

NUTRITION AWARENESS AND PRACTICES AMONG PARENTS PARTICIPATING IN SCHOOL HEALTH CLUB ACTIVITIES IN MONERAGALA DISTRICT, SRI LANKA

C.P Senevirathna,¹ K.W. Wickremasinghe², I. Liyanage¹, P. Katulanda¹, A. Pathirana³, A. Alagiyawanna³, N. Townsend², J. Williams².

¹Diabetes Research Unit, Faculty of Medicine, University of Colombo, Sri Lanka,
²University of Oxford, United Kingdom.

³Health Education Bureau, Ministry of Health, Sri Lanka.
cpchamil@yahoo.com , kremlin.wickramasinghe@dph.ox.ac.uk

Abstract— Non Communicable Diseases (NCD) are gradually becoming a major cause of morbidity and mortality among developing countries than their counterpart. Sri Lanka as a lower middle income country is faced with a double burden of malnutrition. The strong health system needs to be fortified with an empowered population that can make healthy life style choices in order to enhance the effectiveness of national level policies to combat malnutrition.

Aim of this study was to assess the nutrition related behaviours among parents who attended school health club activities in, Sri Lanka. Study sample (n=120) was drawn from parents attending School Health Club activities in 10 selected schools in the Moneragala District. The data were collected by trained data collectors using interviewer administered questionnaires and anthropometric measurements recorded on data sheets. Mean age of the participants was 36.9 years (SD 10.2 CI=95%). 77.2% of participants were females. Mean BMI of the participants was 23.0 Kgm⁻² (SD 3.8, CI = 95%). 28.9% (n=35) of the participants were overweight and 4.2% (n=5) were obese. 78.5% of participant stated that they do not use a list of goods while shopping. Only 30.6% of them actively attempted to choose healthy foods while shopping. 50.4% of them buy vegetable and fruits. When assessing the dinning pattern, 83.5% did not pay attention to the recommended amount of salt and coconut oil while cooking. 15.7% participants made an effort to consume the correct portion size. 84.3% had their meals while watching TV. Only 11.6% used a flat plate to have their meal. When assessing physical activity levels, 94.2% were not active in leisure time domain.

The actual prevalence of unhealthy nutrition practices may be higher than what was recorded here as this sample was biased towards healthy behaviour because the participants here had made a positive effort to attend school health club activities and therefore indicating a health seeking behaviour. The nutrition related behaviours attitudes and practices among parents need to be addressed and corrected in order to achieve favourable results in modifying the behaviour of school children. School children and school health clubs can be utilized as change agents and platforms for inducing life style changes in communities if utilized properly.

I. INTRODUCTION

Non communicable diseases (NCDs) are the leading causes of deaths globally, killing more people each year than all other causes combined and contrary to popular belief that the developed countries are most affected by the rise of NCDs, the available data indicate that nearly 80% of NCD deaths occur in low and middle-income countries [1]. In spite of efforts taken by developing countries to curb the prevalence of NCDs are on the rise [2]. Four major NCDs, cardiovascular diseases (including heart disease and stroke), diabetes, cancer and chronic respiratory diseases (including chronic obstructive pulmonary disease and asthma) — are the leading cause of illness and death worldwide including the South-East Asia Region (SEAR) [3]. The burden is expected to rise to 74% and 89%, respectively, by the year 2030 [3,4]. In addition to the health burden, NCDs have serious socio-economic consequences particularly for poor and disadvantaged populations [4,5]. The epidemiological transition has resulted in a double burden of communicable and chronic non communicable diseases in most developing countries [6]. The estimated 14.5million total deaths in 2008 in SEAR, 7.9 million (55%) were due to NCDs. NCD deaths are expected to increase by 21% over the next decade. Of the 7.9 million annual NCD deaths in SEAR, 34% occurred before the age of 60 years compared to 23% in the rest of the world [7]. Most non-communicable diseases share the common preventable risk factors such as tobacco use, high alcohol consumption, unhealthy diet, raised blood pressure, sedentary lifestyle and obesity [8]. Global strategy emphasizes the need to limit the consumption of saturated fats, trans fatty acids, salt, sugars, increase consumption of fruits, vegetables and levels of physical activity [9]. Recent studies indicate that the working people are more vulnerable to get NCDs such as CVD in their early stage of life due to the changes in lifestyle factors among people [10,11]. South East Regional Countries including Sri Lanka, experiencing a

