



MAURITIUS RESEARCH COUNCIL

**EVALUATION OF THE DAILY LUNCH
PROVIDED UNDER THE ERADICATION OF
ABSOLUTE POVERTY (EAP)
PROGRAMME**

Final Report

January 2012

MAURITIUS RESEARCH COUNCIL

Address:

Level 6, Ebène Heights,
34, Cybercity,
Ebène 72201,
Mauritius.

Telephone: (230) 465 1235
Fax: (230) 465 1239
Email: mrc@intnet.mu
Website: www.mrc.org.mu

This report is based on work supported by the Mauritius Research Council under award number MRC/RSS-EXP-10/18. Any opinions, findings, recommendations and conclusions expressed herein are the author's and do not necessarily reflect those of the Council.

PROJECT REPORT

**EVALUATION OF THE DAILY LUNCH PROVIDED UNDER
THE ERADICATION OF ABSOLUTE POVERTY (EAP)
PROGRAMME**

INVESTIGATORS

Mrs D. GOBURDHUN (Principal Investigator)
**(ASSOC PROFESSOR, FACULTY OF AGRICULTURE,
UNIVERSITY OF MAURITIUS)**

Mrs S. KISTAMAH (Co-Investigator)
**(DIRECTOR, EARLY CHILDHOOD CARE AND EDUCATION
AUTHORITY)**

Funded by
Mauritius Research Council

January 2012

EXECUTIVE SUMMARY

The Eradication of Absolute Poverty (EAP) Programme is an integrated development project within identified pockets of poverty. Financial provision in the budget speech 2008/2009) had been made to ensure that

- (i) all poor children of pre-primary school going age, attend school
- (ii) **these children are provided with decent lunch**
- (iii) parents are trained to get a decent job with sustainable income
- (iv) social problems are dealt with
- (v) there is training in life skills management for parents and children, and adequate infrastructure to those needing it

The EAP programme is being implemented by a consortium involving government, private sector, Non Governmental Organising, socio-cultural organizations, corporate sectors among others. To date, about 819 pre-primary schoolchildren are benefiting from the EAP Programme. After almost 20 months of implementation, it would be relevant to assess the status the project with respect to the provision of a decent lunch. This study particularly focuses on the evaluation of the aspect of “Provision of decent lunch”, where both the quality and safety of the lunch provided will be assessed. This study aims at getting a better understanding of the administrative, nutritional and safety aspects of the daily lunch provision project.

The specific objectives of the study are to:

- Determine mechanism of lunch provision under the EAP programme to pre-primary school children
- Determine the types of meals provided and qualitatively assess their nutritional adequacy
- Assess nutritional knowledge of the caterers.
- Assess the hygienic practices associated and knowledge on food preparation and handling
- Identify any constraints in the implementation of the provision of daily lunch project
- Develop and run a short (5-6 hours) duration training programme on “Preparation of safe and healthy food for preschool children” for the food providers

- Assess the impact of the training programme on the knowledge and attitude of the food providers in nutrition and food safety

Methodology

In order to get a broader view of how the lunch provision aspect is being implemented under the EAP programme, face to face interviews of representatives of the Non Governmental Organisation (NGO) and their case workers, social workers and officers of the National Empowerment Foundation, of caterers and the director of the Early Childhood Care And Education Authority were carried out.

Visits and on –site inspection were carried out with a sample of food providers (caterers) (n=32) to take stock of the meals prepared. A list of the meals provided over one week was compiled and the meals were qualitatively evaluated in terms of different food groups and comparing with the USDA food guide pyramid for preschoolers to assess nutritional adequacy. In 14 cases, the hygienic practices were observed.

A 6 hour course on “Safe and healthy food preparation » was designed and presented to the food providers . A pre and post training assessment was carried out to evaluate the knowledge and attitude of caterers before and after the training.

Key findings

At its setting up in 2008, projects under the EAP programme were being overseen by the Ministry of Finance and Economic Development. The NEF was set up to fast-track projects under the Empowerment Programme, provision for which was made in the 2006/2007 budget. In 2009, the NEF was entrusted to coordinate the existing EAP programme. With the creation of Ministry of Social Integration and Economic Empowerment to fight against social exclusion, the NEF was transferred under its aegis. Restructuration at the level of the NEF in year 2011 engendered the phasing out of the EAP programme. However, projects under this particular programme, namely the “*Provision of a Decent Lunch*”, are still being implemented by the NEF.

The NEF funds NGOs for the EAP programme. Case workers of the NEF and case workers of NGOs identify families living in absolute poverty and who are eligible to benefit from the EAP programme through their regular field work.

11 NGOs are currently involved in the provision of a decent meal to about 819 children. The meal provision activity by the NGO is mainly outsourced to individual caterers or mass caterers already involved in the catering business. About 168 caterers are involved in this project. In some cases the catering activity is carried out by staff employed by the NGO. Rs 25 is allocated for each meal.

Out of the 32 caterers interviewed, 6 of them have their menu pre-planned either by the school or the NGO; 22 prepare the meal in their home kitchen. The food is delivered by the caterers in most cases. Out of the 22 schools surveyed, 15 and 13 are equipped with refrigerators and meal heating facilities respectively.

About 27 different types of meals are provided. Bread based meals are more popular. Mainly fruits are provided as a desert. All the meals provided are adequate in carbohydrates. Most meals provided include sources of protein like meat, fish, chicken and eggs. However, sausages, burgers, luncheon meat, fishfingers, and ham are mainly reconstituted meat products containing little protein but high in salt and unhealthy fats. Meals provided to children under EAP however lack in vegetables and therefore dietary fibre.

25 out of 32 caterers surveyed had a Food Handler's Certificate. All the food caterers have a good knowledge on nutrition (at least 6 correct answers out of 10 statements). Similar results are observed regarding knowledge on food safety and hygiene. Poor reported safety practices concerned mainly reheating of foods, thawing and handwashing. Observed poor practices revolved around personal hygiene and waste disposal.

The major constraints for the proper implementation of the project are financial constraints, procedural delays, lack of database on caterers, lack of transport facilities, lack of parent's involvement, lack of control at the level of the family.

An interactive six hour training workshop on **“Formation sur la sécurité alimentaire et la préparation des aliments sains pour les écoliers pré-primaires »** was designed and administered to 22 caterers from 9 NGOs on the 26th July 2011. It covered the main aspects on food safety and Healthy eating relevant for the caterers. Training materials and posters have also been designed. The caterers had good knowledge on food safety in general having an overall mean score of 88.0% before the training programme. However, after one month of the delivery of the course, their overall mean knowledge score increased to 94.5%. This indicates the training course was effective. The

participants had an overall good nutritional knowledge before the training session and the overall mean nutritional knowledge had increased from 71.8% to 83.4% after the training. An improvement in attitude was also noted after the training.

Some recommendations which may improve the “Provision of a decent lunch” have been formulated for the different stakeholders involved in this programme.

ACKNOWLEDGEMENTS

The research team is particularly grateful to the following institutions and persons who have contributed in the successful completion of this research project:

The Mauritius Research Council - for approving the project proposal and financially supporting the project. Their prompt replies to our requests and queries were also very much appreciated during the implementation of the project.

The University of Mauritius Management and Assoc Francoise Driver, Dean of the Faculty of Agriculture - for their support and encouragement to carry out this research work.

The various Non Governmental Organisations - for providing the required information

The National Empowerment Foundation for having provided us with current and up to date information on the sector

The food providers/caterers for having spared their precious time in filling the questionnaires and for also generously sharing their personal experiences.

The educators in the schools visited

Last but not least, our research assistants, Miss I Ramdin and Mr S. Danyen

RESEARCH TEAM

January 2012

MRS D GOBURDHUN

MRS S KISTAMAH

Table of Contents

| | |
|---|-----------|
| Table of Contents | 1 |
| List of Figures..... | 3 |
| List of Tables | 4 |
| List of Acronyms | 6 |
| CHAPTER 1: INTRODUCTION..... | 7 |
| 1.1 Background | 7 |
| 1.2 The Eradication of Absolute Poverty (EAP) programme | 7 |
| 1.3 Rationale for the study | 8 |
| CHAPTER 2: MECHANISM OF LUNCH PROVISION UNDER THE EAP PROGRAMME TO PRE-PRIMARY SCHOOL CHILDREN | 13 |
| 2.1 The EAP programme..... | 13 |
| 2.2 Methodology | 13 |
| 2.2 Implementation of the EAP programme and meal provision..... | 16 |
| 2.2.1 NEF: the main stakeholder in the EAP programme..... | 16 |
| 2.2.2 NGOs involved in the EAP programme and their role in meal provision | 17 |
| 2.2.3 Caterers involved in meal provision of EAP children and their recruitment..... | 19 |
| 2.2.4 Outcome of interview of caterers and educators on the meal provision activity in the EAP context..... | 21 |
| 2.2.4.1 Meal planning and shopping..... | 21 |
| 2.2.4.2 Meal preparation and packing of lunch | 21 |
| 2.2.4.3 Meal delivery, storage and service at school level | 22 |
| CHAPTER 3: TYPES OF MEALS PROVIDED AND THEIR NUTRITIONAL QUALITY | 24 |
| 3.1. Importance of nutrition in children | 24 |
| 3.2. Methodology | 24 |
| 3.3. Types of meals provided | 25 |
| 3.4. Nutritional adequacy of meals provided | 27 |
| 3.2. Nutritional Knowledge of food providers | 31 |
| CHAPTER 4: HYGIENIC PRACTICES ASSOCIATED WITH FOOD PREPARATION AND FOOD SAFETY KNOWLEDGE OF CATERERS | 34 |

| | |
|---|-----------|
| 4.1. Importance of food Safety and Hygiene | 34 |
| 4.2. Methodology | 34 |
| 4.3. Knowledge of caterers on food Safety and Hygiene..... | 35 |
| 4.5. On-site observation of meal preparation | 38 |
| CHAPTER 5: CONSTRAINTS IN THE IMPLEMENTATION OF THE PROVISION OF DAILY LUNCH PROJECT | 40 |
| CHAPTER 6 – TRAINING PROGRAMME FOR THE FOOD CATERERS..... | 42 |
| 6.1 Introduction | 42 |
| 6.2 Methodology | 43 |
| 6.2.1 Training Programme Development | 44 |
| 6.2.2 Knowledge and Attitude Assessment | 45 |
| 6.2.3 Training Programme Evaluation | 47 |
| 6.3 Results and Discussion..... | 48 |
| 6.3.1 Demographic Profile of Participants | 48 |
| 6.3.2 Food Safety Knowledge and Attitude Assessment of The Caterers Before and After The Training Programme..... | 50 |
| 6.3.3 Nutritional Knowledge and Attitude Assessment of the Caterers Before and After The Training Programme..... | 58 |
| CHAPTER 7: CONCLUSION AND RECOMMENDATIONS | 65 |
| REFERENCES..... | 72 |
| ANNEXES | 77 |

List of Figures

| | |
|---|----|
| Figure 1: Effects of poor nutrition on children..... | 8 |
| Figure 2: Cases of food poisoning over the past 20 years (Hotee (2011) | 10 |
| Figure 3: Mechanism and source from which lists of NGOs, caterers and pre-primary school children were obtained..... | 14 |
| Figure 4: Interaction between the different stakeholders involved in the EAP programme | 17 |
| Figure 5: Types of caterers recruited by the NGOs involved in EAP | 19 |
| Figure 6: Number of caterers with/without previous experience in catering | 20 |
| Figure 7: Number of mass caterers and individual caterers and number of children they catered for respectively | 20 |
| Figure 8: USDA food guide pyramid for preschoolers..... | 27 |
| Figure 9 – Contents of course delivered | 45 |
| Figure 10 – Educational level of the participants | 48 |
| Figure 11 – Period of time for which the participants are preparing food for the children | 49 |
| Figure 12 – Number of participants who has already attended a talk/course on food safety and nutrition/healthy eating..... | 50 |
| Figure 13 - %Knowledge scores of the participants (n=22) in food safety. Vertical bars represent error bars. | 51 |
| Figure 14 - %Nutritional knowledge scores of the participants (n=22). Vertical bars represent error bars..... | 58 |

List of Tables

| | |
|--|----|
| Table 1: List of NGOs, number of caterers and pre-primary schools surveyed | 15 |
| Table 2: NGOs involved in the EAP programme..... | 18 |
| Table 3: Areas of meal preparation and number of caterers preparing meals in those areas | 21 |
| Table 4: Overview of the different scenarios of meal storage at school level | 23 |
| Table 5: Types of meals provided | 25 |
| Table 6: Nutritional classification of meals provided..... | 29 |
| Table 7: Amount of protein and fat in 100g of different non-vegetarian foods | 31 |
| Table 8: Categorisation of level of nutritional knowledge..... | 32 |
| Table 9: Distribution of caterers according to grade obtained for overall knowledge in nutrition | 32 |
| Table 10: Number of correct answers for different nutrition knowledge statements | 33 |
| Table 11: Categorisation of level of food safety and food hygiene knowledge | 35 |
| Table 12: Distribution of caterers according to grade obtained for overall knowledge in food safety and hygiene..... | 35 |
| Table 13: Number of correct answers for different food safety knowledge statements | 36 |
| Table 14: Reported and recommended food safety and hygienic practices | 37 |
| Table 15 – Sampling of food caterers..... | 43 |
| Table 16 – Attendance of caterers | 44 |
| Table 17 - Sections of the questionnaire and their description | 46 |
| Table 18 - Knowledge level classifications | 47 |
| Table 19 – Knowledge scores on food safety before and after the training..... | 54 |
| Table 20 – Attitudinal scores on food safety..... | 57 |
| Table 21 – Nutritional knowledge scores of the participants before and after the training | 61 |
| Table 22 – Attitudinal scores on healthy eating/nutrition..... | 63 |
| Table 23 – Feedback on the workshop by the 22 participants | 64 |

| | |
|---|----|
| Table 24 – Wilcoxon test for the statement: “Foods should be cooked above 60°C for long period of time”.. | 81 |
| Table 25 – Wilcoxon test for the statement: “Well-cooked foods can be kept at room temperature for more than two hours” | 81 |
| Table 26 – Wilcoxon test for the statement: “Cooked food should not be touched after touching raw food”.. | 81 |
| Table 27 – Wilcoxon test for the statement: “I am confident that my current food preparation behaviours do not give rise to a risk of food poisoning” | 82 |
| Table 28 – Wilcoxon test for the statement: “Food can be handled even if I get diarrhoea and vomiting” | 82 |
| Table 29 – Wilcoxon test for the statement: “I think I know all of the food safety precautions necessary for safe food preparation” | 82 |
| Table 30 – Wilcoxon test for the statement: “It is better to consume whole wheat than white flour” | 83 |
| Table 31 – Wilcoxon test for the statement: “Margarine is better than butter” | 83 |

List of Acronyms

| | |
|--------|--|
| EAP: | Eradication of Absolute Poverty |
| ECCEA: | Early Childhood Care and Education Authority |
| MOHQL: | Ministry of Health and Quality of Life |
| NEF: | National Empowerment Foundation |
| NGO: | Non-Governmental Organisation |
| USDA: | United States Department of Agriculture |
| ZEP: | Zone d'Education Prioritaire |

CHAPTER 1: INTRODUCTION

1.1 Background

The Poverty Analysis 2006/07 report of the Central Statistics Office demarks the absolute poverty line as the one which is the cost of the basic needs of a household in terms of food, housing, clothing and other essentials for living; such a line is usually referred to as the *minimum vital*. Population whose monthly income cannot afford these basic needs are said to be living in absolute poverty. The Government efforts are ongoing in all key socio-economic sectors to alleviate absolute poverty and further improve the living standards of the Mauritian population. For this purpose, the National Empowerment Foundation (NEF) was set up under the aegis of the Ministry of Social Integration to help the most vulnerable groups of the population, namely children.

Children are the most vital human resource a country possesses, as they are the future nation. Ensuring optimal conditions for a child's early years is one of the best investments that a country can make if it is to compete in a global economy based on the strength of its human capital. Adequate nutrition is one of the pre-requisite to ensure optimal growth and development in a child (Mann and Trustwell, 2007).

1.2 The Eradication of Absolute Poverty (EAP) programme

To accomplish this objective of poverty alleviation, the Government came up with various programmes, notably the Eradication of Absolute Poverty programme. The EAP Programme, established in 2008, consists of a number of integrated development projects within identified pockets of poverty by providing support to families living in absolute poverty, to improve their socioeconomic status and to facilitate access to education for these children of low income families. The National Empowerment Foundation fast tracks the implementation of projects under the Eradication of Absolute Poverty programme. Out of the 229 pockets of poverty identified by the NEF across Mauritius, some 1600 families out of 76 pockets of poverty have been covered in 2010 by the EAP programme. Some 4 000 families whose monthly income does not exceed Rs 5 000 will benefit from the various projects to the tune of Rs 500 million (Government Information System, 2010). The activities of the EAP programme are related to the creation of employment, housing,

access to health and education, training, infrastructure, environment, access to public services, social attitude and leisure. It also encourages self-sufficiency and aims to increase revenue. The EAP programme is also focussed on the education of young children from disadvantaged backgrounds. Poverty cannot be eradicated in a few months or years, so, special attention is given to education and schooling of children. The earlier a child starts attending school daily, the less is the risk of slipping into a spiral of poverty in adulthood.

Financial provision in the budget speech 2008/2009 for the EAP programme had been made to ensure that:

- all poor children of pre-primary school going age, attend school
- **children are provided with a decent lunch**
- parents are trained to get a job with sustainable income
- social problems are dealt with
- there is training in life skills management for parents and children
- there is adequate infrastructure to those needing it

The 2010 budget provided Rs 277 million (NEF, 2011) to give greater protection to the vulnerable groups and strengthen the Eradication of Absolute Poverty programme in light of the global economic crisis.

1.3 Rationale for the study

Provision of a decent lunch encompasses a nutritious and safe meal to the children. Poor nutrition results in various complications as shown in Figure 1.

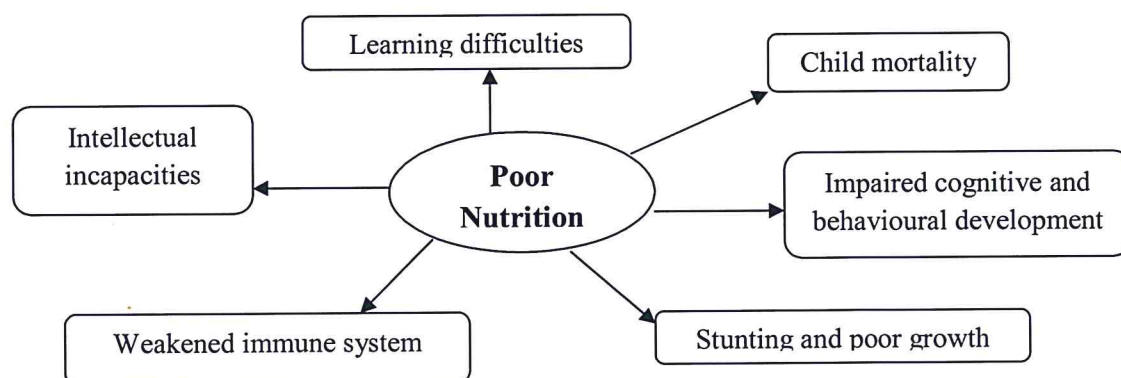


Figure 1: Effects of poor nutrition on children

Proper nutrition is essential for survival, physical growth, mental development, performance, productivity, health and well-being across the entire life-span: from the earliest stages of fetal development, at birth, and through infancy, childhood, adolescence and on into adulthood (Passmore and Eastwood, 1986). However, in young children, improved health outcomes have long-lasting health effects throughout the life-span, including increased performance and productivity, and reduced risk of certain non-communicable diseases. Moreover, healthy children learn better. Children can easily get a balanced diet by eating a variety of foods from four main food groups.

