Social impact, Attitudes and Behavioural pattern of busy life styles Due to Micro-sleepiness.

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Abstract

Survey was carried out to identify human attitudes on micro-sleepiness and preventive measures with a view to develop a food product to combat micro-sleepiness. Statistical data pertaining to road accidents were collected from, Sri Lanka Police Traffic Division and were statistically analyzed to identify the social impact. Results revealed that peak level of road accidents is observed at 14.00 -20.00h (38.2%)[1] and intencity of micro-sleepiness falls at the same time period (37.36%) while14.00 to 16.00h is the peak time,16.00 to 18.00h is the least; again 18.00 to 20.00h it reappears slightly. Peak hours of micro-sleepiness occurs at 14.00- 20.00h and it was also validated by the statistics from Sri Lanka police during last ten years. 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. Reason for this disparity is due to stressful condition of the drivers, traffic jams, mental stress, rushing to attend urgent matters and bad light. Out of the interviewees, 69.27% strongly wanted to avoide micro-sleepiness and intend to spend LKR 10-20 on a commercial product to combat micro-sleepiness. As age old practices to supress micro-sleepiness are time taken, modern day respondents (51.64%) like to have a quick solution through a drink. Moreover, 46.94% respondents proposed a product developed from plant based materials and 94.5% expressed formulation of a product is of nationally importance. Survey further disclosed that about, 76.84%, 96.39% and 80.93% taking heavy diets for their breakfirst, lunch and dinner respectively. 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 glicemic load of food[2].
According to the study micro-sleepiness can be catogorized in to three zones such as low-risk zone(08.00-10.00h and 18.00-20.00h), managable zone(10.00-12.00h), and high-risk zone(14.00-16.00h).

Keywords: Micro-sleepiness, Fatigue, Drowsiness, exhausted behavior, Road Accidents

1. Introduction

Sleeping is a necessary habit for human beings. Normal person should sleep at least 8hours continuously. And also scientifically sleepiness can be felt all over the day. Specially sleepiness easily feels after taking meals because body should incur more energy for food digestion and body tend to get fatigue and eventually it may transform into micro-sleepiness, which may last about for about 1-30seconds. This biological phenomenon may causes for half or full eye closure inadvertently and wake up with unconscious mood. Hence this temporary biological disorder is called as micro-sleepiness and it may cause for serious accidents and damages within a very short time span. Micro-sleepiness has been a major cause of rod accidents leading to severe physical injuries, deaths, Physical disabilities, numbness and significant economic losses in recent years. In addition, drowsiness and micro-sleepiness directly cause for physically incompetence due to fatigued and exhausted nature for the working community as well as school children. Whereas it may also impart for low-productivity and poor time management. Thus the end result will be a downgraded work with low quality. Traffic accidents

due to human errors cause many deaths and injuries all around the world. Also micro-sleepiness is the main factor for sleepiness in drivers and cause one in four fatal accidents on highways.
As a percentage, 54% are suffering from sleep- disordered breathing [3] and drowsy drivers with respiratory diseases during sleep are six times more likely to have an accident. Sleep respiratory diseases
are an independent factor that explains most accidents usually of sleepy drivers. The hours of the day with increased risk of micro-sleepiness between 13:00- 16:00 hours. [4]

2. Materials and methods

2.1. Preliminary Survey.

Preliminary survay was carried out to gather information on social impact, behavioral pattern and attitudes of micro-sleepiness with a pre-designed questionary from 250 respondants. Respondants were selected representing drivers(specially highway drivers), private and public sector workers (shift based workers too) and craming students (university and school students). Questionnaires were directed to filled indipendantly and personally and collected data were analyzed statistically.

1.2. Data collection pertaining to Road accidents.

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

1.3. Data analysis.

Collected data ware analysed through MS Excel and Excel-stat statistical programmes with a view to idintify peak hours of accident occuring under Sri Lankan context.