IV. ASSESSMENT OF OVERWEIGHT AND OBESITY

rapid upsurge in NCD risk factors such as overweight and obesity. Situation in Sri Lanka had been well explained by few researches which determined the prevalence of overweight and obesity in various community settings. One study found that 22.8% adults were overweight while 6.6% were obese [20]. Another study revealed that the prevalence of overweight and obesity in adults were 25.2% and 9.2% respectively [21]. Above two studies shows that the risk of being overweight and obesity among Sri Lankan adults is on the rise. When it comes to the rural communities, 23.3% of adults were overweight (male: 20.4%, female: 26.2%) while 6.7% were obese (male: 4.7% and female: 8.7%) [21]. Therefore the prevalence of overweight and obesity was significantly high in rural community people in Sri Lanka.

Factors such as family and friend perception towards healthy eating, access, personal barriers, knowledge had been identified as the behavioral factors which influence of nutritional practice among people [12]. Individual, social and environment perception were associated factors to purchasing, preparation and consumption [12]. Dietary behavior influences one's nutrition intake [13]. Understanding people's knowledge, attitudes and behavior is fundamental for nutrition education [14]. Therefore using strategically methods to understand attitudes and behavior related to dietary practices would useful to establish a sustainable nutritional change in people. The school health clubs are a focal point of delivering the school intervention in terms of promoting nutrition among school children. School health clubs conduct activities in order to link its activities with the community where children came from.

II. MATERIALS AND METHODS

Study design and participants

This is a cross-sectional descriptive study carried out from August to November 2015. Data were collected from a total of 120 parents from ten schools (1C and type 2) who attended activities conducted by the school health clubs in the District of Moneragla, Sri Lanka.

III. MEASURES

Pre-tested, self-administered questionnaire and data record sheets were used to collect data regarding the behaviors such as healthy dietary practices, healthy shopping practices and physical activities in leisure time. Anthropometric measurements were obtained by trained data collectors using standard protocols. Following the data collection an awareness program was conducted on healthy dining and shopping practices as well as leisure time physical activities.

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health [15]. Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the squared of his height in meters (kg/m^2).

WHO cut off values for categorizing Asian population in to underweight, normal weight, overweight and obese.

Underweight - $< 18.5 \text{ Kg}/\text{m}^2$

Normal weight = $18.5 - 23 \text{ Kg}/\text{m}^2$

Over weight = $23 - 27.5 \text{ Kg}/\text{m}^2$

Obese = $> 27.5 \text{ Kg}/\text{m}^2$

BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered a rough guide because it may not correspond to the same degree of fatness in different individuals [15]. We used check list to determine the behaviors related to the nutrition practices among parents.

V. ETHICAL CLEARANCE

Study was ethically approved by ERC committee, Faculty of Medicine, University of Colombo, Sri Lanka.

VI. DATA ANALYSIS

All the data was entered to the Microsoft excel data base and imported to the SPSS 16.00. Descriptive analysis and inferential statistics were used where appropriate. Means and standard deviations were used to represent quantitative variables and percentages or proportions for categorical variables.

VII. RESULTS

The majority of participants were female ($n=88, 73.3\%$). Mean age of the participants was 36.9 (SD 10.2, CI=95%). Most of participants were housewives, farmers, self-employed. Mean BMI among the participants was $23.03 \text{ Kg}/\text{m}^2$ (SD 3.8, CI=95%). In terms of the BMI information, it was found that proportion of underweight, normal weight, overweight and obesity was 11.6%, 40%, 44.2% and 4.2% respectively. Observation revealed that the 83 of participants (69.2%) haven't measured there BMI during last 12 months.

