Nutrition Society of Sri Lanka
Annual Scientific Sessions
Colombo, 23rd and 24th January, 2016

“Nutrition well-being through behaviour change”

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Nutrition Society of Sri Lanka (NSSL) was established 1972 and incorporated by the Parliamentary Act No 5 (1985) of the Democratic Socialist Republic of Sri Lanka. NSSL is the learned society for nutrition in Sri Lanka. It has a wide membership from different sectors which have a stake in Nutrition including Agriculture, Livestock, Education, Health and Dietetics, Childcare, Poverty Alleviation, Science and Technology, Trade and Commerce and the Food Industry. Professionally, our members are positioned as policy makers, academics, researchers, community workers, educationists, medical and healthcare / dietetic practitioners. NSSL acts as a change agent, pressure group and a resource centre for improving nutrition status of the Sri Lankan population.

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Dear Colleagues,

The Annual Scientific Sessions of the Nutrition Society of Sri Lanka (NSSL), form the pinnacle of activities included in the program for the year.

I am grateful to the Council of the NSSL for selecting this year’s theme “Nutrition well-being through behaviour change”, which is a most appropriate one. The key challenge in any form of development is mobilizing and empowering the populace of the country to take the steps of change. The sessions will address all frontiers of behavior change at the level of the aggregate population, community changes as well as individual change.

The NSSL with approximately 450 members has seen a successful year of action, fashioned and implemented by a great team of Council members. My thanks go out to them and to the general membership and sponsors for supporting the many events implemented throughout 2015.

Visakha Tillekeratne, Msc (Food Technology in Developing Countries)
Director, Human Development
Multi Sector Developments solutions (Pvt) Ltd.
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Message from the Vice-President,

It is with great pleasure that I write this message for the Annual Scientific Sessions 2016 of the Nutrition Society of Sri Lanka which is the most important event in the Society calendar. The main objective of this conference is to provide a platform for nutritional researchers from different parts of the country to gather new knowledge from local and international experts, exchange scientific information and perceive new opportunities for research in the future.

This year’s theme is on “Nutrition well-being through behaviour change” and several aspects related to the theme will be highlighted at the sessions with the key note address being on “population approaches to diabetes prevention”. There will be two plenary lectures, three symposiums, a panel discussion on “sustainable behavior change for nutrition achievements at national scale”, Prof. T.W. Wickramanayake oration and oral and poster presentations.

I wish to thank all the speakers for sharing their knowledge and expertise with us during these two days and all those who contributed to make this event a success especially the council of the Nutrition Society of Sri Lanka.

Dr. Usha Hettiaratchi, PhD
Senior Lecturer,
Department of Biochemistry,
Faculty of Medical Sciences,
University of Sri Jayewardanepura.
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The latest estimates from IDF suggest that 415 million people have type 2 diabetes globally in 2015 and that by 2040, the global prevalence will reach 642 million. This creates an enormous challenge to providing preventative health care to those who have the disease. The case for prevention of type 2 diabetes is clearly established through randomised controlled trials of lifestyle interventions delivered to individuals identified as having high risk. However, implementation in the real world of the preventive approaches that have been tested in those RCTs has considerable challenges. The complementary approach of shifting population distributions of the main determinants of type 2 diabetes, dietary and physical activity behaviour, has considerable potential but, by necessity, has a different type of evidence base. This talk will describe approaches to finding the right balance between investment in individual high-risk and population approaches to prevention.
Food provides a complex mixture of nutrient and non-nutrient constituents that address the energy needs of the body and essential components for health promotion and disease risk reduction. Thus, proteins, lipids and carbohydrates as food macro components provide energy and basic needs of the body along with vitamins and minerals. The bioactives present, such as polyunsaturated fatty acids (PUFA), proteins and biopeptides as well as low glycemic carbohydrates along with minor constituents such as phenolic and polyphenolic compounds are of special interest. Therefore, the ratio of omega-3 to omega-6 PUFA, presence of short-chain peptides and phenolics are important in controlling the balance between oxidants and antioxidants in the body and hence the oxidative stress with its associated impact on health status must be considered. Our ongoing research will be exemplified by a discussion about lipophilization of food phenolics, the role of omega-3 fatty acids and biopeptides in cardiovascular health as well as their inclusion in food as functional ingredients. The presentation will provide an account of different factors in food and natural health products in nutrition and well-being.
The problem of type 2 diabetes is a model of the challenges of non-communicable diseases in the 21st Century. These disorders can be seen as clinical and public health problems and can be dealt with accordingly. However, this approach inevitably leads to medicalization of prevention. The economic challenges of dealing with type 2 diabetes in this way is a major challenge for all economies, but creates a direct challenge to economic development in less well resourced countries. Alternatively, diabetes can be seen as a clinical manifestation of a societal problem that requires societal solutions. The links between the lifestyle behaviour determinants of diabetes and unsustainable development are clear. The major challenge in the future is to create an evidence base for sustainable public health solutions.
ACHIEVING BEHAVIOR CHANGE

Mira Aghi,
Harvard School of Public Health

How do you change the eating and feeding behaviour of communities into nutritious one? This does not imply more food but the right food. It also implies right eating, right amount and right timings. In the case of deprived communities it just implies eating enough of whatever they have and not to go hungry.

All of us who are interventionists have to understand that behaviour change requires four elements. 1. Education driven by the users that is based on the information needs of the users, 2. Motivation for change, 3. Skills required for the change and 4. Enabling environments which make change possible and sustainable.

The mantra is conducting formative research to device the education which is understandable, interesting, and relevant and at the same time credible, scientifically sound. It has to be respectful to the sensibilities of all members of the community so that there are no barriers on that account.

The positive outcomes of such an approach is that even children change their behaviour.
APPLICATIONS OF BODY COMPOSITION IN PATIENT CARE

Sarath Lekamwasam,
Senior Professor of Medicine, University of Ruhuna

For theoretical purposes, the human body can be divided into three main compartments; fat mass, bone mass and bone & fat free mass (lean mass). While each body compartment has a definite role in maintaining normal bodily functions there are strong relationships between the three body compartments. One body compartment could significantly influence another body compartment and this coordination between different body compartments is essential in maintaining health and determining clinical end results of certain diseases.

There are many determinants of body composition and of them, genetic, nutritional and environmental factors play a major role. In addition, hormonal effects, disease prevalence and prolonged intake of certain medications too influence body composition. These factors together explain the individual and geographical variations of body composition reported in previous studies.