3. Results and discussion

3.1. Road accident due to micro-sleepiness

Road accident due to micro-sleep pertaining to police records are given in figure 01

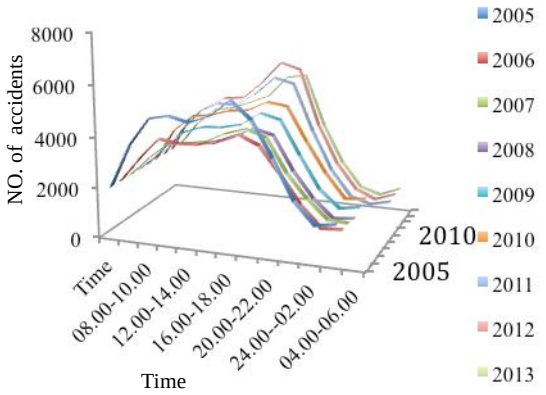


Fig 01. Number of road accidents due to sleepiness in Sri Lanka

According to the figure 01, number of road accidents due to sleepiness has been increased at an alarming rate in last 10 years and also number of fatal and danger accidents have been increased remarkably from the year 2010. Material losses due to total accidents have also been increased from the year 2010 however number of non-serious accidents have been declined during 2011 comparatively 2010.

3.2. Time of road accidents occurring

Police statistics on road accidents and the time of accidents happening for the last nine years are shown in figure2.

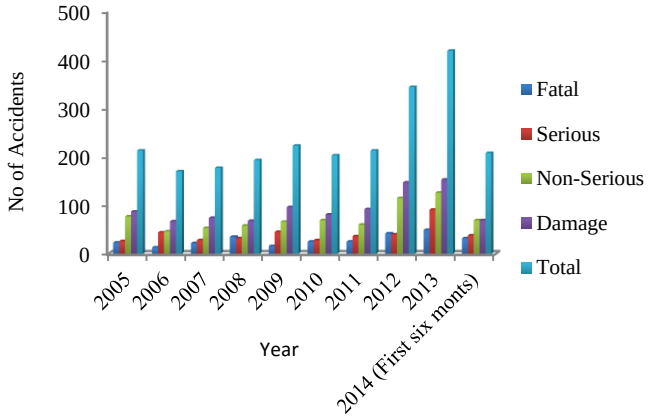


Fig 02. Number of road accidents with the time in last 10 years.

In figure 02, large number of road accidents is occurring in between 14.00h to 20.00h, as an average it is about 38.2%, of which peak number of accidents is happening in between 16.00h to 18.00h (13.43%) for last nine years (Sri Lanka Police Statistical Unit, 2015). According to previous studies, Micro-sleeps is lasted for a short time due to extreme tiredness and other physico-psyco conditions. Those affected are mostly male and middle-aged, overweight, increased frequency of snoring, morning tiredness and hypertension people. These sleepy drivers' are11 times more likely to have an accident than the ordinary drivers [5].

3.3. Occurrence of Micro-sleepiness

Micro-sleepiness can be happened round the clock and intensity of it occurring is showing in figure 03.

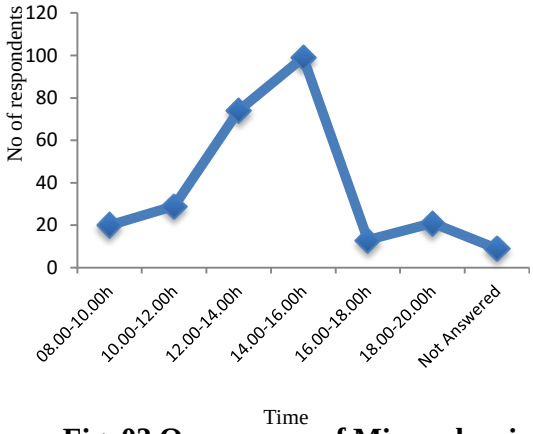


Fig. 03 Occurrence of Micro-sleepiness

The pattern of micro-sleep shown in Fig.03 clearly indicate that peak intensity of which is occuring at 14.00-16.00h, as a percentage it is about 37.36%. And state of it occuring, is gradually increasing from 10.00-16.00h and thereafter it declines from 16.00 to 18.00h, and again it slightly increases from18.00h to 20.00h. This finding was further validated by the statistics of Sri Lanka Police Traffic Records, that 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.