Table 1: BMI information among participants

Category	Number	Percentages	Mean	SD
Under weight	14	11.6	16.8	1.25
Normal Weight	48	40	21.14	1.3
Overweight	53	44.2	25.5	1.16
Obesity	5	4.2	31.4	5.5

amount you eat				
Do you have your meal in front of TV	114	95	6	5
Do you play or walk during leisure time	6	5	114	95
Participation at physical activity session	103	85.8	17	14.2

The participants distribution according to some behaviors related to the nutrition and healthy dining were illustrated in the table 2. It revealed that only 20.8% of participants in the group were taking a good list when they go to the shopping. Percentages of buying more fruits and vegetable at every circumstances where they do shopping was 50.8% and 30.8 % respectively. Majority of participants reported that they buy more artificial and processed food (50.8%). Among 120 participants only 3.3% used measured amount of salt and coconut oil while cooking. Rest of them did not use proper methods to measure salt and oil. 97.5 % of them did not have a meal plan at home. It was found that 15.8% were considering the amount/portion size they eat. Eating in front of the television was very common (95%) among the respondents. In terms of the physical activities only 5% were physically active in leisure time domain. Rest were found to be having a sedentary lifestyle. Interestingly, 103 participants (85.8%) participated in the physical activity session conducted by students.

Table 2: Identified factors associated with nutritional practices in parents.

Factor	Yes	%	No	%
Have you measured BMI during last 12 months	37	30.8	83	69.2
Taking a list of good while shipping	25	20.8	95	79.2
Buying fruits while shopping	37	30.8	83	69.2
Buying processed/artificial foods	61	50.8	59	49.2
Buying more vegetable	61	50.8	59	49.2
Do you use recommended amount of salt and oil while cooking	4	3.3	116	96.7
Do you use a meal plan	3	2.5	117	97.5
Do you concern on	19	15.8	101	84.2

VIII. DISCUSSION

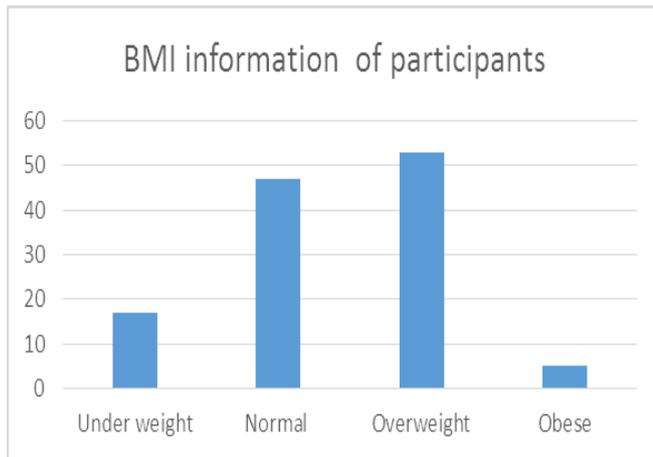
This study was carried-out through the school health club in observe the behaviors related to the healthy dining practices among parents of school children. Health Promoting Schools initiatives (HPS) encourage schools to implement health promotion activities which link up with the schools and communities where school children come from. This intervention would be make a positive impact on linking school and communities as well as promote nutrition behaviors which encourage people to consume more fruits and vegetable as well as cut down excessive carbohydrate, fat and artificial food consumption.

There was an emerging increase of overweight and obesity among rural community people [16]. Some study findings indicate that the prevalence of overweight and obesity in rural community people was nearly 20% and 8. % [17]. WHO report indicated that most of deaths and disabilities are linked with the overweight and obesity in low and middle income countries [18]. One systematic review done in Sri Lanka showed that the increasing the risk of being overweight and obese was determined by the socio-economic factors [19]. Considering the situation in Sri Lanka, one national level study observed that prevalence of overweight and obesity among rural communities were 23.3% and 6.7% respectively [20]. Also it revealed that the prevalence of overweight and obesity was high in female (overweight – 26.2%, obesity – 8.7%) [20]. another study reported that the 22.8% women in Sri Lanka were overweight while 6.6% were obese [21]. Present study found that the proportion of overweight and obesity were 44.2% and 4.2 % respectively (figure 1). It was found that the proportion of the overweight in current group was doubled compared to the other studies mentioned above where as the obesity was mostly similar to the international and local studies. Also it was found that the risk of overweight and obesity among women was greater than men, which was coincided with most of studies mentioned above.