- Bread, other cereals and potatoes – these starchy foods, which also include pasta and rice, provide energy, fibre, vitamins and minerals.
- Fruit and vegetables – these provide fibre, vitamins and minerals and are a source of antioxidants. They are qualified as food for health.
- Milk and dairy foods – these provide calcium for healthy bones and teeth, protein for growth, plus vitamins and minerals.
- Meat, fish and alternatives – these foods, which include eggs and pulses, provide protein and vitamins and minerals, especially iron. Pulses also contain fibre.

Milk, dairy products, meat, fish, poultry, eggs and pulses are categorised as food for growth.

In contrast, foods from a fifth food group that includes fatty and sugary foods like biscuits, cakes, fizzy drinks, chocolate, sweets, crisps and pastries, that add little nutritional value, should be limited. Choosing foods from each of the four main food groups will help to ensure that kids receive all the vitamins and minerals they need for good nutrition and health.

Children are also very much prone to foodborne illnesses. They are defined as diseases, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food, it could be micro-organisms or other agents (chemical products). Every person is at risk of foodborne illness. Food safety experts classify children as easy victims to foodborne illnesses (Buzby, 2001). Hence, food Safety and hygiene is another pre-requisite to ensure children's optimum health. A safe food and water supply of adequate quality is essential for proper nutrition. Food Hygiene is important to ensure that food is fit for consumption. Food safety is an increasingly important public health issue. Governments all over the world are intensifying their efforts to improve food safety. These efforts are in response to an increasing number of food safety problems and rising consumer concerns. Studies have shown that the main source of food poisoning remains

the home. Consumers, while largely aware of the issues involved in food safety, still do not treat hygiene in the kitchen seriously enough. Inadequate food safety and hygiene can lead to foodborne illnesses. Consumption of unsafe food can result in severe adverse health effects, hospitalisation and death. Food safety is a significant issue which needs to be taken seriously. The Mauritius Food Act 1998 stipulates that “any person who imports, prepares, supplies, distributes or sells any food which is poisonous, harmful or injurious to health...shall commit an offence”. The continued application of food hygiene principles by food handlers involved in processing, storage, distribution and sale of food is critical to provide safe food to the consumer who is the final link in the food chain. Consumers have the responsibility to adopt good food safety behaviour when purchasing and handling food to draw the final line of defence against food poisoning bacteria.

In Mauritius, incidence of foodborne disease is referred as ‘food poisoning’ and is compiled as such by the Ministry of Health and Quality of Life (Figure 2).

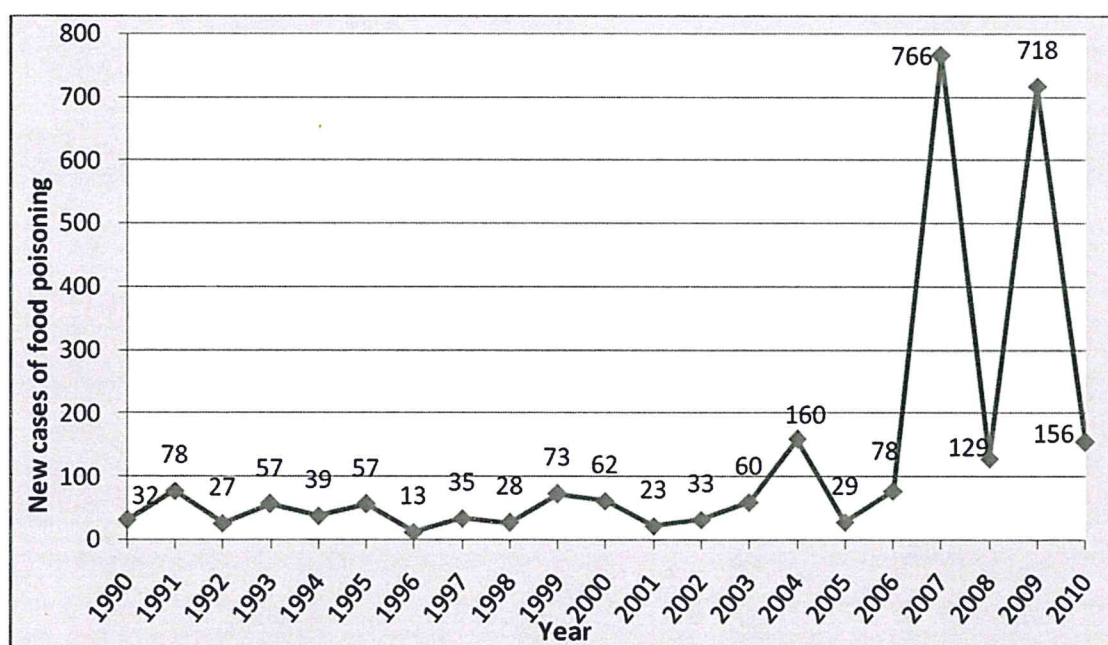


Figure 2: Cases of food poisoning over the past 20 years (Hotee , 2011)

A total of 2026 persons suffering foodborne illnesses were implicated in food poisoning incidents from 1990 to 2011, out of which 157 were children; most of the food poisoning incidents occurred in the home, followed by educational institutions (Hotee, 2011).

Some recent local food poisoning outbreaks are summarised below:

1. In 2003, 60 children from Marcel Cabon primary school experienced food poisoning symptoms due to contaminated yogurt. Yogurt was not stored under required storage conditions. They were stored in the school kitchen, at room temperature, before distribution (L'Express, 2003).
2. In 2004, 74 people in Curepipe were hospitalised due to food poisoning after consuming snacks containing seafood in a dinner party. Among these people, there were 12 children less than 5 years (L'Express, 2004).
3. In April 2007, some 20 adults suffered from food poisoning after consuming 'kebab' from a street-food vendor at Rose Belle. (Le Défi, 2007)
4. In August 2007, a man died due to food poisoning symptoms, after eating 'brede martin' and his wife was hospitalised for a long period of time (L'Express, 2007).
5. In November 2007, major food poisoning outbreak affected 528 people who consumed 'kebab' from a kebab vendor at Flacq. (L'Express, 2007).
6. Recently, in May 2011, major poisoning outbreak in Flacq and Riviere du Rempart made 1 dead and 130 ill after consuming pastries made of whipped cream and milk from the same pastry brand (Le Défi, 2011)

In the light of these recent food poisoning outbreaks, ensuring food safety has become primordial to protect consumers' health from food safety hazards which include food poisoning bacteria, pesticide residues, natural toxicants and physical food safety hazards such as glass, stones and bones. Food hygiene focuses on the implementation of preventive measures to control food safety hazards. Food poisoning bacteria may arise in food through contamination from primary sources namely: soil, skin, nose, intestinal tract of humans, animals and birds. Basic food hygiene is concerned with preventing contamination by food handlers, equipment and the environment. The measures are generic since they address common factors that affect food safety which are relevant to any segment of the food chain. They include personal hygiene, equipment hygiene, cleaning, pest control, waste control, supplier control, time and temperature control. Also, the risk of bacterial food poisoning can be mitigated by preventing "Contamination" and ensuring adequate "Cleaning", "Cooking" and "Chilling" of food.

This study aims at getting a better understanding of the administrative, nutritional and safety aspects of the Provision of a decent lunch daily project.

The specific objectives of the study are to:

- Determine the mechanism of lunch provision under the EAP programme to pre-primary school children
- Determine the types of meals provided and qualitatively assess their nutritional adequacy
- Assess nutritional knowledge of the caterers.
- Assess the hygienic practices during food preparation and handling
- Assess knowledge on food safety and hygiene of the caterers
- Identify any constraints in the implementation of the provision of daily lunch project
- Develop and run a short (5-6 hours duration) training programme on “Preparation of safe and healthy food” for the food providers (caterers)
- Assess the impact of the training programme on the knowledge and attitude of the food providers in nutrition and food safety

The methods used in this study were mainly to gather qualitative data from a selected sample of NGOs, caterers involved in lunch provision and pre-primary schools attended by those children benefitting from EAP. On-site visits to NGOs, food preparation areas and pre-primary schools premises where lunch was provided were carried over a period of 2 months. The methodological approaches used for the objectives set are as follows:

1. Face to face interviews of representatives of the NGOs and their case workers, social workers and officers of the NEF, of caterers and the director of the ECCEA.
2. Survey and inspection in a sample of schools where lunch is provided by these caterers.
3. Qualitative analysis of the meals provided in terms of different food groups and comparing with the USDA food guide pyramid for preschoolers to assess nutritional adequacy.
4. Design of a checklist on hygiene based on hygienic requirements of Food Act 1998 and on site visit to assess hygiene of the premises and the food handlers using the checklist.
5. Development and administration of a 6 hour training course on “Safe and healthy Food preparation” to caterers
6. Design of a questionnaire based on the course contents to assess knowledge and attitude of the food providers before and after the training

CHAPTER 2: MECHANISM OF LUNCH PROVISION UNDER THE EAP PROGRAMME TO PRE-PRIMARY SCHOOL CHILDREN

2.1 *The EAP programme*

The EAP programme is being implemented by a consortium involving the government, private sectors, NGOs and corporate sectors among others. According to the NEF, as at March 2011, about 819 pre-primary school children have been benefitting from the EAP programme. This data was confirmed by the Early Childhood Care and Education Authority (ECCEA) which has the responsibility to implement policies of Government with regard to early childhood care and education in the Republic of Mauritius. Children under the EAP programme attending pre-primary schools are being provided with a daily meal and this responsibility has been assigned to various NGOs involved in the project. In the past, several complaints pertaining to meal provision have been reported at the school level to the ECCEA; namely, cleaners of pre-primary schools, not officially recruited by the NGO, were requested by NGOs to prepare food on the school premises to give to the EAP children. The meal consisted mainly of plain boiled noodles which was prepared in the school kitchen by the cleaner. Moreover, several complaints pertaining to provision of unhealthy foods in unhygienic conditions have also been reported by educators. The director of the ECCEA further reported that no guidelines have been set for the implementation of the “Provision of decent lunch” project in order to ensure optimum health and safety of these benefiting children.

2.2 *Methodology*

In order to get a broader view of how the “Provision of a decent lunch “ is being implemented under the EAP programme, a focus group interview at the level of the NEF with caseworkers and officers of the NEF and in-depth face to face interviews were carried out with representatives of the NGOs and their case workers involved in the herein mentioned programme. The focus group interview at the level of the NEF was carried out through a PowerPoint presentation which highlighted the objectives of the research and the importance of early childhood nutrition and safe food handling. This session provided an insight of how the EAP-“Provision of a decent lunch “ project is managed at the level of the NEF. A key-informant approach was used to gather more background information on the EAP project from 2 social workers and officers of the NEF.

A provisional list of NGOs involved in the EAP programme was obtained from the NEF. Out of the 11 NGOs on the list, 9 of them were interviewed as no contact details were available for 2 NGOs. Contact details of each NGO were obtained either via the website or through telephone operators. Each representative of the various NGOs was contacted via phone and an appointment was taken for the face to face interview with the representative of the NGO or a member of the NGO in-charge of the EAP programme at the NGOs head office. Prior to each interview, the purpose of the study was explained; each interview lasted for about two hours. Figure 3 provides the source and mechanism through which the lists of the different stakeholders involved in the EAP programme were obtained.

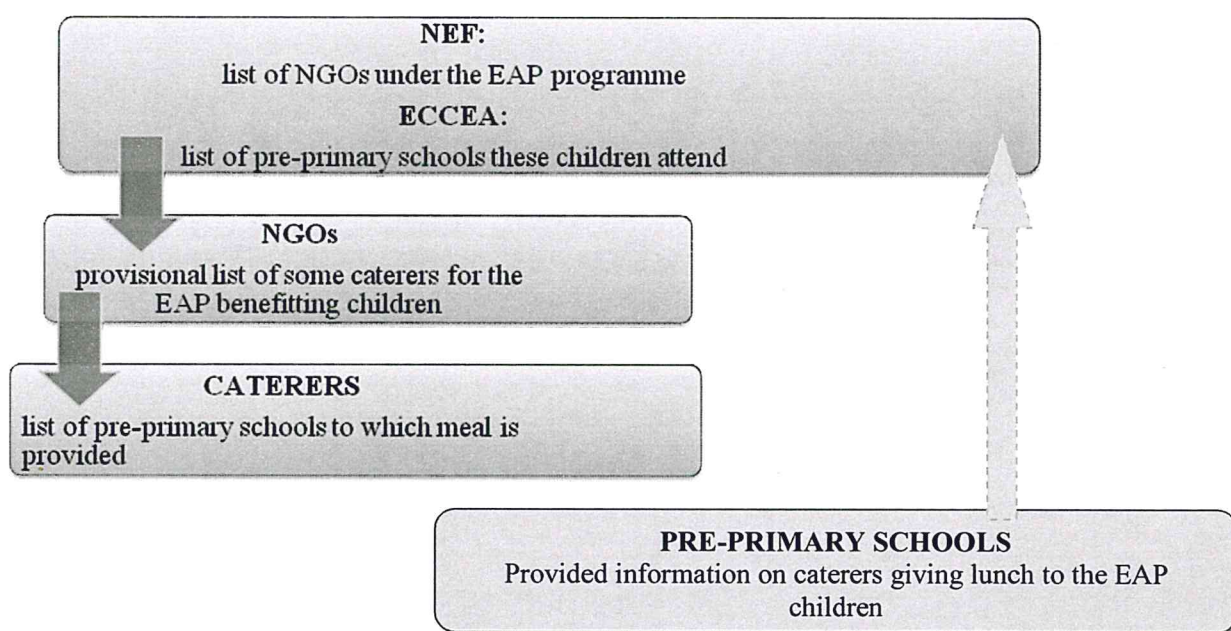


Figure 3: Mechanism and source from which lists of NGOs, caterers and pre-primary school children were obtained

A semi-structured face to face interview was carried out whereby an interview schedule similar to a survey questionnaire was used. The questionnaire consisted mainly of open ended question to guide the respondents and provide them with the opportunity to discuss certain topics. The respondents were probed in certain cases to acquire further details namely on how the lunch was planned, prepared and delivered. Convenience sampling was carried out for the caterers as there was no established list of caterers neither at the NGOs nor at the NEF. Nevertheless, caterers from each of the 9 NGOs were surveyed. The list of caterers obtained was mainly communicated verbally by the NGOs. In some cases, educators from pre-primary schools where many EAP children were present,

from different parts of the island, were also interviewed to obtain details on caterers involved in the programme. Moreover, for each caterer interviewed, educators of the pre-primary schoolchildren for whom the caterers cater for were interviewed. Caterers' contact details were therefore obtained either from schools or NGOs. The caterers were contacted by phone to take an appointment for the interview. In most cases, visits were scheduled in the morning to enable the observation of meal preparation by the caterers. As for the interview of the educators, the ECCEA contacted the respective schools and appointments for interview were scheduled. Table 1 summarizes the different NGOs, the number of caterers and schools surveyed.

Table 1: List of NGOs, number of caterers and pre-primary schools surveyed

| NGOs | Number of caterers communicated by NGO ¹ | | Number of caterers interviewed | Number of pre-primary schools surveyed | Reported number of children getting a meal by NGOs | Number of Children surveyed |
|---------------------------|---|-------------------|--------------------------------|--|--|-----------------------------|
| | In April | In July | | | | |
| Caritas | | 79 | 14 | 14 | 352 | 99 |
| Safire | | n.p. ¹ | 4 | 3 | 70 | 26 |
| Arya Sabha | | n.p. | 4 | 6 | 46 | 19 |
| Terre de Paix | 1 | | 1 | 1 | 44 | 44 |
| Apeded | | n.p. | 3 | 2 | 92 | 25 |
| SOS village | 5 | | 3 | 3 | 13 | 8 |
| SOS Poverty | 1 | | 1 | 1 | 38 | 38 |
| Centre de L'Amitié | 1 | | 1 | 1 | 80 | 80 |
| Mauritius Islamic Mission | 1 | | 1 | 1 | 2 | 1 |
| TOTAL | 88 | | 32 | 32 | 737 | 340 |

¹ n.p: Data not provided by NGOs

Out of the reported 819 pre-primary school children, reported by the NEF, benefiting from the EAP programme, the caterers providing food to 340 schoolchildren were surveyed, accounting for around 40% of the total number of EAP children.

2.2 Implementation of the EAP programme and meal provision

At its setting up in 2008, projects under the EAP programme were being overseen by the Ministry of Finance and Economic Development. The NEF was set up to fast-track projects under the Empowerment Programme, provision for which was made in the 2006/2007 budget. In 2009, the NEF was entrusted to coordinate the existing EAP programme. With the creation of Ministry of Social Integration and Economic Empowerment to fight against social exclusion, the NEF was transferred under its aegis. Restructuration at the level of the NEF in year 2011 engendered the phasing out of the EAP programme. However, projects under this particular programme, namely the *“Provision of a Decent Lunch”*, are still being implemented by the NEF.

2.2.1 NEF: the main stakeholder in the EAP programme

The NEF funds NGOs for the EAP programme. Case workers of the NEF and case workers of NGOs identify families living in absolute poverty and who are eligible to benefit from the EAP programme through their regular field work. NEF provides a list of these families to NGOs. The NGO takes in charge the family to help the latter improve its socioeconomic status. As illustrated in figure 4, case workers of the assigned NGO do regular visits to evaluate living conditions and the socioeconomic development of the family (Figure 4). The case workers also advise the members of the family on the procedures to adopt to get access to employment, lodging, education and other financial aids. In this context, the case workers help families with children of school going age by facilitating access to education to these children. School fees, transport facility, medical check-up, school materials and a daily meal are provided to these children to encourage them attend school regularly.