Numerous methods are used to either measure or estimate body compartments. Direct measurement of bone, fat and lean contents can be done with quantitative CT, quantitative MRI and dual energy x-ray absorptiometry (DEXA). They have varying measurement accuracy and precision and inherent practical and theoretical limitations. Availability, cost and radiation hazards are some of the major concerns. Earlier studies have reported relationships between the body compartments. These studies, in general, indicate that lean mass compared to fat mass has a stronger association with bone mass in premenopausal women while in postmenopausal women fat mass correlates better than lean mass with the bone mass. Most of these studies are limited to Caucasian populations and data from Asian countries are limited. We observed that in a group of healthy, middle-aged, premenopausal volunteers lean mass to correlate with both BMD and BMC better than the fat content even after adjusting for possible confounders (for fat mass r varying from 0.19 to 0.43 for different skeletal sites and for lean mass r varying from 0.28 to 0.54). While this association seen between the lean mass and indices of bone mass can be easily explained, the coordinated activity of lean and bone masses can be of clinical interest. The fracture risk of a patient with low BMD could be enhanced by the co-existent sarcopenia which associates with postural instability and tendency to falls.

These associations, however, can get altered under disease conditions. Young SLE patients with chronic relapsing and remitting disease had lower lean, fat and bone masses when compared with healthy controls. Further, among them fat mass, compared to lean mass was observed to have stronger correlations with the indices of bone mass. This indicates that long standing disease could disturb the normal relationships seen between body compartments in young women.

Many anthropometric indices are used as surrogates of body composition. They are used widely in assessing and monitoring nutritional states at individual, community and country levels. Selected indices are used in clinical decision making (e.g. use of BMI in NCD prevention strategies and assessing fracture risk of vulnerable groups). While BMI is the most widely used surrogate of body fat content recent studies support the use of waist circumference, instead. As most of the data in this area are based on White Caucasian populations whether this is an acceptable practice in our population is uncertain. We observed positive and significant correlations between all anthropometric measurements and total body fat as well as abdominal fat contents. Among this group of young women, BMI showed the strongest correlation with total body fat content (r = 0.89) while correlations of total body fat with waist and hip circumferences were marginally low (r=0.72 and 0.87, respectively). Waist hip ratio however, showed a poor correlation with total fat content (r = 0.18).

We used the DEXA based body composition analysis to estimate the cut-off values of anthropometric surrogates of obesity. There is a debate among scientists and clinicians whether cut-off values of anthropometric surrogates of obesity should be uniform to all or country specific. Although this can be argued both ways, it is logical to find country specific cut-off values. We observed that among healthy young women the cut-off values that corresponded to percentage body fat of 30 were 24.4 Kg/m2 for BMI, 92
cm for waist circumference and 78 cm for the hip circumference and these values are concordant with the observations made in other countries in the region.

The restricted availability of equipment to measure body composition is a major drawback in applying this information in clinical settings. Although fat mass and bone mass can be estimated using portable devices to a certain extent, no valid instrument is available to measure the lean mass. The formulae validated by Lee et al, would provide an easy method of estimating the lean mass in clinical settings. We examined the concordance between the lean masses measured by DEXA and estimated by one of the formula published by Lee et al, in a group of healthy young women. We found that the mean lean masses we measured and estimated were very close (14.8 and 14.5 kg) and the difference ranged from -1.2 to 3.6 kg. Correlation between the two data sets was high ($r=0.92$) and the Bland-Altman plot showed an acceptable measurement agreement between the two methods.

Although the current evidence does not support the inclusion of body composition in clinical decision making, this will become a reality as more epidemiological and clinical data are generated. Current literature help understanding the complex interplay between different body compartments in normal individuals and their combined actions in maintaining health and in some instances the vulnerability for adverse clinical outcome.

References


NUTRITIONAL SUPPORT IN CRITICALLY ILL PATIENTS; A CHANGE IN PRACTICE

Harshini Meegaswatte
Visiting Consultant Dietitian and Nutritionist
Sri Lanka Air Force & Durdans Hospital

Many people are malnourished prior to the admission to the hospital whereas the people in the hospital are at risk of becoming malnourished or further malnourished. Prevalence of malnutrition in hospital could be high as 40%. Malnutrition can be developed due to impaired intake, impaired digestion and absorption, altered nutritional requirements and excess nutrient losses. Feeding critically ill patients is very crucial and it should be started as early as possible. Enteral route is preferred than the parenteral route as the gut as well as the small bowel can be used. Parenteral nutrition can be used when the gut is not available for >7 days, malnourished and posted for major upper GI surgery. Energy & fluid requirement of the patient should be estimated properly. But in practical scenario predictive equations are used for the energy calculations and the thumb rule is 25-30 kcal/kg/day. Protein requirement varies from 1-2g/kg/day. Fluid requirement is 30ml/kg/day. In nutritional delivering rather than the kitchen feeds better to use the formula feeds since kitchen feeds are with unpredictable nutrient contents. Kitchen feeds should not be used for critically ill patients in hospitals because unpredictable levels of nutrients, unsuitable viscosity, makes continuous feeds more challenging, difficult to customize, time and labor intensive. Diarrhea and the refeeding syndrome are the two main complications of nutrition supporting of critically ill patients. Diarrhea can occur due to osmotic overload, medication, intestinal infection, contaminated feeding formula and feeding equipment, prolonged hang time, low residue feeding formula and lactose intolerance. Refeeding syndrome should be managed by incorporating balanced multivitamin/mineral supplement, feeding cautiously, monitoring biochemistry regularly including phosphate, magnesium and potassium correcting for low levels as necessary. Immuno-nutrition potential to modulate the activity of the immune system should be done by interventions with specific nutrients. Immunonutrients most often studied are arginine, glutamine, branched chain amino acids and omega 3 fatty acids and those can be beneficial in upper GI surgery, mild sepsis and trauma patients.

