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Assessment of behavioral patterns of food intakes on micro-sleepiness, with busy lifestyles

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Abstract

The effect of food habits and attitudes on micro-sleepiness was attempted to study simultaneously with development of a food product to combat. Data were collected from Sri Lanka Police Traffic Division and from 250 respondents using a pre-tested questionnaire representing drivers (especially highway drivers), private and public sector workers (shift based) and cramming students (university and school). Questionnaires were directed to respondents to fill independently and analyzed statistically. Results exposed that 76.84, 96.39 and 80.93% out of total consumed rice for all three meals, which leads to obtain a higher glycemic meal. Having two hyper glycemic meals before 14.00h was identified as a cause for micro-sleepiness. Peak level of road accidents were witnessed at 14.00 - 20.00h (38.2%) and intensity of micro-sleepiness was also falling at the same period (37.36%). While from 14.00 to 16.00h was the peak time, 16.00 to 18.00h was the least; again it reappearing to some extent from 18.00 to 20.00h. Even though respondents expressed that peak hours of micro- sleepiness is 14.00-16.00h, according to police reports, peak hours fall in between 18.00-20.00h. Out of the interviewers, 69.27% strongly required to evade micro-sleepiness and keen to spend LKR 10-20 on a commercial product. Since age-old practices connected to suppress micro-sleepiness were time consuming, recent respondents (51.64%) like to have a quick answer via a product like rapid drink. Finally it was concluded that morning and noon food habits may reason for micro- sleepiness and dinner may affect for both, natural as well as micro sleepiness due to heavy glycemic load of food. According to the study, micro-sleepiness can be categorized in to three zones such as low-risk zone (08.00-10.00h and 18.00-20.00h), manageable zone (10.00-12.00h), and high- risk zone (14.00-16.00h).

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Keywords: Micro-sleepiness, Food habits, Road accidents, Glycemic Load.

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1. Introduction

Micro sleepiness is a temporary biological disorder, which has been a major cause of road accidents leading to physical injuries, deaths, disabilities and significant economic losses. Traffic accidents due to human errors cause many deaths and injuries all around the world. Especially the sleepiness simply feels after taking meals because body should gain more energy for food digestion. Therefore, food habits of morning and noon may cause for micro-sleepiness while dinner may cause for both, natural as well as micro sleepiness due to heavy glicemic load of food. Micro-sleepiness may last about 1-30 seconds. The dietary habits of a person may strongly affect for this biological phenomenon which causes for half or full eye shutting unintentionally and waking up with unconscious mood. And also the micro-sleepiness is one of dangerous factors for drivers as which cause one in four fatal road accidents on highways.

Moreover, considerable fraction of Sri Lankan population does not consume a balanced diet[1]. Total mean carbohydrate, protein and fat intakes of an adult are approximately 304.4g, 44.6g and 35 g and total energy generation from which 71.2, 10.8 and 18.9% respectively[2]. Sri Lankans ingest numbers of starch sources and consume them for lunch or dinner by limiting themselves to three meals per day[1]. Almost 65% consumed well beyond the upper level of the references and this is principally due to the average person's meal containing three-quarters of rice with lesser amount of vegetable curry (15g), piece of meat or fish (15g) and some starchy curry as potato or dhal[1]. Incorporation of these types of higher glycemic loads with stresses and tiredness may eventually the brain leads towards the micro sleepiness. The overall objective of this study was to evaluate the effect of food habits and attitudes of public on micro-sleepiness and to make a preventive measure via developing an effective food product.

2. Methodology

2.1. Preliminary Survey

Preliminary survey was carried out to gather information on food habits and attitudes of micro- sleepiness with a pre-designed questionaries' from 250 respondents. Respondents were selected representing drivers (especially highway drivers), private and public sector workers (shift based) and cramming students (university and school). Questionnaires were directed to fill independently and personally. Finally collected data were analyzed statistically.

2.2. Data collection pertaining to Road accidents

Statistics on road accidents in Sri Lanka were collected from statistical unit of Sri Lanka Police Traffic Division[3] for the last ten years. And collected information was analyzed statistically.

2.3. Data analysis

Collected data ware analyzed through MS Excel and Excel-stat statistical programs with a view to identify peak hours of accident occurring under Sri Lankan context.