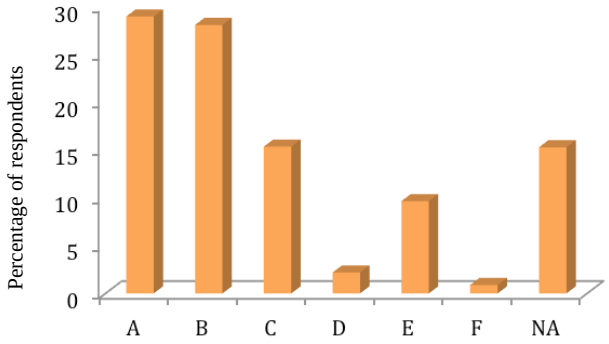
Moreover critical hours for road accidents due to micro-sleepiness is in between 16.00h to 18.00h, reasons for this consequences are mental stress after office work, heavy road traffic jams, weather conditions, personal matters, body itself may inadvertently tend to relax in the vehicle itself and may also cumilative influence of all of these factors. Nevertheless the graph reveals that microsleep does not become zero and it may prevail

throughout the day however human body is capable to suppress it (microsleep) during other hours other than microsleep hours as a result of different types of physical and mental activities .

3.4. Behavioral pattern and attitudes for micro-sleepiness

The data pertaining to behavioral pattern and attitudes on micro-sleepiness were collected from the survey and response of the respondents are showing in Fig. 04 to 10.

3.4.1. Traditional practices used to control micro-sleepiness

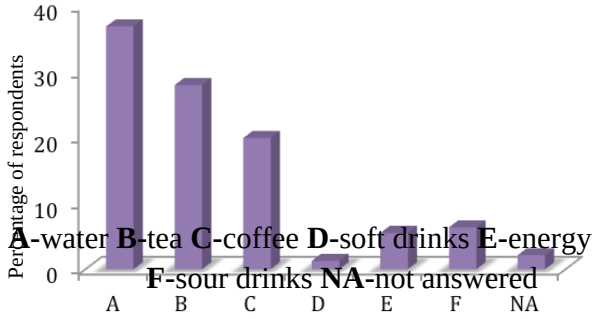


A-nap **B**-wash face/bath **C**-Bubblegum-chew-betle
D-Alcohol/Cigarettes **E**-Toffee/Sweet foods **F**-Ointments
NA-not answered

Fig.04. Methods using to control Micro-sleepiness

According to figure 4, 28.95% (A), 28.07% (B), 15.35% (C), 2.19% (D), 9.65% (E), 0.88% (F) of respondents subjected to survey expressed that they take nap, wash their face or/and bathing, bite chewable food products such as bubblegum and chew-betel, **smoke and take alcohol, chew** sweet foods and toffees, and **apply** ointments respectively because; these people have realized danger of micro-sleepiness and tend to use above short-term solutions to avoid it. However effectiveness of these remedial actions are skeptical because those measures have not been scientifically proven and also practically those practices are incompatible with the busy life style of the modern society.

3.4.2. Water, tea, coffee and other beverages as a solution



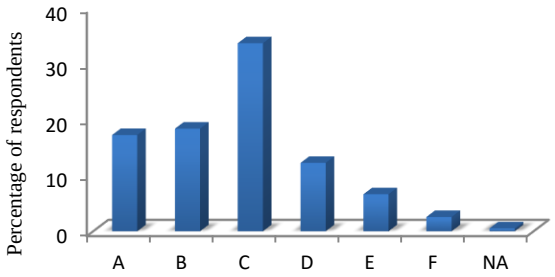
A-water **B**-tea **C**-coffee **D**-soft drinks **E**-energy drinks
F-sour drinks **NA**-not answered

Fig.05. Water and other beverages as a solution to Micro-sleepiness.

