DOI: http://doi.org/10.4038/tar.v30i4.8336 **Tropical Agricultural Research Vol. 30 (4): 143 – 151 (2019)**
Short Communication

Development and Evaluation of a Booklet on Dietary Guidelines and Menus for Pregnant Women in Sri Lanka

A.M.N.T. Adikari[1]*, R. Sivakanesan[2], D.G.N.G. Wijesinghe[3] and C. Liyanage[4]

Postgraduate Institute of Agriculture
University of Peradeniya
Sri Lanka

ABSTRACT: *The improvement of nutrient intake during pregnancy by providing knowledge through dietary menus is not available in Sri Lanka. Hence, the purpose of this study was to develop a booklet of dietary-guidelines for pregnant women. Available dietary-guidelines and menus in Sri Lanka were gathered by reviewing the literature, following available recipes from recipe books and the internet, home visits, face-to-face interviews and through telephone calls. Further, a focus group survey was conducted to identify commonly consumed foods and menus. Nutritionally-balanced dietary menus were formulated and the nutrient content was calculated. The nutrient requirements of pregnant mother's portion sizes were determined and menus were presented with portions. The content validity and format of the draft booklet were read by experts in the field of nutrition and dietetics to ensure the messages were right and could be read easily. The developed booklet was evaluated by fifteen pregnant-women for end-users' satisfaction. The end-users responded that the maternal-nutrition information presented in the booklet was simple and easy to understand. The developed booklet can serve as an important source of information to improve the nutrient intake of pregnant women in Sri Lanka.*

Keywords*: Booklet, dietary guidelines, menus, nutrient intake, pregnant women*

INTRODUCTION

A woman's normal nutritional requirement increases during pregnancy to meet the needs of the growing fetus and the maternal tissues associated with pregnancy. Good maternal nutrition is important for the health and reproductive performance of women and the health, survival, and development of their children (Mora and Nestel, 2000). Dietary intake of expectant mothers reveal that proper dietary balance of mother's diet is necessary to ensure sufficient energy and nutrient intake for adequate growth of the fetus without depleting maternal stores and damaging mother's own tissues to maintain her pregnancy (Mridula *et al*., 2003). A woman who has obtained adequate nutrients through balanced diets during pregnancy may have adequate reserves of several nutrients, so that the needs of the growing fetus and the

[1] Department of Applied Nutrition, Faculty of Livestock, Fisheries and Nutrition, Wayamba University of Sri Lanka
[2] Department of Biochemistry, Faculty of Medicine, University of Peradeniya, Sri Lanka
[3] Department of Food Science & Technology, Faculty of Agriculture, University of Peradeniya, Sri Lanka
[4] Department of Community Medicine, Faculty of Medicine, University of Ruhuna, Galle, Sri Lanka
* Corresponding author: thakshila.adikari@yahoo.com

appropriate nutrients in breast milk to ensure optimal growth of early infancy can be met without affecting maternal health.

Inadequate dietary intake is associated with growth failure, and development of protein-energy malnutrition especially during the gestation (Kathleen and Drora, 2010). It was recognized that poor growth results not only from a deficiency of protein and energy but also from inadequate intake of micronutrients that are vital during pregnancy. Many pregnant women in developing countries suffer from nutritional deficiencies (Mora and Nestel, 2000) and these nutritional problems affect a woman's and her newborn infant's quality of lives. Therefore to have optimal maternal as well as perinatal outcome, nutrition in pregnancy should be well-maintained.

In Sri Lanka, several nutrition interventions are available during pregnancy, which includes supplementation of iron, folic acid, vitamin C and calcium, and food supplementation in the form of a pre-cooked ready-to-eat food, Thriposha. In addition, the anemia control programme includes nutrition education promoting consumption of iron rich foods, provision of iron, folate and vitamin C supplements during pregnancy and the vitamin A deficiency control programme includes a combination of promoting consumption of vitamin A containing foods and a high dose vitamin A supplementation schedule (De Silva *et al*., 2003). Although the benefit of improved intake of protein, energy and other nutrients in pregnancy can be achieved through cost-effective dietary diversification strategies such as providing knowledge of dietary guidelines with nutritionally balanced menus, that kind of intervention is not available in Sri Lanka to overcome maternal nutritional problems. In Sri Lanka despite availability of number of nutrition interventions, underweight among pregnant women is 13.4% (Jayatissa and Hossaine, 2010) and micro-nutrient deficiencies, especially iron deficiency anaemia among pregnant women is 34% (DHS, 2009). These figures suggest a need to improve the maternal nutritional status in Sri Lanka through enhancing dietary nutrient intake.

