# PUBLIC HEALTH RESEARCH

## Sleep Duration Pattern among Workers in a Tertiary Institution

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## ABSTRACT

| | |
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| **Received** | 14 August 2014 |
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| **Introduction** | Sleep has played a very important role in maintaining our health with good living quality therefore the aim of this study is to determine the pattern of sleep duration, especially short sleep and its associated factors among workers in a tertiary institution. |
| **Methods** | A cross-sectional study was conducted from January until May 2012 among 128 randomly selected Universiti Kebangsaan Malaysia Medical Centre (UKMMC) staffs. Data was collected using a guided standardized data sheet which consist of three sections; (1):sociodemographic &socioeconomic, (2): lifestyle and, (3): anthropometric measurement and sleep diary. Data entry and analysis were done using Statistical Package for Social Sciences (SPSS) version 20.0. |
| **Results** | Majority of the staffs had normal sleep duration (67.2%) followed by short sleep duration (26.6%) and long sleep duration (6.3%). Simple logistic regression analysis indicated that late night snacking was significantly related to short sleep (cOR=3.47, 95% CI: 1.12, 12.23, p=0.048). |
| **Conclusions** | Adequate sleep is important to maintain one's health. Steps can be taken to limit late night snacking in order to improve the sleep pattern in this study population. |
| **Keywords** | Sleep duration - late night snacking - workers - tertiary - institution. |

# INTRODUCTION

Sleep is a state of unconsciousness from which one can be aroused. Different age has a difference average of sleep duration. Average sleep duration for adult is about 7-8 hours of sleep per day[1].

According to National Sleep Foundation (NSF), sleep has played a very important role in maintaining our health with good living quality and good performance of our brain[2]. During sleeping, our body will repair and restore our muscles and soft tissue, release growth hormones, process our memories and knowledge[3]. Lack of sleep will result in sluggishness, forgetfulness, lack of concentration, slower reaction times and general malaise, drowsiness, poor concentration, mood swing with irritability and grogginess and even memory impairment and poor physical performance[3,4]. Inability to become a productive worker will definitely occur, as well as other worse consequences such as motor vehicle accidents and injuries at the workplace. Having the adequate amount of sleep will allow you to operate well and also able to focus andconcentrate[5].

However, according to a global perspective report in the year 2010 there is 81% of Malaysian claimed that they are not getting enough sleep[6]. The top reason that causing Malaysian to have sleep deprivation is because they tend to go to sleep late at night, and wake up very early in the morning. This may be due to tougher working conditions. Up to 42% of Malaysian had claimed that their physical health was affected due to lack of enough sleep[6]. This affected their mental health, home life, job performance, relationships with others and the community.

Sleep is a modifiable factor, therefore it is always possible for us to organize appropriate intervention programs to improve the awareness among our community regarding the importance of normal sleep duration. This will eventually improve the morbidity and mortality related to sleep pattern in our community. The aim of this study was to determine the pattern of sleep duration among workers in University Kebangsaan Malaysia Medical Centre (UKMMC). Specific objective was to determine the factors associated with short sleep duration.

# METHODS

## Study Design and Sampling

A cross-sectional study was conducted from January until May 2012 among 128 randomly selected UKMMC staffs. Ethical approval was obtained from Research and Ethics Committee of Faculty of Medicine UKM (FF-453-2011) and UKMMC Director & Dean of Medical Faculty to conduct the study. Name list of staffs working in the office hour working system (8am-5pm) was used for the random selection. Inclusion criteria include permanent staffs and Malaysian citizen.

Staffs with history of chronic diseases were excluded from the study.

## Data Collection

Data was collected using a guided standardized data sheet which consist of three sections; (1):socio demographic & socioeconomic, (2): lifestyle and, (3): anthropometric measurement and self reported sleep diary Socio demographic data included age, sex, marital status and having children ≤18 years old. Socio economic data comprised of income, educational level and occupation. Lifestyles measured were smoking status, caffeine/alcohol consumption, exercise practice and late night snacking practice.

Anthropometric measurements were performed with the respondents wearing light clothing and no footwear. Body weight was measured to the nearest 0.1 kg using a digital scale, and height was measured to the nearest cm in the standing position using a wall stadiometer. Body mass index (BMI) was calculated as weight (kg) divided by squared height (kg/m$^2$) and categorized according to the recommendations of the WHO (2000).

