

# Investigation of Daily Macronutrient intakes by Sri Lankan Managerial Level Employees working in the Private Sector

M. A. Jayasinghe<sup>1</sup>, S. P. A. S. Senadheera<sup>2</sup>, I. Wijesekara<sup>3</sup>, K. K. D. S. Ranaweera<sup>4</sup>

<sup>1,3,4</sup>Department of Food Science and Technology, Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka

<sup>2</sup>Department of Biochemistry, Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka

**Abstract**— With changes of lifestyles and social values in the food culture, many individuals working as managerial level employees in the as private sector are seemingly selecting more improper daily meal combinations. This study was designed to determine whether this occurrence can have a severe impact to imbalance the daily nutrient intakes by the individuals in the mentioned social segment, which increase the tendency of having nutrition related chronic diseases. In a hierarchy range from junior executives to CEOs of private sector organizations, 800 individuals were selected by disproportionate stratified random sampling. Selected individuals are interviewed using a structured questionnaire to assess their daily food combinations and their consumed portion sizes. Frequently consumed meal combinations were then analyzed for their macronutrient composition, to compare with world Health organizations' (WHO) Reference Dietary Intake (RDI) levels of nutrients. The results reveal of significantly ( $p<0.05$ ) higher daily fat ( $45.3 \pm 1.7$  g/day) and protein ( $65.2 \pm 1.4$  g/day) intakes than the WHO recommendation levels and significantly ( $p<0.05$ ) lower in dietary fibre ( $22.3 \pm 1.1$  g/day) contents by selected participants. Carbohydrate intake ( $133.1 \pm 2.2$  g/day) was higher than reference levels but was not significant ( $p>0.05$ ). This indicates of a considerable risk for many individuals in the concerned social segment, of having non-communicable diseases, if observed dietary patterns are continued.

**Keywords**— dietary fibre, protein, fats, carbohydrates, Managerial-level-employees, Private-sector

## I. INTRODUCTION

With increased urbanization, energy-rich diets containing higher amount of fat and sugar, which also provide less dietary fibre and essential micronutrients are being frequently consumed, particularly by high income groups. In addition, the urban population is turning to be more sedentary with little physical activity. Consumption of

alcohol, providing empty calories, and tobacco use is also common among them. Hence, prevalence of disorders like obesity, heart disease, hypertension (high blood pressure) diabetes and certain types of cancers is on the increase.

Managerial level employees who are recognized to be spending a more sedentary lifestyle with higher stress conditions (Jayasinghe *et al.*, 2015), are seemingly highly susceptible for the above mentioned health risks. Therefore, this study provides valid information about their current macronutrient intakes, in aim to organize daily meal plans in a proper way, as this valuable social segment in the country could prevent nutrition related chronic diseases in future.

## II. MATERIALS AND METHODS

### 2.1 Community survey

A community study was carried out to identify the portion sizes, varieties of selected foods regularly consumed by employees in the private sector who are positioned in between Junior Executive level and CEO in the hierarchy. The study was included randomly selected 800 private sector managerial level employees in the age range 25 yrs. – 54 yrs., covering all provinces of the country, elected according to the “disproportionate stratified random sampling technique”. Individuals were questioned broadly according to a questionnaire structure prepared. The sample population contained. Among the districts, the sample sizes were determined according to their population ratios. As the UK National Nutrition and Dietary Survey (NDNS) collected dietary details from 1724 participants from a population of 60 million (Nelson *et al.*, 1997), it was assumed that the sample size of 800 used in the current study is within adequate limits.

Managerial level employees were mainly selected from the private sector in urban areas, aiming to reveal the realistic impact of changed lifestyles in nutrient intakes. The approximate grid made for the sample selection in

the survey is indicated in the figure 1. As shown, it has covered more urban areas than rural.

## 2.2 Questionnaire formation

Major aim in designing the questionnaire was to assess the realistic nutrition intake Managerial level employees working in the private sector. This included sections to put information about the frequently consumed food varieties, their processing / cooking methods and also the portion sizes.

## 2.3 Data collection

The field level implementation was carried out by colleagues volunteered to help as surveyors in this research project. All of them were associated with government Universities island-wide who have completed at least B.Sc. level qualifications. Questionnaires were filled by surveyors while interviewing candidates. Broad explanations were given about how to answer the questions properly. Among the different provinces of the country, numbers of volunteers was selected, considering the relative population sizes of managerial level employees. Not more than one member from a family was interviewed and hence, all the individuals represent different 800 households. Activities undertaken by each surveyor included: conducting interviews and collecting completed questionnaires. If there were any missing information in questionnaires, relative volunteers were contacted again and relevant information obtained.

## 2.4 Training of surveyors

An informative practicing session was conducted at first focused on field data collection procedures, and management of other aspects of the survey. The training agenda included inputs on purpose of the study, responsibilities of each member of the survey team. Training in interviewing techniques was carried out through detailed explanation of the contents of the questionnaire, mock interviews and checking of data to ensure the completeness of the questionnaire.

