

## Improving best practices through nutrition education among Caribbean healthcare professionals

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### Abstract

Diabetes and hypertension are among the leading causes of mortality and morbidity in the Caribbean with obesity being the major underlying factor. The Caribbean Food and Nutrition Institute (CFNI) developed a "Protocol for the Nutritional Management of Obesity, Diabetes and Hypertension in the Caribbean" whose main goal is to improve the standards of care in the region. A short training programme was developed on how to implement the Protocol. The successful implementation of the Protocol depended on the effectiveness of this training, thus an evaluation of the training was conducted. Two hundred and seventy nine (279) healthcare workers were trained in Jamaica, Guyana, Belize, St. Vincent and the Grenadines, and Suriname through a three-day workshop. Participants were given a short pre and post-knowledge test and completed an end of workshop evaluation. The results showed that in all the countries there was a positive shift in the knowledge and that most of the participants rated the content and quality of the training highly. Participants stated that the overall aim, structure and scope of the workshop were met and that they appreciated greatly the overall usefulness of the training. The improved knowledge of healthcare professionals is key to the successful implementation of the protocol and improved quality of care.

**Key Words:** Chronic Diseases, Interprofessional Education, Nutrition, Guidelines, Programme Evaluation, Best Practices

### Introduction

The four leading causes of death in the Caribbean are heart disease, cancer, stroke and diabetes and in 2000 they accounted for over 51% of all mortality.<sup>1</sup> All of these health conditions share a common underlying factor, obesity, which has increased to epidemic proportions across the region. A rising trend has been observed in both the prevalence and mortality rates of diabetes in the Caribbean. It was estimated that over the five-year period 1995-2000 the number of cases of type 2 diabetes would increase from 1.3 million to almost 1.5 million.<sup>2</sup>

The observed increase in diabetes rates can largely be attributed to an increase in overweight and obesity among the Caribbean population. The report of the Caribbean Commission on Health and Development<sup>1</sup> shows overweight levels (BMI >25 kgm<sup>-2</sup>) of over 50% among the female populations in St. Kitts and Nevis, Belize, Jamaica, Dominica, Guyana, Trinidad and Tobago and Barbados. A cross cultural study found a high waist circumference (>0.8, males; >0.7 females), in 34% of females in Jamaica, 41% in Saint Lucia and 45% in Barbados.<sup>3</sup> High waist

circumference is indicative of increased risk for the development of diabetes.<sup>4</sup>

Diabetes is accompanied by a significantly increased prevalence of hypertension and dyslipidaemia. Cooper et al<sup>5</sup> reported hypertension rates of 27.2%, 24% and 25.9% for Barbados, Jamaica and Saint Lucia, respectively. The data for Jamaica was confirmed by Mendez et al,<sup>6</sup> who reported that the prevalence of hypertension is 20% in men and 28% in women. These findings were similar to those found by Ragoobirsingh et al,<sup>7</sup> who reported a point prevalence of hypertension of 30.8% in the 15-and-over age group.

Practice guidelines for nutrition care have been developed for patients with type 2 diabetes in various countries. Evaluation studies done on medical nutrition therapy that follows these guidelines have shown that the management is more cost effective when the guidelines are adhered to.<sup>8</sup> Studies have also found that management using guidelines achieved a greater magnitude of change in fasting plasma glucose and HbA<sub>1C</sub> levels.<sup>9</sup> Since medical nutrition therapy for chronic diseases is not a "one size fits all", a protocol needs to be used to guide health professionals in providing nutrition therapy that is individualized and aimed at improving outcomes.

For healthcare providers to contribute fully to the implementation of a chronic disease management programme, they will need the following:

1. Appropriate staff

Received on: 3/5/2007

Accepted on: 19/10/2007

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2. Efficient integration, both between the various levels of health care and with other sectors
3. Appropriate training and professional education
4. Adequate funding for essential supplies and equipment

One major barrier in the Caribbean is a lack of human resources where there is not only a shortage of people with appropriate basic training in nutrition but an overall shortage of health workers. Those in the post lack the skills of specialist care, counselling, education and evaluation. In a survey that CFNI carried out in five countries it found that the nutritional management of obesity, diabetes and hypertension was inconsistent with the global consensus. Additionally the quality of anthropometric evaluation was not only inconsistent between countries but also within countries.