3. Results and Discussion

The occurrence of micro-sleepiness of respondents were shown in Fig 1 (a) and the number of road accidents due to sleepiness in Sri Lanka is shown in fig 1 (b). As per the graph 1 (b), large number of road accidents were occurred in between 14.00h to 20.00h (38.2%), also the highest number of road accidents happen in between 16.00h to 18.00h (13.43%) for last nine years (Sri Lanka Police Statistical Unit, 2015). Figure 1 (a) clearly indicates that peak intensity of micro sleepiness is occurring in between 14.00-16.00h (37.36%). And also found, it was gradually increasing from 10.00-16.00h and in declining trend from 16.00 to 18.00h. However, it is again reappearing in a slight incremental pattern from 18.00h to 20.00h. According to literature, micro-sleep is lasted for a short time and it is facilitated by high glycemic load particularly from both breakfast and lunch. This finding was further validated by the statistics of

Sri Lanka Police Traffic Records[3], which also cited danger hours for accidents are in between 14.00h to 20.00h. Therefore, there is a strong positive co relationship between micro sleepiness and road accidents. Moreover critical hours for road accidents due to micro-sleepiness is in between 16.00h to 18.00h, reasons for this phenomenon may be mental stress after office work, traffic jams, un conducive environmental factors, loss of proper sleep and personal issues. Hence, body of the chauffeur itself may inadvertently tend to relax in the vehicle itself due to cumulative influence of all of these factors.

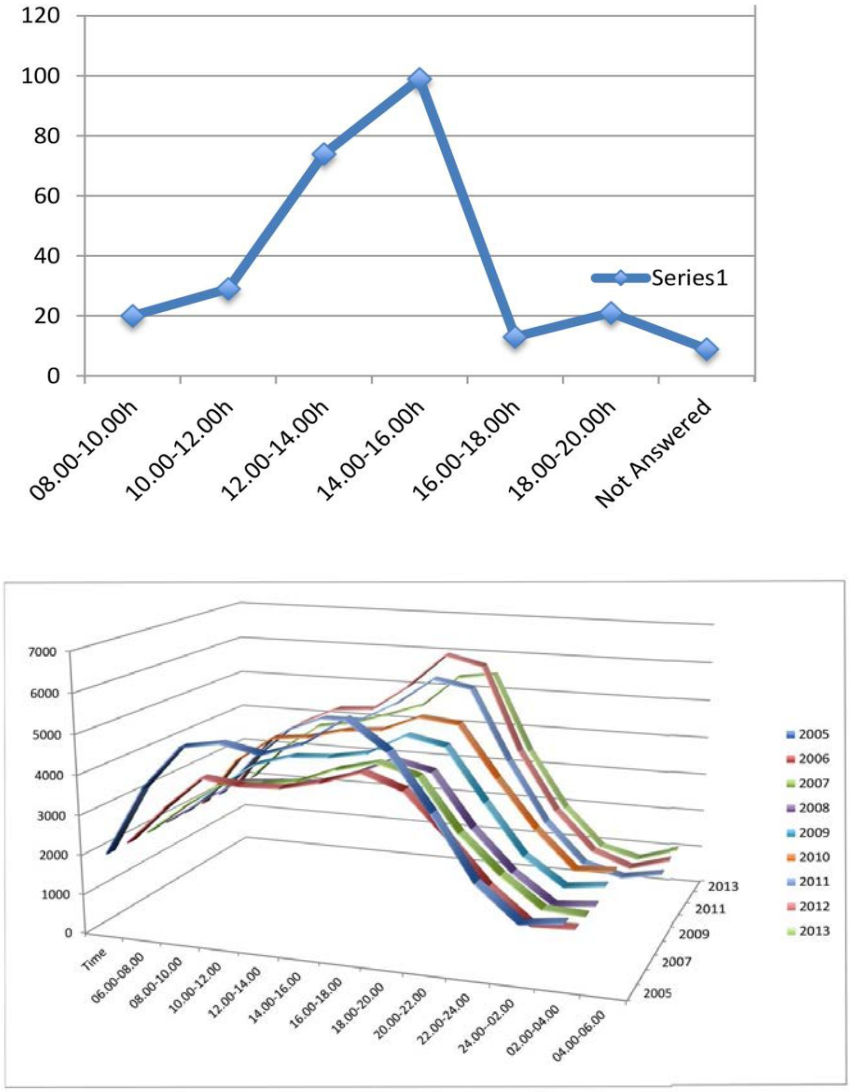

Fig 1 (a). Occurrence of Micro sleepiness of respondents (b) Number of road accidents due to sleepiness in Sri Lanka