ROLE OF DIETARY CHANGES IN LIVER DISORDERS; THERAPEUTIC APPROACH

Nilushi Mudalige
Hemas Hospital Group & Sri Lanka Navy Hospital

Liver disease refers to any disorder of the liver, including steatosis, fibrosis, hepatitis, cirrhosis or cancer. There are over hundred types of liver diseases which can be acute or chronic, inherited or acquired. Medical Nutrition Therapy plays a significant role in managing the risk factors, symptoms, complications, and progression of liver disorders and even enhances the quality of the life of the patients with these diseases. In fact, in some liver diseases, nutrition becomes an essential form of treatment. Nutritional regimens should be tailored to the specific needs of patients with each category of liver disease. For Non Alcoholic Fatty Liver Disease (NAFLD) the first line of treatment is lifestyle modification, including managing obesity, increased exercise and improving insulin sensitivity. When targeting weight reduction in patients with NAFLD slow and controlled weight loss over time is encouraged as sever calorie restrictions and rapid weight loss may worsen the liver injury. Patients with alcoholic liver disease often suffer from protein energy malnutrition (PEM) and micronutrient deficiencies. Hence all patients with alcoholic hepatitis should be assessed for PEM and vitamins and minerals deficiencies as well. Those with sever disease should be treated with high protein high calorie diet. However for patients who are at risk to develop re feeding syndrome due to heavy alcohol intake and prolonged reduced nutrient intake caution should be taken before commencing feeding. Patients with cirrhosis should maintain a balanced diet, one which ensures adequate calories, carbohydrates, fats and proteins. Such a diet will help to overcome their hypermetabolic state and reverse malnutrition and most importantly, will aid the liver in the regeneration of liver cells. Sodium restriction is often recommended for these
patients in order to manage common complications like ascites, edema and portal hypertension. Medical Nutritional therapy is extremely vital for patients with End Stage Liver disease (ESLD) and during all phases of Live transplantation. Adequate nutritional assessment before a transplant helps identify individual nutritional problems and may prevent future complications. In the acute post transplant phase, early nutritional support can correct nutrient deficiencies. Long-term nutrition management should be aimed at preventive measures for the metabolic complications of liver transplantation such as diabetes mellitus, hypercholesterolemia, obesity, and hypertension.

NUTRITIONAL MANAGEMENT OF CHRONIC KIDNEY DISEASE

J. R. Tennakoon Jayaweera
Medical Nutrition Unit,
National Hospital of Sri Lanka

Currently Chronic kidney disease (CKD) has become a major health issue in Sri Lanka, with some districts having an increased prevalence. Medical management is carried out according to the severity of the CKD. Patients with CKD display a variety of metabolic and nutritional problems, which need to be managed both medically and through nutrition therapy and such management must be closely linked. Principles of management include maintaining of optimum nutritional status, nutrition therapy to slow the progress of disease and nutrition management of specific complications such as hyperkalaemia, hyperphosphataemia, metabolic acidosis etc. It is important to apply evidence based nutritional management for CKD patients according to the different stages of the disease, including for patients on dialysis and after transplantation. The need to concentrate on operational challenges and possible solutions during managing CKD patients is particularly relevant in Sri Lanka.

ROLE OF SOCIAL INSTITUTIONS FOR ASSURANCE OF FOOD QUALITY: THE FOOD ECONOMICS POINT OF VIEW

Udith K. Jayasinghe-Mudalige
Dept. of Agribusiness Management, Wayamba University of Sri Lanka

One of the major and increasing preoccupations of the food supply system in recent years has been consumer concerns about 'food quality'. An increasing number of problems related to food such as prevalence of human illness and deaths worldwide; food scandals; crises resulting from animal diseases; genetically modified food; new processing technologies, and use of inputs such as drugs and agro-chemicals as well as liberalization and globalization of world trade create this situation.

The 'social institutions' working on the food value chain, in response to the above, are “intensifying their efforts” to improve the level of food quality.

Food quality attributes, based on the Caswell's classification (1998), can be sorted into several 'Subsets', including: (1) Safety (food pathogens, food additives); (2) Nutrition (calorie, fat, cholesterol); (3) Sensory/Organoleptic (taste, appearance); (4) Process (place of origin); (5) Value/Functional (size, packaging material); (6) Text/Measurement (labelling, certification), and (7) Cues (branding, advertising). Taking into account of the level of valid, reliable and timely “information available for a consumer” about the food he/she consumes, these attributes can be congregated into three components, namely: (a) Search reached by a consumer “prior to purchase”; (b) Experience feel the product by “using it” and/or “due to
ECOLOGICAL WELLBEING IS THE KEY TO A HEALTHY NATION BUILDING

Sevvandi Jayakody
Wayamba University of Sri Lanka, Makndura, Gonawila, Sri Lanka

Ecological wellbeing is the status of an environment which is a resultant from the level of relationship between organisms and their environment. Very often, the health of an environment is directly tied to the wellbeing of its inhabitants. It is a measure of how successful a given ecological system is in managing, distributing, and sustaining environmental resources. This provides clues regarding the way a system minimizes, adapts to, or produces alternatives to environmental pressures such as over consumption, pollution, and unsustainable practices. Human wellbeing is directly decided by the ecological wellbeing and in managed environments, the governance decides the tradeoffs taken between two. The ideal scenario is equal weight age given to both, but increasingly world is ignoring the ecological wellbeing by anthropocentric attitudes and actions. Hence, political disclosures often indicate conflicting scenarios between two as to ensure ecological wellbeing, human often have to make choices that can contradict personal desires, needs, and ultimately, happiness. However, in most cases this interpretation is invalid as time lag in showing the impacts is ignored. Short term losses are positively compensated by long term sustainability of the resources ensuring food and nutritional security but uncertainty and inability of the implementers to enjoy the future benefits often impacts actions. Accordingly, short term negative impacts to physiological wellbeing of the immediate population that implement decisions, often results in total giving up of actions that could lead to ecological wellbeing. The ostensible conflict between human happiness and planetary welfare can be addressed with education systems that take into consideration the fact that habituation and imprinting happens at younger age. Hence, deontological thinking on consumption and resource use should be introduced to primary education as well as parenting. Ample examples now exist on success of such focused education, positively contributing to right nutrition of humans as well as the environment that support the production of food and living space. Both developed and developing nations should invest on conscious choice to reduce material consumption in order to increase nonmaterial benefits.
GENES AND BEHAVIOUR CHANGE

Sharmila Jayasena,
Department of Biochemistry and Molecular Biology,
Faculty of Medicine,
Colombo.

The prevalence of obesity and related lifestyle diseases is increasing globally, including Sri Lanka. Prevention and management of obesity and obesity related disease risk requires long term nutritional and lifestyle changes. However, it is often observed that in any nutritional and lifestyle intervention, dropouts as well as non-responders do exist. Non-responders being those who follow the regime but do not achieve the desired outcomes.

