

**INTERNATIONAL LITERATURE REVIEW ON PERCENTAGE DAILY
INTAKE LABELLING**

USA Studies

In the USA, the Nutrition Labelling and Education Act (NLEA) was passed in 1990 and new food labels containing percentage daily values (%DV) were introduced in 1994¹. A number of studies conducted during the 1990's investigated the use and understanding of % DV.

Lewis and Yetley (1992) reported a focus group study in which four groups considered various ways of presenting %DV information – bar graphs, pie charts, adjectival descriptors and the numeric format. Overall the numeric format was preferred, as this required less work for participants to interpret compared with graphs and charts. Some respondents had difficulty in interpreting percentage values. Respondents were divided as to whether the reference value should be expressed as a percentage or as the quantity established as the reference value.

Levy et al. (1992) reported a study in which 1460 primary shoppers evaluated five label formats. The “control” format included figures for macronutrients per serving and percentage of the reference daily value for micronutrients and the “control/Daily Reference Value” (DRV) format added the DRVs for six nutrients. The other three formats included *adjectives* (high, medium, low) for all nutrients, %DV for macro- and micronutrients and *bar graphs* for %DV data. Results suggested that the inclusion of the %DVs increased the time respondents took to compare two products, although the accuracy of the task was similar to the “control” and “control/DRV” formats. Although the format with adjectives was most preferred, the control format performed the best in terms of accuracy of responses and time taken to complete the task of comparing two products.

In a series of studies by Burton and colleagues (Burton and Biswas 1993, Burton et al. 1994, Burton and Andrews 1996), primary grocery shoppers were asked to evaluate various label formats, via a survey. Overall the studies indicated that the inclusion of %DV values did not result in a significant improvement in participants differentiating between a more or less healthy food product, compared with the pre-NLEA label.

Levy et al. (1996) extended the earlier study by including a larger range of label formats and increasing the range of performance tasks. Seven label formats were tested (control, control/DV, adjectival, grouping, highlighting, percent/DRV (%DVs for macro and micronutrients, reference values for macronutrients and gram amounts/serve), percent (%DVs for macro and micronutrients, reference values excluded)). Using the shopping intercept method, 1216 shoppers were asked to compare two products, judge product healthiness, verify claims, estimate servings needed to meet the daily requirements for a nutrient and to balance nutrients in a daily diet. The percent format was the best overall in terms of performance. When respondents were given a brief explanation of %DV, their ability to answer subsequent questions was only better for one task of five tasks, compared with those not given the explanation. The inclusion of reference values did not improve performance on label-use tasks suggesting that consumers tend to use information in the form that it is

¹ Note that in the USA and Canada, %DVs are included in most NIPs for fat, saturated fat, carbohydrate, dietary fibre, cholesterol, sodium, vitamins and minerals. %DVs for protein (except when there is a claim) sugars and energy are **excluded**. Data are given for each nutrient on a per serve basis but not per 100g. Reference values for fat, saturated fat, cholesterol, sodium, total carbohydrate and dietary fibre are included in a footnote on the nutrition facts panel except on small packages.

presented and not transform it. As in the earlier study (Levy et al. (1992)), respondents' views of which format would be most useful did not predict actual performance. Respondents tend to say they want the largest amount of information offered but this does not necessarily result in improved accuracy in label use.

In 1996, Barone et al. reported a study in which 127 undergraduate students were required to evaluate six labels after receiving some education on nutrition labels. The main objective of the study was to examine the impact of reference information (3 levels: none, %DV, average brand) on respondents' perception of product healthiness. The presence of %DVs appeared to help respondents evaluate the products dietary fibre content more accurately but reduced the accuracy of the respondents' judgements of the sodium content. The authors suggested that this confusion (even after some education) highlights the need for consumer education about %DVs.