A qualitative and a quantitative modification of nutrient intake are essential for a pregnant woman in order to support the growing fetus and also to prepare the expectant mother for the upcoming events of childbirth and subsequent feeding. This modified requirement of nutrients during pregnancy can either be met through nutrient supplementations or through a qualitative modification of food intake. One of the food-based strategies to overcome and control maternal under-nutrition and iron deficiency anaemia like more prevalent maternal nutrition-related problems in Sri Lanka is to improve the nutrient intake of pregnant mothers by giving knowledge about dietary guidelines and nutritionally-balanced dietary menus for pregnancy. It may be the most desirable and sustainable method to prevent and/or control nutrition-related problems among pregnant women.

National and international health agencies recommend that primary health care should adopt educational strategies and offer pregnant women guidance on a healthy diet and good nutrition, in order to promote health and achieve positive effects on maternal and fetal well-being (WHO, 2004). Hoffmann and Warrall (2004) reported the importance of using printed educational materials to improve knowledge, satisfaction, and adherence to treatment/ guidelines, as well as stimulate patients' self-care. When reviewing the available nutrition educational materials for pregnant women in Sri Lanka, the absence of a nutrition educational booklet was seen as an obstacle. Hence, this study aimed to develop and validate a nutrition educational booklet on dietary guidelines and nutritionally-balanced dietary menus for pregnant women in Sri Lanka with a view to improve their nutritional status by enhancing dietary nutrients intake.

METHODOLOGY

Among available nutrition intervention tools for pregnant women in Sri Lanka an absence of nutrition educational booklets was felt as a prime need that should be fulfilled. Therefore development of such a booklet was selected for this study. It could include more information and be handy to improve nutritional counseling for patients in mother and child health clinics (Ilmonen *et al.*, 2012). This study was conducted in three steps: development of the booklet for pregnant woman about healthy nutrition guidelines and nutritionally balanced dietary menus during pregnancy; validation of the booklet (nutrition information material) by experts of health, nutrition and dietetics and pregnant women; and, evaluation of the developed booklet by pregnant women.

The development phase followed the process of construction of an educational booklet for health promotion of pregnant women (Reberte *et al*., 2012). This process composed of the following steps: choice of the content based on dietary needs to fulfill the nutrient requirements of pregnant women; creation of illustrations; content preparation based on scientific literature; validation of the material by experts in the field of nutrition and dietetics, pregnant women and mothers.

Development of the booklet

In the development process of the booklet, a literature review was conducted. Available dietary-guidelines (Nutrition Division of Ministry of Health , 2011) and menus for pregnancy in Sri Lanka were gathered by reviewing the literature, following available recipes from recipe books and the Internet, home visits, face-to-face interviews and through telephone calls. Further, a focus group survey was conducted to identify commonly consumed foods (Adikari, *et al.,* 2015a), menus, dietary habits and food believes (Adikari, *et al.,* 2015b). Furthermore, dietary advices and the maternal nutrition related information given by the Maternal and Child Health (MCH) clinics were considered. The socio-demographic information and knowledge, attitudes and practices (KAP) on maternal nutrition were gathered among a sample of pregnant women who were attending the MCH clinics in Pannala Medical Officer of Health (MOH) area, Sri Lanka by using a pre-tested interviewer-administrated questionnaire (Adikari and Sivakanesan, 2005c). These data were used to guide the elaboration of the topics of booklet and its main contents.

The elaboration of the content was based on scientific literature in order to guarantee reliability. Some information related to public health services available for pregnant women was included in the booklet, and the reliability was confirmed by face-to-face discussion. Further, text books and images on electronic pages were accessed in order to find better illustrations. Nutritionally balanced dietary menus were formulated, incorporating commonly available local foods and the nutrient content of the recipes was calculated by using FoodBase 2000 software (The Institute of Brain Chemistry and Human Nutrition, University of North London) modified with Sri Lankan food. The nutrient requirements of pregnant mother's portion sizes were determined and menus were presented with portions. Since written health related education materials can only be effective if they can be read, understood, and remembered by the target group, the booklet was written in local (Sinhala) language.