The role of gene-environment interactions has become exceedingly apparent with respect to lifestyle interventions as well as in the fetal origins of adult onset chronic disease. Genetic variations in key genes that regulate food intake, metabolism and energy homeostasis modulate the response to nutritional and lifestyle interventions such as diet and exercise. The fetal environment, determined by the maternal nutritional status, is known to modify the epigenetic programming of the fetal genes, forming the basis of the 'fetal origins of adult onset chronic diseases'.

The time has come for us to ask questions. Should we adopt personalized nutritional and lifestyle regimes in Sri Lanka in order to reduce the prevalence of obesity and related diseases? Should we be paying more attention to the genetic component that underlies the response to behaviour changes? Specifically, is there a need for personalized regimes which consider genetics?

BEHAVIOR CHANGE COMMUNICATIONS (BCC) IS BOTH A SCIENCE AND AN ART

Sandya Salgado

Background

Behavior of a person is linked to many aspects; habit, family, culture, education, values, societal influence and many more ...
Therefore a change in attitude, perception and behavior is one of the most challenging outcomes to achieve. Health seeking behavior falls within this challenge and needs in depth understanding and careful planning of multi-sectoral centric intervention. It is a strategic process which needs a planned time line with clear milestones.

Communications is just one cog in this wheel, a very important one though. Therefore an insight based, strategic approach is what would work. Many programs in this country have failed due to the misnomer of what an integrated social marketing campaign is. A media campaign on a social issue is unfortunately considered to be a Social Marketing campaign. A proper social marketing campaign is meant to 'sell' a social cause in the same manner a consumer product or service is sold, using the 4Ps of Marketing.

The Process

4Ps of Marketing
'Product, Price, Place and Promotion' is one of the tried and tested processes used in the practice of social marketing with three more P's also added for better effect; Process, People and Physical Evidence. The communications component only falls within the segment of 'Promotion'.

P-Process
The 'P-Process' developed by Johns Hopkins University, to change behavior, is yet another tried and tested tool in implementing successful BCC programs. The P-Process consists of interventions under the following; Inquire, Design Strategy, Create and Test, Mobilize and Monitor, Evaluate and Evolve.

Sri Lankan success stories through the use of Social Marketing:
Leprosy and Polio were eradicated with the effective use of the principles of social marketing, while programs such as promotion of iodized salt and awareness creation on child abuse impacted positively through the use of this process. Sri Lanka achieved Universal Child Immunization status and also managed to control the family size to four, in the 70's and 80's using this same principle, even though they may not have labelled it as Social Marketing or BCC.
A HEALTH PROMOTION APPROACH TO ADDRESS NUTRITION RELATED COMMUNITY BEHAVIOR

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Goal
To end the intergenerational cycle of under-nutrition and its severe consequences on the individual, community and national human capital and to reduce the prevalence of stunting among children under 5 years and low birth weight.

Specific Objective:
1. To build and improve the capacity of mothers, community groups and Public Health Midwives to support communities to improve nutritional status.
2. To enable Families and Communities to initiate actions to improve the nutritional status of children under 5 years of age.

Methodology
The methodology employs engagement and enabling communities to find and address the factors affecting their health through Community Based Health Promotion (CBHP) approach. The changes/outcomes are achieved through a process of collective community action. This approach has a community focus rather than an individual focus where the communities fully own the process, identify and address the most crucial determinants of child nutrition and development and monitor the initial results of their action and modify action to optimize outcomes as well as future goals. It also provides the control of interventions to the community thereby building capacity and strengthening empowerment of individuals and communities.

Outcome
In addition to the improvement in child nutritional status, there was a significant positive impact on adult wellbeing including reduced salt/sugar/oil intake, increased physical exercise and improved familial relationships. Perception of health services and utilization also improved.
and vitamin C of those foods were analyzed according to AOAC methods.

Results and Discussion: Jack fruit contained the highest amount of carbohydrate (21.9 ± 2.7 g/100 g) while long beans contained the highest amount of crude protein (3.3 ± 0.6 g/100 g), Beta carotene (26.0 ± 7.5 µg / 100 g), vitamin C (14.6 ± 2.4 mg / 100 g), calcium (40.7 ± 2.9 mg / 100 g) and phosphorus (51.6 ± 6.4 mg / 100 g) among these selected foods. The highest moisture content was detected in “Kekiri” (91.8 ± 2.7 g/100 g) followed by “Kohila” (91.0 ± 2.6 g/100 g) which has the highest crude fiber content (4.8 ± 1.9 g/100 g).

Conclusion: Representative nutrition labels for each food items were formulated using the results. The results could be used to update the current Sri Lankan FCT and are also available for nutritional labeling.

OP 2
GLYCEAMIC RESPONSES OF FINGER MILLET (Elucine coracana) PORRIDGES (FMP) SUBJECTED TO DIFFERENT FOOD PROCESSING METHODS
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Background: Finger millet porridge is a popular snack, rich in nutrient and non nutrient compounds used in the traditional food culture in Sri Lanka with proven health benefits. The glyceamic response of foods is one of the important factors particularly for the patients with diabetes. Therefore present study was conducted to determine the glyceamic index (GI) and glyceamic loads (GL) of FMP subjected to
different food processing methods.

**Methodology:** Porridges were prepared using finger millet flour which submitted to parboiling, roasting and reduced to two particle sizes with a control for each processing method. Phenolic extracts of porridges were tested for total phenolic content (TPC) and antioxidant activity by 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging ability. Porridge samples were tested for resistant starch (RS) contents. The sensory characteristics of each FMP were evaluated. To determine the glyceamic response, porridge samples with 25g available carbohydrates were fed to 10 individuals after an overnight fast. Blood glucose values of individuals were measured at fasting and 30, 60, 90 and 120 minutes postprandial using finger prick blood samples. GI and GL values were calculated by the incremental area under the curve (IUAC) of glucose response of porridges compared to 25g of glucose.

**Results and Discussion:** Roasting and parboiling of finger millets increased the TPC and DPPH radical scavenging ability of FMP. There was an equal preference for all porridges in sensory evaluation. All FMP samples exhibited low GI values (<55) except the raw roasted flour which showed high GI values (>70) for both particle sizes.

**Conclusion:** Parboiling with 15 minutes steaming of finger millets allows to prepare FMP with low glyceamic response and rich in antioxidants.