The Caribbean Food and Nutrition Institute (CFNI) developed a “Protocol for the Nutritional Management of Obesity, Diabetes and Hypertension in the Caribbean”. The main goal of the Protocol is to improve the standards of care for all people with diabetes in the Caribbean region, and thus to enhance their quality of life. To this end, the Protocol provides some necessary tools for carrying out effective nutrition management including tools for assessment, planning, implementation, co-ordination and evaluation.

Training is seen as the key to success for any implementation programme. Thus the success of the Protocol depended on the effectiveness of the training, which accompanied the implementation in a given country. A short training programme was developed for the training of non-nutrition health professionals on how to implement the Protocol for the nutritional management of diabetes, hypertension and obesity.

This paper presents the results of an evaluation of the effectiveness of the training programme used in the implementation of the use of the nutrition protocol and the knowledge changes in healthcare workers after the training.

**Materials and Methods**

Training of healthcare professionals was carried out in Jamaica, Guyana, Belize, St. Vincent and the Grenadines, and Suriname. A three-day workshop was facilitated in each country by the first two authors. The training covered an overview of non-communicable diseases in the region, the rationale for the Protocol, the nutrition management process, nutrition assessment, the role of nutrition in the management of obesity, hypertension and diabetes and the role of communication in nutritional management.

The methodology used in the workshops included lectures/presentations, practical work on anthropometric measurements and case study discussions. Emphasis was placed on the practical aspects of anthropometric measurements as this was seen as a key element of the nutrition assessment process. Anthropometric measurements were among the least reported client measurements in a Knowledge and Practice (KP) study conducted by CFNI in the five countries.<sup>10,11</sup>

The participants were selected by the respective Ministries of Health after an invitation letter sent by the Caribbean Food and Nutrition Institute (CFNI). Participants were mainly nurses, physicians and nutritionists who were working in primary care facilities in their respective countries. Lay educators from the national diabetes association were also included in Jamaica, Belize and St. Vincent.

Participants who attended the training were given a short knowledge test at the start of the workshop (Pre-test). This was given to all participants and all were asked to put in a unique code, which only they would identify. The test consisted of nine multiple choice or fill-in response questions and seven true or false statements. All questions were based on the material that was to be used during the training. Each correct answer carried a point score and the test was scored out of a maximum of 26 points (100%).

The same test was given at the end of the workshop (Post-test) and participants were again asked to use the same unique identifier code so that pre and post tests could be matched and scores compared. The Pre and Post-test was used to evaluate knowledge acquired during the training.

Participants were also required to complete an end of workshop evaluation instrument. This was an anonymous evaluation using a five-point Likert and forced-choice response formats. Participants were asked to rate to what extent they thought the overall aim of the workshop was met, as well as to indicate whether or not the structure and scope of the training were appropriate. Participants were also asked to rate each of the sessions for content covered, quality of presentation and usefulness using a Likert Scale ranging from 5 as excellent to 1 as poor. Space was provided for the inclusion of additional comments.

**Results**

Two hundred and seventy nine (279) healthcare workers attended the three-day training sessions, which were held in the five countries. Table 1 presents the number of participants by country.

**Measuring change in knowledge**

Pre and Post test scores were matched for 243 participants (Table 2). The individual pre-test scores of participants ranged from 23% in Suriname to 100% in St Vincent. Guyana showed the lowest mean score (59.5%) while the highest (77.4%) was achieved by the Jamaican group (Table 3).