Figure 1: BMI information of parents participated at health promotion camp.

www.ijtra.com Special Issue 36 (September, 2015), PP. 1-7

vegetable and fruits while they shopping. During the observation, students used a subjective method to determine the status of buying vegetable and fruits. Therefore the results might not coincide with the real consumption level of fruits and vegetable in this group. However previous researches documented that the vegetable and fruit consumption is lower than the amount which is recommended by the dietary guidelines [28]. It is evident that a substantial proportion of the Sri Lankan population does not consume a varied and balanced diet, which is suggestive of a close association between the nutrition-related NCD in the country and these unhealthy eating habits [29]. As mentioned earlier, majority of participants were farmers. Therefore they do not buy vegetable and fruit from outside market. That would be another factor to get this results. Results revealed that 61% of participants buy processed foods while shopping. This was included by biscuits, instance noodles, salty products, chips, bite packets, carbonated drinks, etc. Although this was a rural community, there was a considerable trend on consuming artificial foods. Many studies showed that consumption of process foods mirrors the increased the prevalence of overweight and obesity [30]. Saturated fat, sugary products, diets high energy-dense, refined starches and beverages contribute to overweight and obesity in community people [31]. Although current observation was carried out in a rural community, it was found that majority of people prefer on consuming artificial and processed foods which contributes to increase the risk of overweight/obesity and other risk factors for NCDs.



In terms of the common factors associated with the overweight and obesity were found to be as unhealthy dietary habits, sedentary lifestyle [22]. Some studies revealed that being obese in childhood, overweight or obese parents would increase the risk of being overweight and obese in adulthood [23]. One comprehensive systematic review done from 1988-2004 which searched 333 studies in terms of assessing the link between obesity and socio economics status found that there was a strong association between socio economics characteristics and obesity in women [24]. Therefore the risk of being overweight and obese would be a common in this rural community group as well.

In terms of the behaviors which effect on increasing weight in rural communities is yet to be defined well. Our observation basically focused on determining the behaviors related to the nutrition practices and physical activities as the overall objective of the mother project was to change the behavior to improve dietary pattern and physical activity in rural communities. Previous studies suggested that the behavioral strategies of reducing consumption of carbohydrate and fat consumption as well as promoting the consumption of vegetable and fruit could assist people in keeping controlling the overweight and obesity [25]. Previous studies explained that the obesity pattern are linked to obesogenic environments and societal trends which promote patterns of excessive eating and sedentary lifestyle [26]. Sociological perspectives suggest that addressing the social relations can help explain collective food and eating pattern [27]. Observation of the present study was done based on the suggestions which were come up by school health club. They developed a check list including practices they usually observe at home in day to day life. Table 2 shows the behaviors in terms of the buying foods during shopping, healthy cooking and dining and leisure time physical activities.

It was found that majority of participants (95%) did to list out foods which need to be bought while shopping. Therefore participants likely to buy foods which were not supposed to consume. Majority of participants did not buy enough

Most of dietary guidelines promotes to having a “Meal Plans” which allows people to select the necessary food groups which help to obtain a balance diet. Planning meals also help to have a variety of foods groups as well as to prevent waste of foods [32]. Present observation found that 97.5% did not have a meal plan in order to organize their meals a head. Therefore they consume all the meals according to their usual practice, convenient, availability and preference of the person who dominant in the family. Therefore the future intervention should encourage community people to plan their meal a head of time. Most of processed food are extremely high in sodium. In Asian countries source of the sodium is salt added in cooing [33]. Although the recommended amount of salt consumption was 5 grams per day, World Health Organization report on “salt reduction” emphasizes that the most people consume too much salt (average 9-12 g per day). Researches have documented that the use of excessive unsaturated and saturated fat produce some weight gain on the long term [34, 35]. It was found that 96.7% participants had poor practices in terms of use of recommended amount of salt and coconut oil. Therefore measures should be taken to cut down the excessive use of salt and coconut oil in order to prevent the risk of NCDs in this community group.