Format of the booklet

The size of the booklet was 13 cm in width and 20 cm in length. The booklet contained fifty-six doubled-sided pages. It is composed of covers, table of contents, preface, contents and an

appendix. The booklet consists of 2 sections. The first section provides the general information on maternal nutrition and a balanced diet and the second section listed out the nutritionally-balanced dietary menus with portion sizes for healthy pregnant women and pregnant women with diabetes. Simple language, illustrations and photos of menus were used for clear understanding and to facilitate the practice of the menus.

Validation of the booklet

The draft version of the developed booklet was given to experts in the field of nutrition and dietetics with an open-ended questionnaire (Luz *et al.*, 2003). Evaluators were asked to evaluate the booklet using the questionnaire guide. The samples (n = 12) were evaluated individually according to the four sets of parameters: structure, content, language, and illustrations. The evaluators were also asked to submit extra comments if they felt necessary.

For each topic of the booklet, professionals evaluated the adequacy of information and whether it was appropriately presented, considering the reader's perspective. Regarding the language they evaluated the convenience and the ease of understanding, and whether the most important concepts were approached in a clear and objective vocabulary. They also indicated possible conceptual errors. Regarding illustrations, the appropriateness of visual composition, its attractiveness and organization as well as the quantity and adequacy of the illustrations were assessed. At the end of the validation, the recommendations of experts were accepted and incorporated in the booklet.

Furthermore, ten pregnant women, who were attending the MCH clinic for a prenatal care having literacy skills and will be the end-uses of the developed dietary guidelines booklet justified the format and contents of the entire booklet. They were requested to read the entire booklet and analyse it in terms of understanding the vocabulary, as well as the adequacy of illustrations. They were also asked to indicate the unknown or difficult terms and to suggest other substitutive terms considered easier and understandable.

Evaluation of the developed booklet

Regarding the evaluation of content and layout of the booklet by the pregnant women, they were invited to participate in the study while waiting for the Maternal Clinic of the Pannala Medical Officer of Health (MOH), North Western Province, Sri Lanka. A total of 15 pregnant women agreed to participate. In the informed consent for the pregnant women, the aims and procedures of their participation were presented. An instrument was developed to characterize the social profile of the pregnant women (age, level of education, occupation and family income).

For evaluation by the pregnant women, the first version of the booklet was given with a questionnaire that was designed to evaluate end-users satisfaction. Pregnant women were asked to handle the booklet and analyze figures and texts. For those who did not understand the written text, a researcher was instructed to perform the reading. The questionnaire had close-ended questions of rating scale (Likert) with 4 levels of measurements. The participants were asked to indicate the degree of likeness with given information on maternal nutrition and dietary menus, format and overall aspects of the booklet. After the questionnaire was completed, item responses were summed up and presented as number and percentage. According to comments and suggestions given by the experts and pregnant women, modifications were done and the final version of the booklet was developed.

The details of the study was submitted to the Ethical Review Committee, Faculty of Medicine, University of Peradeniya, Sri Lanka and got the approval under the protocol number 2014/EC/08.

RESULTS AND DISCUSSION

Conducting a needs assessment, establishing contents, writing the text, and evaluating the piece are the steps that should be followed when developing quality educational materials. This study followed all the steps that are necessary in quality tool development. Apart from that, when developing the booklet for pregnant women in Sri Lanka all the aspects given below were considered. Since the quality of the text is often determined by readability, the text of the booklet was written on a level that was appropriate for the target group. As content and style, layout, colour, and illustrations all influence readability and quality, those aspects were also considered when developing the booklet. The sample of 12 experts in the field of nutrition and dietetics composed of 2 Professors, 1 Senior Lecturer, 2 Doctors, 1 Medical Officers of Health, 1 Nutritionist, 2 Dieticians, 2 Public Health Nursing Sisters, and 1 Public Health Midwife. All agreed to participate in the evaluation and returned with the material completed.

