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## Short Communication

# Clinical evidence vs preliminary speculation in newspaper coverage of diabetes innovations: a quantitative analysis



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## ABSTRACT

**Objectives:** Researchers have discussed that journalistic reporting of medical developments is often characterised by exaggeration or lack of context, but additional quantitative evidence to support this claim is needed. This study introduces a quantitative approach to assessing coverage of medical innovations, by aiming at provided references to observed clinical effects. Although observed clinical effects reflect increased chances for future medical applications, it is unknown to which extent newspaper articles refer to it when spreading health information. We aimed to assess, over a 6-year period, newspaper publication characteristics of diabetes innovations, arising from all scientific areas of interest, regarding the total count and the proportion of articles that provide references to demonstrated clinical efficacy.

**Study design:** Quantitative content analysis of newspaper articles covering innovative treatments for diabetes.

**Methods:** We performed a systematic review of newspaper articles between 2011 and 2016 printed in the largest six Dutch newspapers. By assessing in-article references, it was possible to quickly distinguish between (1) articles that referred to actual clinical efficacy demonstrated in a scientific setting and (2) articles that presented either predictions, fundamental research, preclinical research or personal experiences and recommendations. Proportion differences between scientific areas of interest were analysed using the chi-squared test.

**Results:** A total of 613 articles were categorised. Total newspaper publication frequency increased with 9.9 articles per year ( $P = .031$ ). In total, 17% of the articles contained a reference to any proven clinical efficacy. Articles about human nutrition science (7%;  $P = .001$ ) and (neuro)psychology (4.3%;  $P = .014$ ) less frequently provided a reference to actual clinical efficacy.

**Conclusions:** Our findings show that less than one in five newspaper articles about diabetes research contains a reference to relevant clinical effects, while the publication count is increasing. These statistics may contribute to feelings of false hope and confusion in patients.

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Diabetes innovations like the artificial pancreas receive extensive media coverage,<sup>1</sup> but the adequacy of media coverage is not always guaranteed. Medical scientists argue that news is often hampered by exaggeration and lacks context.<sup>2,3</sup> Regardless if health journalism is sloppy or intentionally fake, invalid claims pollute public health information and threaten individual decision-making.<sup>4</sup> Unrealistic expectations of treatment may evoke rejection of other modest but achievable goals.<sup>5</sup>

In media, also non-medical professionals recommend unusual ways to combat diabetes and its symptoms. Real examples are in economy sections ('We grow micro-vegetables that treat diabetes') and recipes ('Adding cinnamon lowers glucose levels'). A significant public interest in lifestyle improvements blurs the border between serious diabetes news and messages that lack scientific proof of their therapeutic concept.

Quantitative evidence regarding characteristics of diabetes coverage is lacking but is crucial to obtain an objective picture of news quality. We conducted a systematic review of Dutch newspaper articles published in a 6-year period. Our goal was three-fold. First, to find a possible trend in diabetes coverage, we quantified the number of articles that contained news, tips, speculations or predictions about innovative treatments for diabetes (all types). Second, to estimate the proportion of viable medical developments covered in the news, we assessed if claims were supported with in-article references to proven clinical efficacy in patients. Third, to explain a possible lack of references to clinical efficacy, we distinguished between scientific areas in the news reports.

We performed a quantitative content analysis of Dutch newspaper articles published between January 2011 and December 2016. The LexisNexis database was searched for paper-printed newspaper articles from the six largest national newspapers in the Netherlands. Keywords were 'diabetes' in combination with Dutch words, referring to the development of medical innovations: therapy, treatment, science, development, expectation, hope, optimism, breakthrough, innovation, revolutionary, life-saving, intervention or possibilities. This resulted in the extraction of 2699 articles that were manually scanned for describing (a) potential relationships of a substance, method, environmental condition, behaviour or medical device, with medical diabetes outcomes (e.g. insulin susceptibility, quality of life, weight) or with diabetes risk outcomes (e.g. 'stevia prevents diabetes'), (b) foreign treatments that were not registered or reimbursed in the Netherlands or (c) forecasts of future scientific developments. Articles solely describing an available standard therapy were not included. Duplicate articles were removed, but different articles about one topic were assessed individually. Thus, 613 articles were included, ranging from news texts and background articles to interviews, columns and lifestyle features, covering diabetes innovations as the central topic or mentioning them in passing. The six newspapers were treated as a single group because of high similarities in genres, audience and self-proclaimed journalistic roles.

References to empirically demonstrated clinical efficacy were confirmed when two conditions were satisfied: (1) the article indicated that medical outcomes or biomarkers were

positively affected in at least one patient; and (2) the article specified the scientific environment in which efficacy was measured in a systematic and controlled manner (i.e. name of a university, scientist, study, academic journal or industrial R and D department). The combined outcome measure distinguishes health claims with a reference to any proof of its theoretical concept<sup>6</sup> from earlier research (e.g. preclinical, observational) and speculation.