In terms of the dining practices, 84.2% (n=101) did not concern about the amount they eat despite their weight. Also the majority (95%) had their meal in front of the television. Even though there weren't many research done in order to

determine the relationship between the having in front of television and weight gain, handful studies showed that there was a link between watching television while having meals and risk of overweight in children [36,37]. Attention on meal frequency and watching TV during meals in longitudinal and intervention studies in promoting nutrition, may assist to may better understanding of causality.

Physical activity and physical fitness are closely relate and being physically active contributes to reduce the risk of overweight, obesity and cardio vascular diseases [38]. Being active helps people to reduce the risk of being overweight and obesity [39]. Observation found that 95% of participants had a sedentary lifestyle during the domain of leisure time physical activities. Following the data collection process, most parents (85.8%) joined with the physical activity session, which was conducted by the school health club. There was a high level of enthusiasm in parents during the physical activity session which showed that the lack of time is not the limiting factor but improving knowledge, guidance and mutual support from rural community people would useful to break up the sedentary lifestyle in leisure time domain.

IX. LIMITATIONS OF THE STUDY

Study has identified few limitations which should be improved in future studies. The sample selected for this study is biased towards adopting healthy life styles as the participants have made an active effort to participate in these events organized by the School Health Clubs. The parents who did not come for this study was not evaluated and therefore it was not representative of all parents in the Moneragala district. Sample was collected randomly which effects on the strength of the scientific validity of the study. Future studies should well describe the participants. This observation did not gather more general information as activity happened in very short time period. Therefore we did not have enough time to collect those information. Future studies should focus on gathering more general information in order to determine the co-relations between each factor.

X. CONCLUSION

In conclusion study found that considerable amount of participant were overweight and obese. During the event, it was found that most participants did not have proper dietary practices in terms of healthy cooking techniques, considering the proportion of eating, developing meal plans and having meals in front of television. Also we could identify there were bad shopping practices which should be improved to ensure the consumption of vegetable and fruits. Also sedentary lifestyle was common among the participants and they intended to do some physical activities when they were supported by the healthy promotion club. This role model health promotion camps can be used to identify the community behavioral

practices which are commonly used by people. Also this would be an ideal forum where people could improve the knowledge and attitudes towards healthy eating practices. Encouraging school health clubs to implement these kind of events would useful to getting children involved with following healthy nutritional practices in day to day life.

REFERENCES

1. World Health Organization, “*global status report on non communicable diseases*. Geneva”, WHO, 2010.
2. World Health Organization, “*back ground paper: Non communicable diseases in low and middle income countries*”, WHO, 2010.
3. A. Dans, N. Nawi, C. Varghese, E. Shyong, R. Firestone, and R. Bonita, (2011), “*The rise of chronic non-communicable diseases in southeast Asia: time for action*”, . Lancet, Vol. 19, 377, 2011.
4. World health organization, “*global status on non communicable diseases, chapter 2 : NCDs*”, *Diseases and development* . WHO, 2010.
5. The World Bank, “*Human Development Network, the growing danger of non-communicable diseases, Acting now to reverse course*”, WDB, 2011.
6. D. Bloom, E.T. Cafiero, E.T.J. Llopis, G.S. Abrahams, L.R. Bloom, S. Fathima, A.B. Feigl, T. Gaziano, M. Mowafi, A. Pandya, K. Prettner, L. Rosenberg, B. Seligman, A.Z Stein, and C. Weinstein, “*The Global Economic Burden of Non communicable Diseases*. Geneva”, *World Economic Forum*, 2011.
7. World Health Organization, “*2008-2013 action plan for the global strategy for the prevention of NCDs*”, WHO, 2008
8. World Health Organization, *Non Communicable Diseases in South East Asian Countries (SEAR)*. WHO, 2011.
9. L. Jun, Q. Liu, Y. Ren, T. Gong, S. Wang, L. and Liming, “Socio-demographic association of multiple modifiable lifestyle risk factors and their clustering in a representative urban population of adults: a cross-sectional study in Hangzhou”, China. *International Journal of Behavioral Nutrition and Physical Activity*, Vol. 8(40), 2011.
10. H. Stenlund, R. Bonita, M. Hakimi, S. Wall, and L. Weinehall, “Preventable risk factors for non communicable diseases in rural Indonesia: prevalence