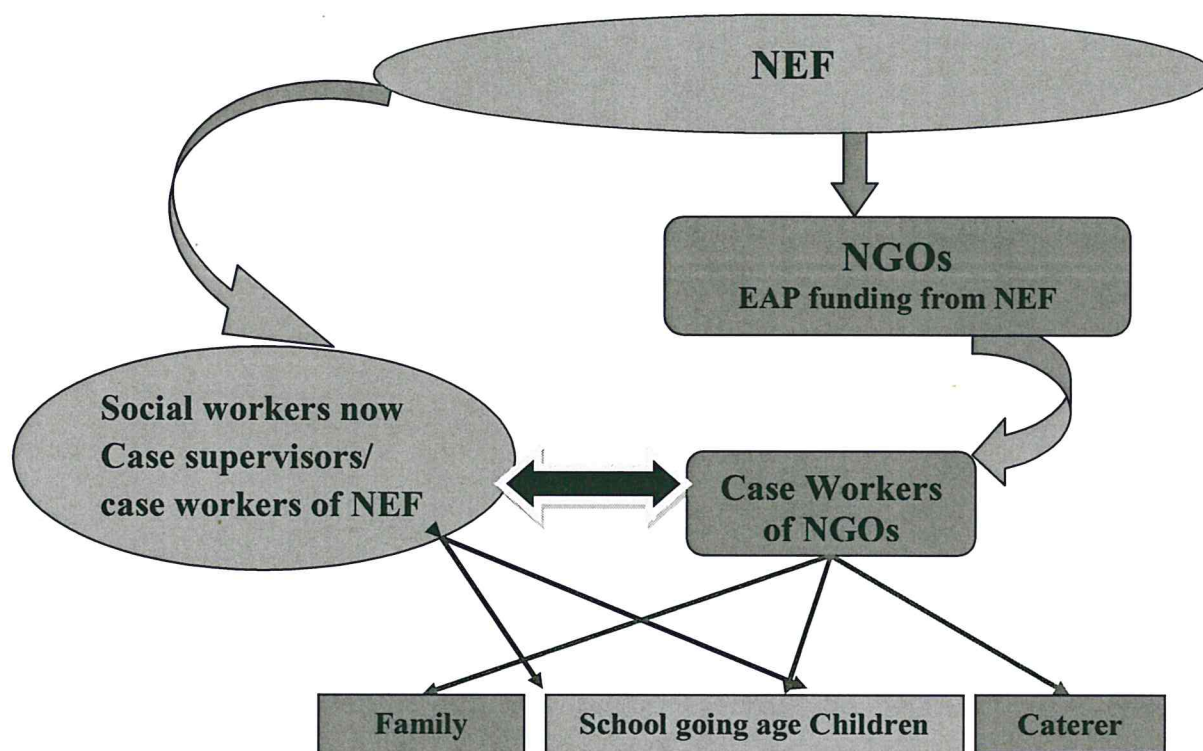


Figure 4: Interaction between the different stakeholders involved in the EAP programme

Both the case workers of the NGOs and those of the NEF monitor the family and whether the children attend school daily and in case of frequent absenteeism, an investigation is carried out to determine the cause. Through the various interviews, it can be deduced that NEF case workers do follow-up solely with the family and school children, verifying if the case worker of the responsible NGO has taken in charge properly of the family. On the other hand, the NGOs case workers do follow up with the family, school children and caterers on a monthly basis. NGOs case workers have also the duty to verify the lists of meals provided to the children by the caterers. In cases where these visits were carried out, the case worker signed the menu list, to acknowledge his visit. This list on number of meals provided is used by the NGOs to make monthly payments to the caterers. A sum of Rs 25 is allocated per meal.

2.2.2 NGOs involved in the EAP programme and their role in meal provision

The choice of the NGO is based on the involvement of the NGO in this particular pocket of poverty where the family lives. Table 2 introduces the different NGOs involved in the EAP programme.

Table 2: NGOs involved in the EAP programme

| NGOs | Date Established | Nature of Activity |
|--|-------------------------|--|
| CARITAS ILE MAURICE | 1970 | <ul style="list-style-type: none"> • Empower life skills • Follow up of children under EAP • Provision of meal and transport to the EAP children • Cater for welfare of homeless. • Provide a night shelter to the homeless and help them integrate society |
| SAFIRE | 2006 | <ul style="list-style-type: none"> • Follow up of children under EAP • Provision of Meal and transport to the EAP children |
| Mauritius Arya Sabha | 1875 | <ul style="list-style-type: none"> • Promote the vedic culture • Organise sensitization campaign against substance abuse and provide training in IT to children of pre-primary schools • Follow up of children under EAP • Provision of Meal and Transport |
| Fondation pour L'Enfance, Terre de Paix | 1989 | <ul style="list-style-type: none"> • Cater for welfare of poor /abandoned children • empowering the poor and vulnerable people in the region of Albion |
| Centre de L'Amitié | 1987 | <ul style="list-style-type: none"> • welfare of poor /abandoned children • Provide free pre-primary education needy children in Bambous |
| Association Pour l'Education des Enfants Défavorisés (APEDED) | 2002 | <ul style="list-style-type: none"> • Provide free pre-primary education to 200 needy children in Mauritius and 60 in Rodrigues • Empowerment of women through cultivation medicinal plants in a green house in Chemin Grenier • Distribute books and school materials to needy children secondary schools • Follow up of children under EAP • Provision of meal and transport to EAP children |
| SOS Children's Village Mauritius | 1989 | <ul style="list-style-type: none"> • Follow up of children under EAP • Provision of Meal and Transport to the EAP children • Works towards poverty alleviation |
| SOS Poverty | 2000 | <ul style="list-style-type: none"> • Works towards poverty alleviation |
| Mauritius Islamic Mission (MIM) | 1962 | <ul style="list-style-type: none"> • Works towards poverty alleviation |

Source: NEF website, actotogether.mu

In this context NGOs are given the responsibility to provide the lunch to these children. The meal provision activity by the NGO is either outsourced to a caterer recruited by the NGO or carried out by the NGO itself as shown in the figure 5.

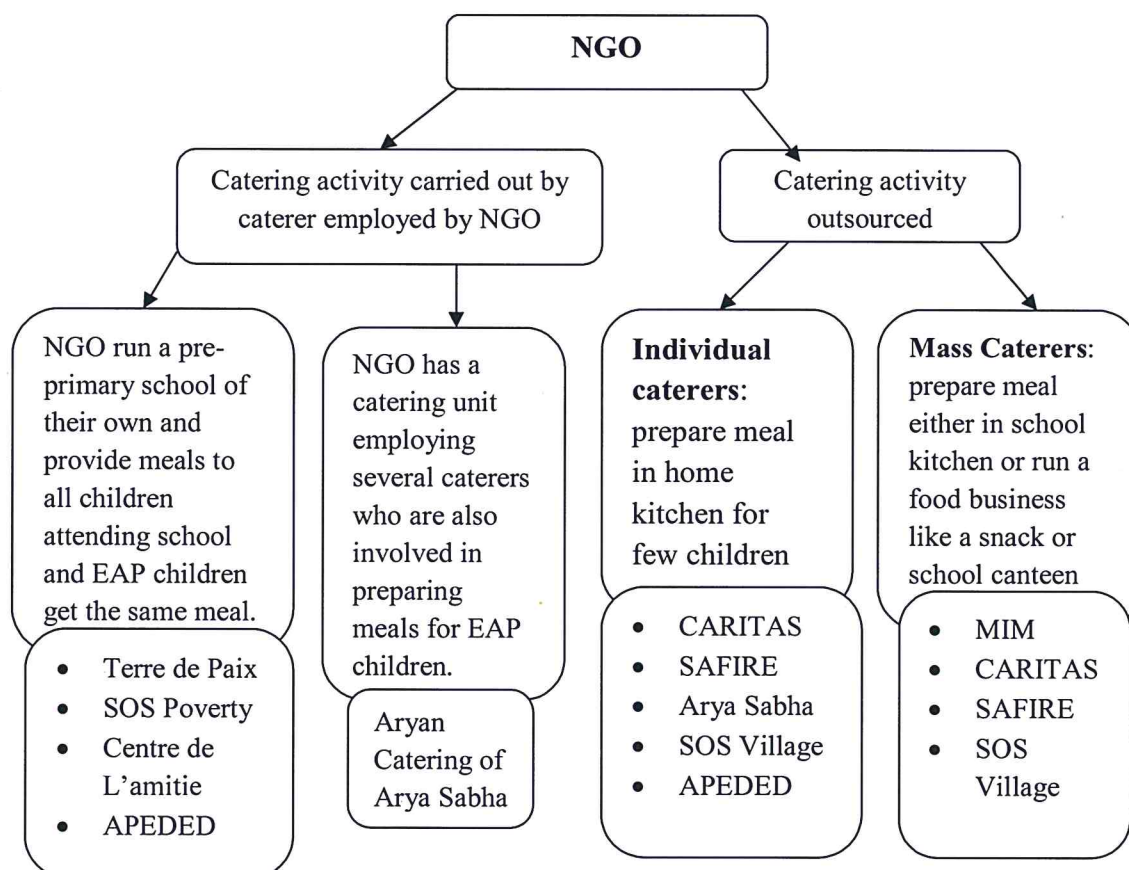


Figure 5: Types of caterers recruited by the NGOs involved in EAP

2.2.3 Caterers involved in meal provision of EAP children and their recruitment

Details on caterers involved in the EAP programme were obtained either from NGOs or pre-primary schools. Caterers are recruited by NGOs either based on their experience in food preparation or with the aim of empowering women looking for a job. Some NGOs, namely CARITAS and SAFIRE, recruit caterers who previously participated voluntarily in social activities organised by the NGO, for example, preparation of refreshments for children attending evening classes set up by the NGO or those who followed Home Economics classes offered by the Ministry of Women.

Out of the 32 caterers interviewed, the 12 caterers having previous experience were employed in hotels, food businesses or participating in the catering activity as volunteers (Figure 6), the., 5 are presently involved in catering at the school level itself and 3 detain a food business. In 5 cases out of 32, catering for EAP children has been outsourced to educators or school attendants as these people are in contact daily with the children and therefore they do not have to bear an additional cost to deliver the meal to the children.

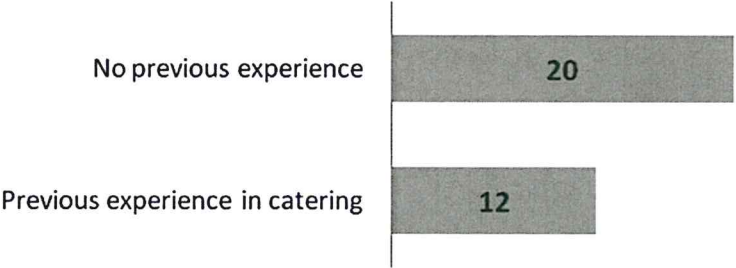


Figure 6: Number of caterers with/without previous experience in catering

Food providers(caterers) involved in the EAP programme have been classified into two categories: individual and mass caterers in the contest of this project. Mass caterers are those already involved in the catering activity and are normally already employed in school kitchen, kitchen of food businesses (snack, school canteen). Individual caterers, however, cater specifically for EAP children and often prepare lunch of the children under the EAP programme together with their family meal within their home kitchen. As shown in figure 7, only 10 caterers out of 32 were mass caterers and they catered for 186 children out of the 340 surveyed.

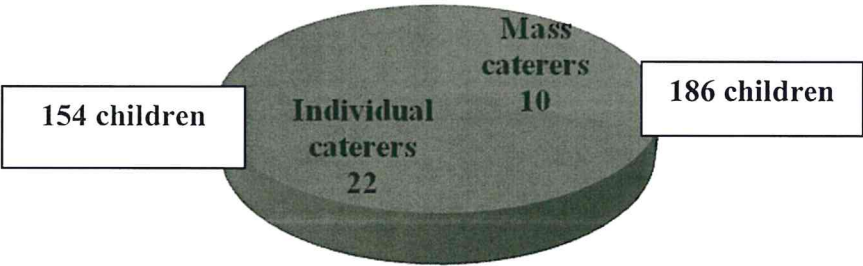


Figure 7: Number of mass caterers and individual caterers and number of children they catered for respectively

2.2.4 Outcome of interview of caterers and educators on the meal provision activity in the EAP context

In depth interviews with the various caterers and educators of the pre-primary schoolchildren for whom these caterers provide lunch to, gave an overview of the way the lunch is planned, prepared and delivered to the children. For each caterer interviewed, the respective school to which meal was provided was surveyed.

2.2.4.1 Meal planning and shopping

The lunch provided is planned either by the NGO or the caterers. Out of the 32 caterers interviewed, 6 of them have their menu pre-planned either by the school or the NGO. Menu is planned by school in cases where meal is provided to all the children attending school. In the case of individual caterers, there is no pre-planning of meals; they prepare what they would have for their family members. Pre-planning is usually carried out to establish the shopping list. Shopping is often done by the caterers and in few cases, by members of the NGOs wherever the meal provision is being done by the NGO itself. In cases where lunch is prepared in school kitchen or NGOs kitchen, there is a storage room. Shopping is either done on a monthly basis or each two weeks for non-perishable and long shelf-life goods. Fruits and vegetables are usually bought on a weekly basis, while bread is bought on a daily basis.

2.2.4.2 Meal preparation and packing of lunch

In most cases it has been reported that meals are prepared on the same day, in the morning or just before lunch. However, 2 out of the 22 individual caterers interviewed reported that sometimes when they prepare 'Briani' or '7 carris' on the eve, they made provision for lunch of the following day. 4 main areas of food preparation were identified, as shown in Table 3.

Table 3: Areas of meal preparation and number of caterers preparing meals in those areas

| Areas of food preparation | Number of caterers preparing meal in these areas |
|----------------------------------|---|
| Home kitchen | 22 |
| School kitchen | 7 |
| NGOs kitchen | 1 |
| Food business kitchen | 2 |

Depending on convenience, it has been observed that two main types of meals are provided namely, bread based or sandwich type meals and hot meals.

Hot meals are mostly prepared in school kitchens and the children getting hot meals have their dishes and cutleries provided by school. In some cases where caterers provide hot meals, they pack it in big containers. Educators then serve the children their meals individually either in dishes provided by the caterers or brought from home by the children. In cases when children forgot to bring their dishes, the latter is provided by the school. Caterers providing bread based meals, pack it directly in small plastic bags. However, only in 3 out of 32 cases that the bread was wrapped in kitchen paper before being put in plastic bags. All lunch boxes, containers and individually wrapped bread are brought to school in big plastic or cloth bags.

2.2.4.3 Meal delivery, storage and service at school level

Seven out of the 32 caterers interviewed prepare lunch on school premises itself. The rest of the caterers either come to deliver the lunch to the school or the educator who accompanies children in school buses take the lunch from the caterer on his/her way to school and in some cases, the families take the prepared lunch from the caterer early in the morning before going to school. In all the schools surveyed, it has been reported that meal is delivered before lunch time. Table 4 gives an overview of the different scenarios of meal storage at school level in the case of EAP children. Out of the 32 schools surveyed, only 15 are equipped with a refrigerator and 13 with meal heating facilities like oven, stove or microwave. In cases where hot meals are provided, school attendants often reheat the children's meal before serving. Meal intake of the children at school is supervised by the educators and attendants. The later make sure that the children eat all the food provided. Leftovers are packed for the children to bring back home or in case an EAP child is absent or has brought his meal from home, the food is shared among other children in the class. In the school kitchen, where food is prepared in mass, leftovers are rare but in case food is left, it is shared among needy children or taken home by the school attendant.

Table 4: Overview of the different scenarios of meal storage at school level

| Types of food provided | Ways meals stored | |
|----------------------------------|---|--|
| | School with kitchen | School without kitchen |
| Bread based/ sandwich type meals | Bag brought by caterer kept in school kitchen | Bag brought by caterer kept either on teacher's desk or in mess room. Bread is put in children's lunch bag |
| Hot meals | Kept in school kitchen at ambient temperature | Container brought by caterer kept either on teacher's desk or in mess room. |
| Yogurt | In refrigerator if school equipped with one. | Children eat it immediately or during morning break. Kept at ambient temperature till children eat it in 2 schools. |

CHAPTER 3: TYPES OF MEALS PROVIDED AND THEIR NUTRITIONAL QUALITY

3.1. *Importance of nutrition in children*

Recent evidence shows that early childhood is perhaps the most important developmental stage for establishing healthy eating pattern. This will ensure optimal growth and cognitive development, and prevent a lifetime of obesity and nutrition related diseases. If children do not eat the appropriate nutrients during their early years they may show signs of cognitive impairment, be overweight or at risk for obesity during their school years, and have established eating patterns that result in a lifetime of insufficient intake of milk, fruits and vegetables and key nutrients, like iron and calcium. Good nutrition is critical in optimizing each child's potential for success. Meeting nutritional requirements throughout childhood is essential to full intellectual development. Research has shown that undernutrition impacts on children's behaviour, performance and overall quality of development. Children require sufficient energy and essential nutrients each day to concentrate. Undernutrition and short term hunger are barriers to learning. Meals and snacks served should meet children's nutrition need; parents and teachers should provide models of healthy eating patterns, and help children establish good eating patterns at an early age.

3.2. *Methodology*

Prior to the data collection process of the study, it was decided that assessment of the nutritional quality of meals provided under the EAP programme would be carried out as follows:

- Weighing of meal
- Recipe verification
- Calculation of nutrient composition using food composition table

However, since there was no recipe provided and the exact amount of ingredient used was not available, the method used to assess nutritional quality of meals was adapted. A list of commonly prepared menus, over a period of one week, was taken from each caterer and also from some of the schools surveyed whereby a record of meals provided was kept. The list of menus provided by all the 32 caterers was compiled and a list of (32 x 5) 160 menus was obtained. The frequency at which

those meals were provided to the children over a period of one week was calculated. The different menus were then analysed in terms of the various food groups, namely food for energy, food for growth and food for health. This was then compared to the USDA food guide pyramid for preschoolers to assess the nutritional adequacy (USDA, 2011). Furthermore, methods of cooking were also looked into so as to provide recommendations on healthy cooking.

3.3. Types of meals provided

28 different types of meals were provided out of which 17 were bread based (Table 5). The most common meal is bread, sausage or burger or fishfinger with salad and fruit as dessert.

