Suitability Assessment of Printed Dietary Guidelines for Pregnant Women and Parents of Infants and Toddlers from Seven European Countries

INTRODUCTION

The pregnancy period and the first years of a child’s life are characterized by specific nutritional and dietary requirements and a need for safe food. Most national health authorities publish printed dietary guidelines to inform pregnant women and new parents about specific dietary needs during this phase. These guidelines must be suitable for a heterogeneous population of pregnant women and parents in terms of literacy level, ethnicity, and previous knowledge about healthy eating. Previous studies show that printed health education materials are often produced with too little attention to their suitability for the intended target population. The suitability of printed health promotion materials refers to how well the material can be understood and accepted by the reader and depends on many factors. Health literacy is important in this context and includes people’s knowledge,
motivation, and ability to access, understand, and apply health information.\textsuperscript{7} Since most societies are increasingly multicultural, printed health materials should also be suitable for ethnic minority and immigrant populations.\textsuperscript{8}

Although the publication of printed health education materials has increased in recent years, their effectiveness has been questioned in the literature.\textsuperscript{9} Reviews of the literature resulted in recommendations or principles for designing effective printed health educational materials.\textsuperscript{10-12} However, this research focuses primarily on printed patient education materials with information about treatment rather than on health promotion.

The suitability assessment of materials (SAM) instrument is a validated method for evaluating written health-related education materials.\textsuperscript{6} It is used to evaluate printed materials in terms of categories and factors known to enhance people’s understanding of printed materials.\textsuperscript{6} The SAM has previously been used to evaluate patient information and information to promote physical activity.\textsuperscript{2-4,13-15} No publications were found in which SAM was applied to printed dietary guidelines. The aim of this study was to use the SAM method to evaluate selected European printed dietary guidelines for pregnant women and parents of infants and toddlers. The findings are discussed in relation to possible critical factors in development of new dietary guidelines as emphasized by the SAM instrument.
Printed dietary guidelines for pregnant women and parents of children between the ages of 0 and 6 years were collected from 7 European countries between October 2011 and February 2012. The guidelines were downloaded or ordered from the websites of public health authorities in Austria, Germany, and Switzerland (German language), Denmark, Norway and Sweden (Scandinavian languages), and the United Kingdom (English language). Materials included in the assessment had to be 1) be produced by national public health authorities and distributed free of charge; 2) provide dietary guidelines for pregnant women and parents of children between 0 and 6 years; and 3) be written in English, German, or a Scandinavian language.

Three public health nutritionists, who could read all of the five languages, assessed the dietary guidelines using the SAM instrument based on an adapted protocol. The protocol was pilot tested on two separate materials to identify and standardize interpretation of the factors. All 14 materials were evaluated and scored independently by the 3 investigators. The final scores were based on the mean of the scores. The SAM method rates written materials on 22 factors grouped in 6 categories: “content”, “literacy demand”, “graphics”, “layout and typography”, “learning stimulation and motivation”, and “cultural appropriateness”. Each factor is rated as superior (2 points), adequate (1 point), or not suitable (0 points). Factors that do not apply to the material are rated not applicable. The total possible score is 44, from which 2 points per nonapplicable factor can be deducted. The original SAM
protocol includes a rating measured with the Fry formula of the readability level suitable for English-language materials. This rating was removed from the scores since materials in different languages were assessed. As in the SAM protocol by Smith, the factor “scope” was removed since it proved difficult to score. Thus, the maximum possible score was 40. The overall suitability of a material and each category were presented as a percentage of the maximum possible score. The materials were rated as either superior (70–100 %), adequate (40–69 %), or not suitable (0–39 %).