Nevertheless, the graph reveals that micro sleepiness does not become zero and it may prevail throughout the day. However human body is capable to suppress it (micro sleep) during other hours other than micro sleepiness hours as a result of different types of physical and mental activities. Survey results further revealed that 76.84, 96.39 and 80.93% of respondents consumed rice for breakfast, lunch and dinner respectively (Fig.2). Since Glycemic Load (GL) of the lunch is very high, the body requires more energy to digest it. Under this circumstance, the person unintentionally tends to relaxations. Part of this relaxation is drowsiness. Of this, brain of the person inadvertently transformed into another mode which called beginning of the micro-sleepiness. Hence avoiding of heavy meals with high glycemic load is advisable.

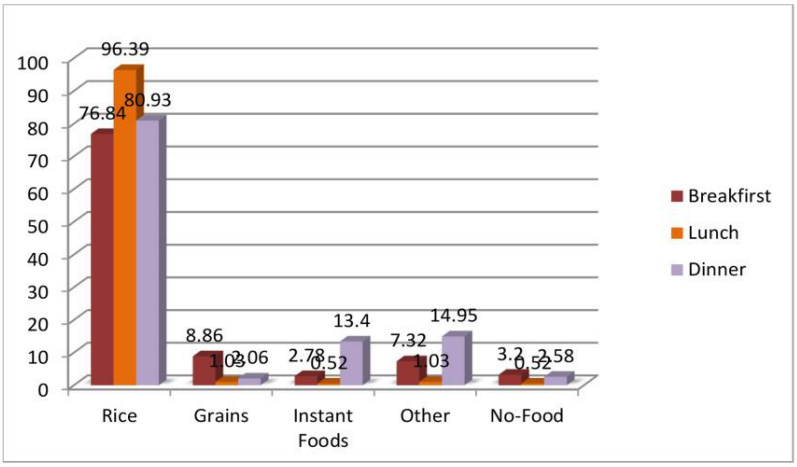

Fig 2: Food habits of respondents

Nevertheless, grain consumption for all 3 meals breakfast, lunch & dinner was 8.86, 1.03 and 2.06% respectively. Trend of consuming instant and other foods (such as kottu, parata etc) at dinner was 13.4 and 14.95% respectively in addition to rice. There were also some respondents who don't have major meals for an entire day because of their duty shifts and many other reasons.

When considering about the opinions of respondents regarding control of micro sleepiness, taking naps (28.95%), wash their face or/and bathing (28.07%), chewable food products such as bubblegum and chew-betel(15.35%), smoke and/or take alcohol (2.19%), chewing sweet foods and toffees (9.65%) and application of ointments (0.88%). Using water, tea, coffee, soft drinks, energy drinks and sour drinks were considered by 30.86, 27.97, 19.25, 2.21, 6.36, & 1.27% respectively as productive solutions because respondents believed these drinks are capable to suppress micro-sleepiness into a greater extent. Moreover, medical research has revealed that caffeine in coffee and tea can suppress micro sleepiness and also sour taste substances in foods can refresh the nerve system of the human being.

Considering about attitudes, regarding necessity and product portfolio to combat micro-sleepiness, 69.27% of the respondents are willing to suppress micro-sleepiness in order to avoid negative consequences as accidents, lethargic behavior, drowsiness, apathy etc. However 21.43% of respondents expressed lack of interest to control micro-sleepiness. The types of the products which had respondent choice were beverage (51.64%), confectionary product like toffee (19.72%), chewable food products (13.62%), pills (2.82%) and ointments (2.82%). When considering about the expected price for the product respondents proposed LKR 10-24 (58.56%), 25-39 (16.94%), 40-54 (14.9%), 55-

69 (6.18%), 70-84 (2.04%) and more than LKR 85 (1.38%).

4. Conclusions

Food habits of public are largely responsible for micro-sleepiness, especially after taking heavy meals. Micro-sleepiness can happen throughout the day and it may climax in between 14.00- 16.00h. However, most of respondents are willing to have a product with an affordable price along with plant based ingredients in different formulations such as in drinking, chewable, licking and ointments modes.

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