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Words or numbers? Communicating harms in written consumer health information: a systematic review and meta-analysis

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Background

Misleading information on the risk of adverse effects of drugs or other medical intervention can lead to misinterpretation of benefit and harms of medical treatment. One mechanism that could lead to misinterpretation of the risks of adverse effects is the use of words in communicating their frequency.

Objective

To summarize the evidence on comparative effects of verbal versus numerical communication of the frequency of adverse effects.

Methods

A systematic review and meta-analysis.

Inclusion criteria were: (1) study design: randomised controlled trials (RCTs), (2) outcomes: interpretation of probability, comprehension, recall, satisfaction, impact on decision, likelihood of treatment utilization, adherence and psychological outcomes (e.g. anxiety); (3) context: treatment effects communicated through written health information and (4) language: studies published in English or German.

We searched MEDLINE, EMBASE, PsycINFO, CINAHL, ERIC, DARE, the CDSR, CENTRAL and the Campbell Library up to November 2012.

Search results

Seven articles including ten studies met our inclusion criteria. All studies were randomised controlled trials, many of which used a factorial design. They all compared verbal and numerical or combined formats in communicating the frequency of adverse drug effects. The studies were all conducted by two groups of authors from the UK, who were interested in evaluating the effects of the nomenclature used in drug package inserts in the European Union. Thus, the verbal descriptors that were studied in the trials were: very common, common, uncommon, rare and very rare.

Risk of bias of the included studies varied from low to high. Methods of sequence generation and allocation concealment were frequently not reported. Follow-up was complete for all outcomes. There were no signs of selective reporting.

Results

Estimation of probabilities

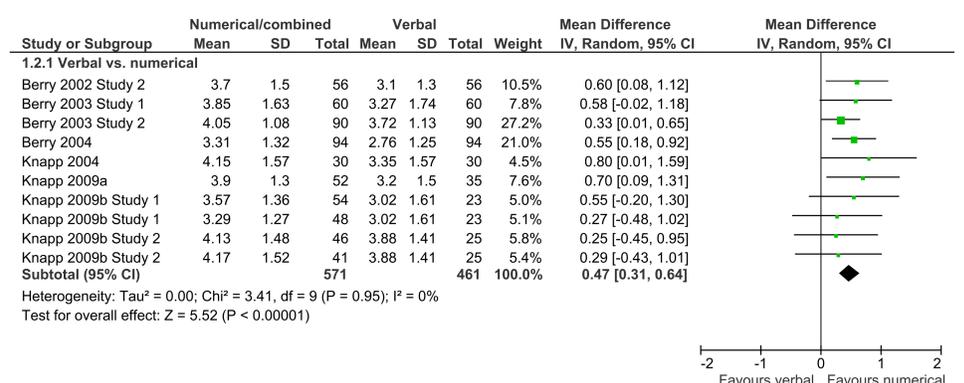
After the information was presented in either numerical or verbal form, participants were asked to estimate the risk that they would have this side effect. The verbal descriptors used for communicating frequencies of adverse effects systematically led to an overestimation of the probability of adverse effects (range of means: 3% to 54%). Interestingly, numbers also led to a slight overestimation of probabilities (range of means: 2% to 20%).

Example: Risk estimates for “common” in the different studies (actual frequency marked in red):

| Common | Verbal | Numerical |
|-------------------------------------|--------|-----------|
| Tamoxifen (cancer therapy) | 49 % | 12 % |
| Cataract (3%) | | |
| Simvastatin/Atorvastatin (statin) | 34 % | 8 % |
| Constipation (2,5%) | | |
| Epidoxin (skin infection) | 58 % | 19 % |
| Nausea, vomiting, diarrhoea (1-10%) | | |
| Taxol (cytostatic) | 62 % | 30 % |
| Muscle and joint pain (10%) | | |

Satisfaction

Satisfaction with the information provided was consistently higher in groups who received a numerical description of the frequency of adverse effects compared to a verbal description (MD: 0.47 [CI: 0.33, 0.61], I² = 0%, p<0.00001)



Likelihood of occurrence

Participants who received a verbal presentation of the frequency of adverse effects thought they were more likely to occur than those who received numerical information. Very Common: (MD: 0.80 [CI: 0.24, 1.37]; I²=85%, p=0.006); Common (MD: 1.39 [CI: 1.05, 1.74]; I²=0% (P=0.00001); Rare: (MD: 0.90 [0.30, 1.50]; Heterogeneity: Not applicable (P=0.003).

Intention to take or continue to take medicine

Participants who were presented with numbers, stated that they were or would be more likely to take or continue taking the drugs which were suggested to them (MD for very common side effects: 1.45 [CI: 0.78, 2.11], p=0.0001, I²=68%; MD for common side effects: 0.90 [CI: 0.61, 1.19], p<0.000001, I²=1%; MD for rare side effects: 0.39 [0.02, 0.76], p=0.04, I²=not applicable).

Impact of information on decision

Verbal presentations of adverse effects had a larger impact on the decision to take the drugs than numerical presentations (MD: 0.52 [CI: 0.22, 0.82], p=0.0007, I²=0%)

All outcomes were measured on a 6-point Likert scale, suggesting small to moderate effects.

Discussion

This systematic review provides evidence that verbal descriptors commonly used to communicate the frequencies of adverse effects in written health information including “very common”, “common”, “uncommon”, “rare” and “very rare” lead to an overestimation of the probability of adverse effects, when they are used as recommended in the Guidelines of the European Commission. Interestingly, numbers also lead to a slight overestimation. Furthermore, people seem to be more satisfied with numerical presentations and that they would be more likely to take the drugs or continue taking them. This may be important for the development of health information, considering that one of the main reasons that people do not take their medicine as prescribed may be general concerns about drugs.

Limitations

None of the studies measured actual behaviour or health outcomes. Many studies were conducted with healthy volunteers and used fictional scenarios.

Implications for providers of patient information

Our review suggests that – whenever possible – treatment effects should be quantified numerically, because they lead to better estimates of risks and more satisfaction with the information. Although we cannot rule out that there might still be a role for verbal terms in written information, for example for people with difficulties in understanding numbers, or when large amounts of numbers make information too difficult to comprehend.