*This research was supported by National research Council of Sri Lanka (NRC 12-096).*

**OP 3**

**IRON STATUS, VITAMIN A STATUS, TOTAL ENERGY INTAKE AND ASSOCIATED FACTORS AMONG FEMALE FIELD HOCKEY PLAYERS.**

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**Background:** Compromised micronutrient or energy intake can affect aerobic endurance of athletes. The objectives were to assess body mass index, aerobic endurance, iron and vitamin A status and nutritional intake of national level female field hockey players and to identify associations between analyzed parameters.

**Methodology:** A purposive sample of national level professional, adult female field hockey players (n=31) were recruited. A pretested questionnaire for general socioeconomic data and sport specific data was administered and a 24-hour dietary recall was done. Height and weight were assessed using standard techniques and BMI was calculated. Hemoglobin concentrations (Cyanmethemoglobin method), serum ferritin levels (ELISA) and serum vitamin A concentrations (HPLC) and aerobic endurance (‘beep test’) were assessed.

**Results and discussion:** Over half the players (n=17) were anemic (Hb< 120g/L) and 25 % (n=08) were iron deficient (ferritin <15.00 µg/L). 29 % (n=09) had BMI < 18.5 kg/m². Total energy intake from the habitual diet was less than the requirement in 52 % (n=16). Carbohydrate intake was higher (77 % n=24, > 67 % total energy intake from carbohydrates) and lipid intake was lower (87 % n=27, < 20 % total energy intake from lipids) than recommended; Dietary intake of iron and vitamin A were less than the RDA in most players (90 % n=28 and 94 % n=29) respectively. Mean aerobic endurance (27.98±6.90 ml/min/kg VO₂ max) was below recommended levels for athletes. A strong
negative correlation was observed between BMI and aerobic endurance \( (\rho=-0.708, p<0.01) \).

**Conclusion:** Individualized programs, aimed at improving nutritional status and sports performance of athletes should be implemented with regular monitoring.

_Ethical from the Ethics Review Committee, Faculty of Medicine, Colombo. Funding from Department of Biochemistry and Molecular Biology Faculty of Medicine, Colombo._

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**OP 4**

**WEALTH INEQUALITY OF THE HOUSEHOLDS: IS IT AN INFLUENTIAL FACTOR ON NUTRITIONAL STATUS OF CHILDREN IN JAFFNA DISTRICT.**

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**Background:** Nutritional status of children in Sri Lanka is inequal and reported to be high. Even though several factors such as educational level of the parents, frequent infections and dietary patterns have been indicated as causes, the financial status could be one of the important reasons for malnutrition. The objective was to determine the effect of household wealth inequality on nutritional status of children aged 1 to 5 years in Jaffna District.

**Methods:** The household wealth index (WI) was calculated from household ownership of durable assets and household characteristics to derive the social class of families into poorest, second, middle, forth and richest classes based on standard deviations. Height and weight were measured to derive age and sex specific Z-score values for wasting, stunting, underweight and overweight. Multivariate analysis was performed to determine the association between WI and nutritional status of the children.

**Results & Discussion:** A total of 846 households were visited and of the children between 1-5 years 414 were boys (48.9%). Number of children in the rural households were more \([641 (75.8)]\). Mean WI was 17.04 (±8.52) and it was significantly higher in urban families \((29.52 ± 10.42)\) than in rural families \((13.05±6.57)\). In this study, 5.2, 25.4, 57.7 and 11.7 \% of the families were poor, second, middle and forth class while families of richest class were not found, and prevalence of undernutrition was 12.8, 42.4, 27.1 and 5.2 \% in the respective each group. The prevalence of wasting, underweight and stunting of children in the households were 21.6, 33.1 and 26.4 \% respectively and significantly decreased with increasing WI \((p<0.05)\). From poor class, 50 and 56.8 \% of the children were affected with anaemia and protein deficiency respectively whereas only 27.3 and 9.1 \% of children were affected from forth class. Risk for wasting \([OR=14.4 \ (1.7-123.3)]\) and underweight \([OR=7.6 \ (1.3-68.8)]\) were significantly higher in children from poor class than that from forth class.

**Conclusion:** More than half of the families in Jaffna District are middle class and nutritional status of the Jaffna children is influenced by wealth of the family.

_Ethical clearance was obtained from Ethical Review Committee of the Faculty of Medicine, University of Jaffna. Source of funding was NRC research grant (13-121)._
OP 5

THE USE OF WAIST TO HEIGHT RATIO (WHtR) IN CARDIAC PATIENTS

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Background: Central obesity is a more accurate indicator of cardio-metabolic risk. The conventional anthropometric measurements including Body Mass Index (BMI) have poor sensitivity in identifying patients with increased risk. The aim of this study was to assess WHtR as a marker of increased metabolic risk among cardiac patients.

Methods: A cross-sectional study was carried out among 526 patients admitted to the Institute of Cardiology, Colombo. Height, weight, waist circumference were measured using standard techniques and BMI was calculated. Cut-off values from Sri Lankan guidelines were used (underweight <18.5 kg/m², normal weight 18.5-22.9 kg/m², overweight 23-25 kg/m², obese >25 kg/m²). In addition, BMI ≥21.5 kg/m² was used as a cut-off point to determine high cardio-metabolic disease risk level according to local research findings. Details regarding the presence of diabetes, hypertension, dyslipidemia were obtained by history and clinical records.

Results and Discussion: Mean WHtR was 0.565 (± 0.083). According to local BMI cut-offs, 68.3% of normal weight and 13.5% of underweight patients had WHtR >0.5. With BMI ≥21.5 kg/m² taken as cut-off, 68.4% had a high risk level. Among patients with the low risk BMI, 41.6% had WHtR >0.5. Receiver-operating characteristic (ROC) curve analysis for the presence of diabetes revealed Area Under ROC (AUROC) values of 0.629, 0.589 for WHtR and BMI respectively. WHtR was a significant predictor of the presence of diabetes and co-morbid metabolic disease in cardiac patients. (p<0.05)

Conclusions: WHtR is an effective anthropometric index to identify cardiac patients with increased metabolic risk.

Ethical Clearance for the study was obtained by Ethics Review Committee, National Hospital of Sri Lanka. This research received no specific grant from any funding agency in the public or commercial sectors.
RELATIONSHIP BETWEEN BMI AND BODY FAT PERCENTAGE IN A YOUNG ADULT FEMALE POPULATION.