Using a Scheffe Post Hoc test the mean pre-test score for Jamaica was found to be significant at the 0.05 level when

**Table 1:** Number of Participants in training workshops by country

Country	Number of Participants
BELIZE (BLZ)	64
GUYANA (GUY)	34
JAMAICA (JAM)	77
ST.VINCENT (SVG)	63
SURINAME (SUR)	41
TOTAL	279

**Table 2:** Number of matched pre/post test scores by country

Country	Number of Participants	Number of Respondents with matched tests
BELIZE (BLZ)	64	38
GUYANA (GUY)	34	31
JAMAICA (JAM)	77	72
ST.VINCENT (SVG)	63	63
SURINAME (SUR)	41	39
<i>TOTAL</i>	<i>279</i>	<i>243</i>

**Table 3:** Pre-Test Scores (%) by country

Country	N	Mean	Std Dev	Std Error	Min	Max
Belize	38	65.7	10.0	1.62	46	88
Guyana	31	59.5	16.6	2.98	23	88
Jamaica	72	77.4	11.7	1.38	50	96
Suriname	39	63.8	18.0	2.89	23	96
St Vincent and the Grenadines	63	68.4	9.8	1.24	42	100
Total	243	68.8	14.3	0.92	23	100

**Table 4:** Post-Test Scores by country

Country	N	Mean	Std Dev	Std Error	Min	Max
Belize	38	82.19	8.50	1.379	65	96
Guyana	31	84.00	10.56	1.897	62	96
Jamaica	72	89.16	8.83	1.041	62	100
Suriname	39	80.08	10.98	1.759	52	100
St Vincent and the Grenadines	63	85.65	10.06	1.268	58	100
Total	243	85.04	10.16	0.652	52	100

**Table 5:** Number of completed workshop evaluations by country

Country	Number of Participants	Number of Respondents
BELIZE (BLZ)	64	47
GUYANA (GUY)	34	31
JAMAICA (JAM)	77	71
ST.VINCENT (SVG)	63	52
SURINAME (SUR)	41	40
<i>TOTAL</i>	<i>279</i>	<i>241</i>

**Table 6:** Percentage response to extent to which the overall aim of the workshop was met

	BEL (46)	GUY (30)	JAM (71)	SUR (38)	SVG (52)
Greatly	93.5%	90%	98.6%	76.3%	90.4%
Somewhat	6.5%	10%	1.4%	23.7%	9.6%

compared to all the others. There was also significant difference between the means for Guyana and St Vincent and the Grenadines. However none of the other means showed statistically significant differences.

Since the group sizes were unequal, a Scheffe Homogenous Subset test was used to compare the five countries among

**Table 7:** Percentage mode for the practical session on case studies

Country	Content		Quality		Usefulness	
	Mode	%	Mode	%	Mode	%
BEL (46)	5	73.9	5	68.9	5	73.3
GUY (31)	5	67.7	5	43.3*	5	76.7
JAM (71)	5	52.1	4	57.7	5	66.7
SUR (38)	5	65.8	5	47.4**	5	63.2
SVG (46)	5	56.5	5	47.7***	5	71.1

\*40% rated this as 4

\*\* 39.5% rated this as 4

\*\*\* 45.5% rated this as 4

each other. Using a harmonic mean sample, Guyana, Suriname and Belize had comparable means as did Suriname, Belize and St Vincent. The Jamaican group had a mean that was not comparable to any of the others.

Post-test scores showed that the minimum achieved by any individual was 52%, compared to 23% in the pre-test (Suriname). The Jamaica group registered the highest post-test mean (89.16%) while the lowest (80.08%) was seen with the Suriname group (Table 4). All groups in the five countries registered increases in their mean post-test score, with the best increase being recorded by the Guyana group.

As was done for the pre-test scores, a Post Hoc Scheffe test was conducted and the inter-country means were analysed. Statistical significance at the 0.05 level was found between the scores of Jamaica and Belize, and those of Jamaica and Suriname. None of the other inter-country analysis showed statistical significance. Using an ANOVA test between the pre and post test scores a statistical significance ( $p < 0.001$ ) was found.