Data collected in 1995/96 indicated that only 39% of 1450 respondents interviewed via a telephone survey said they usually read %DV from fat information on nutrition labels (Neuhouser et al. 1999). Respondents who believe that there is a relationship between diet and cancer were more likely to read %DV for fat. Overall there was a significant relationship between reading nutrition labels and eating a lower fat diet. The authors concluded that there is a need for further education on consumer use of %DV.

Levy et al. (2000) investigated the understanding of %DV in a survey of 104 respondents conducted in 1995/96. The questionnaire included questions on the definition of %DV for fat, the importance of %DV in relation to other information included on labels and whether respondents could use %DV to select foods. Only 29% of respondents correctly defined %DV for fat, and only 10% of respondents said that %DV was most useful for assessing fat content. In addition, only 20% of respondents could correctly state how %DV could be used to select a diet low in fat. Fifty percent of respondents said they use %DV to select foods with less than 30% calories from fat suggesting they do not understand %DV. Given the confusion with %DV, the authors suggested a set of criteria be developed for evaluating foods using %DV.

In the 1996 Food Marketing Institute/Prevention Magazine Survey, 82% of 1000 shoppers claimed to have seen the %DV information on nutrition information panels (FMI/Prevention, 1996). However, only 43% understood the meaning of a DV for fat of 5%. Even among the "healthy" eaters, only 50% could accurately interpret %DV for fat.

The use and understanding of food label information amongst 27 women with non-insulin-dependent diabetes mellitus was investigated (Miller et al., 1997). Focus groups and face-to-face interviews were carried out. Participants did not consider %DV to be useful because of the belief the figures did not apply to them and that percentages were confusing. Almost all respondents overlooked the information presented in the footnote of the nutrition facts panel. Misconceptions relating to %DV include: %DV relating to the nutrient in the entire package; product with the highest %DV is the nutrient that is present in the highest amount in the product.

Li et al. (1997) reported a study which investigated the impact of nutrition knowledge on the understanding and use of %DV labelling. Two hundred and five students were exposed to one of four test labels (higher nutritional value (no %DVs), lower nutritional value (no %DVs), higher nutritional value (with %DVs), lower nutritional value (low %DVs)). In addition half the respondents read three pages designed to educate them about %DVs. The students were

asked to evaluate the healthiness of the product using a 9-point scale. Following the evaluation of the test label, respondents completed a questionnaire and were asked to evaluate the healthiness of another product and respond to specific questions on %DVs. Results indicated that those participants who received the education were better able to evaluate a product's healthiness and better understand %DVs compared with those who did not receive the education. While this is not a surprising result, it is of interest since in the USA %DVs have been promoted as providing a nutritional information environment that is more easily understood by less knowledgeable consumers. If this was the case then the effect of the education given in this study would be less marked for the interpretation of the label with %DVs compared with the pre-%DV label, which was not the case. Rather than creating information less dependent on how much consumers know, the label with %DVs has seemed to have increased the importance of educating consumers about nutrition labelling.

Kristal et al. (1998) compared the use of nutrition labels before (1993) and after the introduction of the new label requirements (1996) using phone surveys. In 1993, 75% of respondents said they usually or sometimes looked for % calories from fat, while in 1996, 62% of respondents said they usually or sometimes looked for %DVs for fat. Overall, use of nutrition labels increased over the study period; however 70% respondents said they wanted labels to be easier to understand.

In 1998, 884 adults were interviewed about awareness, knowledge and use of nutrition labels (Cotugna and Vickery, 1998). Only 31% of respondents said they use %DV information and more than half of those who used the information were under 40yrs. More educated respondents were more likely to use %DV information. Of those who reported using %DV most did so to monitor fat intake.

A small focus group study reported that few participants used %DV (US Food and Drug Administration, 2004). They either did not understand the meaning or thought it was not relevant to them since they did not consume a 2000 calorie diet. Those that did or might use it thought it was a good way to estimate how much of a particular nutrient they were eating or to gauge a healthy and balanced diet. The use of %DV for calories is to be explored further as one option for increasing consumer awareness of energy intake.