The “content” category assessed whether the purpose of the material was explicitly stated, the information provided was behavior-focused, and a summary of the materials’ key messages including examples was present. In this study, “literacy demand” was assessed based on writing style (eg, mostly conversational style and active voice), sentence construction (eg, the context is given before new information is given), the use of vocabulary (eg, common words are used; avoidance of technical words and jargon), and the use of learning aids such as headers or topic captions. In the “graphic” category, the cover graphic (eg, cover graphic is friendly and attracts attention) as well as the type of illustration (eg, simple line drawings without distracting details) and their relevance were rated. “Graphics” were also rated on whether they include step-by-step instructions for actions with examples and explanatory captions. “Layout” (eg, visual cuing devices are used to direct attention to specific points or key content) and “typography” (eg, text type and size) were assessed. Within this factor, materials were also rated on whether they included long lists without descriptive subheadings. The assessment of “learning stimulation and motivation” considered whether interaction was included in the text (eg, problems or
questions) and whether desired behavior patterns are modeled (eg, changing eating patterns, shopping and cooking practices). The assessment of the materials’ motivation involved whether complex topics were subdivided so that readers may experience that the tasks are doable. “Cultural appropriateness” measured how well the materials’ logic, language, and experience matched the “logic, language and experience” (LLE) of the target audience. Researchers searched the materials explicit for reference to a target audience. If not found, a general population, which is multi-cultural in all the selected countries, was assumed. Images of people, illustrations and suggested foods were assessed for whether they accommodated diverse cultures.

Inter-rater reliability between the 3 investigators was assessed using Cohen’s kappa ($\kappa$) in SPSS 22.0 for Windows (Chicago, IL).\textsuperscript{18} Cohen’s $\kappa$ ranges strength of agreement from 0 to 1.0 with coefficient’s ≤0.20 indicating poor agreement, 0.21–0.40 indicating fair agreement, 0.41–0.60 indicating moderate agreement, 0.61–0.80 indicating good/substantial agreement, and 0.81–1.0 indicating almost perfect agreement.\textsuperscript{19} Cohen’s $\kappa$ was calculated for each pair of investigators in each category of variables (category-specific). Review by an Institutional Research Board was not required for this study because human subjects were not involved, as per (blinded information).

**RESULTS**
The researchers assessed 1 printed dietary guideline for pregnant women and 1 for parents of infants and toddlers from each of 7 countries, in total 14 materials. The format of the materials (brochures, booklets, books, flyers) varied greatly in length, from 2 to 122 pages, as well as the content. All of the materials for pregnant women included topics other than dietary guidelines. Materials for parents of infants and toddlers were usually organized according to the child’s age, with a general emphasis on breastfeeding and the introduction of solid foods. Most of the 14 materials provided food-based dietary advice.

The category-specific inter-rater reliability on the SAM categories ranged from Cohen’s $\kappa$ 0.37 to 0.62 (mean = 0.41) indicating a variation between categories from fair to moderate agreement among the 3 investigators with the exception of good agreement on content.

The SAM results are presented in Table 1. Five of the materials were rated superior, 9 adequate, and none not suitable. The mean overall SAM score for the materials for pregnant women was adequate (61%), and the mean overall SAM score for the materials for parents of infants and toddlers was adequate (67%).
Most of the materials (n=10) scored superior (74%) for the presentation of the “content”. The purpose of the material was stated in the title, and the context was often presented in a behavior-related context.

Seventy percent of the materials scored superior on “literacy demand.” Nine materials were rated superior, characterized by the use of conversational style and active voice, presentation of the context before new information, and the use of advance organizers (eg, headers or topic captions). The factor that led to lower ratings was the lack of the use of common vocabulary and the explanation of technical words.

The mean score for the use of “graphics” was adequate (56%). Only a few materials provided simple drawings and presented key messages in illustrations. In several materials, “graphics” were presented without explanations or captions. Another common feature of the materials was a lack of step-by-step instructions with examples. For example, although the materials encourage pregnant women to eat 5 servings of fruits and vegetables a day, only a few materials provided suggestions. The materials got the highest mean SAM score in the category “layout and typography” (75%).