Approximately 90% of the articles fitted five scientific areas: (a) pharma, biomedical and genetics research; (b) human nutrition sciences; (c) human movement science; (d) medical devices and information and communication technology (ICT); and (e) (neuro)psychology. Furthermore, we created a group called 'other' to categorise the remaining topics, including surgical procedures. Statistical analyses were performed using SPSS software. Statistical significance was defined as  $P < .05$ . Frequency differences were tested with chi-squared calculations. Linear regression slope was calculated to find a possible increase or decrease in articles.

We found that, annually, the six largest Dutch newspapers together publish on average 102.2 ( $\pm 21.7$ ) articles about innovative ways to diagnose, treat or prevent diabetes (Table 1). This number increased by 9.9 articles per year ( $P = .031$ ). Only 17.0% of the diabetes treatments were supported by references to clinical efficacy (Table 1).

Most reported innovations arose from 'human nutrition sciences' (30.3%) and 'pharma, biomedical and genetics research' (26.9%). Less contributing groups were 'medical

**Table 1 – Publication count of innovative methods to treat diabetes, and references to actual clinical efficacy (CER), in the largest six newspapers in the Netherlands: total, by year and by scientific area.**

| Characteristics                       | Articles (%)     | CER %             |
|---------------------------------------|------------------|-------------------|
| Total                                 | 613              | 17.0              |
| Year                                  |                  |                   |
| 2011                                  | 83               | 20.5              |
| 2012                                  | 72               | 27.8              |
| 2013                                  | 112              | 16.1              |
| 2014                                  | 107              | 14.0              |
| 2015                                  | 106              | 17.9              |
| 2016                                  | 133              | 11.3              |
| Trend                                 | 9.9 <sup>a</sup> | -2.2 <sup>b</sup> |
| Scientific area <sup>c</sup>          |                  |                   |
| Pharma, biomedical, genetics research | 165 (27)         | 25.5              |
| Human nutrition science               | 186 (30)         | 7.0 <sup>d</sup>  |
| Human movement science                | 51 (8)           | 17.6              |
| Medical devices and ICT               | 78 (13)          | 28.2              |
| (Neuro)psychology                     | 46 (8)           | 4.3 <sup>e</sup>  |
| Other                                 | 87 (14)          | 18.4              |

Statistically significant  $P > .05$  is shown in bold.

ICT, information and communication technology.

<sup>a</sup>  $P = .031$ ; two sided.

<sup>b</sup>  $P = .107$ ; two sided.

<sup>c</sup> Different CER between all groups ( $\chi^2 [5] = 33.9$ ;  $P < .001$ ).

<sup>d</sup> Different vs other groups combined ( $\chi^2 [1] = 18.9$ ;  $P < .001$ ; two sided).

<sup>e</sup> Different vs other groups combined ( $\chi^2 [1] = 5.6$ ;  $P = .014$ ; two sided).

devices and ICT" (12.7%), 'human movement sciences' (8.3%) and '(neuro)psychology' (7.5%).

Referencing differences between all scientific areas was significant ( $P < .001$ ). Also, articles about nutrition less frequently referred to efficacious (diet)therapies (7.0%;  $P < .001$ ) when compared with all other groups combined. Furthermore, also articles in the category (neuro)psychology less often contained references to clinical efficacy (4.3%;  $P = .042$ ) when compared with all other groups combined. No other differences were found.

The sheer number of diabetes publications is in line with the large quantity of diabetes information observed in US newspapers.<sup>1</sup> Its increase corresponds to the population's increasing interest in lifestyle-related information.<sup>7</sup> Regardless of content and tone, large news volumes about a topic affect immediate examples that come to patients' mind and influence risk perception.<sup>8</sup>

Our data show that the availability of empirical evidence for clinical efficacy is not conditional for communicating innovative diabetes treatments in Dutch newspapers. Less than one in five newspaper articles provided any references. The lack of actual evidence may have undesirable consequences on patients' hope, confusion, and, perhaps, on health decisions.<sup>4</sup>

Especially, nutrition-related messages lacked reference to experimental evidence for diet modifications. The difference is explained by the frequent dissemination of observational study results demonstrating relationships between nutrition and health and unintentionally stimulating rumours about diets. The absence of references in articles covering (neuro)psychology is, to a great extent, explained by fundamental research on sleeping patterns and stress.

Many journalists share a sense of responsibility to care for audiences and improve their well-being.<sup>9</sup> Reporting facts instead of disseminating opinion improves this.<sup>10</sup> However, the journalistic system is under pressure. Firm deadlines, together with increasingly sophisticated medical studies, compromise the correctness of health claims. Moreover, while specialist health journalists still emphasise interpretation over facts and, therefore, guide readers' understanding of medical numbers and figures, such contextualisation is often absent in generic journalism.<sup>10</sup> The resultant large amounts of fact-free news about diabetes may pollute public perceptions and people's trust in medical innovation.

More analyses are needed to assess trends in online media. Observational and experimental studies should examine the

potential effects of factual and fact-free health claims on diabetic patients' emotions, cognition and behaviours.

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## Author statements

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None declared.

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