect of such an approach to pupils' obtainment of critical evaluation skills might be that the coming health journalists are equipped with the healthy scepticism which will enable them to critically consider their sources of health news.

CONCLUSION

In Norway, newspapers seem to experience a large pressure from institutions who try to "sell" them health news. To meet this trend, health journalists in Norway probably need to improve their skills in performing scientific evaluation of health claims. Statistical and NOS- knowledge are presuppositions to such skills. The newspapers themselves probably give in to this "pressure" by frequently publishing health research reports as news, often in an unevaluated, sensationalized and tabloid wrapping, which apparently seems to be readers' expectation. Potential sales-success seems to be the selection criteria of the health research reports rather than the scientific content quality. However, this possible strategy might not contribute substantially to the readers' critical health literacy, which should be the educational purpose of the newspapers' health news coverage.

ACKNOWLEDGEMENTS

I thank journalism professor Harald Hornmoen and public nutrition professor Ingrid Barikmo for highly valuable discussions and advice during the questionnaire development. This study also benefited from the comments of clinical dietician professor Asta Bye, and the service people at the QuestBack™ "help desk". The entire research project was financially supported by Akershus University College, Norway.

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