The mean score for the application of “learning stimulation and motivation” was 59%, (adequate). Only 4 materials scored superior in this category. The 2 materials rated
not suitable lacked interaction and learning stimulations, such as a question-and-answer format to present problems and solutions.

The poorest ratings were for “cultural appropriateness.” The overall SAM score was adequate (45.7%), and 6 materials were evaluated as not suitable. None of the materials clarified a specific target audience. Only few included images of people of different ethnic backgrounds or provided examples of how the dietary recommendations could be adapted to different food cultures (eg, provided examples of how to eat wholegrain based on staples used by different food cultures). However, we found that some of the materials were available in several different languages (n=5).

DISCUSSION

To our knowledge, this is the first publication that used the SAM method to evaluate printed dietary guidelines. Overall, the assessed materials were scored as adequate in relation to the target groups’ assumed needs. None of the materials was scored not suitable. Among the categories, the highest average scores were in the “layout and typography,” and the lowest average scores were for “cultural appropriateness” and “learning stimulation and motivation.”
Previous studies using the SAM instrument on written patient education materials find that they often are weak on aspects of health literacy.\textsuperscript{2-5} Attractive materials enhance readers’ attention to, understanding of, and recall of the information.\textsuperscript{12,20} In this study, the materials scored highest in the “content” (74\%) and “layout and typography” (75\%) categories. High scores were achieved because several of the materials presented the content in a behavior-related context and in an easy to read font. Even though 70\% materials scored superior for “literacy demand”, higher scores would have been achieved by more use of common vocabulary and explanation of technical words.\textsuperscript{6} Scores in the “graphics” category show that only a few materials used illustrations to overcome barriers related to low health literacy levels. Even though readability is another important aspect of health literacy, the researchers deducted this factor in this study due to the different languages used.

One of the categories that scored lowest in this study was “learning stimulation and motivation” (adequate, 59\%). The SAM approach emphasizes that printed materials should stimulate and motivate readers, and this can be achieved by presenting the information in a question-and-answer format and by modeling how to change a targeted behavior (eg, eating habits).\textsuperscript{6} Previous research indicates that pregnant women in particular may experience information overload leading to lower motivation to focus on healthy eating.\textsuperscript{21,22} The substantial difference in the material length is also worth noticing, as comprehensive written materials could influence the reader’s ability and motivation to engage with message.\textsuperscript{7} However, the number of words was not assessed in this assessment tool.
The materials scored lowest in the category “cultural appropriateness” (46 %). There has been a growing recognition that health promotion materials should be culturally sensitive. Other studies have pointed to that printed patient education material lack consideration of minority group’s needs or account for cultural diversity in a population group. However, “cultural appropriateness” was the factor with the highest inconsistency in scoring among the researchers, as also found in previous studies. We judge that a core factor, was initial difficulty in determining the material’s target audience. Lack of images of people with different ethnic background or suggested food items suitable for different cultures contributed to the low scores in this category. The use of step-by-step illustrations is suggested by the SAM methodology to help overcome language barriers. Some materials in this study were available in other languages, but this is not accredited in the SAM scores.

The limitations of this study have to be considered. The SAM is a subjective evaluation tool. As in previous studies that use the SAM tool, users were not involved in assessing the material. The number of investigators scoring the materials independently in this study is comparable with other studies using SAM as an evaluation tool, but the inter-rater reliability scores were slightly lower than in previous studies presenting the same analyses. The inclusion of another factor to assess the quality of the content in the scoring scheme should be considered for future studies.
IMPLICATION FOR RESEARCH AND PRACTICE

This research demonstrates that the suitability of the assessed printed dietary guidelines was *adequate* according to the SAM tool. However, findings indicate a potential to enhance the suitability of such materials with use of less technical words and more use of common language, and adding features to stimulate and motivate the reader. Simple graphics to illustrate dietary changes as well as dietary recommendations based on different food cultures may overcome cultural barriers and increase the suitability for low health literacy populations.