Table 5: Types of meals provided

| Types of meals | Frequency lunch provided by the 32 caterers on a period of 1 week |
|--|--|
| Bread + Sausage/ burger/ fishfinger +fruit | 19 |
| Bread + Chicken/ Meat/ Fish/Egg | 9 |
| Bread + tuna salad (tuna + vegetables) | 8 |
| Bread+ egg salad (boiled eggs+ vegetables) | 8 |
| Rice + Pulses+ (minced meat/ luncheon meat/ sausages) + vegetables | 8 |
| Bread + peanut butter | 7 |
| Bread + Chicken/ Meat/ Fish/ Egg+ vegetables | 7 |
| Bread + ham/ canned fish + butter | 7 |
| Bread + Gratin chouchou (Vegetables+ cheese) | 7 |
| Bread+ Butter+ Cheese+ Peanut Butter | 7 |
| Bread+ omelette | 7 |
| Bread + Sausage/ burger / fishfinger + yogurt | 6 |
| Bread + vegetable salad (achard legume) | 6 |
| Macaroni Gratin (cheese) | 6 |
| Rice + Pulses+ (chicken/ fish/ meat) daube+ vegetables | 6 |
| Bread + butter+ cheese | 5 |
| Macaroni + Eggs/ Tuna+ Vegetables | 5 |
| Rice + Pulses+ chicken/ fish/ meat | 5 |
| Rice+ (chicken/ fish/ meat) daube+ vegetables | 5 |
| Fried Rice (Chicken/ Eggs + vegetables) | 4 |
| Spaghetti + cheese+ Eggs+ vegetables | 3 |
| Fried Noodles (Chicken/ Eggs + vegetables) | 3 |
| Fried Rice (Egg+sausages/Luncheon meat + vegetables) | 3 |

| | |
|---|--|
| Bread + butter | 2 |
| Bread + crabsticks+ mayonnaise+ vegetables | 2 |
| Bread+ soya+ vegetables | 2 |
| Briani (vegetables+ Chicken/soya) | 2 |
| Bread+ Gateau Piment | 1 |
| TOTAL | 160 |
| Dessert provided | Frequency dessert provided by the 32 caterers on a period of 1 week |
| Fruit | 110 |
| Yogurt / Dahi | 36 |
| Dairy or cereal based dessert (idli, pudding, flan) | 14 |
| Jellies / snacks | 12 |

The following observations have been made:

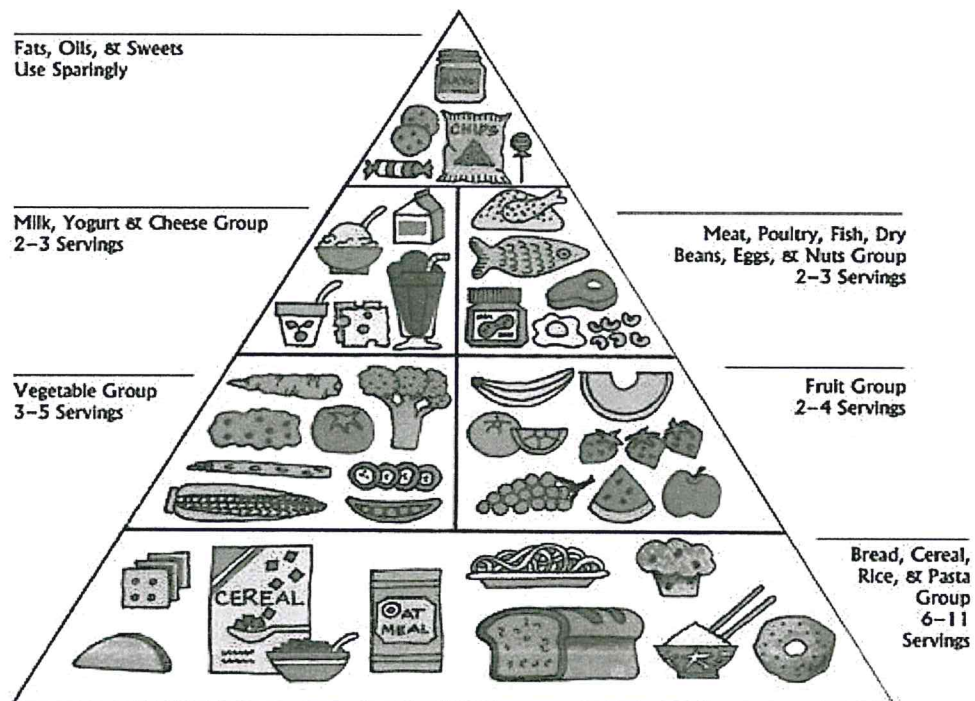
- Most caterers provide fruit on a daily basis, either whole or cut. It has also been observed that apples, pears, oranges, that is, imported fruits are mostly provided to children. In many cases, educators at school have reported that when a whole fruit is given, often the children do not consume it. To encourage the child eat the fruit, whenever possible, the educators cut the fruit in quarters and share it among the children present.
- Some NGOs like Caritas and Safire recommend that caterers provide fruits 3 days a week and yogurt 2 days a week.
- Caterers often opt for convenience and easy to prepare food like sausages and burgers as these foods are well accepted by children.
- Out of the 28 different types of meals provided, only 16 contained a source of vegetable. Vegetables are often provided in the form of salad, fried and sometimes sautéed or in bouillon. It has been observed that the quantity of vegetables served per children usually amounts to 1 to 2 lettuce leaves or 1/5th of a medium carrot. Most commonly served vegetables were lettuce, carrots, cabbage, brede blanc, beetroot, tomato and chouchou. It was also noted that in meals like 'fried rice' or 'spaghetti with vegetables', frozen mixed vegetables were used.
- Commonly used cooking method is frying. During frying, fat is absorbed by the food, hence increasing the fat content of the food and consequently its energy value. Mauritian dietary guidelines provided by the Mauritius Institute of Health, recommend a reduction in the

amount of fried foods consumed. Moreover, frying is carried out at high temperatures thus leading to the destruction of heat-sensitive nutrients and hence decreasing the nutritional value of the food.

- Frequency at which mayonnaise/ ketchup are provided to children on a period of 1 week is 16. Mayonnaise and/or ketchup are mostly provided with bread based meals to make it more palatable to the children.
- 6 out of 32 of the caterers interviewed provide diluted juice to the children almost regularly.

3.4. Nutritional adequacy of meals provided

The United States Department of Agriculture (USDSA) designed a food pyramid of daily guidelines for kids. The USDA food guide pyramid essentially states that a child's daily diet should be composed mostly of calories from complex carbohydrates and lean proteins and no more than 20 percent of calories from fat (Figure 8).



Source: <http://heathersparentingblog.blogspot.com/p/preschoolers-nutrition.html>

Figure 8: USDA food guide pyramid for preschoolers

According to USDA, preschoolers generally need about 1,000 to 1,400 calories per day. For this age group, roughly five or six mini-meals throughout the day are preferable to keep their energy up. According to the healthy food pyramid, children also need:

- six servings from the breads/cereals/rice/pasta group (1 serving = 1 slice of bread, 1 cup of cereal, 1/2 cup of cooked cereal, rice, or pasta)
- five servings from the fruit and vegetables group (1 serving = 1 cup of raw leafy vegetables, 1/2 cup of other vegetables cooked or raw, 3/4 cup of vegetable/fruit juice, 1 medium apple, banana, orange, pear)
- two servings from the milk/yoghurt/cheeses group (1 serving = 1 cup of milk or yogurt, or 2 slices (40g) of cheese)
- two servings from the meat and beans group. (1 serving = 55-85g of cooked lean meat, poultry, or fish, 1/2 cup of cooked dry beans)

Moreover, milk is an important part of a child's diet as it is a good source of calcium and vitamin D, which helps build strong bones. Young children should be getting at least 500 milligrams of calcium a day. This can be provided by two servings of dairy foods every day.

Ensuring adequate iron in a child's diet is primordial as after 12 months of age, children are at increased risk for iron deficiency because their intake of iron-fortified formula or breast milk is greatly reduced. Young children should be getting about seven milligrams of iron each day. It is important to ensure that children receive enough iron, as low iron levels can affect a children's growth and may lead to learning or behavioural difficulties. Iron deficiency anaemia, a condition where there is a decreased number of red blood cells in the body can also develop. Red blood cells help carry oxygen throughout the body and depend on iron to be produced. If there are not enough red blood cells, tissues and organs in the body do not receive enough oxygen and fail to function as well as they should. To help avoid iron deficiency occurring children should get adequate amount of iron rich foods such as green leafy vegetables and lean meats.

However, in the EAP context, the socio-economic status of these families does not allow them to provide sufficient and adequate food to their children. Hence, the lunch provided to these children at school should try to cater for at least 1/3 of their daily nutritional requirements.

The different types of meals provided to the EAP children (Table 6) were further classified according to the different food groups, namely:

- Food for energy: Bread, other cereals, potatoes and starchy foods like rice

- Food for growth: Milk and dairy products, pulses, meat, fish, poultry, eggs and alternatives like burgers and sausages
- Food for health: fruits and vegetables.

Table 6: Nutritional classification of meals provided

| Meals | Food for energy | Food for growth | Food for health |
|--|------------------------|-----------------------------|------------------------|
| Bread + Sausage/ burger/ fishfinger +fruit | Bread | Sausage/ burger/ fishfinger | Fruit |
| Bread + peanut butter | Bread | Peanut | |
| Bread + butter | Bread | | |
| Bread + butter+ cheese | Bread | Cheese | |
| Bread + tuna salad (tuna + vegetables) | Bread | Tuna | Vegetables |
| Bread+ egg salad (boiled eggs+ vegetables) | Bread | Egg | Vegetables |
| Bread + Chicken/ Meat/ Fish/ Egg+ vegetables | Bread | Chicken/ Meat/ Fish/ Egg | Vegetables |
| Bread + ham/ canned fish + butter | Bread | Ham/ canned fish | |
| Bread + crabsticks+ mayonnaise+ vegetables | Bread | Crabsticks | Vegetables |
| Bread + Chicken/ Meat/ Fish/Egg | Bread | Chicken/ Meat/ Fish/Egg | |
| Bread + Gratin chouchou (Vegetables+ cheese) | Bread | Cheese and milk | Vegetables |
| Bread + vegetable salad (achard legume) | Bread | | Vegetable |
| Bread+ Butter+ Cheese+ Peanut Butter | Bread | Peanut, cheese | |
| Bread+ omelette | Bread | Egg | |
| Bread+ soya+ vegetables | Bread | Soya | Vegetables |
| Bread+ Gateau Piment | Bread | Dal | |

| Meals | Food for energy | Food for growth | Food for health |
|--|------------------------|---|------------------------|
| Spaghetti + cheese+ Eggs+ vegetables | Spaghetti | Eggs, cheese | Vegetables |
| Macaroni Gratin (cheese) | Macaroni | Cheese and milk | |
| Macaroni + Eggs/ Tuna+ Vegetables | Macaroni | Eggs/ Tuna | Vegetables |
| Rice + Pulses+ (minced meat/ luncheon meat/ sausages) + vegetables | Rice | Pulses and minced meat/ luncheon meat/ sausages | Vegetables |
| Rice + Pulses+ chicken/ fish/ meat | Rice | Pulses and chicken/ fish/ meat | |
| Rice + Pulses+ (chicken/ fish/ meat) daube+ vegetables | Rice | Pulses and chicken/ fish/ meat | Vegetables |
| Rice+ (chicken/ fish/ meat) daube+ vegetables | Rice | Chicken/ fish/ meat | Vegetables |
| Fried Rice (Chicken/ Eggs + vegetables) | Rice | Chicken/ Eggs | Vegetables |
| Fried Noodles (Chicken/ Eggs + vegetables) | Noodles | Chicken/ Eggs | Vegetables |
| Fried Rice (Egg+sausages/Luncheon meat + vegetables) | Rice | Egg and sausages/Luncheon meat | Vegetables |
| Briani (vegetables+ Chicken/soya) | Rice | Chicken/soya | Vegetables |

From table 6, it can be deduced that, firstly, all the meals provided are adequate in carbohydrates which are the grains group in the form of bread, rice, noodles or pasta. Nevertheless, it has been noted that mainly refined carbohydrates are given to the children. Most meals provided include good sources of protein like meat, fish, chicken and eggs. However, sausages, burgers, luncheon meat, fishfingers, and ham are mainly reconstituted meat products containing little protein but high in salt and unhealthy fats. Table 7 provides the protein content of different foods for growth.

Table 7: Amount of protein and fat in 100g of different non-vegetarian foods

| Foods | Amount of protein in grams in 100g | Amount of fat in grams in 100g |
|--------------|---|---------------------------------------|
| Poultry | 24 | 0.5 |
| Eggs | 12 | 8 |
| Pulses | 22 | 0 |
| Fish | 20 | 1.5 |
| Burgers | 9.8 | 7 |
| Fish fingers | 6.2 | 10.5 |
| Sausages | 12.9 | 19.5 |

Source: (National Institute of Nutrition, 1989)

In addition to carbohydrates and protein, it is of utmost to ensure that the lunch provided to the EAP children contains the adequate amount of vegetables. Meals like ‘bread and gratin chouchou’, ‘bread with achard legume’ and rice based meals contain generally at least one serving of vegetables. In most cases the vegetables served did not even amount to 1 serving. Although a fruit too is provided with the meal, it is essential that a variety of vegetables be included so that it contains all the vitamins and minerals needed by the children. Hence it can be deduced that meals provided to children under EAP lack in vegetables and therefore dietary fibre. Refined carbohydrates provided to these children are poor in dietary fibre, unlike unrefined carbohydrates. Conversely, pulses are good sources of dietary fibre and also of protein but few caterers include it in the meal provided. Pulses are provided mainly with hot meals. Some meals provided are high in fats in the form of butter, peanut butter and fried products. In cases where peanut butter or ham is provided, butter can be completely omitted as it only adds to a fat-rich meal. Moreover, the most common source of calcium provided is yogurt and some meals include cheese and milk. It can be concluded that in general, meals provided were poor in calcium and the latter is of utmost importance in the diet of children for proper bones and teeth formation. It is felt that since the children are from poor facilities and possibly cannot afford dairy products, efforts can be made to include dairy products in the meals..

3.2. Nutritional Knowledge of food providers

Eleven nutrition statements were given to the 32 caterers and for each correct answer, 1 point was attributed. All the points were then summed up to get the total score for each caterer. Level of

nutritional knowledge of the caterers was then categorised as ‘excellent’, ‘very good’ and ‘good’ according to the number of correct answers they obtained (table 8).

Table 8: Categorisation of level of nutritional knowledge

| Number of correct answers out of 11 nutritional knowledge statements | Grade |
|---|--------------|
| 11 | Excellent |
| 9 – 10 | Very Good |
| 7 – 8 | Good |
| 5 – 6 | Fair |
| < 5 | Poor |

Out of 32 caterers interviewed, the vast majority, that is, 21 caterers had an excellent nutritional knowledge and most of the remaining of the caterers had a very good knowledge on nutrition (Table 9). The mean score of the 32 caterers for nutritional knowledge was 10.4 ± 1.1 , the highest achievable score being 11.

Table 9: Distribution of caterers according to grade obtained for overall knowledge in nutrition

| Grade | Excellent | Very Good | Good |
|---------------------------|------------------|------------------|-------------|
| Number of caterers (n=32) | 21 | 8 | 3 |

Hence, almost all the caterers had a very good/excellent knowledge on nutrition and what makes up a balanced diet.

However many of the caterers reported that though they know about a balanced meal, they are unable to always provide for it to the children due to high costs of a balanced meal. Therefore caterers perceive balanced meal as being expensive. It can be deduced that all of the surveyed caterers knew about the importance of fruits, vegetables and milk in children's diet (Table 10). However, some of the caterers believe that a vegetarian meal is not a balanced meal and classify pulses as vegetables.

Table 10: Number of correct answers for different nutrition knowledge statements

| Knowledge statements | Number of correct answers out of 32 |
|---|--|
| Fruits and vegetables are bad for health | 32 |
| Children should avoid sweets and fizzy drinks | 32 |
| Bread and chicken only can make up a balanced meal | 29 |
| Milk and dairy products are bad for health | 32 |
| Water is better than diluted syrup | 32 |
| Rice, Lentils with chicken is a balanced meal | 21 |
| Rice, Dal, Rougail soya with brede make up a balanced meal | 27 |
| Bread, butter, cheese with banana make up a balanced meal | 31 |
| Boiled noodles, vegetables sautee and egg make up a balanced meal | 32 |
| Macaroni cheese, salad with a fruit make up a balanced meal | 32 |
| Rice, fish curry and salad make up a balanced meal | 32 |

CHAPTER 4: HYGIENIC PRACTICES ASSOCIATED WITH FOOD PREPARATION AND FOOD SAFETY KNOWLEDGE OF CATERERS

4.1. Importance of food Safety and Hygiene

Food safety experts classify children as a group which can be easy victims of food-borne illnesses (ICN, 2007). Children are vulnerable to severe and chronic food-borne illnesses as their immune system is not fully developed and still immature. Thus, they are unprotected against microbial invasions. Moreover studies have demonstrated that under-nourished and underweight children are more prone to food-borne illnesses as it takes a smaller quantity of pathogens to make the child sick than it would otherwise be for a healthy adult. In Mauritius, several food poisoning outbreaks involving children have been reported:

1. In 2003, 3 children in ZEP schools were reported ill after consumption of contaminated yogurt (Saminaden, 2003)
2. In March 2002, 12 children of Hugues Otter Barry Government school in Curepipe were hospitalised due to food poisoning after eating fried noodles from the school canteen (L'Express, 2002). However pathogen/s responsible was not reported.
3. In August 2010, around 15 pupils from Mahébourg RCA primary school were hospitalized after consuming Faratas and Noodles purchased at Pointe Canon (Le Défi, 2010).
4. In November 2010, 28 children of L'Amitié Government school were hospitalised due to food poisoning caused by Riz Cantonais purchased at a restaurant in Grand Baie. The food was served 6 hours after preparation, during which growth of food poisoning microbes occurred (Le Défi, 2010)
5. In June 2011, 9 year old boy of Rose Hill died after consuming pork meat present in 'Wan-Tan' a Chinese snack prepared at home. Sanitary health inspectors reported poor hygiene within the home kitchen (L'Express, 2011).

4.2. Methodology

A triangulation method involving on-site observation of food preparation where possible, interview of caterer and that of the educator at school level which is the point of meal delivery, was used to assess hygienic practices of the caterers. In some cases, however, observation was difficult to carry

out as food was prepared in domestic kitchens and the caterers were not keen for the assessment. For on-site observation, a checklist on hygiene based on hygienic requirements of Food Act 1998, was designed. The checklist covered the basic food safety and hygiene requirements a caterer should abide to in order to ensure that the food provided to the children is safe. It covered the aspect of personal hygiene, safe food handling and the premises. Knowledge on food safety and hygiene was also assessed using a scoring system similar to that for nutritional knowledge. 10 food safety and hygiene statements were provided and 1 point was awarded to each correct answer. No points were given in case the respondent answered by 'Don't know'. The total score was then calculated and level of knowledge on food safety and hygiene was categorised (Table 11).

Table 11: Categorisation of level of food safety and food hygiene knowledge

| Number of correct answers out of 10 food safety knowledge statements | Grade |
|--|-----------|
| 10 | Excellent |
| 8-9 | Very Good |
| 6-7 | Good |
| <5 | Poor |

4.3. Knowledge of caterers on food Safety and Hygiene

Knowledge of caterers on contamination, cross contamination, cleaning, cooking and chilling was assessed. Questions related to cooking dealt mainly with high risk foods like poultry, meat and eggs. All of the caterers interviewed had at least a good knowledge level on food safety and hygiene Table 12) while 25 out of 32 caterers had a very good/ excellent knowledge in food safety and hygiene.

Table 12: Distribution of caterers according to grade obtained for overall knowledge in food safety and hygiene

| Grade | Excellent | Very Good | Good |
|---------------------------|-----------|-----------|------|
| Number of caterers (n=32) | 6 | 19 | 7 |

The mean score for the 32 caterers on food safety and food knowledge was 8.3 ± 1.2 . It was noted that, knowledge specifically on potential sources of contamination was poor and the fact that the home kitchen can be a source of poisoning (Table 13).

More than two thirds of the caterers surveyed believed that food can be kept at ambient temperature more than 2 hours after cooking. Most of the caterers disagreed that the home kitchen was a potential source of food poisoning and that kitchen cloths could be a source of microbiological cross contamination of food. However, statistics show that food poisoning incidents over the last 20 years occurred mostly at home (Hotee, 2011). Most microorganisms do not cause disease, however, harmful pathogenic microorganisms are widely found in soil, water, animals and people. These microorganisms are carried on hands, wiping cloths and utensils, especially cutting boards and the slightest contact can transfer them to food and cause foodborne diseases. 8 out of 32 caterers were unaware of the fact that mayonnaise, which is commonly implicated in food poisoning, contained raw eggs.