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Background: Body Mass Index (BMI) is used as a useful measure of classifying overweight and obesity. The relationship between BMI and body fat percentage (BF%) has been studied in various ethnic groups to estimate the capacity of BMI to predict adiposity. In clinical practice, use of BMI as an indicator of overweight and obesity is easy, but its reliability as a tool for measuring body fat on an individual level can be questioned. The objective was to determine the relationship between BMI and BF% in female undergraduates residing in hostels of University of Sri Jayewardenepura.

Methodology: An analytical cross sectional study was performed among 367 female hostellers (age group of 20-26 years) randomly selected using hostel registries. Height was measured using stretch-resistant measuring tape to the nearest 0.1 cm. Body weight and BF% values were taken using Karada Scan®, Body fat analyzer (Bioelectrical Impedance Analysis). Data analysis was performed using SPSS 16. Correlation and association was tested by Pearson correlation and Chi-square test respectively.

Results and Discussion: When BMI was categorized according to WPRO 2000 categorization specifically for Asians, 41.4% were underweight (<18.5 kg/m²), 43.1% were normal weight (18.5-22.9 kg/m²), 7.9% (23-24.9 kg/m²) were overweight and 7.6% (≥25 kg/m²) were obese. 4.1% (≤19.9%) were with low, 59.1% (20.0%-29.9%) were with normal, 28.9% (30.0%-34.9%) were with high and 7.9% (≥35.0%) were with very high BF%. (p value on 2 test=0.000, Pearson correlation=0.630, Significance (2-tailed)=0.000).

Conclusion: In the study population 15.5% were overweight and obese, 36.8% had high BF%. A significant association and correlation was found between BMI and BF%.

Ethical clearance for the study was obtained from Ethics Review Committee, Faculty of Medical Sciences, University of Sri Jayewardenepura and all subjects signed informed consent.

HYDROLYZING ACTIVITY OF DIFFERENT TYPES OF STARCHES CONSUMED IN SRI LANKA

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Background: Type 2 diabetes, formerly known as non-insulin dependent diabetes mellitus accounts for most cases of diabetes mellitus worldwide. As one possible way to overcome diabetes, a great interest has been stimulated in understanding the relationship between different types of dietary carbohydrates and appetite regulation. Starch is the commonest storage carbohydrate in plants. Starch from all plant sources occurs in the form of granules which differ markedly in size and physical
characteristics from species to species. Therefore, there is a great difference in the hydrolyzing rate by the enzymes. The aim of this study was to investigate and characterize differences in hydrolyzing rate of commonly consumed starches in Sri Lanka.

**Methods:** Fourteen different types of flours were purchased from different locations in local market, Sri Lanka and samples were pooled. The hydrolyzing rate of the starch solutions were analyzed against the enzymes α-amylase and amyloglucosidase. The data were analyzed using the Complete Randomized Design (CRD) model.

**Results and discussion:** The hydrolyzing rate of wheat and kurakkan by α-amylase enzyme was significantly higher than the other starches followed by Atta, raw white rice, corn, palmyrha, steamed wheat, row red rice, Kithul, Kadala (Chick pea), Oat, Olu seed flour and soy. The hydrolyzing rate of wheat by amyloglucosidase was significantly higher than the other starches followed by Atta, raw white rice, kurakkan, raw red rice, steamed wheat, Palmyrha, oats, corn, Kithul, Undu (Black gram), chick pea, Olu and soy.

**Conclusion:** The study results of the starches tested suggest that soy, oat, Olu, chick pea, Kithul, Undu and Palmyrha starches had slower digestibility when compared with wheat, Atta, raw white rice, kurakkan, raw red rice, steamed wheat.

**PP 3**

**IODINE STATUS OF PREGNANT WOMEN IN PANNALA MOH AREA, SRI LANKA**

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**Background:** Adequate maternal iodine status is important to prevent iodine deficiency disorders (IDD) of mother as well as newborn. Although salt iodization program has been conducting since 1995 in Sri Lanka, no more studies have been done to assess iodine status of pregnant women. This clinic based cross-sectional study was conducted to assess iodine status of pregnant women in Pannala MOH area, Kurunagala district, Sri Lanka.

**Methodology:** Pregnant women who attended to MCH clinics and were willing to give the urine sample were selected. Urinary iodine excretion (UIE) was used for assessing the current iodine status of pregnant women. A total of fifty two pregnant women were studied and UIE was measured in casual urine sample in all subjects. Sandell-Kolthoff reaction was used to analyze the urinary iodine status which was recommended by the international council for control of IDD and world health organization.

**Results and Discussion:** The median urinary iodine concentration of the sample was 299.16 μg/L which was above the WHO recommendation between 150 and 249 μg/L. Urine iodine distribution indicated 13.46%, 53.85%, 17.31% and 15.38% pregnant women of the sample had inadequate (<150 μg/L), adequate (150-249 μg/L), above requirement (250-499 μg/L) and excessive intake (≥500 μg/L) respectively. Previous research has found that, prevalence in North Western province was 56.8%, 25.9%, 17.3% and 0% respectively.

**Conclusion:** This study concluded that iodine intake among pregnant women in Pannala MOH area is at good level.

Ethical clearance certificate for the study was obtained from Ethical Review Committee of Faculty of Medicine, University of Peradeniya.
Prevalence of non communicable diseases (NCD) and their risk factors among employees in National Hospital of Sri Lanka (NHSL).

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**Background:** In Sri Lanka NCDs (Non Communicable Diseases) are recognized as leading causes of morbidity, mortality and disability. Objective of this study was to investigate the prevalence of NCD and their risk factors among employees in National Hospital of Sri Lanka (NHSL).

**Method:** Cross-sectional study was carried out among NHSL permanent employees. Population size was 1076. Interviewer administered questionnaire was used to collect the information. Weight, height and waist circumference was measured. BMI was calculated. Total serum cholesterol level, post prandial blood sugar (PPBS) level and full blood count were carried out. Statistical analysis was carried out using SPSS 21 software.

**Results:** The response rate was 14.34%. Mean age of participants was 39.02 ± 10.7. Female participation percentage was 59.6. Sedentary lifestyle was seen in 47.5% of participants and moderate level physical activity was seen in 50.9%. Mean BMI was 23.81±4.14kgm<sup>2</sup>. Prevalence of overweight and obesity was 33.99% and 14.42% respectively. 25(2.4%) subjects were identified as newly diagnosed diabetes patients. Cholesterol level above 200 mg/dL was found in 50.9% of participants. Abdominal obesity prevalence was 57.26% (male and female prevalence 13.79% and 57.1% respectively). It was significantly higher in females than males (p<.0005, OR=5.014). 26.3% were male smokers and 50.6% used alcohol respectively. Prevalence of beetle chewing was 24.1% among male population.