REFERENCES


25. Garnweidner L, Terragni L, Pettersen K, Mosdøl M. Perceptions of the Host Country's Food Culture among Female Immigrants from Africa and Asia: Aspects Relevant for


Table 1
SAM Scores for Each Category and Overall SAM Scores in Percentage of the Total Possible Scores.

<table>
<thead>
<tr>
<th>Material and Source</th>
<th>Content</th>
<th>Literacy Demand</th>
<th>Graphics</th>
<th>Layout and Typography</th>
<th>Learning Stimulation and Motivation</th>
<th>Cultural Appropriateness</th>
<th>Total Score</th>
</tr>
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<tbody>
<tr>
<td>Pregnant, Norwegian Directorate of Health, 2009.</td>
<td>100</td>
<td>96</td>
<td>70</td>
<td>89</td>
<td>83</td>
<td>75</td>
<td>85</td>
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<td>The best diet for your baby, Federal Ministry of Food and Agriculture, Germany, 2011.</td>
<td>83</td>
<td>71</td>
<td>80</td>
<td>100</td>
<td>67</td>
<td>58</td>
<td>78</td>
</tr>
<tr>
<td>Good food for infants, National Food Agency Sweden, 2011.</td>
<td>72</td>
<td>71</td>
<td>77</td>
<td>100</td>
<td>67</td>
<td>50</td>
<td>74</td>
</tr>
<tr>
<td>Food for infants and toddlers, Danish Health and Medicines Authority, 2012.</td>
<td>72</td>
<td>79</td>
<td>63</td>
<td>89</td>
<td>50</td>
<td>83</td>
<td>72</td>
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<tr>
<td>Food for infants, Norwegian Directorate of Health, 2001.</td>
<td>78</td>
<td>83</td>
<td>67</td>
<td>67</td>
<td>72</td>
<td>42</td>
<td>70</td>
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<tr>
<td>Dietary guidelines for mother and child, Research Institute for child nutrition, Germany, 2010.</td>
<td>89</td>
<td>46</td>
<td>73</td>
<td>83</td>
<td>61</td>
<td>42</td>
<td>67</td>
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<td>The right diet from the beginning! Federal Ministry of Health, Austria, 2010.</td>
<td>61</td>
<td>75</td>
<td>57</td>
<td>83</td>
<td>78</td>
<td>33</td>
<td>66</td>
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<td>Dietary advice for pregnant women, National Food Agency Sweden, 2008.</td>
<td>83</td>
<td>75</td>
<td>60</td>
<td>56</td>
<td>61</td>
<td>33</td>
<td>63</td>
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<tr>
<td>Building blocks for a better start in life, National Health</td>
<td>56</td>
<td>75</td>
<td>50</td>
<td>78</td>
<td>61</td>
<td>42</td>
<td>61</td>
</tr>
<tr>
<td>Source</td>
<td>Mean Score (total)</td>
<td>Mean Score (infants/toddlers)</td>
<td>Mean Score (pregnant)</td>
<td></td>
<td></td>
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<td>Service United Kingdom, 2010.</td>
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<td>70</td>
<td>74</td>
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<td>Healthy habits – prior, during and after pregnancy, Danish Health and Medicines Authority, 2010.</td>
<td>83</td>
<td>71</td>
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<td>Eating while you are pregnant, booklet, Food Standards Agency, United Kingdom, 2007.</td>
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<td>Nutrition in pregnancy and lactation, Federal Council Switzerland, 2008.</td>
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<tr>
<td>Tips for diet and physical activity in pregnancy and in the first years, Federal Office of Public Health, Switzerland, 2011.</td>
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<td>63</td>
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<tr>
<td>Mean Score (total)</td>
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<td>70</td>
<td>74</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mean Score (infants/toddlers)</td>
<td>70</td>
<td>74</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Score (pregnant)</td>
<td>78</td>
<td>61</td>
<td>78</td>
<td></td>
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</table>

*Suitability scores: 70–100%, superior; 40–69%, adequate; 0–39%, not suitable.*