Table 13: Number of correct answers for different food safety knowledge statements

| Knowledge statements | Number of correct answers out of 32 |
|--|--|
| Same gloves should be put while manipulating raw and cooked food | 32 |
| Jewelleries (Rings) should not be removed while preparing food | 30 |
| Home kitchen is a potential source of food poisoning | 6 |
| Same knife can be used to cut both raw poultry and salads | 31 |
| Mayonnaise contained raw eggs | 24 |
| Expiry and used-by dates need to checked | 32 |
| Salmonella is found in poultry meats and raw eggs | 15 |
| Food should be reheated till boiling temperatures | 21 |
| Cooked meals can be left out for more than two hours after cooling | 10 |
| Kitchen cloths can spread microorganisms | 9 |

Furthermore, 17 out of the 32 caterers did not know that raw eggs and poultry meat contained Salmonella and the risk it represented. Ingestion of Salmonella causes an infection known as Salmonellosis resulting in diarrhoea, vomiting, fever and abdominal cramps. The majority of the

caterers interviewed responded correctly that knives and chopping board need to be washed after cutting raw poultry or meat and that jewelleries can cross contaminate food.

4.4. **Reported practices of caterers on food Safety and Hygiene**

25 out of 32 caterers reported detaining a Food Handlers Certificate. Table 14 analyses some of the reported practices.

Table 14: Reported and recommended food safety and hygienic practices

| Reported Practices | Comments |
|--|---|
| <i>Hand washing</i> | |
| <p><u>Good Practices:</u> All of the caterers claimed washing their hands before meal preparation</p> <p><u>Bad Practices:</u> 17 out of 32 claimed washing hands only with water and not with soap each time.</p> | Proper hand washing is the basic of personal hygiene, to ensure food prepared is safe and fit for consumption. Hands frequently move microorganisms from one place to another, so hand washing is one of the most important ways of keeping food safe. According to WHO, hand washing can prevent 40 to 60% of diarrhoeal diseases. |
| <i>Cleaning of equipments and surfaces</i> | |
| <p><u>Good Practices:</u> 14 caterers stated cleaning their meal preparation area and kitchen equipments regularly</p> <p><u>Bad Practices:</u> 18 claimed doing so after meal preparation mainly.</p> | Effective cleaning is essential to get rid of harmful bacteria in the kitchen and to stop them spreading. All food contact surfaces like preparation surfaces, cutting boards, utensils and all hand contact surfaces e.g. door and cupboard handles, bin lids, taps, should be thoroughly cleaned and disinfected at regular intervals to prevent the build up of contamination around food areas. |

| Reported Practices | Comments |
|--|---|
| <i>Keeping food at the correct temperatures</i> | |
| <p><u>Good Practices:</u></p> <p>All the caterers asserted storing yogurt and mayonnaise in the refrigerator.</p> <p>Only 4 caterers reported reheating the food till piping hot.</p> <p><u>Bad Practices:</u></p> <p>When asked about reheating practices, 28 caterers stated that they reheated food just to warm it.</p> | <p>Incorrect storage of food can cause spoilage and food poisoning. High risk food should be kept below 5°C or above 60°C to avoid the 'temperature danger zone', where bacteria multiply fastest. High risk food includes meat, poultry, eggs and dairy products. By holding temperatures above 60 °C the growth of microorganisms can be stopped.</p> |
| <i>Defrosting practices</i> | |
| <p><u>Good Practices:</u></p> <p>17 out of 32 caterers claimed keeping raw poultry for thawing below ready to eat food in the refrigerator</p> <p>25 reported keeping the meat or poultry in a dish in order to prevent leakage of juices on other food items</p> <p>10 caterers reported that they placed frozen poultry or meat overnight in refrigerator to thaw</p> <p><u>Bad Practices:</u></p> <p>16 stated soaking the product in water to thaw</p> <p>6 reported cooking without much thawing.</p> | <p>Proper thawing is important to ensure that food does not remain in dangerous temperature zone for too long during cooking. Within the temperature danger zone (5 °C to 60 °C), bacteria present in the food proliferate at a very fast rate. By holding temperatures below 5 °C the growth of microorganisms is slowed down. Raw meat is already lauded by microorganisms harmful to the health, but when cooked these microorganisms are destroyed. Juices that leak out from raw meat during thawing have a high microbial laud and may contaminate ready to eat food if in contact with it.</p> |

4.5. On-site observation of meal preparation

On-site observation was carried in only 14 cases where caterers were agreeable that their kitchen area and meal practices were observed and assessed. In 5 cases it was observed that caterers handled their phone and did not wash hands again before going back to food preparation. Studies carried out

have shown that mobile's dial touch has same microbial load as handle of public toilet's doors (Bruhn *et al.*, 1999). If proper handwashing is not carried out, this can cause cross contamination of food prepared.

Many of the kitchens surveyed did not have covered bins. In some cases, plastic bags kept on sink surface were used to dispose of waste. However, all of them reported discarding the waste bag at the end of the day, to avoid attracting pests and insects in kitchen area.

In most cases, caterers did not wear protective clothing besides an apron. However, it was observed that the apron was used to dry hands regularly. Also some caterers used same wiping cloth for utensils and surfaces. This can further spread microorganisms. None of the caterer surveyed wore gloves or hair net. Often, ready to eat food like bread was handled using bare hands. Also, in 7 cases, it was observed that knives were not washed before cutting bread. This can be a potential source of contamination as there is no further hurdle to prevent bacterial growth. In all 14 cases, raw food was well separated from cooked food.

CHAPTER 5: CONSTRAINTS IN THE IMPLEMENTATION OF THE PROVISION OF DAILY LUNCH PROJECT

The major constraints reported by the people involved in the “Provision of a decent lunch” are summarised below.

1. Financial Constraints

NGOs and caterers reported that they faced financial constraints. NGOs receive payments for the project from the NEF too late and therefore, payment of caterers and case workers by the NGOs is delayed.

Caterers complained of the fact that they do not receive their payment on time to shop properly for the meal preparation. Very often they have to use their own funds to purchase the raw materials. They also reported that the sum allocated per meal (Rs 25.00) is not adequate to provide for a balanced meal.

2. Procedural delays

In some cases when NGOs identify and refer needy families to the NEF to benefit from the EAP programme, the process takes too long. Often in these cases, NGOs, caterers and even educators have to manage to provide a lunch to these needy children well before the case is formalised.

3. Lack of Database

Neither the NEF nor the schools have a proper database on the caterers providing food to these children. Neither do some NGOs have an updated compiled list. It poses a serious problem for recruiting caterers for training and research

4. Lack of transport facilities

Caterers reported that they faced problems to transport the meals to school. Caterers have to manage to deliver the lunch on their own to different schools. This explains why individual caterers rarely provide hot meals. In many cases, individual caterers may cater for more than 30 children.

5. Lack of parents' involvement

Lack of participation of parents in the meal provision or education of their children has also been observed.

6. Lack of control

In few cases, it has been reported that some families do not agree that someone else caters for their child, so monthly provision in terms of basic food commodities are given to the family to ensure that the latter has enough resources to nourish their children. Nevertheless, it has been observed that these parents rarely provide a proper school lunch to their children.

7. Lack of monitoring on quality of meals provided

Some monitoring is done by case workers on whether the food is actually provided to the children. However monitoring on quality (safety and nutritional) is not done on a regular basis.

CHAPTER 6 – TRAINING PROGRAMME FOR THE FOOD CATERERS

6.1 INTRODUCTION

The health, growth and development of an individual are largely influenced by diet (WHO, 2003). Diet is one of the major risk factors for several non-communicable diseases like *diabetes mellitus* and alongside is a vehicle that can cause food borne diseases. The risks of developing diet related chronic diseases begin in fetal life and continue into old age (Mann and Trustwell, 2007). Thus, healthy eating should start during early lifecycle stages. Moreover, food borne diseases are alarming in Mauritius. It has been reported in the press, as stated earlier, that several children during the recent years have been victims of poor food safety practices adopted by food handlers although the Mauritian food law specifies that all food handlers should ensure food safety throughout the food chain. New laws related to the promotion of good health of children like banning of the sale of soft drinks in schools, have also been introduced in Mauritius. Hence, it is a must that all those working for the EAP programme have the responsibility to provide the children with not only safe but with healthy foods.

Following the in-depth interviews conducted with 32 of the food caterers working for the NGOs, together with the observations made that focused on their food safety practices and types of melas provided, several areas of non-conformities with respect to nutritional quality of food and safe food handling practices were identified. This might infer that, in some cases, that unhealthy foods were being prepared under poor hygienic conditions. One of the reasons behind some of these malpractices could be lack of knowledge. Effective consumer communication strategies are required to reduce the prevalence of risk related food handling behaviours, increase consumer awareness of risks and motivate consumers to change unsafe and unhealthy behaviours (Yang *et al.*, 1998). In this respect, to empower the caterers, a nutrition and food safety education programme was designed within the context of this project to educate the food caterers about safe and healthy food preparation. Hence, the **objectives** of this training aspect were to:

- develop and run a short training programme for the food providers on healthy eating and safe food preparation.

- assess the knowledge and attitude of the food caterers about healthy eating and food safety before attending the training session.
- determine the impact of the training session after a period of one month on the knowledge and attitude of the caterers.

This chapter provides an overview of the development and on the implementation of a training programme entitled “Healthy eating and safe food preparation”. It also sheds light on the impact of the training session on the knowledge and attitude of the caterers after one month.

6.2 METHODOLOGY

The target group for this part of the project was the population of food caterers working for the NGOs. The fact that a proper list of food caterers was not provided by some of the NGOs, an estimate was obtained by asking different case workers, social workers and the food caterers themselves and is compiled in Table 15. A proportionate stratified sampling method was adopted; the stratum being the NGOs. Table 15 indicates the number of food caterers sampled out from each NGO.

Table 15 – Sampling of food caterers

| NGO | Number of hired caterers | Number of caterers sampled out |
|------------------------------|--------------------------|--------------------------------|
| 1. Caritas | 79 | 17 |
| 2. Safire | 50 ¹ | 11 |
| 3. Arya Sabha | 20 ¹ | 5 |
| 4. APEDED | 5 ¹ | 1 |
| 5. SOS Village | 8 | 2 |
| 6. SOS Poverty | 1 | 1 |
| 7. Centre de L’amitié | 1 | 1 |
| 8. Terre de Paix | 1 | 1 |
| 9. Mauritius Islamic Mission | 1 | 1 |
| | 168 | 40 |

¹ estimated from in depth interviews with case/social workers and food caterers

A covering letter that explained the purpose of the survey and assurance that anonymity and confidentiality of respondents would be protected was sent to each NGO. The first five NGOs (Table 15) were requested to select the required number of food caterers who would attend the training course. As for the remaining NGOs, *all* their food caterers were chosen because each one hires only

one food caterer and the sample taken should represent all the NGOs. Return of completed forms was an indication of consent. Besides, non-responders were given telephone reminders. A total of 34 caterers was recommended by the different NGOs but only 22 caterers actually attended the course (Table 16).

Table 16 – Attendance of caterers

| NGO | Number of caterers who would attend | Number of caterers who attended |
|------------------------------|-------------------------------------|---------------------------------|
| 1. Caritas | 12 | 9 |
| 2. Safire | 2 | 1 |
| 3. Arya Sabha | 9 | 4 |
| 4. APEDED | 2 | 0 |
| 5. SOS Village | 5 | 4 |
| 6. SOS Poverty | 1 | 1 |
| 7. Centre D'amitié | 1 | 1 |
| 8. Terre de Paix | 1 | 1 |
| 9. Mauritius Islamic Mission | 1 | 1 |
| | 34 | 22 |

6.2.1 TRAINING PROGRAMME DEVELOPMENT

A six hour course on “Healthy Eating and Safe Food Preparation” was prepared after going through websites, books and legal documents. Microsoft Power Point was used as the communication tool for the presentation. The wording on the slides was in simple, straightforward French language, accompanied with lots of photos to ensure better understanding by the audience. The powerpoint slides were printed and were given as training materials to the participants. Moreover, the delivery was made in Creole language and was interactive to enhance understanding and any clarifications were most welcome.

The course was divided into two sections: food safety and healthy eating. The duration of each section was three hours and was covered in the morning while the section on healthy eating was delivered in two hours in the afternoon. After each presentation, an interactive session was held between participants and trainers to encourage active participation. Main contents of the course are shown in Figure 9. The course was delivered in a lecture room at the Faculty of Agriculture of the University of Mauritius on the 26th of July 2011. The programme is given in Annex 1. This date was found to be more convenient to the participants since school children would already be in Easter

school holidays and the caterers would thus be free. Each participant was given hard copies of the training materials.

| FOOD SAFETY | HEALTHY EATING |
|---|---|
| <ol style="list-style-type: none"> 1. Causes of food borne disease 2. Importance of food hygiene and the Mauritian food laws that relate to food safety 3. Different food safety hazards and their link with food borne disease 4. Insight in the world of microorganisms 5. Safe steps before, during and after meal preparation. | <ol style="list-style-type: none"> 1. Importance of breakfast 2. Importance of a balanced diet 3. Classification of foods in different food groups 4. Food guide pyramid 5. Ways of preparing balanced meals 6. Improving the nutritional quality of meals prepared |

Figure 9 – Contents of course delivered

6.2.2 KNOWLEDGE AND ATTITUDE ASSESSMENT

6.2.2.1 Instrumentation tool and design

A questionnaire was used as the research tool. Statements in the questionnaire were formulated based on information available in reliable published literature such as research articles (Albert, 1995; Bruhn *et al.*, 1999; Rimal *et al.*, 2001), review articles (Redmond and Griffith, 2005) and from books (Sprenger, 2002; Mann and Trustwell, 2007). The questionnaire was designed in English and was translated into Creole language to ease the understanding of the statements by the respondents. Moreover, interviewer bias was prevented since the researcher to repeat the same statements in the questionnaire in similar manner.

In a pilot study, the questionnaire was administered to five caterers, resulting in minor modifications with the question wording. The average completion time for each questionnaire was 20 minutes. The revised questionnaire was divided into three sections (Table 17).

Table 17 - Sections of the questionnaire and their description

| Section | | Description |
|---------|------------------|--|
| 1 | Personal details | Demographic profile |
| 2 | Food safety | Six attitude statements towards food safety |
| | | 20 questions assessing knowledge on food safety |
| 3 | Healthy eating | Five attitude statements towards healthy eating |
| | | 20 questions assessing knowledge on healthy eating |

The first five items of the questionnaire were designed to obtain information about the demographic characteristics of the participants. In order to determine their food safety and nutrition attitudes, a 3-likert type scale was used for each category. The scale included a set of negative sentences in addition to the positive ones. Attitudinal responses to the positive sentences were graded as follows: “I agree”- three points; “undecided”- two points; and “I don’t agree”- one point.

However, knowledge grades were different to that of the attitudinal ones and were assigned as follows: *correct answer - three points; don’t know - two points; and wrong answer - one point* (Redmond and Griffith, 2005). In the negative sentences, the grades were assigned in reverse order (Redmond and Griffith, 2005). When all the knowledge statements for each section are replied correctly, the total grades to be obtained should be 60 points.

6.2.2.2 Data collection

Prior to the delivery of the course, a questionnaire was administered to each participant to assess their knowledge and attitude towards food safety and healthy eating to collect the research data. Completion of the self-administered questionnaire was carried out by gathering the selected sample of food caterers in a classroom at the Faculty of Agriculture of the University of Mauritius. Each caterer was provided with a questionnaire and to facilitate completion, the researcher read each statement on the questionnaire which was projected on a projector screen and they had to only tick

the answers which they deemed to be correct. Besides, two persons were hired to help any person facing any difficulties in filling the questionnaire. The researcher assured the participants that the questions were not an examination test but an insight to their understanding of food safety and nutrition and as such they should not guess but answer the questions to the best of their ability.

6.2.2.3 Data analysis

The knowledge scores obtained by each respondent for each section were determined separately by adding the marks they got for each statement answered correctly and then converting it into a percentage score. A mean \pm standard deviation rating of percentage knowledge score was next calculated for each section. Then, the overall level of knowledge of the participants was rated empirically either as "very good", "good", "fair" or "poor" (Table 18) based on the level of the course and the question asked.

Table 18 - Knowledge level classifications

| Percentage knowledge score | Knowledge level |
|----------------------------|-----------------|
| 80-100 | Very good |
| 65-79 | Good |
| 50-64 | Fair |
| <50 | Poor |

As for the attitude section, only a mean \pm standard deviation was calculated for each statement.

6.2.3 TRAINING PROGRAMME EVALUATION

6.2.3.1 Target group

The same target group involved in the pre-training programme, that is the 22 persons, was used for the post-training programme. The participants were already informed during the training course that they would be needed for a post training assessment of the training after one month and thus a convenient date was chosen. Most of them agreed to do it on the 25th of August. This opportunity was also seized to reward the participants with a certificate of attendance (Annex 2). Using their contact details provided during the registration of the pre-training programme, the participants were telephoned to remind them about the post-training programme.

6.2.3.2 Instrumentation tool and data collection

The same questionnaire used for the pre-training programme was used for the evaluation. This was to evaluate any improvement that has occurred in the level of knowledge and attitude shown by the respondents after following the training and giving them the opportunity to practise what they had learnt. Only 17 of the respondents attended the post training evaluation programme that is, an attendance rate of 77%. However, the absentees were contacted and the questionnaire was filled over the telephone by the researcher. Feedback on the training programme including location of delivery and materials provided were obtained using a questionnaire and informal group discussions.

6.2.3.3 Data analysis

Data were analysed using the SPSS statistical package (release 10.1.3, 2003). Non-parametric Wilcoxon signed rank tests were also used to analyse differences between the pre-test and post-test data and a p value of 0.05 was taken to be statistically significant.

6.3 RESULTS AND DISCUSSION

6.3.1 DEMOGRAPHIC PROFILE OF PARTICIPANTS

The majority (96%) of the food caterers, who participated in the programme, were female. Besides, 41% of the participants had an uncompleted secondary level while only 36% of them had completed secondary education (Figure 10). The majority catered for above children (Annex 3).

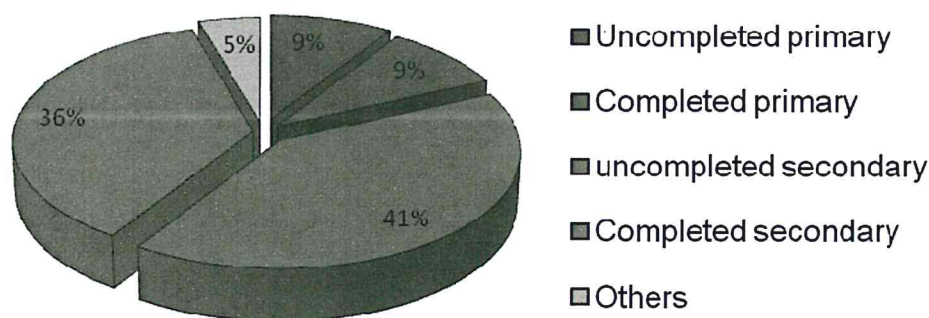


Figure 10 – Educational level of the participants

41% of the participants have been involved in the EAP project as food providers for one to two years (Figure 11). Besides, 27% of them have recently joined in the project implying that this training course could be beneficial to them in preparing safe and healthy foods for the children.