UK Studies

In the UK, nutrition labelling is only required when a claim is made and otherwise is optional. Values are typically presented per 100g and per serve. Guideline Daily Amounts (GDA) for calories, total fat and salt were initiated by industry in 1998. Percentage GDAs have increasingly been used by various companies in a range of formats, particularly on the front of packs.

A quantitative study (2406 interviews) was undertaken by the Food Standards Agency (Food Standards Agency, 2003) to investigate consumer understanding of and preference for, five label formats (current label (energy and core nutrients expressed per 100g and per serve), 3 new label designs including GDAs, and the USA format)). Overall, the existing label format was considered the best in terms of performance. Respondents preferred the label with GDAs and descriptors, and the USA label format.

In 2004, the Institute of Grocery Distribution (IGD) carried out further research to investigate current awareness, understanding and use of GDAs (Institute of Grocery Distribution, 2004). Of the 1000 consumers surveyed, 34% said they have seen and used GDAs while 38% said they had seen but not used GDAs. Nine focus groups (including consumers who had only seen GDAs, those who had seen and used GDAs, and those who had not seen GDAs) were used to further explore the understanding and use of GDAs. All participants apparently understood the concept without prompting difficulties in obtaining participants who had “not seen GDAs” may have influenced these findings. Those who had seen and used GDAs were motivated to use the values because they were trying to lose weight, were buying a new product or buying products for family with a disease condition. Participants who had seen GDAs but not used them believed the information was not applicable to them or that it was more useful for people trying to lose weight. Participants who said they had not seen GDAs had no interest in nutrition and product selection was mostly driven by price and taste. Barriers related to reading GDAs include: too prescriptive, repetitive, cannot relate to values, don't buy products with GDAs, confusion with other diets, endorsement (origin of GDA values), time, lack of interest, budget, not diet conscious. Focus group participants were also asked about their views on including GDA values for other nutrients, for children, for weight loss and for men and women. In summary the key findings include:

- there was support for including GDA values for sugar, fibre, carbohydrate, protein, saturated fat, vitamins/minerals (in priority order)
- overall support for including values for children though the difficulty of providing figures for children of different ages was recognized
- unanimous support for including values for men and women
- GDAs for weight loss not considered necessary.

Of the format options presented (table, graphs, circles, points, percentages) the table format was preferred (nutrients per 100g and per meal, GDA panel below nutrient list). Teenagers and older people acknowledged that percentages were not readily understood.

In the second of four studies carried out by the FSA on signposting from 2003-05, preference for GDA formats was investigated (Food Standards Agency, 2005). Focus groups were used to explore participant views on five GDA label formats (percentages, numerical value, bar charts, and colour coding, high, medium and low descriptors). Participants were divided over the use of numerical values versus percentages. There was some confusion as to whether the percentage referred to the nutrient in the food or the proportion that the food contributed to GDA for individual nutrients. There was no clear agreement over bar charts. Colour coding was considered useful and helped the interpretation of the numerical values. Overall, a numerically based concept which includes traffic light colours to indicate high, medium or low ratings was the option participants favoured most.

Relevant findings from a comprehensive international review of 129 papers on nutrition labelling (European Heart Network, 2003) include:

- percentage energy on labels is not well understood
- information on single nutrients was most useful when a dietary context was provided (dietary reference values (DRVs) or guideline daily amounts)

- conflicting evidence on the usefulness of %DRVs - consumers with lower levels of nutrition knowledge tended to be insensitive to presence of %DRVs
- verbal descriptors or graphical information help people to place food or nutrient in context of their overall diet
- weak indication that interventions could be effective in increasing understanding and use of labels, however there are few reported studies in this area.

In conclusion, studies suggest that while %DV/GDA information potentially provides consumers with useful information with which to assess products, many find the concept difficult and are confused by some aspects of its application to product evaluations.

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