In Fig. 05, considerable number of respondents 36.86% (A) used water as a productive solution. And also 27.97% (B), 19.25% (C), 6.36% (E), 2.21% (F), and 1.27% (D) of respodendsare are used tea, coffe, energy drinks, sour-drinks and soft drinks respectively.Because these respondents are believe these drinks are capable

to supress ,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.

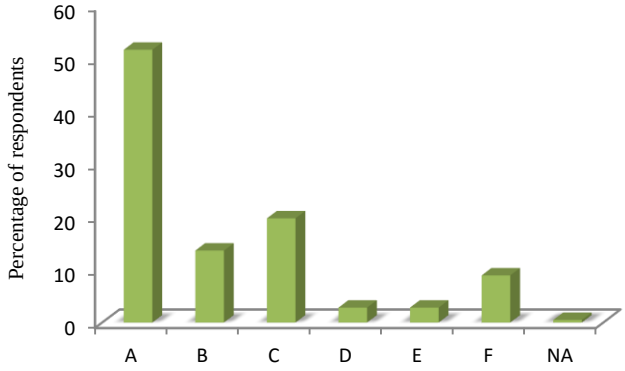
3.4.3. Necessity and product portfolio to combat micro-sleepiness



A-strongly required **B**-required **C**-Slightly required
D-scant **E**-Not required **F**- strongly rejected

Fig. 06 Necessity to combat Micro-sleepiness

According to Fig.06, 69.27% (A,B & C) of the respondants is willing to supress micro-sleepiness in order to avoid negative consequences such as accidents, lethargic attitudes, drowsiness, aparthy etc. However 21.43% (D,E,& F) respondents expressed lack of interest to controll micro-sleepiness.

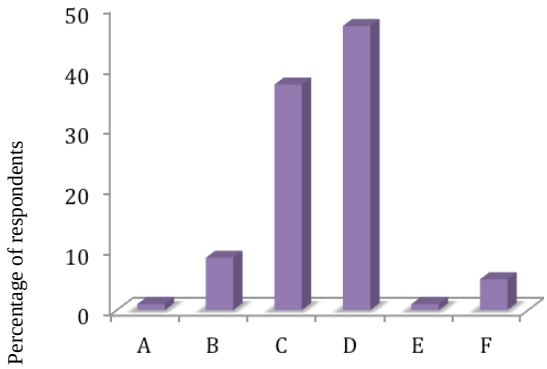


A-beverage **B**-chew product **C**- confectionary
D-pills **E**-ointments **F**-no-idea
NA-not answered

Fig. 07. Required Product type.

The bar chart given in Fig.07 indicates that 51.64% (A), 19.72% (C), 13.62%(B), 2.82% (D), 2.82%(E) of respondants like to have a beverage, confectionary product like toffee, chewable food products,pills and oinments respectively.

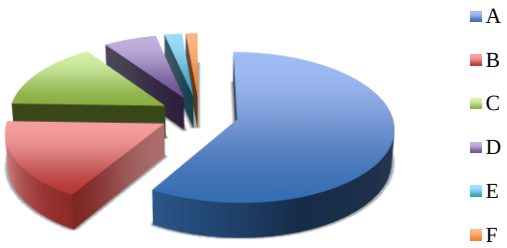
3.4.4. Product ingredient and affordable price are shown in fig.08 and 09



A-artificial product **B-**artificial colours and flavours free product
C-product with almost plant materials
D-low cost but natural product **E-**low-cost product
F-no idea

Fig. 08 Product ingredient requirement.

Accroding to the Fig.08, 46.94% (D) of the respondents willing to have a product with more plant based materials and 37.25% (C) expressed like to have a product with almost plant based constituents. Whereas, 8.67% (B), 1.02% (E), 1.02%(A), respondents like to have a product without artificial colours and flavours, an artificial product, and any type of product respectively. However 5.1% (F) of respondents nither given nor favorable answer for this question.