■ < 1 year ■ 1-2 years ■ 2-3 years ■ > 3 years

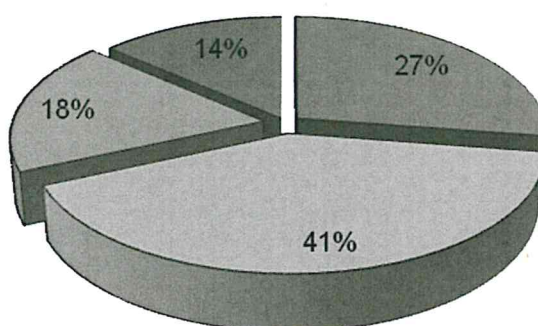


Figure 11 – Period of time for which the participants are preparing food for the children

15 out of 22 participants had attended a talk/ course on food safety while 16 had attended a talk/ course on nutrition/healthy eating (Figure 12) . Only 45% of the participants have a food handler's certificate and they are thus able to prepare food for sale lawfully. All participants are expected to have this certificate because according to the food act (1998), any person who is preparing food for sale should possess the food handler's certificate.

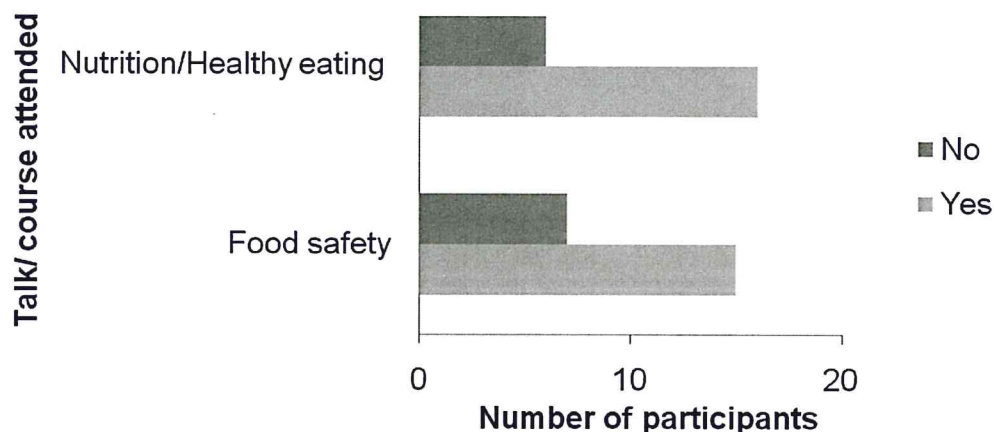


Figure 12 – Number of participants who has already attended a talk/course on food safety and nutrition/healthy eating

6.3.2 FOOD SAFETY KNOWLEDGE AND ATTITUDE ASSESSMENT OF THE CATERERS BEFORE AND AFTER THE TRAINING PROGRAMME

The food caterers had good knowledge on food safety in general having an overall mean score of 88.0% before the training programme (Figure 13). They had a *very good* knowledge on ‘food hygiene’ and ‘food safety hazards’ and on ‘food purchase and storage’ since the mean % knowledge score obtained was above 80%. They had only a *good* knowledge level on ‘food preparation, cooking, cooling and service’ as their mean % knowledge score obtained was 74.4% before the delivery of the training course. However, after one month of the delivery of the course, their overall mean knowledge score increased to 94.5%. This indicates the training course was effective. However, the increase was only significant ($p < 0.05$) for the section on preparation, cooking, cooling and service. Moreover, all participants answered rightly all the questions on the food hygiene and food safety hazards section after being trained.

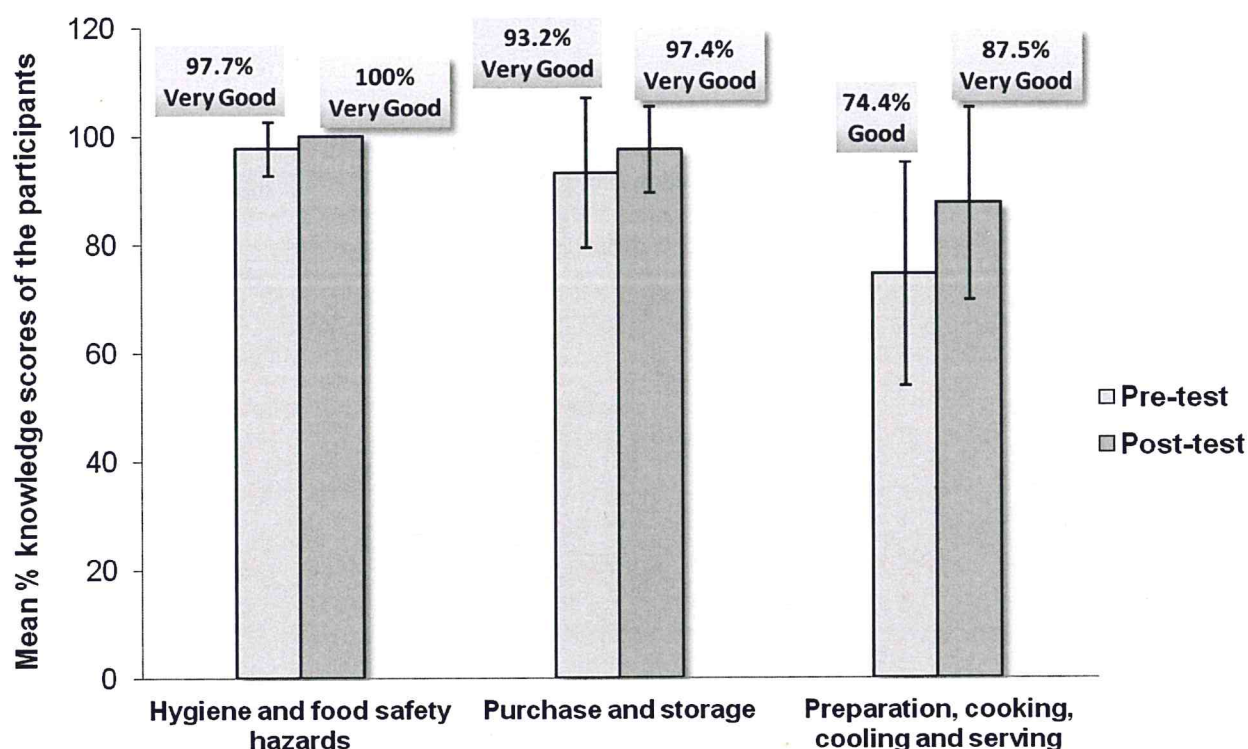


Figure 13 - %Knowledge scores of the participants (n=22) in food safety. Vertical bars represent error bars.

Findings of this study revealed that food safety knowledge scores had increased after the training. Similarly, three survey studies also aimed to consider the effects of a food-safety intervention of consumers' food-safety knowledge (Angell, 2008; Dharod *et al.*, 2004; Medeiros *et al.*, 2004). Angell's (2008) study revealed that food-safety knowledge increased significantly between pre- and post-test ($p < 0.0001$) (Annex 4). Dharod *et al.*'s (2004) study also revealed positive results as individuals exposed to the campaign were more likely to have a higher food-safety knowledge score than unexposed counterparts ($p < 0.001$). Medeiros *et al.* (2004) also found that the mean "knowledge gain" scores for the intervention groups were significantly higher than for the control ($p < 0.01$) (Annex 4).

Table 19 provides the details on knowledge scores obtained by the participants before and after the training programme. All the participants correctly answered 6 out the 20 knowledge statements before the training session. The knowledge scores of the participants has increased in 11 out of the 20 food safety statements after the training; statement 17 being answered rightly in greater

proportion after the training. However, the increase was significant only for the statements 17, 18 and 19.

The result of this study indicates that 50% of the caterers were aware about the safe temperatures that foods should reach during cooking before the training. An increase of 29.6% in their knowledge score after the training for the statement 17 on whether "*foods should be cooked above 60°C for long period of time*" or not could be accounted that most of the participants have grasped that foods should not remain in the danger zone ranging from 5°C and 60°C due to safety reasons. If food is being cooked above 60°C for a long time, most microorganisms die and this renders the food microbiologically safe to be consumed.

Cooked food should not be left at room temperature for more than two hours. Cooked and perishable food should be promptly refrigerated, preferably below 5°C. Microorganisms can multiply very quickly if food is stored at room temperature. By holding food at temperatures below 5°C or above 60°C, the growth of microorganisms is slowed down or stopped (WHO, 2005). Therefore, there has been an improvement in the knowledge regarding the statement "*Well-cooked foods can be kept at room temperature for more than two hours*" after the training (Table 19). In a study by Williamson et al. (1992), 41.9% of the participants stated that it was worrying for them to keep cooked meat and poultry at room temperature for more than four hours while 13.9% stated that they were not bothered by this

Furthermore, most of the respondents in the research learnt that "*cooked food should not be touched after touching raw food*" during the training (Table 19). In Angelillo et al.'s (2000) study, 97.3% of the respondents agreed that washing hands before handling unwrapped raw or cooked foods reduces the risk of food poisoning. As described in the WHO five keys to safer food, raw and cooked food should be kept separately (WHO, 2005). In the study conducted by Mitakakis et al. (2004), it was determined that 41.7% of the participants performed wrong applications in using raw food and 70.1% did so in using cooked food.

Minor decrease in knowledge scores has also been observed in statements 10 and 15. However, many participants have wrongly answered the statement 16 after the training. A decrease of 10.4% in the knowledge score for the statement 16 that "*a food is said to be well-cooked only by looking at its appearance*" was noted after the training (Table 19). One of the reasons could be that some of the

participants still used appearance of cooked foods to check if food has been cooked although this could sometimes be misleading as explained during the course. The size of the food is important during cooking. For instance, when a large piece of meat is being cooked, its centre takes time to achieve the recommended safe temperature and to be palatable as compared when small pieces of meat are being cooked.

Besides, a slight decrease in knowledge score was noted for both statement 10, "*meat should be purchased at the end of a shopping trip*" and the statement 15, "same chopping board can be used to cut raw poultry and vegetables" (Table 19). The decrease in both statements was due to the wrong answer of one participant after the training. However, it was not the same participant that gave the wrong answer for both statements. It is worth noting that these participants gave the right answer for the statements before the training. One reason could be they did not understand the questions correctly since these participants were interviewed through the telephone.

Table 19 – Knowledge scores on food safety before and after the training

| Statement | Mean \pm SD score | | % change | Significance |
|---|------------------------|-------------------------|----------|--------------|
| | Pre-training programme | Post-training programme | | |
| Food hygiene and food safety hazards | | | | |
| 1. Food borne diseases are caused by poor hygienic practices adopted by a food handler. | 3 \pm 0 | 3 \pm 0 | 0 | NS |
| 2. A hairnet should be used whenever food is being handled. | 3 \pm 0 | 3 \pm 0 | 0 | NS |
| 3. Jewelleries can be worn during food handling. | 2.95 \pm 0.21 | 3 \pm 0 | +1.69 | NS |
| 4. Hands are a major source of microbes. | 3 \pm 0 | 3 \pm 0 | 0 | NS |
| 5. Pathogenic microbes cause food borne disease. | 3 \pm 0 | 3 \pm 0 | 0 | NS |
| 6. Salmonella is a bacterium that causes food borne disease. | 2.95 \pm 0.21 | 3 \pm 0 | +1.69 | NS |
| 7. Newspapers can be used to wrap food barely. | 2.91 \pm 0.43 | 3 \pm 0 | +3.09 | NS |
| 8. Pesticide residues on fruits and vegetables can cause food poisoning. | 2.91 \pm 0.43 | 3 \pm 0 | +3.09 | NS |
| Purchase and storage | | | | |
| 9. An expired food should not be consumed. | 3 \pm 0 | 3 \pm 0 | 0 | NS |
| 10. Meat should be purchased at the end of a shopping trip. | 2.95 \pm 0.21 | 2.89 \pm 0.46 | -2.03 | NS |
| 11. Food in dented cans can cause food poisoning. | 3 \pm 0 | 3 \pm 0 | 0 | NS |
| 12. Raw poultry can be kept above cooked foods in the refrigerator. | 2.64 \pm 0.73 | 2.89 \pm 0.46 | +9.47 | NS |
| Food preparation, cooking, cooling and service | | | | |
| 13. Hands should be washed regularly with water only, during preparation of food. | 2.55 \pm 0.86 | 2.58 \pm 0.84 | +1.18 | NS |
| 14. Cracked eggs can be used for cooking. | 2.77 \pm 0.53 | 2.79 \pm 0.63 | +0.72 | NS |
| 15. Same chopping board can be used to cut raw poultry and vegetables. | 2.95 \pm 0.21 | 2.89 \pm 0.46 | -2.03 | NS |
| 16. A food is said to be well-cooked only by looking at its appearance. | 2.41 \pm 0.91 | 2.16 \pm 1.01 | -10.4 | NS |
| 17. Foods should be cooked above 60°C for long period of time. | 2.23 \pm 0.87 | 2.89 \pm 0.46 | +29.6 | ** |
| 18. Well-cooked foods can be kept at room temperature for more than two hours. | 2.59 \pm 0.73 | 2.89 \pm 0.46 | +11.6 | * |
| 19. Cooked food should not be touched after touching raw food. | 2.52 \pm 0.75 | 2.84 \pm 0.50 | +12.7 | * |
| 20. Hot foods can be kept in any type of plastic bowls. | 2.82 \pm 0.50 | 3 \pm 0 | +6.38 | NS |

SD: standard deviation; NS not significant; **p<0.01; *p<0.05. Score 3: correct answer; score 2: don't know; score 1: wrong answer (Annex 4)

Table 20 shows the food safety attitude of the participants. Out of the six attitudinal statements, respondents showed good food safety attitude towards three of them (statement 1, 5 and 6) before the training. However, a more significant positive attitude ($p < 0.05$) has been developed in five statements (1, 2, 4, 5 and 6) after the training. Proper preventive measures being taught to caterers have created and developed a more positive attitude on food safety compliance. Educating the participants on the risk of contamination and its source has proved to be one of the contributing factors to positive food safety attitude.

All of the participants agreed that food hygiene is important during food preparation before and after the training session (mean = 3) (Table 20). Besides, 50% of the participants were neutral for the statement *"I think I know all of the food safety precautions necessary for safe food preparation"* (median score = 2) before the training session but after the training course, the median score shifted to 3. This indicates that 50% of the participants agreed that they now know and are confident about all of the food safety precautions necessary for safe food preparation. The mean score for this statement has shifted from 2.32 to 2.74, which further indicates that the participants, on average, agreed with this statement after the training session.

In addition, 50% of the participants were neutral about the statement: *"I do not need to be given any food safety advice"* before and after the training programme (median = 2) (Table 20). The mean for this statement before and after the training was almost similar and was close to "neutral". Moreover, after the training, the participants became more confident (mean increased from 1.36 to 2.89) that their food safety behaviours adopted did not pose to any risk of food poisoning. The knowledge acquired could account for this change.

Poor food safety behaviour can lead to food poisoning cases. For instance, when a food handler is suffering from diarrhea or vomiting, the food being prepared can be contaminated with pathogens, which result in food borne illness when consumed. According to Sprenger (2002), a person is considered fit to handle food if he has not suffered from any symptoms of diarrhea or vomiting after 48 hours of treatment. It was interesting to note from this study that the number of participants who knew about this food safety behaviour increased significantly ($p < 0.01$) from 55% to 91% after the training session. Again, this change in food safety attitude indicates the effectiveness of the training.

All respondents in this survey either before or after the training session had indicated that they are likely to read food safety advice stated on food packaging. Previous research has shown labeling on

food package is a preferred source of food safety information (Redmond and Griffith, 2005), cumulatively suggesting the benefits of food packaging as a source of food safety advice.

Table 20 – Attitudinal scores on food safety

| Attitude Statement | n | Median score before the training course | Median score after the training course | Mean \pm SD attitude score before the training course | Mean \pm SD attitude score after the training course | Significance |
|---|----|---|--|---|--|--------------|
| 1. Food hygiene is important during preparation of food. | 22 | 3 | 3 | 3.00 \pm 0.00 | 3.00 \pm 0.00 | NS |
| 2. I think I know all of the food safety precautions necessary for safe food preparation. | 22 | 2 | 3 | 2.32 \pm 0.65 | 2.74 \pm 0.45 | * |
| 3. I do not need to be given any food safety advice. | 22 | 2 | 2 | 1.64 \pm 0.66 | 1.58 \pm 0.69 | NS |
| 4. I am confident that my current food preparation behaviours do not give rise to a risk of food poisoning. | 22 | 1 | 3 | 1.36 \pm 0.66 | 2.89 \pm 0.32 | *** |
| 5. Food can be handled even if I get diarrhoea and vomiting. | 22 | 3 | 3 | 2.36 \pm 0.79 | 2.84 \pm 0.50 | ** |
| 6. I am likely to read food safety advice stated on food packaging. | 22 | 3 | 3 | 3.00 \pm 0.00 | 3.00 \pm 0.00 | NS |

NS: not significant; ***p<0.001; **p<0.01; *p<0.05; score 3: right attitude; score 2: undecided; score 1: poor attitude(Annex 4)

6.3.3 NUTRITIONAL KNOWLEDGE AND ATTITUDE ASSESSMENT OF THE CATERERS BEFORE AND AFTER THE TRAINING PROGRAMME

The participants had an overall good nutritional knowledge before the training session since their mean % nutritional knowledge score for all sections were above 71.8% (Figure 14). The participants scored a mean of 89.1% for the health section, which indicates that they are knowledgeable about the foods related to health and some health issues. The high number of health programmes broadcast on the media and the health problems occurring in the country could account for this awareness. But after attending the training, their nutritional grade shifted from *good* to *very good* for 2 out of 4 sections while the % knowledge score increased in all sections after the training (Figure 14). Though the overall mean nutritional knowledge had increased from 71.8% to 83.4% after the training, this was not significant statistically ($p>0.05$).

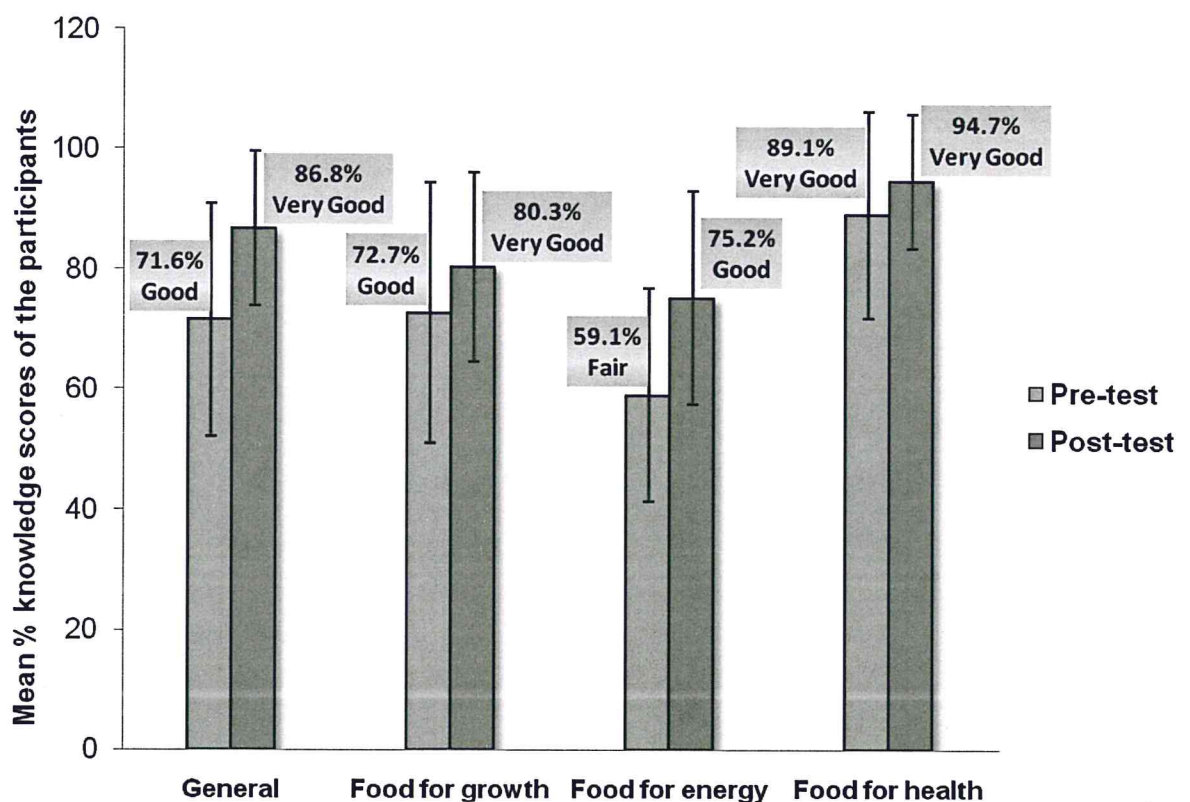


Figure 14 - %Nutritional knowledge scores of the participants (n=22). Vertical bars represent error bars.

