

# Effects of Food Habits on Road Accidents Due to Micro-Sleepiness and Analysis of Attitudes to Develop a Food Product as a Preventive Measure

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**Abstract**— Study it was attempted to identify effect of food habits and public's attitudes on micro-sleepiness and preventive measures to develop a food product to combat. Statistical data pertaining to road accidents were collected from, Sri Lanka Police Traffic Division and a pre tested questionnaire was used to collect data from 250 respondents. They 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 and collected data were analyzed statistically. Results revealed that 76.84, 96.39 and 80.93% out of total respondents consumed rice for all three meals which leads to ingest higher glyceimic meals. Taking two hyper glyceimic meals before 14.00h was identified as a cause of micro-sleepiness within these respondents. Peak level of road accidents were observed at 14.00 - 20.00h (38.2%) and intensity of micro-sleepiness falls at the same time period (37.36%) while 14.00 to 16.00h was the peak time, 16.00 to 18.00h was the least; again 18.00 to 20.00h it reappears slightly. Even though respondents of the survey 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 interviewees, 69.27% strongly wanted to avoid micro-sleepiness and intend to spend LKR 10-20 on a commercial product to combat micro-sleepiness. As age-old practices to suppress micro-sleepiness are time taken, modern day respondents (51.64%) like to have a quick solution through a drink. Therefore, food habits of morning and noon may cause for micro-sleepiness while dinner may cause for both, natural and micro-sleepiness due to heavy glyceimic 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).

**Keywords**— Micro-sleepiness, Food habits, Road accidents, Glyceimic Load

## I. INTRODUCTION

**M**ICRO sleepiness is a temporary biological disorder, which has been a major cause of road accidents leading to physical injuries, deaths, disabilities, numbness and 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 and ultimately it may convert into micro-sleepiness, which last about 1-30 seconds. The dietary habits of a person may strongly accompanied with this biological phenomenon cause for half or full eye shutting unintentionally and wake up with unconscious mood. Also the micro-sleepiness is the main factor for sleepiness in drivers and cause one in four fatal accidents on highways.

A considerable fraction of the population does not consume a balanced diet (Jayewardena et al, 2012). Total mean carbohydrate, protein and fat intakes of Sri Lankan adults are approximately 304.4, 44.6 and 35 g and 71.2, 10.8 and 18.9% from total energy generated respectively (Jayewardena et al, 2014). Sri Lankans ingest numbers of starch sources and consume them for lunch or dinner by limiting themselves to three meals per day (Jayewardena et al, 2012). 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 (Jayewardena et al, 2012). Incorporation of these types of higher glyceimic loads with stresses and tiredness may eventually leads the brain 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

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preventive measures with a view to develop a food product.

II. METHODOLOGY

A. Preliminary Survey

Preliminary survey was carried out to gather information on food habits and attitudes of micro-sleepiness with a pre-designed questionnaires' 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 and collected data were analyzed statistically.

B. Data Collection Pertaining To the Road Accidents.

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

C. Data analysis.

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

III. 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). Both graphs show a similar dispersion pattern. As per the graph 1 (b), large number of road accidents were occurring in between 14.00h to 20.00h (38.2%), also the highest of 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 the peak intensity of micro sleepiness is occurring at 14.00-16.00h (37.36%) as a gradual increase from 10.00-16.00h and thereafter a decrease from 16.00 to 18.00h again with a slight increase from 18.00h to 20.00h. According to literature, micro-sleep is lasted for a short time due to higher glyceimic load from both breakfast and lunch. This finding was further validated by the statistics of Sri Lanka Police Traffic Records; 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 these consequences are mental stress after office work, traffic jams, weather, personal matters, body itself may inadvertently tend to relax in the vehicle itself and may also cumulative influence of all of these factors

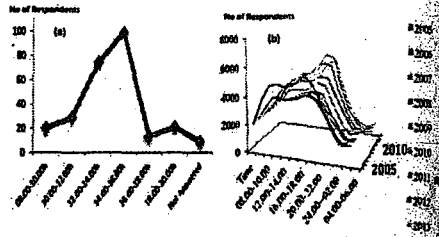


Fig 1 (a). Occurrence of Micro sleepiness of respondents (b) Number of road accidents due to sleepiness in Sri Lanka

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 sleep hours as a result of different types of physical and mental activities. Figure 2 represents the food habits of respondents. Survey results revealed that 76.84, 96.39 and 80.93% out of total respondents consumed rice for breakfast, lunch and dinner. Since Glycemic Load (GL) of the lunch is very high, the body requires more energy to digest it. Under this condition, the person unintentionally tend to relaxations. During relaxation process of human, the metabolic activities of body are lowered and as a result of that micro-sleepiness is beginning. Therefore avoiding heavy meals with high glyceimic load is advisable. Grain consumption for all 3 meals was 8.86, 1.03 and 2.06%. Trend of consuming of instant and other foods as kottu, parata etc. at dinner was observed (13.4 and 14.95%) secondly to rice. There were respondents who having no food for a single meal because of their duty shifts and many other reasons. Having two heavy glyceimic meals (breakfast and lunch) before 14.00h may be a reason for micro sleepiness and occurring of accidents at that time. Since micro sleep has other numerous reasons as extreme tiredness, mental stress, traffic jams, weather conditions, personal matters and loss of proper sleep other than the higher glyceimic load, this multi factorial scenario must be appropriately explored with further research.

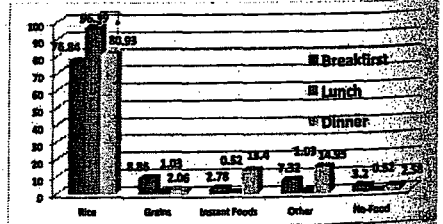


Fig 2: Food habits of respondents

When considering about the opinions of respondent regarding control of micro sleepiness, taking naps (28.95%) wash their face or/and bathing (28.07%), bite 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%) were seen respectively. Using of water (36.86%), tea (27.97%), coffee (19.25%), soft drinks (2.21%), energy drinks (6.36%) and sour drinks (1.27%) as productive solutions seen because of the belief of these drinks are capable to suppress, micro-sleepiness into a greater extent. Moreover, medical research has revealed that caffeine in coffee and tea is the active agent which can suppress micro sleepiness and sour taste substances can refresh the nerve system of the respondent.

Considering about attitudes regarding necessity and product portfolio to combat micro-sleepiness 69.27% of the respondents is willing to suppress micro-sleepiness in order to avoid negative consequences as accidents, lethargic attitudes, 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%) respectively.

#### IV. CONCLUSIONS

Food habits of public is largely responsible for micro-sleepiness, especially after taking heavy meals. Micro-sleepiness can be happen all over the day and it may especially highest in 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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