Age of pregnant mothers who evaluated the booklet ranged from 19 to 40 years with a mean age of 27.3 ± 4.59 years and the entire sample was literate. Their monthly family income showed that 5 % had < Rs.10, 000/= and 39 % had > Rs.25, 000/= while others were in-between. In the experts' validation process, suggestions related to information, language, illustrations, photos and vocabulary were given. All the experts gave a positive evaluation of the booklet. The language was considered easy to understand and this aspect was highlighted as vital to promote the interests of pregnant women.

Developed booklet on dietary guidelines and menus for pregnancy

The developed booklet was a colourful nutrition information containing booklet for giving knowledge about dietary guidelines and nutritionally balanced menus for pregnant women in Sri Lanka.

Format of the booklet

The developed booklet, which was 13 cm in width and 20 cm in length, contained fifty six doubled-sided pages. The booklet consisted of 2 sections. The first section provided the general information on maternal nutrition and a balanced diet while the second section listed out the nutritionally balanced dietary menus with portion sizes for healthy pregnant mothers and mothers with diabetes. The font types was colourful FMAbhaya, size 16 bold for heading, size 14 bold for sub heading and size 13 normal for details. Space between each line, in two sections, was single spacing. The function of illustrations was to decorate and to be easily read. The simple language was used for clear understanding and to motivate reading.

Validation of the developed booklet

The content validity and format of the draft booklet were read by experts in the field of nutrition and dietetics to ensure the messages were right and could be read easily. There were some suggestions for the photos in the booklet. Experts also had commented about the font size in content and advised to increase the size. All experts advised to change the sequence of

contents and few words in order to encourage consumption of nutritionally balanced diets by following given menus.

Ten pregnant women confirmed understandability, creditability, and relevance of the message in the booklet. All mothers who validated the booklet were having a positive opinion with the booklet and had a few comments on some parts. One of their suggestions was to present the information in simple Sinhala language. All the comments and suggestions were accounted for in developing the final booklet.

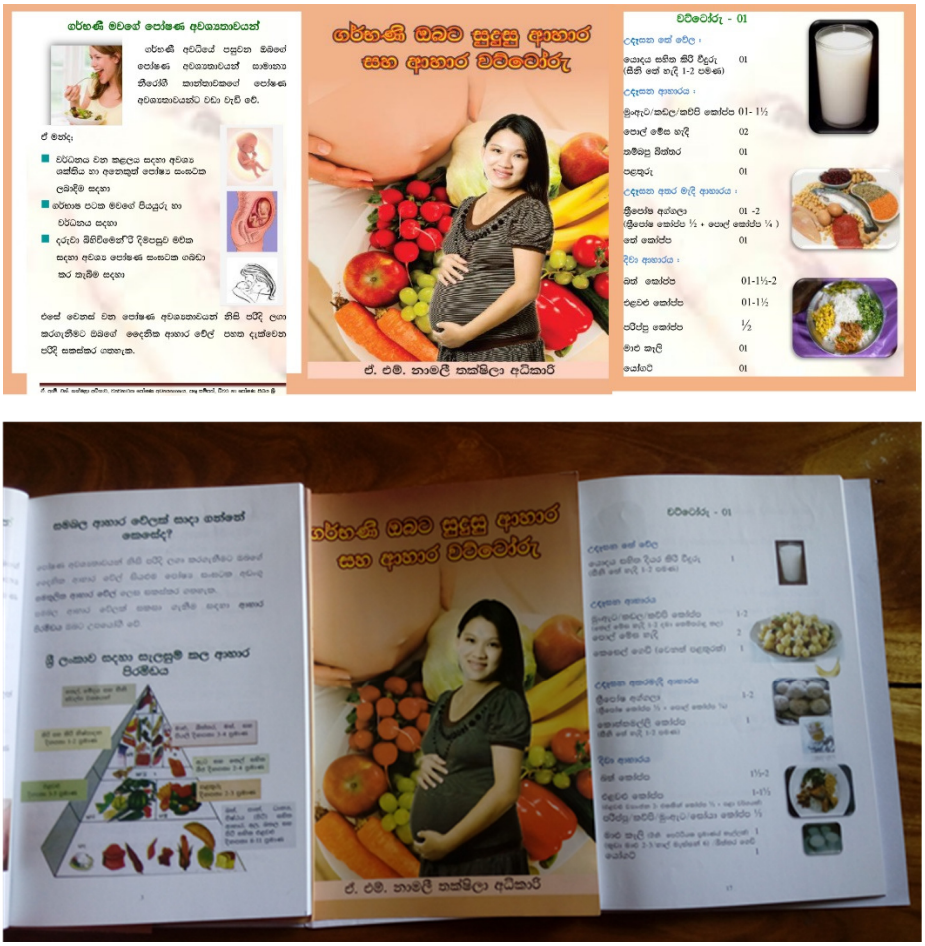

Figure 1. The developed booklet on dietary guidelines and menus for pregnant women in Sri Lanka.