- study using WHO step survey”, *Bulletin of world health organization*, Vol. (84),305-313, 2006.
11. L. Tracy, C. Buckmaster, C. Nosse, L. Dreyer, F. Bull, T. Noakes, and V. Lambert, “Chronic disease risk factors, healthy days and medical claims in South African employees presenting for health risk screening”, *BMC Public Health*, Vol. 8:228, 2008.
 12. J.D. [Graham](#), J. [Pelletier](#), D.N. [Sztainer](#), K. [Lust](#), and N.M. [Laska](#), “Perceived Social Ecological Factors Associated with Fruit and Vegetable Purchasing, Preparation, and Consumption among Young Adults”, HHS author manuscript, Vol. 10(1):113,2013.
 13. A. Barzegari, M. Ebrahimi, M. Azizi, and K. Ranjbar, “A Study of Nutrition Knowledge, Attitudes and Food Habits of College Students”, *World Applied Sciences Journal*, Vol. 15 (7): 1012-1017, 2011.
 14. L.W. Wei, and Y.W. Lee, “Nutrition knowledge, attitudes, and dietary restriction behavior of the Taiwanese elderly”, *Asia Pac J Clinical Nutrition*, Vol. 14 (3):221-229, 2005.
 15. World health organization, “Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies”, *Lancet*: 363: 157–63, 2004.
 16. J.S. Alison, and F.W. Rebecca, “Upstream Ecological Risks for Overweight and Obesity Among African American Youth in a Rural Town in the Deep South, 2007”, *Centers for disease control and prevention*, Vol. 8(1), 2011.
 17. A. Rasaan, O. Balogun, A. Rufus, A. Oluwayemisi, and A. Uqman, “Prevalence and pattern of overweight and obesity in three rural communities in southwest Nigeria”, *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, Vol. 7, 153–158, 2014.
 18. World Health Organization, Report on overweight and obesity. <http://www.who.int/mediacentre/factsheets/fs311/en/>. (8.27.2015 at 8.23 pm).
 19. R. Jayatissa, S.M. Hossain, S. Gunawardana, J.M. Ranbanda, M. Gunathilaka, and P.C. Silva, “Prevalence and associations of overweight among adult women in Sri Lanka: a national survey. Sri Lanka Journal of Diabetes”, *Endocrinology and Metabolism*, Vol. 2: 61-68, 2012.
 20. R. Jayawardena, M. Nuala, B. Mario, P. Katulanda, and P.H. Andrew, “Prevalence, Trends and Associated Socio-Economic Factors of Obesity in South Asia”, *Obese Facts*, 6:405–414, 2013.
 21. P. Katulanda, R. Jayawardena, M.H.R. Sherrif, G. Constantine, and D.R. Matthews “Prevalence of overweight and obesity in Sri Lankan adults”, *Obesity reviews*, Vol. 11(1), 1467-789, 2010.
 22. L. Cai, J. He, Y. Song, K. Zhao, and W. Cui, “Association of obesity with socio-economic factors and obesity-related chronic diseases in rural southwest China”, *Journal of public health*, Vol. 127(3), 247-51, 2013.
 23. N. A. Odunaiya, K. Grimmer, and Q. A. Louw, “High prevalence and clustering of modifiable CVD risk factors among rural adolescents in southwest Nigeria: implication for grass root prevention”, *BMC journal in Public Health*, Vol. 15:661, 2013.
 24. [L. McLaren](#), “Socioeconomic Status and Obesity”, *American Journal of epidemiology*, Vol. 29(1), pp.29-48, 2012.
 25. Sri Lanka Socio-economics data 2014. Central bank of Sri Lanka. Vol. XXXVII. http://www.cbsl.gov.lk/pics_n_docs/10_pub/_docs/statistics/other/Socio_Econ_Data_2014_e.pdf (8/28/2015 at 9.51 pm).
 26. U. Kruger, H.M. Blanck, and C. Gillespie, “Dietary Practices, Dining Out Behavior, and Physical Activity Correlates of Weight Loss Maintenance”, *Public health research practice and policy*, Vol. 5(1), 2008.
 27. T. Delormier, L. Katherine, Frohlich, and P. Louise, “Food and eating as social practice – understanding eating patterns as social phenomena and implications for public health”, *Sociology of Health & Illness* Vol. 31(2), 2009.
 28. J. [Kimmons](#), C. [Gillespie](#), J. [Seymour](#), M. [Serdula](#), and [H.M. Blanck](#), “Fruit and Vegetable Intake Among Adolescents and Adults in the United States: Percentage Meeting Individualized Recommendations”, *The Medscape journal of Medicine*, Vol. 11(1), 2009.
 29. R. Jayawardena, N. Byrne, J.M Soares, P. Katulanda, and A. Hills, “Food consumption of Sri Lankan adults: an appraisal of serving characteristics”, *Public Health Nutrition*, Vol. 16(4), 653–658, 2012.
 30. F. Juul, E. and Hemmingsson, “Trends in consumption of ultra-processed foods and obesity in Sweden between 1960 and 2010”, *Public health of nutrition*, Vol. 25(1), 2015.
 31. “The link between food, nutrition, diet and non-communicable diseases.world cancer research fund international”, http://www.wcrf.org/sites/default/files/PPA_NCD_Alliance_Nutrition.pdf. (9/01/2015. 10.50 pm).
 32. [Chasey](#) K. “Modern day meal planning: Eating to promote fat-burning”, <http://breakingmuscle.com/nutrition/modern-day-meal-planning-eating-to-promote-fat-burning>. (9/2/2015:7.55 a.m).
 33. P. Elliott, and I. Brown, “Sodium Intake Around the World. World Health Organization”,