Need to ensure quality of data collected was emphasized throughout the training including conduct of quality checks at the field level.

## 2.5 Interviewing at the organizational / household level

Administration of the questionnaires was done by the trained surveyors. The questionnaire included several sections, some of which relate to household demographics, and socioeconomic characteristics. Major questions were designed to thoroughly understand the lifestyle impacts on dietary patterns and the variety of frequently consumed foods cum their regular portion sizes. The 24 hour dietary recall was done for 4 days, but altogether dietary assumptions were reported considering an years' time period back. When there were incredible deviants of frequent meal combinations consumed in the entire year rather than the 4 days considered for the recall,

those combinations were included for the identified diet lists. The names of respondents and identification data on the organizations and households were kept strictly confidential.

## 2.6 Determination of proximate compositions of macronutrients

Homogeneous mixtures were made using the most frequently consumed meal combinations consumed by individuals. Then nutrient contents of actual portion sizes were calculated. Proximate analysis was done for moisture, digestible carbohydrates, insoluble dietary fibre, soluble dietary fibre, fat, protein, Vitamins and minerals. Obtained values were indicated in dry weight basis.

## 2.7 Statistical Analysis

The results of the nutrient compositions were analyzed by the two tailed unpaired T-test using Microsoft Excel 2013 at 95% confidence level. Mean percentages of macronutrient contents were calculated with their standard deviation values. Two tailed paired t-test was performed to investigate of any existing significant differences between the Reference Dietary Intake Guideline (RDI) values of nutrients provided by the World Health Organization (WHO) and actually consumed food combinations. Average nutrient contents of test foods identified from each district was compared separately with RDI s. The Q-test was performed to identify the existing outliers among the volunteers.

## III. RESULTS AND DISCUSSION

The daily dietary fibre content taken by were significantly ( $p<0.05$ ) lower (Table 1) than the daily requirements and it may result in severe bowel disorders and other non-communicable health disorders if continued in this habit (Mathur *et al.*, 2005).

Significantly ( $p<0.05$ ) excessive daily protein intakes by participants was visible (Table 1), where it alarms a severe threat to the physically least active individuals.

Carbohydrate intakes were found to be higher than the RDI (Figure 2), but the difference was not significant ( $p>0.05$ ).

Daily fat consumption was significantly high ( $p<0.05$ ) in managerial level employees (Figure 2). The population sample represented the ones who are mainly working in urban areas, where fast food outlets were common, which can be assumed for one of the main reasons for this occurrence. During the interviews, 71.5 % of them mentioned that due to the mental stress they undergo during the long hours of work, they repel balanced, nourishes diets and go for the 'tasty' fast foods to satisfy their minds. Another main reason was the convenience due to lack of time for food consumption in working days. Overall, 44.1% of participants mentioned the selection of fast food as a matter of convenience

There was another hindered factor revealed during the interviews after questioning the individuals, which revealed that; due to the socio-trend pressure, 36.2% of the individuals, are going for the famous branded fast food outlets located in urban areas frequently.

The major outbreak of with respect to revealed factors of the macronutrient consumption rates was seen regard to dietary fibre, which was significantly low ( $p<0.05$ ) in daily intakes with a minimal p value (Table 1 and Figure 2). The change of lifestyles was identified as the main reason, which has lead them to consume processed foods and fast food rich in fat, proteins and carbohydrates but lack in fibre.

Another main factor affected was the unawareness of the abundant rich dietary fibre sources which are readily available. Overall, 53.4% were only considering quite a few sources as rich in fibre such as *Lasia spinosa* (Kohila) and *Cartica papaya* (Papaya), not being aware of many other fibre rich sources which are abundant in the local market. The change of attitudes in the society has changed the food culture in a great deal in urban as well as sub urban areas, where valuable natural sources have been replaced by convenient processed foods.

Our observations were supported by previous research findings of Jayewardene *et al* (2012) which showed low mean daily intake of fruits and vegetables among Sri Lankan adults (2.16 portions) compared with the USA (3.0) and France (3.6).

Although we care less about the nutritional and health requirements of the common social segments, they are the ones who are mostly vulnerable non-communicable diseases at some part of their life. Therefore, it is necessary to prevent that by providing them necessary guidelines. When life is normal, people are less concerned about the nutritional needs, and lead in to severe diseases with time, without intention.