Evaluation of the booklet

Pregnant women positively assessed the booklet and indicated that the booklet was relevant with respect to illustrations, complementary texts, the motivation to read, respect to the cultural aspects, as well as the clarity of writing. Overall satisfaction of pregnant women regarding the developed “Dietary Guidelines and Menus Booklet” is shown in Table 1.

Table 1. Overall satisfaction of pregnant women on the developed booklet.

Characteristics of developed menu booklet for pregnant women in Sri Lanka	Excellent %	Good %	Poor %	Very Poor %
Information on maternal nutrition and dietary menus	17	73	10	-
Overall appearance	12	67	21	-
Overall format	23	60	17	-

As shown in the table above, 73% of the pregnant women responded that the maternal nutrition information and dietary menus presented in the booklet were good. The appearance and the overall format of the booklet were identified as good by 67% and 60% of the respondents respectively. The overall comments were maternal nutrition information was simple and easy to understand, menus were presented in an attractive way and since menus had commonly available foods they are easy to follow (Thakshila *et al*., 2015). After the development of the final version of the booklet, registration of copyright in the National Library Foundation of Sri Lanka was completed and ISBN 978-955-42435-0-7 was obtained.

Several important considerations, reported by previous researches, such as short sentences with simple words, few words on a page, use of illustrations were taken in to account when constructing the booklet. The appearance of printed materials was thought to be a crucial factor in determining whether people read or dispose them (Anderson *et al*., 1980). Therefore, the developed "Dietary Guidelines and Menus Booklet" followed the characteristics of the efficient printed materials such as the use of short sentences with simple words, use of headings, optimizing material into paragraphs, using a sufficiently large font, use of underlying, arrows, and bold face print (Kaplowitz and Olson, 1983 and Ries and Schoon, 1996), colour coding (Shepherd *et al*., 1989) and colour illustration (Descry, 1983 and Shepherd *et al*., 1989).

Since good quality educational materials help promote the relationship between the target group and the health care professional as well as enhance target group/patient knowledge and self-care, this developed booklet on dietary guidelines and menus for pregnant women in Sri Lanka would be an important source of information to improve the nutrient intake of pregnant women in Sri Lanka.

CONCLUSIONS

The developed "Dietary Guidelines and Menus Booklet" is accepted by experts and end-users as an important source of dietary guidelines to improve the nutrient intake of pregnant women in Sri Lanka.

REFERENCES

Adikari, A.M.N.T., Sivakanesan, R., Liyanage, C. and Wijesinghe, D.G.N.G. (2015a). Food and dietary nutrient intake of pregnant women in a rural community in Sri Lanka. Proceedings of the 2nd International Conference on Research Publication and Networking, Colombo, Sri Lanka; ISBN 978-955-7766-02-7, p 33.

Adikari, A.M.N.T., Sivakanesan, R., Liyanage, C. and Wijesinghe, D.G.N.G. (2015b). Assessment of food beliefs in pregnant mothers in a rural area of Sri Lanka. Proceedings of International Conference on Multidisciplinary Approaches - 2015, Sri Lanka; ISSN: 2386-1509, p 52. Available at http://www.fgs.sjp.ac.lk/icma.

Adikari, A.M.N.T. and Sivakanesan, R. (2015c). Knowledge, attitudes and practices of pregnant mothers on maternal nutrition in Pannala MOH area, Proceedings of the 71st Annual Sessions; part 1 Abstracts, of Sri Lanka Association for the Advancement of Science, Faculty of Applied Science, University of Sri Jayewardenepura, Sri Lanka; ISSN:1391-0248, p 101.

Anderson, M.L.F., Olson, C.M. and Rhodes, K. (1980). Development and pilot testing of a tool for evaluating printed materials. J. Nut. Edu. *12(2)*, 50-54.