Detailed outcomes of the nutritional knowledge scores of the participants after the training are shown in Table 21. After the training, % knowledge score increased in 15 out of 22 nutritional statements. Highest increases were noted for the 11th statement followed by the 15th and 2nd statements. Moreover, it was interesting to note that after the training, all participants were aware of the definition of a balanced diet and they knew that whole wheat flour is better to be consumed than white flour (statement 3). All of them also gave the correct answer that soya chunks and beans are rich in protein (statement 5) and fruits and vegetables should be consumed in large quantity daily (statement 17) and fruits and vegetables help prevent constipation (statement 18).

The 11th statement whether “*Margarine is better than butter*” was correctly answered by 40.9% and 90.9% of the participants before and after the training respectively and as a result, this statement had the highest % nutritional knowledge increase as indicated in Table 21 after the training. They had understood it well that margarine is made from vegetable oils, so it contains no cholesterol and is higher in "good" fats — polyunsaturated and monounsaturated — than butter which contains high levels of saturated fat that increases the bad cholesterol and the risk of heart disease (Grogan, 2011). Hence, this shows that most of the participants correctly grasped this fact significantly ($p < 0.05$) during the training course and thus highlighting the effectiveness of the training.

Moreover, an increase of 13.1% in the nutritional knowledge of the participants was noted after the training for the 15th statement which is “*Consumption of excess energy leads to obesity*”. Indeed, this statement is correct. 54.5% of the participants had correctly understood during the training that each individual has his own energy requirements needed to balance energy expenditure in order to maintain body size, body composition and a level of necessary and desirable physical activity consistent with long-term good health. But, if an individual exceeds his daily recommended energy requirements, the excess energy taken will be converted into fat and stored in the body gradually and finally leading to different grades of obesity (Mann and Trustwell, 2007). However, the post-response was statistically similar to the pre-response ($p > 0.05$).

However, minor decrease in % knowledge score was also observed for some statements; statement 7 being wrongly answered in greatest proportion: “*Children of 3-5 years need more protein foods than energy-giving foods*”. 45.5% of the participants knew that the statement was incorrect before the training but after the training, the percentage of participants who correctly answered this statement decreased to 36.4%. It should also be noted that 18.4% of the participants claimed that this statement

was right both before and after the training. The % decrease in score could be due to the fact that they believed that children are actively growing and thus, they needed more protein foods than energy providing foods although the food guide pyramid for two to six years old children emphasises that cereals, whole grains and cereal products remain the ones to be consumed in largest amount (6-11 portions) followed by the fruits and vegetables groups (3-5 portions) and next are the protein rich foods (3-4 portions) (USDA, 2011). The respondents might also have forgotten this fact since the post assessment was carried out after one month.

Table 21 – Nutritional knowledge scores of the participants before and after the training

| Statement | Mean \pm SD score | | % change | Significance |
|--|---------------------|-----------------|---------------|--------------|
| | Pre-training | Post-training | | |
| General | | | | |
| 1. A balanced meal is a meal that contains foods from all food groups – energy, growth and health. | 2.91 \pm 0.43 | 3 \pm 0 | +3.09 | NS |
| 2. A vegetarian diet is healthier than a non-vegetarian diet. | 2 \pm 0.87 | 2.21 \pm 0.98 | +10.5 | NS |
| 3. It is better to consume whole wheat flour than white flour. | 2.82 \pm 0.39 | 3 \pm 0 | +6.38 | NS |
| 4. Bread and sausages is an example of a balanced meal. | 2.59 \pm 0.73 | 2.79 \pm 0.63 | +7.72 | NS |
| Food for growth | | | | |
| 5. Soya chunks and beans are rich in protein. | 2.91 \pm 0.29 | 3 \pm 0 | +3.09 | NS |
| 6. Protein rich foods are needed for growth. | 2.64 \pm 0.66 | 2.89 \pm 0.46 | +9.47 | NS |
| 7. Children of 3-5 years need more protein foods than energy-giving foods. | 2.09 \pm 0.92 | 1.79 \pm 0.92 | -14.4 | NS |
| 8. It is not important to consume milk and milk products daily | 2.82 \pm 0.50 | 2.95 \pm 0.23 | +4.61 | NS |
| Food for energy | | | | |
| 9. All fats and oils are unhealthy. | 1.41 \pm 0.80 | 1.53 \pm 0.90 | +8.51 | NS |
| 10. Fried potatoes are better than boiled and smashed potatoes. | 2.73 \pm 0.63 | 2.89 \pm 0.46 | +5.86 | NS |
| 11. Margarine is better than butter. | 2.14 \pm 0.83 | 2.79 \pm 0.63 | +30.37 | * |
| 12. Tuna and sardines are rich in omega fats. | 2.86 \pm 0.35 | 2.74 \pm 0.65 | -4.20 | NS |
| 13. One quarter of a plate should be filled with energy giving foods. | 2.64 \pm 0.66 | 2.89 \pm 0.46 | +9.47 | NS |
| 14. Soft drinks are rich in calories. | 2.64 \pm 0.73 | 2.58 \pm 0.77 | -2.27 | NS |
| 15. Consumption of excess energy leads to obesity. | 2.14 \pm 0.77 | 2.42 \pm 0.84 | +13.1 | NS |
| Food for health | | | | |
| 16. Fruits and vegetables should be consumed to obtain vitamins and minerals. | 3 \pm 0 | 2.89 \pm 0.46 | -3.67 | NS |
| 17. Fruits and vegetables should be consumed in large quantity daily. | 2.91 \pm 0.43 | 3 \pm 0 | +3.09 | NS |
| 18. Fruits and vegetables help prevent constipation. | 2.86 \pm 0.35 | 3 \pm 0 | +4.90 | NS |
| 19. Eating too much of fruits and vegetables leads to obesity. | 2.73 \pm 0.55 | 2.89 \pm 0.46 | +5.86 | NS |
| 20. It is best to consume plant based meals. | 2.86 \pm 0.35 | 2.74 \pm 0.65 | -4.20 | NS |

NS: not significant; *p<0.05; Score 3: correct answer; score 2: don't know; score 1: wrong answer

Table 22 shows the attitudinal scores of the participants (n = 22) on healthy eating/nutrition. No changes were brought to their attitudes towards the statements on healthy eating/nutrition ($p>0.05$) after the training. It can be noted that many of the participants believed that the preparation of balanced meals is expensive both before and after the training (Table 22). Many participants believed that balanced meals can be prepared at a low cost. Interestingly, in their feedback questionnaires, five of the participants (Table 23) had recommended to elaborate further on the different balanced menus that they can prepare for the children from the amount of money they obtained per child from the NEF.

Besides, all of them knew that vegetables should be included in all meals. According to WHO (2005), each individual should consume at least 5 servings of fruits and vegetables. To meet this nutritional guideline, vegetables should be included in all main meals which are breakfast, lunch and dinner. It may happen that if a person is consuming vegetables in any two main meals, the amount consumed may not reach the daily desired serving size. Hence, it is better to make it a good practice to include vegetables in all meals, as correctly stated by all the participants.

Furthermore, the participants became more confident that they were preparing balanced meals for the children daily after the training course (Table 22). This increase in mean confidence can be linked to the knowledge acquired for the definition of a balanced meal during the training since after the training, all the participants understood what a balanced meal meant, as indicated in Table 21 and they knew how to prepare it.

Table 22 – Attitudinal scores on healthy eating/nutrition

| Attitude Statement | Median score before the training | Median score after the training | Mean \pm SD score before the training | Mean \pm SD score after the training | Significance |
|--|----------------------------------|---------------------------------|---|--|--------------|
| 1. It is expensive to prepare balanced meals daily. | 3 | 3 | 1.59 \pm 0.67 | 1.74 \pm 0.87 | NS |
| 2. Vegetables should be included in all meals. | 3 | 3 | 3.00 \pm 0.00 | 3.00 \pm 0.00 | NS |
| 3. A balanced diet can help prevent health problems. | 2 | 2 | 3.00 \pm 0.00 | 2.95 \pm 0.23 | NS |
| 4. I am confident that I am preparing balanced meals for the children daily. | 1 | 3 | 2.86 \pm 0.35 | 3.00 \pm 0.00 | NS |
| 5. I know how to prepare balanced meals. | 3 | 3 | 2.91 \pm 0.29 | 2.89 \pm 0.32 | NS |

NS: not significant; score 3: right attitude; score 2: undecided; score 1: poor attitude

6.3.4 FEEDBACK OF THE PARTICIPANTS ON THE WORKSHOP

From the feedback obtained from the participants (Table 23), it can be deduced that they were very happy to have attended the workshop on food safety and safe food preparation. All of them found the course to be very useful and some even found that the duration of the course which was about six hours, was too short. All of them were also very satisfied with the trainers in their delivery of the course. They have all learnt new things and most of them found Réduit to be an appropriate place for the delivery of the course.

Table 23 – Feedback on the workshop by the 22 participants

| QUESTIONS | OPTIONS | | | | |
|--|----------------|-----------------|-------------|-------------------|-----------|
| CONTENTS OF THE COURSE | | | | | |
| Usefulness of course | Very useful | Not very useful | | Not useful at all | |
| Frequency | 22 | - | | - | |
| Complexity of course | Very difficult | Difficult | Easy | Very easy | |
| Frequency | - | 1 | 14 | 7 | |
| Course duration | Very lengthy | Lengthy | Appropriate | Not long enough | |
| Frequency | - | 1 | 14 | 7 | |
| Completeness of hygiene course | Agree | | Disagree | | |
| Frequency | 22 | | | | |
| Completeness of nutrition course | Agree | | Disagree | | |
| Frequency | 17 | | 5 | | |
| Unnecessary sections in course | Yes | | No | | |
| Frequency | 1 | | 21 | | |
| DELIVERY | | | | | |
| Pace of presentation | Very quick | Quick | Appropriate | Slow | Very slow |
| Frequency | - | - | 22 | - | - |
| Was course interesting? | Yes | Somewhat | | No | |
| Frequency | 22 | - | | - | |
| Whether all questions asked were answered? | Yes | Somewhat | | No | |
| Frequency | 22 | - | | - | |
| GENERAL QUESTIONS | | | | | |
| Was it easy to come to Réduit? | Yes | | | No | |
| Frequency | 18 | | | 4 | |
| Learnt new things from course | Yes | | | No | |
| Frequency | 22 | | | - | |
| Ability to put into practice things learnt | Yes | Somewhat | | No | |
| Frequency | 22 | - | | - | |

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

Implementation of the EAP programme

Basically, the “Provision of a decent lunch” within the EAP programme was initially set up in 2008 by the Ministry of Finance and Economic Development. The NEF was set up to fast-track projects under the Empowerment Programme, provision for which was made in the 2006/2007 budget. In 2009, the NEF was entrusted to coordinate the existing EAP programme. With the creation of Ministry of Social Integration and Economic Empowerment to fight against social exclusion, the NEF was transferred under its aegis. Restructuration at the level of the NEF in year 2011 engendered the phasing out of the EAP programme. However, projects under this particular programme, namely the “*Provision of a Decent Lunch*”, are still being implemented by the NEF.

The EAP programme is being implemented by a consortium involving the government (NEF), private sectors, NGOs and corporate sectors among others. There seems to be close collaboration between the stakeholders. Along with providing a meal to the children, this programme attempts to empower women as many of the individual caterers are unemployed women from low income families. However, besides the provision of meal this project has a very humane aspect where the NEF, NGOs and educators work together to help the needy children.

The NEF funds NGOs for the EAP programme. Case workers of the NEF and case workers of NGOs identify families living in absolute poverty and who are eligible to benefit from the EAP programme through their regular field work. NEF provides a list of these families to NGOs. NGOs are given the responsibility to provide the lunch to these children. Close to 819 pre-primary children from about 35 schools are benefiting from this programme. About 11 NGOs are involved in this programme but not much information is available on 2 NGOs. Most NGOs outsource the provision of meal to caterers (food providers). Figures reported by the 9 NGOs who participated in the study point out to about 168 caterers in the project. Yet no official database is available at the NEF and NGOs are not keen to share the information.

NGOs case workers have the duty to verify the lists of meals provided to the children by the caterers. This list on number of meals provided is used by the NGOs to make monthly payments to the caterers. A sum of Rs 25 is allocated per meal.

The children are provided with mainly bread based meals which are prepared by mainly individual and a few mass caterers. All the meals are adequate in energy but seem to be deficient in vegetables, fruits and dairy products. In very few cases, there is meal planning which is carried out.

There is a consensus among caterers that the amount of money allocated per meal is not sufficient to prepare a balanced meal . Furthermore since payment is made after the meal provision on a monthly basis, some caterers reported that they donot manage to shop properly for the raw materials needed for meal preparation.

The caterers surveyed in this study had good knowledge on food safety /hygiene and nutrition. Some bad practices which were observed on site or reported, relate to: personal hygiene, cooling and reheating of foods. Not all food handlers have a Food Handler's Certificate, which is a prerequisite for any person preparing food for sale. In the EAP programme, though it is not a profit driven business, caterers are "paid" for each meal they provide; therefore it may be considered as "sale of food" and hence caterers are expected to abide by the Food Act. Many NGOs, with the aim of alleviating poverty, outsource the catering service to unemployed women. In these cases, preplanning of meals and controlling level of food safety become more tedious and difficult as these women often prepare the food in their home kitchen together with family meals. In many cases individual caterers are preparing meals for more than 20 children. Though NGO case workers carry out regular visits to caterers, they are not involved in monitoring either the quality of foods provided or the food handling practices.

The training on "Safe and healthy food preparation" developed and administered to 22 caterers was well received . Post training assessment reflected an improvement in knowledge and attitude towards both food safety and nutrition. The research team is of opinion that caterers should be motivated by their NGO's to attend training where available. In the context of this study, NGOs were requested to send their caterers for one day training. A total of 34 caterers had registered for the course but only 22 attended it. As an extension to the project, training materials on "Safe and healthy food

preparation” have been prepared and they can be used to train more caterers. Posters on the same theme have been prepared and they can be distributed to caterers and NGOs.

Overall, the EAP project-“Provision of a decent lunch” is well established. However, in order to ensure it is carried out in the proper way and to avoid wastage of resources, the role of the different stakeholders involved in the project should be well defined. Some recommendations are being proposed.

Role of NEF in ensuring provision of a proper meal to children

- The NEF should serve as a platform for the representatives of the different NGOs and the case workers to meet up, discuss issues and find solutions to improve the EAP programme.
- A complete and well established record of all the caterers involved in the programme should be kept by the NEF and regularly NEF should seek the collaboration of the Ministry of Health and Quality of Life to monitor the quality and safety of foods provided.
- NEF should come up with a set of guidelines that all NGOs involved in the project need to abide to (eg NGOs to ensure possession of Food Handlers Certificate by caterers, meal planning by NGOs/nutritionist mechanism for monitoring quality of food, ...)
- NEF might consider reviewing the sum allocated per meal to ensure that all children are provided with a proper balanced meal. A minimum amount of Rs 30 is recommended (Table 24).

Table 24: Cost of common balanced meals

| Balance Meals | Approximate Cost (Rs) of Raw materials for 1 serving | Average Cost of meal (Rs) |
|---|--|------------------------------|
| Bread with chicken sauté and salad | <ul style="list-style-type: none"> • 1 bread(100g) : Rs 2.50 • 1 serving of chicken : Rs 28.50 • 1/10 of a medium size lettuce head: Rs 1.50 • 1/4 of a medium size carrot : Rs 1.00 • Other ingredients : Rs 2.00 • Fruit : Rs 6.00 | Rs 41.50 |
| Bread with soya sautee and vegetables | <ul style="list-style-type: none"> • 1 bread(100g) : Rs 2.50 • Soya : Rs 5.00 • 1 serving mixed vegetables :Rs 6.00 • Other ingredients : Rs 2.00 • Yoghurt : Rs 12.00 | Rs 27.50 |
| Macaroni with mixed vegetables and egg or Macaroni with mixed vegetables and cheese | <ul style="list-style-type: none"> • 1/2 servings of macaroni (50g) : Rs 11.00 • 1 serving mixed vegetables :Rs 6.00 • 1 egg or cheese : Rs 6.00 • Other ingredients : Rs 2.00 • Fruit : Rs 6.00 | Rs 31.00 |
| Bread with tuna salad | <ul style="list-style-type: none"> • 1 bread(100g) : Rs 2.50 • ¼ portion of canned tuna : Rs 9.50 • 1/10 of a medium size lettuce head: Rs 1.50 • Other ingredients : Rs 2.00 • Fruit : Rs 6.00 | Rs 21.50 |
| AVERAGE COST OF MEAL | | Rs 30.38 |

(i) Prices of the various commodities were taken from 2 different supermarkets during August 2011.

(ii) Average cost excludes packaging of meal, time allocated for meal preparation and associated overhead (gas/electricity, water...), indirect costs associated with purchase, meal delivery

Guidelines for NGOs involved in meal provision

- In order to have a better control on the catering activity, it is recommended that meal preparation could be centralised and outsourced to experienced caterers who are involved in mass catering or who are involved in catering activity. Lack of facilities can hinder the implementation of safe food preparation practices. Pilling *et al.* (2008) found that insufficient number of hand sinks, resource location and attitude of the food handlers had restraint them from implementing food safety programme such as hand washing. It seems that although knowledge is sufficient, physical facilities might be an obstacle in guaranteeing proper food safety attitude. Green and Selman (2005) also found that there were a number of factors that impacted food service employees' ability to prepare food safely, including time pressure; equipment and resource availability; food safety emphasis by management and co-workers; and food safety education and training.
- The NGOs should ensure that caterers involved in the project abide by the law and possess a Food Handler's Certificate. They can work in collaboration with the Ministry of Health and Quality of Life (MOH & QL). In this process, the caterers also follow a 6 hour course and thus they become more knowledgeable about safe food preparation
- It is important that caterers have the knowledge of current "healthy" eating guidelines in order to produce "healthy" and appetizing meals. The Food handler's Certificate course offered by the health inspectors of the Ministry of Health in Mauritius focusses only on food safety but did not have a nutrition component. If caterers have insufficient knowledge or practical skills it may be difficult for them to produce appropriate "healthy" options. Therefore, practical aspects of nutrition should be taught also besides food safety and this can be done in collaboration with nutritionists.
- NGOs should encourage caterers to abide by the canteen laws in order to ensure provision of nutritious food to children.
- NGO's can liaise with the MOH & QL for meal planning by nutritionists, thus ensuring healthier food preparation.
- Case workers should encourage families of these children to participate in education process of their child, for example, by donating fruits and vegetables in their garden to the caterers.