#### IV. FIGURES AND TABLES

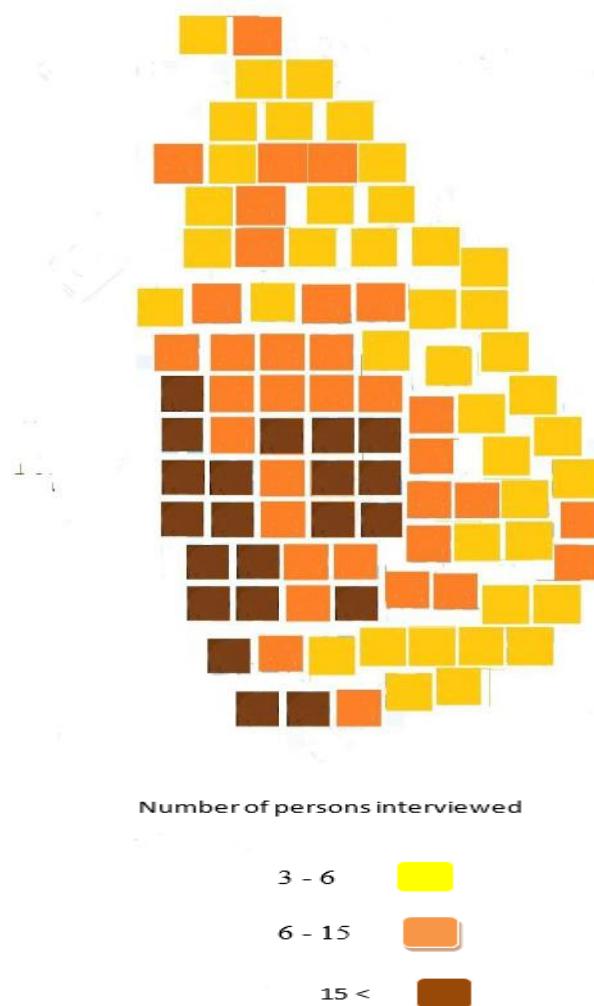


Fig.1: The grid; Sample population of selection

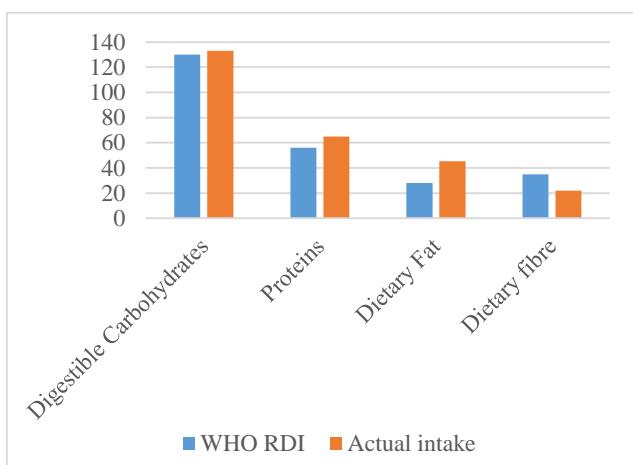


Fig.2: Macronutrient intake comparison with WHO RDI values

Table.1: Comparison of Macronutrient intakes with WHO Reference levels

Nutrient	WHO RDI (g)	Actual intake (g)	P Value
Digestible Carbohydrates	130	133.1 ± 2.2	0.22
Proteins	56	65.2 ± 1.4	0.03
Dietary Fat	28	45.3 ± 1.7	0.006
Dietary fibre	35	22.3 ± 1.1	0.005

## V. CONCLUSION

Most frequently consumed meal combinations by local managerial level employees in the private sector are significantly ( $p<0.05$ ) higher in fat and protein contents than the WHO recommendation levels. Those were significantly lower in dietary fibre contents. This alarms of possible high number of nutrition related chronic disease occurrences among individuals in this particular social segment in future.

## ACKNOWLEDGEMENTS

We are extremely grateful to Ms. Kalina Sivaraj and Mr. Gayan Chandrajith who work as temporary demonstrators at the Department of Food Science and Technology – University of Sri Jayewardenepura for their kind corporation during the documentation processes.

## REFERENCES

- [1] Firmin H. Aikpo, Miriac Dimitri S. Ahouanse, Lucien Agbandji, Patrick A. Edorh, Christophe S. Houssou(2017).Assessment of contamination of soil by pesticides in Djidja's cotton area in Benin. International Journal of Advanced Engineering Research and Science (ISSN : 2349-6495(P) | 2456-1908(O)),4(7), 001-005. <http://dx.doi.org/10.22161/ijaers.4.7.1>
- [2] Perfect, T. J., & Schwartz, B. L. (Eds.) (2002). Applied metacognition Retrieved from <http://www.questia.com/read/107598848>
- [3] Myers, D. G. (2007). Psychology(1stCanadian ed.). New York, NY: Worth.
- [4] Cognition.(2008). In Oxford reference online premium dictionary. Retrieved from <http://www.oxfordreference.com>
- [5] Blue, L. (2008, March 12).Is our happiness preordained? [Online exclusive]. Time. Retrieved from <http://www.time.com/time/health>
- [6] J. Clerk Maxwell (1892), A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, pp.68–73.
- [7] I. S. Jacobs and C. P. Bean (1963), “Fine particles, thin films and exchange anisotropy,” in Magnetism, vol. III, G. T. Rado and H. Suhl, Eds. New York: Academic, , pp. 271–350.

- [8] K. Elissa, “Title of paper if known,” unpublished.
- [9] R. Nicole, “Title of paper with only first word capitalized,” J. Name Stand. Abbrev., in press.