- <http://www.who.int/dietphysicalactivity/Elliot-brown-2007.pdf>. (9/2/2015: 3.58).
34. “World Health Organization. Salt reduction.2014”, <http://www.who.int/mediacentre/factsheets/fs393/en/>. (9/2/2015:8.23 a.m).
 35. P. L. Zock, “Do favourable effects of increasing unsaturated fat intake on cardiovascular disease risk outweigh the potential adverse effect on body weight”. *International journal of obesity*, Vol. 30(5), s10-s15, 2006.
 36. N. Derrien, H. Bosch, E. Oosterink, S. Keshtkar, C. Duval, J. Vogel, M. Kleerebezem, M. Müller, and R. Meer, “Saturated fat stimulates obesity and hepatic steatosis and affects gut microbiota composition by an enhanced overflow of dietary fat to the distal intestine”, *American Journal of Physiology.*, Vol. 303(5), 2012.
 37. F. Vik , H. Bjornara, C. Nina, N. Lien, O. Androutsos, L. Maes , N. Jan, F. Kovacs, L. Moreno, A. Dössegger, Y. Manios, J. Brug, and E. Bere,
 38. A. Katharine, J. Goldberg, L. Beatrice, and L. Katherine, “Relationships Between Use of Television During Meals and Children’s Food Consumption Patterns”, Vol. 107(1), 2001.
 39. S.N. Blair, Y. Cheng, and S.J. Holder, “Is physical activity or physical fitness more important in defining health benefits?”, *Medicine and Science in Sports and Exercise*, Vol. 11(15), 2000.
 40. N. [Owen](#), P. [Sparling](#), G.N. [Healy](#), D.W. [Dunstan](#), and C.E. [Matthews](#), “Sedentary Behavior: Emerging Evidence for a New Health Risk”, *Mayo clinic proceeding*, Vol. 85(12), pp 1138–1141. 201. .