**Discussion/ Conclusion:** Total prevalence of NCD and risk factors were high among hospital employee. Significant percentage of them had previously undiagnosed dyslipidaemia, diabetic mellitus, and anemia. Very high prevalence of obesity was observed among females and smoking, alcohol use among male population which were major risk factors for NCD prevalence at NHSL.

**Keywords:** Obesity, NCD risk factors, Hospital employees, Dyslipidemia, Diabetes mellitus

Vitamin D Status of newly diagnosed breast cancer patients

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**Background:** Vitamin D is believed to be associated with reduced breast cancer (BC) risk due to anti proliferative and pro differentiation activities. Vitamin D level of ≥50ng/ml is reported.
to lower the BC risk by 50%. This study compared vitamin D status and animal protein intake of BC women with healthy females.

Methods: Newly diagnosed BC patients from National Cancer Institute, Maharagama (n=150) and age matched apparently healthy females (n=75) were enrolled. Data on frequency of consumption of animal protein was recorded using an interviewer administered questionnaire. Serum vitamin D status was measured with mini vidas immuneanalyser using an enzyme immunoassay competition method with final fluorescent detection.

Results and Discussion: Consumption of meat, fish, egg and dairy products was not significantly different (p>0.05) among BC patients and healthy females. Majority of BC patients and healthy females (> 95%) were not consuming chicken, beef or pork ≥3times a week. BC patients (44%) and 40% of healthy women consumed fish ≥3times a week. However egg consumption ≥3 times a week was rare (13%) among both groups. Majority of BC women (90%), and healthy women (63%) consumed full cream milk> 3 times a week. Only 6% among both groups consumed cheese ≥3 times per week. None of the women were not on any other supplements. Mean vitamin D concentration of BC women (20.5±5.5 ng/mL) was not significantly different (p>0.05) when compared to healthy women (20.2 ±4.3 ng/mL). Half of BC women and healthy females were vitamin D deficient (< 20 ng/mL). Only 3% of BC women and none of healthy women had vitamin D above 30ng/mL.

Conclusion: Serum vitamin D status of breast cancer and apparently healthy women was considerably low among the study sample. This could be due to low consumption of foods rich in vitamin D by both groups. Thus preventive measures are needed to be taken in order to lower the risk associated with low vitamin D status among both BC and healthy women.

Ethical approval- Ethics Review Committee, Faculty of Medical Sciences, University of Sri Jayewardenepura (Approval Numbers-651/12, 28/14)

Financial Support- University grants- ASP/06/RE/MED/2012/20, ASP/06/RE/MED/2013/30

PP 6

CUSTOMER PREFERENCES REGARDING PURCHASE OF FOODS AND THE IMPACT OF NUTRITIONAL KNOWLEDGE ON THE FOOD SELECTION

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Background: Food behaviours play an important role in development of diseases. Thus it is essential to follow the proper food behaviours to lead a healthy life. There are several methods to evaluate the nutritional knowledge of consumers with the aim of determining food selection habits and to promote healthier food behaviours among consumers. The study was designed to determine the customer preferences regarding purchase of foods and impact of nutritional knowledge on food selection.

Methods: A descriptive cross-sectional study was carried out among 384 (females 65.1%, males 34.9
%) consumers, who visited the selected public markets in Colombo. An interviewer administered questionnaire was used and data were analysed using SPSS (15.0). Chi-squared test values were used to analyse the relationship. Significance of the tests was measured at the point of $P < 0.05$.

**Results and Discussion:** Most important 5 factors which influence customer preferences were nutritional content (36.2%) followed by taste (24.2%), cost (17.7%), brand name (12.2%) and convenience (8.6%). Only around 29% of people were able to express suitable definition for the term 'Nutrition'. Around 65% of the population considered expiry date before consuming the goods. Sources of knowledge on nutrition were ranged as traditional knowledge (54.4%) followed by books (27.6%), advertisements (12.5%) and newspapers (5.5%).

**Conclusion:** There was no statistically significant correlation between knowledge on nutrition and actual food behaviours. Usage of nutritional knowledge while making food choices is comparatively low as practically cost and taste play a major role. However, appreciable level of green vegetable and fruit consumption was observed. Traditional and cultural knowledge passed down the generations exerts the major impact on knowledge on nutrition as found in the present study. Though participants possessed knowledge regarding nutrition, this knowledge is not applied in their day to day life.

Food preferences, knowledge on nutrition

Ethical clearance was obtained from Ethics Committee, Faculty of Medical Sciences, and University of Sri Jayewardenepura.

**PP 7**

THE COMMON PROBLEMS AND THE FACTORS ASSOCIATED WITH THEM IN MOTHERS ATTENDING THE LACTATION MANAGEMENT CENTRE AT CASTLE STREET HOSPITAL FOR WOMEN.

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**Background:** Early initiation and establishment of breastfeeding are essential pre requisites for the practice of exclusively breastfeeding up to complete six months (Nutrition Policy, 2010). First ever LMC to support mothers while in hospital and after discharge in breastfeeding, was established at CSHW and lessons learned were replicated throughout the country. The objective was to describe the problems in breastfeeding in mothers attending the Lactation Management Centre at the CSHW and the factors associated with them.

**Methods:** A descriptive cross sectional study was carried out among a consecutive sample of 423 mothers attending the LMC at CSHW.

**Results and Decision:** The age of the mothers ranged from 15 - 43 years (Mean = 29.2 years; SD = 5.05y) and majority (91.5%) were educated up to GCE(O/L) or more. Proportion of working mothers conformed to national proportions (32.9%; Central Bank Report, 2013). There were babies delivered by normal vaginal delivery (62.4%) as well as by caesarian section (29.3%). Among mothers of
babies with birth weight more than 2.5kg (87.7%), 92.1% have attended 2 or more antenatal classes and 94.5% have read 2 or more books on breast feeding. Majority (88.5%) of them had initiated breast feeding within the 1st hour. Main reasons for attending LMC were reduced urine output (23.2%), to learn how to breast feed (21.3%) and drinking milk or drinking less amount (21.3%) indicating they have not established successful breast feeding despite the services they have received.