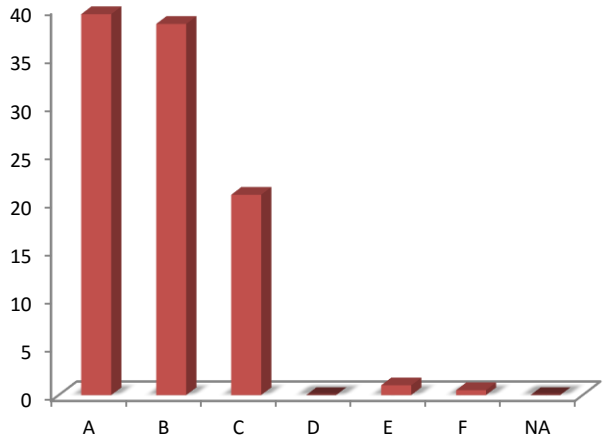
All prices are given in LKR

A-10-24	**B-**25-39
C-40-54	**D-**55-69
E-70-84	**F-**more than 85

Fig. 09 Expected price for the product.

Expected price range for the product is shown in Fig.09 and 58.56%(A), 16.94% (B), 14.9%(C), 6.18%(D), 2.04%(E), 1.38%(F) of the respondents praposed LKR 10-24,25-39 ,40-54 , 55-69 ,70-84 and more than LKR 85 respectively. (1LKR = $134.28). However most of respondents like to have a product with high impact value with a low price.

3.5. Social impact towards the product.



A-Beneficial **B**-Worth **C**-Average **D**-not satisfactory
E-no benefit **F**-Harmful **NA**-Not answered

Fig. 10 Social impact towards the product to combat micro-sleepiness

According to the Fig.10, while 98.5% of the respondens (from A to D) expressed favourably, 1.52% (from Eto F) says this research in a not worth for the society.

3.6. Food habbits of respondents

Foods and food habbits directly cause for micro-sleepiness as shown in Fig. 11.

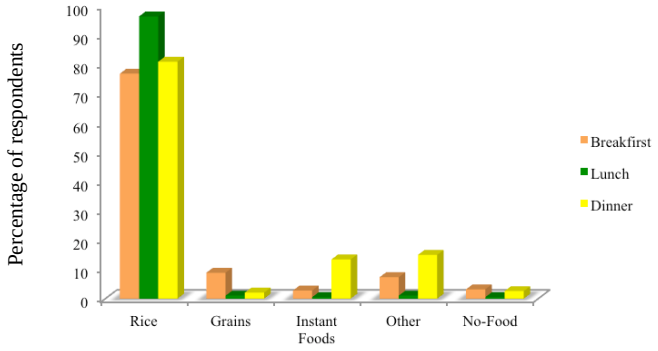


Fig. 11 Food habits of respondents.

The data given in Fig. 11 clearly indicate that rice is the most staple food for the three meals. While76.84% and 80.93% of the respondents consume rice for breakfirst, and dinner, 96.39% take rice as a heavy lunch. Since Glycemic Load(GL) of the lunch is very high, the body requirs more energy to digest it. Under this circumstance, the person inadvertantly tend to relaxations. During relaxation metabolic activities of the body is lowering and as a result of that micro-sleepiness is begining.Therefore avoiding heavy meals with high glycemic load is advisable[6].

4. Conclusions

Micro-sleepiness can be happens around the clock of a day and it may specially crowning in 14.00-16.00h. And also it is sudsiding in between 16.00- 18.00h and again slightly it reappearing in between18.00-20.00h.

Micro-sleepiness has three states such as low-risk (in between 08.00-10.00h and 18.00-20.00h), managable(in between 10.00-12.00h), and high-risk(in between 14.00-16.00h). Micro-sleepiness also directly affects for road accidents and specially **it should be controlled at high risk time at least upto a managable level.**

Food habits of humans may also affects on occuring of micro-sleepiness, specially aftertaking heavy meals during lunch time.

Nevertheless, most of respondents are willing to have a product with an affordable price along with plant based ingredients in different formuations such as in drinking, chewable, licking and oinments modes.

References

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