- Talks should be organised with the parents to sensitize them on good health and healthy eating.

Recommendations for caterers involved in meal provision

It is highly desirable that caterers follow the special training programme designed in the context of the project. Some advice are given below:

- Hands need to be washed regularly with warm water and soap ideally for at least 20s before meal preparation and after handling raw foods and going to toilet.
- Hands should be thoroughly dried after washing with clean towel.
- Working surfaces should be cleaned and disinfected before and after meal preparation. (Clean as you go).
- All cookery and utensils should be washed with hot water and kitchen cleaning agent.
- Wiping cloth should be changed and washed regularly.
- Separate wiping cloth should be kept for hands and utensils.
- Kitchen cupboards should be dry, cool and tidy.
- Kitchen sinks need to be sanitised daily.
- Bins in kitchen should be covered, emptied daily and disinfected regularly.
- Kitchen area should be kept free from insects, pests and pets.
- Chilled and frozen foods should be bought last when shopping.
- Raw foods (fruits and vegetables) should be kept away from cooked and ready to eat foods in the refrigerator.
- Refrigerator and freezer should be at correct temperatures.
- Labelling of foods e.g expiry date and use by date should be checked for before purchase and use of packed foods.
- Perishable food that has been left out at room temperature for more than a couple of hours should be discarded.
- Cutting boards and knives should be washed and sanitised after preparing raw foods and before using them for ready to eat foods. Ideally we use separate chopping boards for raw and cooked foods.
- Foods should be thoroughly defrosted before cooking.

- Frozen food should not be thawed at room temperature.
- Food should be immediately cooked after defrosting and should not be refrigerated once thawed.
- When planning and preparing meals, at least 1 food from each of the food groups, i.e. energy giving food, food for growth and food for health should be included.
- Hot meals can be provided at least twice weekly.
- Calcium rich food should be included in meals regularly (yogurt, milk, cheese, paneer)
- A variety of vegetables of different colours should be included.
- Too much salt and fats should not be used for meal preparation.
- Frying as cooking method should be avoided while grilling, stewing, roasting or baking should be favoured to minimise oil use.
- To minimise cost, locally available and seasonal products can be used.

REFERENCES

1. Albert, J. A. (1995). Food safety knowledge and practices of consumers in the USA. *Journal of Consumer Studies and Home Economics*, 19, 119–134.
2. Angelillo, I.F., Viggiani, N.M.A., Rizzo, L. and Bianco, A. (2000), “Food handlers and foodborne diseases: knowledge, attitudes and reported behaviour in Italy”, *Journal of Food Protection*, Vol. 63 No. 3, pp. 381-5.
3. Angell, D. (2008), “Food demonstration and taste testing format: Ohio extension program proves effective”, *Journal of Family and Consumer Sciences*, Vol. 100, p. 38.
4. Bruhn, C. M., & Schutz, H. G. (1999). Consumer food safety knowledge and practices. *Journal of Food Safety*, 19, 73–87.
5. Buzby, J.C (2001). Examining the well being of children. *USDA Food Review*, Vol.24, Issue 2.
6. Dharod, J., Perez-Escamilla, R., Bermudez-Millan, A., Segura-Perez, S. and Damio, G. (2004), “Influence of the fight BACI food safety campaign on an urban Latino population in Connecticut”, *Journal of Nutrition Education and Behavior*, Vol. 36 No. 3, pp. 128-34.
7. Gallagher S. (2000). *Philosophical Conceptions of the Self: Implications for Cognitive Science*. University of Florida, USA. Available at <http://pegasus.cc.ucf.edu/~gallaghr/tics2000.html> (Accessed on 23.12.09).
8. Government Information Service (2010). “NEF accelerates project-implementation under Eradication of Absolute Poverty Programme”. Available at http://www.gov.mu/portal/site/Mainhomepage/menuitem.a42b24128104d9845dabddd154508a0c/?content_id=60deb335b71d6210VgnVCM1000000a04a8c0RCRD (Accessed on 29.03.11).

9. Green, L. R. & Selman, C. (2005). "Factors impacting food workers' and managers' safe food preparation practices: a qualitative study". *Food Protection Trends*, Vol. 25 No. 12, 981-990.
10. Grogan, M. (2011). Healthy eating and nutrition. [online]. Available at: <http://www.mayoclinic.com/health/butter-vs-margarine/AN00835>. Date accessed: 27th September 2011.
11. Hotee, M. F (2011) *A critical analysis of food poisoning in Mauritius*. MSc Degree in Food Technology. Faculty of Agriculture, University Of Mauritius. Unpublished.
12. Mann, J. and Trustwell, A. S. (2007). *Essentials of Human Nutrition*, 3rd edn. Oxford University Press, New York.
13. Medeiros, L., Hillers, V., Gang, C., Bergmann, V., Kendall, P., and Schroeder, M. (2004). Design and development of food safety knowledge and attitude scales for consumer food safety education. *Journal of the American Dietetic Association*, Volume 104, Issue 11, November 2004, 1671-1677.
14. Ministry of Health and Quality of Life (2006): *Annual Health Statistics*. Port-Louis, Mauritius.
15. Ministry of Health and Quality of Life (2009): *National Plan of Action for Nutrition*. Port Louis, Mauritius.
16. Ministry of Health and Quality of Life (1991). *Health Statistics Annual 1990*. Port-Louis: Ministry of Health and Quality of Life.
17. Ministry of Health and Quality of Life (1992). *Health Statistics Annual 1991*. Port-Louis: Ministry of Health and Quality of Life.

18. Ministry of Health and Quality of Life (1993). Health Statistics Annual 1992. Port-Louis: Ministry of Health and Quality of Life.
19. Ministry of Health and Quality of Life (1994). Health Statistics Annual 1993. Port-Louis: Ministry of Health and Quality of Life.
20. Ministry of Health and Quality of Life (1995). Health Statistics Annual 1994. Port-Louis: Ministry of Health and Quality of Life.
21. Ministry of Health and Quality of Life (1996). Health Statistics Annual 1995. Port-Louis: Ministry of Health and Quality of Life.
22. Ministry of Health and Quality of Life (1997). Health Statistics Annual 1996. Port-Louis: Ministry of Health and Quality of Life.
23. Ministry of Health and Quality of Life (1998). Health Statistics Annual 1997. Port-Louis: Ministry of Health and Quality of Life.
24. Ministry of Health and Quality of Life (1999). Health Statistics Annual 1998. Port-Louis: Ministry of Health and Quality of Life.
25. Ministry of Health and Quality of Life (2003). Health Statistics Annual 2002. Port-Louis: Ministry of Health and Quality of Life.
26. Ministry of Health and Quality of Life (2011a). Health Statistics Annual 1999, 2000, 2003, 2004, 2005, 2006, 2007, 2008, 2009 [online]. Available from:
<http://www.gov.mu/portal/site/mohsite/menuitem.87d6fc32e054fac41a42860aa0208a0c/>
[Accessed on 16 May 2010].

27. Mitakakis, T.Z., Sinclair, M.I., Fairley, C.K., Lightbody, P.K., Leder, K. and Hellard, M.E. (2004), "Food safety in family homes in Melbourne", Australia, *Journal of Food Protection*, Vol. 67 No. 4, pp. 818-22.
28. National Empowerment Foundation website (2011), <http://www.nef.mu/>
29. Gopalan, C., Rama Sastri, B. V., Balasubramanian, S. C. (1989) *Nutritive value of Indian foods*. National Institute of Nutrition, Indian Council of Medical Research, India
30. Passmore, R., Eastwood, M.A. (1986). *Davidson and Passmore Human Nutrition and Dietetics*. 8th Ed. Churchill Livingstone, Longman Group Ltd, Edinburgh.
31. Pilling, V. K., Brannon, L, Roberts, K. R., Shanklin, C. W., & Howells, A. (In Press). Using the Theory of Planned Behavior to Elicit Restaurant Employee Beliefs about Food Safety: Using Surveys versus Focus Groups. *Journal of Food service business Research*.
32. Redmond, E.C. and Griffith, C.J. (2005), "Consumer perceptions of food safety education sources: implications for effective strategy development", *British Food Journal*, in press.
33. Rimal, A., Fletcher, S.M., Mcwatters, K.H., Misra, S.K. and Deodhar, S. (2001), "Perception of food safety and changes in food consumption habits: a consumer analysis", *International Journal of Consumer Studies*, Vol. 25 No. 1, pp. 43-52.
34. Sprenger R. A. (2002). *Hygiene for Management*. 13th edn., High field Publications. 415 pages.
35. Unusan, N. (2007). Consumer food safety knowledge and practice in the home in Turkey. *Food Control*, 18, 45-51.
36. USDA (2011). Child nutrition and health. Available at: <http://www.choosemyplate.gov/preschoolers/index.html>. Date accessed: 20th August 2011.
37. USDA (2011). Food Guide Pyramid for Preschoolers. Available at: <http://heathersparentingblog.blogspot.com/p/preschoolers-nutrition.html>

38. Williamson, D. M., Gravani, R. B., & Lawless, H. T. (1992). Correlating food safety knowledge with home food preparation practices. *Food Technology*, 46 (5), pp.94-100.
39. WHO (2003). Scientific Facts on Diet and Nutrition Prevention of Chronic Diseases. [Online]. Available at: <http://www.greenfacts.org/en/diet-nutrition/1-2/3-childhood-eating-habits.htm>. Date accessed: 10th July 2011.
40. WHO (2005). Five keys to safer food manual. Available at: http://www.who.int/foodsafety/publications/consumer/manual_keys.pdf. Date accessed: 4th August 2011.
41. Yang, S., Leff, M. G., McTague, D., Horvath, K. A., Thompson, J., Murayi, T., Boeselager, G. K., Melruk, T. A., Gildmaster, M. C., Ridings, D. L., Altekruse, S. F. and Angulo, F. J. (1998), Multi-state surveillance for food handling and preparation and consumption behaviours associated with foodborne diseases 1995 and 1996, *Morbidity Mortality Weekly Report*, 47, pp. 33-54.

ANNEXES

ANNEX 1

PROJET SUR LE “ERADICATION OF ABSOLUTE POVERTY AMONG PRE- PRIMARY SCHOOL CHILDREN”

Financé par :

le Mauritius Research Council

ÉQUIPE DE RECHERCHE:

- Assoc. Prof. Goburdhun D. (Mme.),
Lecturer, Faculté D’Agriculture,
Université de Maurice
- Kistamah S. (Mme.), Directrice du Early
Childhood Care Education Authority,
Maurice
- Danyen S. (M.)
- Ramdin N. (Mlle.)

BUTS DU FORMATION

Au cours du formation, vous apprendrez sur ces sujets suivants:

- Sécurité alimentaire
- L'hygiène alimentaire
- Risques alimentaires
- La chaîne alimentaire
- Précautions pour garantir la sécurité alimentaire dans la chaîne alimentaire
- Alimentation saine et équilibrée
- Groupes alimentaires
- Guide alimentaire pour les enfants
- Techniques pour préparer une alimentation saine

| PLAN DE TEMPS | |
|---------------|---|
| 09:00-09:15 | Enregistrement des participants |
| 09:15-09:30 | Accueil et introduction au cours |
| 09:30-10:00 | Testé la connaissance et l'attitude des participants sur ce thème |
| 10:00-11.00 | Formation sur l'hygiène alimentaire |
| 11:00-11.15 | Pause de thé |
| 11:15-12:15 | Les guides sur la securite alimentaire |
| 12:15-13:00 | Dejeuner |
| 13:00-13:30 | Session interactive |
| 13:30-14:45 | formation sur l'alimentation saine |
| 14:45-15:00 | Pause de thé |
| 15:00-15:45 | Session interactive |
| 15:45-16:00 | Rétroaction sur la formation |



University of Mauritius, Faculty of Agriculture

in collaboration with

Mauritius Research Council and The Early Childhood Care & Education Authority

Certificate of Attendance

awarded to

Name SURNAME

for attending a training programme on

“HEALTHY EATING AND SAFE FOOD PREPARATION”

held on 26 July 2011

Assoc. Prof. M F Driver
Dean, Faculty of Agriculture

Assoc. Prof. D Goburdhun
Resource Person, Faculty of Agriculture

ATTENDANCE SHEET RECORD

| NAME OF NGO | | NAME OF CATERER | ADDRESS | VEG / NON-VEG | ATTENDANCE | NO. OF CHILDREN |
|---------------------------|-----|--|---|--------------------|------------|-----------------|
| Caritas Ile Maurice | 1. | Beauharais Shirley | Montagne Blanche | Non-Veg | ✓ | 26 |
| | 2. | Global Patricia <i>Ciopal</i> | Belle Mare | Non-Veg | ✓ | 28 |
| | 3. | Feau Staphanie | Goodlands | Non-Veg | | |
| | 4. | Mamet Lilette | Poudre D'Or | Non-Veg | | |
| | 5. | Adrien Noelle | NHDC Riambel | Non-Veg | ✓ | 36 |
| | 6. | Fakun Shirley | Riviere des Anguilles | Non-Veg | ✓ | 9 |
| | 7. | Seetaloo Nisha | Mahebourg | Non-Veg | ✓ | 20 |
| | 8. | Aayekoo Toolsee | Le Morne | Non-Veg | | |
| | 9. | Dorlan Sybille | Cite La Cure | Non-Veg | | |
| | 10. | Pochee Josée | Riche Lieu | Non-Veg | ✓ | 38 |
| | 11. | Dhookit Christiane | Tranquebar | Non-Veg | ✓ | 47 |
| | 12. | Boutia Ange <i>Sybille Doshin</i> | St Pierre <i>Cite La Cure</i> | Non-Veg | ✓ | 24 |
| Arya Sabha | 13. | Seegoolam Devi Rani | Mare La Chaux | Veg | ✓ | 2 |
| | 14. | Sumroo Premila | Belle Mare | Non-Veg | ✓ | 11 |
| | 15. | Bassantee Charawah | Poste de Flacq | Veg | | |
| | 16. | Mundy Dawantee | Poste de Flacq | Veg | | |
| | 17. | Sewrani Rajanah | Ecroignard | Non-Veg | | |
| | 18. | Jottee Sok Appadu | Chemin Grenier | Non-Veg | | |
| | 19. | Gungoo Sharmila | Cap Malheureux | Veg | ✓ | 12 |
| | 20. | Foolee Bharati | St Pierre | Non-Veg | | |
| | 21. | Anjaheb Vijayantimala <i>D. Pillay</i> | Terre Rouge <i>Gr RNV P. Louis</i> | Veg | ✓ | 8 |
| Centre D'amitié | 22. | Seblin Josette <i>O'Conne Martine</i> | Cole La Ferme | Non-Veg | ✓ | 150 |
| Mauritius Islamic Mission | 23. | Rosun Reaz | Ail Doré, Port Louis | Non-Veg | | |
| | 24. | Karmally Yusuf | Rue Vélor, Port Louis | Non-Veg | ✓ | 28 |
| | 25. | Karmally Parwez | Bamboo | Non-Veg | | |
| SOS Village | 26. | Emma La Gauche <i>Mylene</i> | Bamboo <i>Cite Mary. Flower</i> | Non-Veg | ✓ | 60 |
| | 27. | La Fleur H. Lagache | Glen Park <i>Bamboo</i> | Non-Veg | ✓ | 28 |
| | 28. | Jhusline Abbaham | Curepipe | Non-Veg | | |
| | 29. | Dodin Veronique | Vacoas | Non-Veg | ✓ | 40 |
| | 30. | Jessica <i>Robertson Case Worker</i> | <i>Vacoas</i> | Non-Veg | ✓ | n.a |
| SOS Poverty | 31. | Mehreen Rughony <i>Case Worker</i> | <i>PLouis</i> | Non-Veg | ✓ | n.a |
| Apeded | 32. | <i>Absent</i> | | | | |
| Saphire | 33. | Codor | Baie du Tombeau | ✓ | ✓ | 27 |
| Terre De paix | 34. | Pamela Marie | Quatre Bornes | <i>Non-Veg.</i> | ✓ | 890 |
| Caritas | | <i>Lyndy Armogum Beau</i> | | <i>Non-Veg.</i> | | 19 |

ANNEX 3

Table 24 – Number of children catered by the participants

| Caterer | NGO | No. of children catered |
|---------|-----|-------------------------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |
| 17 | | |
| 18 | | |
| 19 | | |
| 20 | | |
| 21 | | |
| 22 | | |

ANNEX 4

WILCOXON TABLES

Table 24 – Wilcoxon test for the statement: “Foods should be cooked above 60°C for long period of time”

| Test Statistics ^b | |
|------------------------------|---------------------|
| | P17 - temperature |
| Z | -2.743 ^a |
| Asymp. Sig. (2-tailed) | .006 |

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Table 25 – Wilcoxon test for the statement: “Well-cooked foods can be kept at room temperature for more than two hours”

| Test Statistics ^b | |
|------------------------------|---------------------|
| | P18 - table |
| Z | -2.070 ^a |
| Asymp. Sig. (2-tailed) | .038 |

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Table 26 – Wilcoxon test for the statement: “Cooked food should not be touched after touching raw food”

| Test Statistics ^b | |
|------------------------------|---------------------|
| | P19 - touchcook |
| Z | -2.460 ^a |
| Asymp. Sig. (2-tailed) | .014 |

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Table 27 – Wilcoxon test for the statement: “I am confident that my current food preparation behaviours do not give rise to a risk of food poisoning”

| Test Statistics ^b | |
|------------------------------|---------------------|
| | A4 - confident |
| Z | -4.099 ^a |
| Asymp. Sig. (2-tailed) | .000 |

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Table 28 – Wilcoxon test for the statement: “Food can be handled even if I get diarrhoea and vomiting”

| Test Statistics ^b | |
|------------------------------|---------------------|
| | A5 - diarrhoea |
| Z | -2.810 ^a |
| Asymp. Sig. (2-tailed) | .005 |

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Table 29 – Wilcoxon test for the statement: “I think I know all of the food safety precautions necessary for safe food preparation”

| Test Statistics ^b | |
|------------------------------|---------------------|
| | A2 - knowall |
| Z | -2.486 ^a |
| Asymp. Sig. (2-tailed) | .013 |

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Table 30 – Wilcoxon test for the statement: “It is better to consume whole wheat than white flour”

| Test Statistics ^b | |
|------------------------------|---------------------|
| | N3 - wholewheat |
| Z | -2.000 ^a |
| Asymp. Sig. (2-tailed) | .046 |

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

Table 31 – Wilcoxon test for the statement: “Margarine is better than butter”

| Test Statistics ^b | |
|------------------------------|---------------------|
| | N11 - margarine |
| Z | -2.163 ^a |
| Asymp. Sig. (2-tailed) | .031 |

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test