Using the Scheffe statistical test and the Harmonic mean of the group sizes the mean scores for Suriname, Belize, Guyana and St.Vincent and the Grenadines were statistically comparable. The mean scores for Guyana, St Vincent and the Grenadines were also found to be comparable with that of Jamaica.

**Training impact from participants' perspective**

The end of workshop evaluation was completed by 241 participants representing 86.4% of the total (Table 5).

When asked to what extent they thought the overall aim of the workshop was met, the majority of respondents rated this as "greatly" (Table 6).

All participants in Belize, Jamaica and St. Vincent and the Grenadines rated the structure and scope of the workshop as 'appropriate'. This rating was reinforced with additional comments such as: "broad in scope"; "practical and not boring"; and, "appropriate clinical presentations". Approximately three percent (2.6%) of participants in Suriname and 3.2% in Guyana rated the structure and scope of the workshop as inappropriate.

Technical presentations were evaluated by participants for *Content Covered*, *Quality of Presentation* and *Usefulness*. The Mode for each was calculated. In all countries the following presentations had a mode of 5 as the majority rating for content, quality and usefulness: *Overview of non-communicable diseases in the Caribbean*; *Rationale for the Protocol*, *The Nutrition Management Process*; *Nutrition Assessment*; *Role of Nutrition in the management of obesity, hypertension and diabetes*; and *Communication in Nutritional Management*. The practical session on anthropometric measurements had a majority rating of 5 in all countries apart from Jamaica where the quality had a majority rating of 4.

There was a difference in the modes for the practical session related to case studies. The results in table 7 show that the mode for quality was 5 in all the countries except Jamaica, however the percentages for each mode were low. The mode for Jamaica for this section was rated at 4.

In additional comments, a significant proportion of the participants indicated that the training would make a positive impact on the management of patients (36.7% Belize; 46.5%, Jamaica, 41.4%, St Vincent and the Grenadines and 16.7%, Suriname). Thirteen percent of respondents in Belize stated that putting what they learnt into practice will be challenging and 23.5% of respondents in Guyana stated that policy makers should be trained as this would be the only way to ensure that what was learnt in the training would be put into practice. Forty percent of respondents in Suriname stated that the training should have been in Dutch as many of the participants' level of English was weak.

### Discussion

The results of the knowledge tests showed that in all the countries there was a positive shift in the knowledge of the participants following the training. This is consistent with other studies that have demonstrated changes in knowledge following education.<sup>12,13</sup> The extent of the knowledge shift was not equal in all the countries with the lowest change being shown in Jamaica. Participants in Jamaica, however, started with the highest mean pre-test score and thus it was expected that the change in mean would be low. The post-test mean score was lowest in Suriname where language seemed to play a role as although the invitation stated that the participants should be fluent in English those who attended were not all very fluent in the language. This was also seen in the comments that participants made in the training evaluation where approximately three percent (2.6%) of respondents rated the training as inappropriate and commented that this was related to the language problem.

Participants in Guyana had the highest mean pre-post test score difference and this may be attributed to the fact that they also had the lowest pre-test score mean. The persons trained in Guyana were mainly nursing aids and their entry knowledge base of the subject was fairly limited. However, they actively participated in the training and seemed to have benefited as much as the other countries from the training

with a post-test mean that was similar to the other countries. Notwithstanding this, 3.2% of participants in Guyana, indicated that the structure and scope was inappropriate and this showed that the training programme needed to be adapted better to integrate non-professional healthcare workers. This is an important factor to consider as the reality of the system in Guyana, and many of the other small Caribbean states, is that the majority of healthcare workers in primary care have not had formal professional training and are either nurse assistants or health aides.