Department of Census and Statistics Sri Lanka. (2009). Demographic and Health Survey 2006/7 Colombo, Sri Lanka. Department of Census and Statistics in collaboration with Ministry of Healthcare and Nutrition Sri Lanka.

De Silva, A., Mahamithawa, A.M.A.S.B. and Piyasena, C. (2009). Maternal and child nutrition: the Sri Lankan perspective. Indian J. Med. Res. *130*, 609-611.

Descry, D.E. (1983). Colour in media: Is it really worth the extra cost? Inter.J.Instruct Media. *8*, 261 -266.

Hoffmann, T. and Warrall, L. (2004). Designing effective written health education materials: considerations for health professionals. Disabil Rehabil. *26(9)*,1166–1173.

Ilmonen, J., Isolauri, E. and Laitinen, K. (2012). Nutrition education and counselling practices in mother and child health clinics: study amongst nurses. J Clin Nurs. *21*, 2985-2994.

Jayatissa, R. and Hossaine, S.M.M. (2010). Nutrition and Food Security Assessment in Sri Lanka (2010), Medical Research Institute in collaboration with UNICEF, Sri Lanka.

Jayatissa, R. and Gunatilleka, M.M. (2006). Vitamin A nutritional status in Sri Lanka. Department of Nutrition, Medical Research Institute, Ministry Health Care and Nutrition, Sri Lanka in collaboration with UNICEF.

Kaplowitz, D.D. and Olson, C.M. (1983). The effect of education program on the decision in breastfeed. J. Nut. Edu. *15*, 61-65.

Kathleen, A. and Drora, F. (2010). Maternal Nutrition and Birth Outcomes. Epidemiologic Reviews. *32*, 5–25.

Medical Research Institute - MRI (2001). Iodine deficiency status of children in Sri Lanka. Medical Research Institute, Colombo: Ministry of Health, Sri Lanka.

Luz, Z. M. P., Pimenta, D.N., Rabello A. and Schall V. (2003). 'Evaluation of informative materials on leishmaniasis distributed in Brazil: criteria and basis for the production and improvement of health education materials'. Cadernos de Saúde Pública, *19(2)*, 561–569.

Mora, J.O and Nestel, P.S. (2000). Improving prenatal nutrition in developing countries: strategies, prospects, and challenges. Am. J. Clin. Nutr. *71*, 1353–1363.

Mridula, D., Mishra, C.P. and Chakraverty, A. (2003). Dietary intake of expectant mother. Indian J Nutr Diet. *40*, 24-30.

National Iodine Deficiency Disorder Survey - NIDDS (2005). Medical Research Institute, Colombo: Ministry of Health, Sri Lanka.

Nutrition Division Ministry of Health (2011). Food based dietary guidelines for Sri Lankans. Nutrition Division, Ministry of Health, Sri Lanka collaboration with WHO.

Piyasena, C. and Mahamithawa, A.M.A.S.B. (2003). Assessment of anaemia status in Sri Lanka. Colombo, Sri Lanka; Medical research Institute, Department of Health Services.

Reberte, L. M., Hoga, L. A. K. and Gomes, A. L. Z. (2012). 'Process of construction of an educational booklet for health promotion of pregnant women', Revista Latino-Americana de Enfermagem. *20(1)*, 101–108.

Ries, C.P. and Schoon, D.K. (1996). Evaluation of a cafeteria-based education program for college students. J. Nut. Edu. *18,* 107-110.

Shepherd, S.K., Sims, L.S., Cronin, F.J., Shaw, A. and Davis, C.A. (1989). Use of focus groups to explore consumers' preferences for content and graphic design of nutrition publications. *J* Am Diet Assoc. *89*, 1612 -1614.

Thakshila, A., Ramaiya, S., Chandrani, L. and Nihal, W. (2005). Evaluation of the developed dietary menu booklet for pregnant women in Sri Lanka, Abstract book of the 12th Asian Congress of Nutrition (CAN 2015), Yokohama, Japan; p 221.

Vahabi, M. and Ferris, L. (1995). Improving written patient education materials: a review of evidence. Health Education Journal. *54*, 99 -106.

World Health Organization (2004). Global strategy on diet, physical activity and health. Geneva.