**Conclusion:** Though we have improved the quantity of services given, the quality of supportive services needs improvement to achieve successful breastfeeding.

*Ethical clearance was obtained from Medical Faculty, University of Kelaniya. The research was self-funded by the investigators.*

**PP 8**

**PREPARATION OF GINGER**

*(Zingiber officinale)* **BLEND WITH LIME**

*(Citrus aurantifolia)* **READY-TO-SERVE (RTS) FUNCTIONAL BEVERAGE,**

**SWEETENED BY PALMYRA SUGAR CANDY**

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**Background:** In recent times, people have become very health conscious due to degenerative diseases and they seek for health promoting and disease preventing functional beverages. A research was conducted to compare the chemical and organoleptic characteristics of ginger varieties (Local: Sidda and Chinese) and to prepare the RTS functional beverage.

**Methods:** Ginger and lime juices were mixed together to find out the best blend combination and the six different blends of 20:0, 18:2, 16:4, 14:6, 12:8 and 10:10 % of functional beverages were prepared by using 65% of portable water and 15% of palmyra sugar candy. The chemical and organoleptic studies revealed that local variety is superior to the Chinese variety to formulate RTS functional beverages. The chemical analysis of the freshly prepared RTS beverage blends showed increasing trend in titrable acidity from 0.22 to 0.52% (as % of citric acid), Total Soluble Solids from 12.6 to 16.8°Brix, ascorbic acid content from 12.4 to 56.9 mg/100 ml, total sugar from 16.6 to 20.4% and the pH was showed decreasing trend from 6.63 to 3.10 when lime juice concentration increased from 0 to 10%. The sensory scores of freshly made blends were significantly differed (p<0.05) for colour, aroma, pungency, taste and overall acceptability and the blend with 12% ginger and 8% lime juice had higher mean scores in sensory attributes.

**Conclusion:** This research revealed that RTS beverage formulated with 12% of ginger juice and 8% lime juice is the best combination for commercial preparation and it could be stored up to 12 weeks at ambient conditions without any significant changes in quality attributes.

**PP 9**

**ASSESSMENT OF KNOWLEDGE AND PRACTICES OF A HEALTHY DIET AMONG A SELECTED POPULATION OF DIABETIC PATIENTS ATTENDING THE DIABETIC CLINIC IN COLOMBO SOUTH TEACHING HOSPITAL**

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**Background:** Diabetes is a chronic disorder which
requires continuous medical care as well as patient and family education to prevent and minimize the complications. Dietary management plays a major role in management of diabetes.

**Objectives:** The aim of this study was to assess knowledge and practices regarding a healthy diet among a selected population of diabetic patients attending the diabetic clinic in Colombo South Teaching Hospital.

**Method:** This was a descriptive cross sectional study (n=146; age - 2070 years). An interviewer administered pretested questionnaire was used for data collection on knowledge and practices of a healthy diet. There were 15 questions included to assess knowledge and based on the marks, patients were classified as having good knowledge (75-100), average knowledge (50-75), and poor knowledge (< 50). Data analysis was done using SPSS 16.0 version and chi-square test was used to study the associations between characteristics of the study population.

**Results and Discussion:** In the population, 82% were females and 18% were males. Mean age was 57±9 years. Mean duration of diabetes was 9.1±6.8 years. Majority of the participants (n=129) had good knowledge regarding a healthy diet, 14 had average knowledge and 3 had poor knowledge. Knowledge of a healthy diet was positively influenced by educational level of the participants (p<0.05). The dietary practices were good according to the results. However, most of the participants still had high fasting blood sugar levels (> 126 mg/dl) with diet control and medications. Poor family support was highlighted as the main barrier to maintain proper dietary management.

**Conclusion:** Thus, effective methods as well as repeated dissemination of knowledge and encouragement for the patients and family are needed to maintain proper healthy diet to achieve optimal glycemic control.

*Ethical Clearance for the study was obtained from the Ethics Review Committee, Faculty of Medical Sciences, USJP and Colombo South Teaching Hospital.*

**PP 10**

**MOBILE HEALTH SOLUTIONS TO IMPROVE THE EFFECTIVENESS OF DATA COLLECTION AND MONITORING IN NUTRITION PROJECTS**

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*World Vision Lanka*

**Background:** Introducing mobile technologies to record data improves the efficiency of work, accuracy of the data, analysis and enables viewing of real-time data. The objectives were, to effectively adopt and maximize the use of mobile applications for the data collection and to establish a simplified child monitoring process that saves time by optimizing data collection, registration, storage and sharing and linking households, community health workers, and health facilities with real-time health information system.

**Methods:** Used three separate mobile applications according to the needs (Open Data Kit, CommCare Software & a tailor made application). Open Data Kit is used to develop the questionnaire for the surveys. Customized mobile applications were created according to the needs. Software has a mobile front end and cloud backend. Mobile interfaces can be viewed in local languages. The customized mobile application allows users to collect data, perform calculations such as age, nutrition status of children (WAZ, HAZ and WHZ) and manage subcases . The
Some of them are recorded as poisonous to animals, but there are specific methods to cook them. Sri Lankans do not eat these flowers in fresh forms like other countries; therefore specific fragrance is not expected, except flowers like clove. As these flowers are not commercially cultivated, they are not contaminated with agrochemicals. Some parts of certain flowers have to be removed before cooking. Ayurveda theories describe their properties as *Thridosha Shamaka* (pacifying three bio energies) and *Dhathu Poshaka* (body tissues nourishing) etc. They are also beneficial in treating diseases in gastrointestinal tract, eye disorders, respiratory disorders and urinary disorders according to Ayurvedic teachings. This data can be used to promote the use and medicinal values of edible flowers among the community.

**Conclusions:** Data collection and monitoring systems can be significantly enhanced with the introduction of this solution. It will enable the efficient capturing, storage, comparison and analysis of real time data.

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**DIVERSITY OF EDIBLE FLOWERS IN SRI LANKA: A REVIEW**

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**Background:** The world of flowers can be considered as the most amazing gift offered by Mother Nature. Some of the flowers can be considered as functional foods due to their medicinal and nutritional values.

**Methods:** This review was carried out with the objectives of enlisting edible flowers in Sri Lanka, to explore the culinary methods and to explore the nutritional and medicinal values of them. The information was gathered from ayurvedic and traditional texts, open interviews, an old as well as recent recipe books, and from scientific articles.

**Results and discussion:** There are about 26 edible flowers currently used by Sri Lankan community.