The evaluation of the training programme was done to ascertain to what extent the aim and scope of the training was achieved. It was important for the facilitators to use this evaluation to ensure that the structure of the training was meeting the needs of the participants. The content of the training was well received by the participants and most rated this at the highest score for content, quality and usefulness. The only sessions that had a different mode were the practical sessions in Jamaica where the quality had a majority rating of 4. This was due to some technical problems, which were encountered during this session due to malfunction of equipment. This again was an important lesson for training, where the equipment used can determine the success, or not, of the training.

The concept and usefulness of the case studies was well appreciated by the participants, and all gave them a majority mode of 5, however the quality of the cases was not so highly rated. These results can be explained by the fact that they were originally developed to be trans-Caribbean, however it became evident from the evaluation that the case studies should be country specific. The participants felt that the food and healthcare scenarios needed to be more specific to their own country. Although one would assume that across the Caribbean eating habits were similar, the results of the evaluation showed that there are very country specific eating habits and cultures, which need to be addressed when using case studies as part of a training programme.

The overall usefulness of the training was much appreciated by the participants and the fact that training was done in a team setting was also identified as an important factor. This is an essential component of holistic management and various studies have shown that the team approach to management of non-communicable diseases not only leads to improved quality of care but also better outcomes. The concept of team care is still in its infancy in the Caribbean and this training has helped to improve the concept and also show the different team players not only their role in the team but also the role that other members have in making up a successful team.

The comments made by the Guyanese participants regarding the training of policy makers are also key to a successful implementation of the programme. The sensitization of policy makers is a key element to successful implementation and this is especially so in resource poor settings as the policy makers have to make key decisions on where to allocate such limited resources. Thus sensitization of the policy makers can be essential for them to identify



priority areas for resource mobilization and allocation. When the protocol for the nutritional management of diabetes, hypertension and obesity in the Caribbean was being developed these issues were taken into consideration and before the protocol was launched in the region the key policy makers were sensitized both through their involvement in the development process as well as at the end through their endorsement of the final protocol. The comments made by the Guyanese participants show that the sensitization process may not have been as effective as originally envisaged, stressing the importance of stakeholder involvement at all stages of policy development and implementation.

The results of the evaluation of this training programme in the nutritional management of diabetes, hypertension and obesity have shown that short, intensive training can change knowledge. The nutrition knowledge of primary health care staff, although an important component of chronic disease management, is often neglected. Moore et al,<sup>14</sup> in a study performed in North-East of England, found that only 65% of the knowledge-based questions were answered correctly by most practitioners. Goodman et al<sup>15</sup> also found deficiencies in in-service training and gaps in knowledge and practice of staff in health centres in Cape Town. Spolett<sup>16</sup> also reported that diabetes knowledge among hospital nurses is sub-optimal and that to promote advances in glycaemic control the nursing staff must be better educated. The conclusions by the authors continue to highlight the need for continuous post-qualification training, especially in the light of the fact that many of our healthcare professionals were trained under the acute model of care and are now being faced with working in the chronic disease model. The results of this study have also shown that a programme, which is structured using didactic lectures/presentations and hands-on practical sessions with case studies is useful and meets the scope of the participants. These results are important, as very few in-service study modules have been developed for nutrition and chronic disease management. Thus it is not a popular topic for such training, Murray et al<sup>17</sup> reported that only 14% of respondents rated in-service training as an important source of nutritional information and 74% had never attended an in-service study event or display on healthy eating.

Various studies<sup>14,17,18</sup> have concluded that educational interventions for healthcare professionals are needed to improve the quality of chronic disease care and lower the mortality and morbidity. Spolett<sup>16</sup> states that the methods used to promote continuing education need to be cost-effective, as well as flexible to accommodate work shifts and learning needs. The training of healthcare professionals on the use of a protocol using a structured continuous education model is cost effective and produces a knowledge change in the nutritional management of obesity, diabetes and hypertension. The methodology used in this training programme can be used in resource limited settings, as in the Caribbean, to train non-nutrition professionals of the healthcare team on the role of nutrition in the management of these non-communicable diseases, thus contributing to an

improvement in the quality of care and reduction of mortality and morbidity from these chronic diseases.

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