Sleep duration pattern was collected using a self reported diary. The staffs were required to record their sleep pattern for 5 consecutive days (weekdays). The total hours for these five days was totalled up and categorized into three patterns; (1): short sleep duration (≤ 6 hours), (2): standard/ normal sleep duration (6-8 hours) and (3): long sleep duration (≥ 8 hours).

## Data Analysis

All data were analysed using SPSS version 20.0. Mean and standard deviation (SD) were used to describe the characteristics of the staffs for continuous data, whereas frequency and percentage were used for categorical data. Univariable analysis used were analysis of variance (ANOVA) and Chi-square with Yates correction between the independent and the three sleep patterns. Simple logistic regression analysis was used to determine the association between independent and dependent variables, which was short sleep pattern vs normal sleep pattern. The level of significant was set at $P$ value of less than 0.05.

# RESULTS

Table 1 shows that the mean age of staffs was 32.4 (±6.63) years old and majority of the staffs were female (71.9%), married (67.2%), not having children ≤ 18 years old (64.1%), educational attainment up to PMR/SPM (59.4%), not smoking (85.9%), do not consume alcohol (98.4%) and do not exercise (80.5%). Table 2 indicates that majority of the staffs had normal sleep duration (67.2%) followed by short sleep duration (26.6%) and long sleep duration (6.3%).

**Sleep Duration Pattern**

**Table 1** Demographic data of workers in UKMMC

|  | Mean (sd) | n (%) |
|---|---|---|
| Age (years) | 32.4 (6.63) |  |
| 18-25 |  | 14 (10.9) |
| 26-35 |  | 84 (65.6) |
| 36-45 |  | 23 (18.0) |
| 46-55 |  | 7 (5.5) |
| Gender |  |  |
| Male |  | 36 (28.1) |
| Female |  | 92 (71.9) |
| BMI category | 25.4 (4.97) |  |
| Normal |  | 70 (54.7) |
| Overweight |  | 43(33.6) |
| Obese |  | 15(11.7) |
| Marital status |  |  |
| Single |  | 42 (32.8) |
| Married |  | 86 (67.2) |
| Having children ≤18 years old |  |  |
| Yes |  | 82 (64.1) |
| No |  | 46 (35.9) |
| Income (MYR) | 1816.9 (754.51) |  |
| Educational level |  |  |
| PMR/SPM |  | 76 (59.4) |
| STPM/Matriculation |  | 12 (9.4) |
| Diploma/Degree |  | 40 (31.3) |
| Occupation[a] |  |  |
| Professional |  | 7 (5.5) |
| Non-professional |  | 121 (94.5) |
| Smoking |  |  |
| Yes |  | 18 (14.1) |
| No |  | 110 (85.9) |
| Consume Caffeine[b] |  |  |
| Yes |  | 67 (52.3) |
| No |  | 61 (47.7) |
| Consume Alcohol |  |  |
| Yes |  | 2 (1.6) |
| No |  | 126 (98.4) |
| Exercise[c] |  |  |
| Yes |  | 25 (19.5) |
| No |  | 103 (80.5) |
| Late night snacking[d] |  |  |
| Yes |  | 12 (9.4) |
| No |  | 116 (90.6) |

a: Professional: staffs with job gred ≥ 41, Non-professional: staffs with job gred < 41
b: Yes: consumption of caffeine at least 1cup/day for at least 3 days during the study period
c: Yes: Aerobic exercise (eg: jogging, swimming, gardening) for at least 3 days and 20 minutes per day.
d. Yes: Eat any type of food between 12.00 am -4.59 am, regardless of the total calories consumed.

**Table 2** Pattern of sleep duration among workers in UKMMC

| Sleep duration pattern | n (%) |
|---|---|
| Short sleep[a] | 34 (26.6) |
| Normal sleep[b] | 86 (67.2) |
| Long sleep[c] | 8 (6.3) |

Chi-square test shows that late night snacking significantly related to short sleep (p=0.018) (Table 3). Due to the small number of staffs with long sleep duration, this group was omitted from further analysis. Simple logistic regression was conducted for short sleep and

normal sleep pattern. This analysis indicated that staffs who practice late night snacking remain significantly associated with short sleep (OR=3.47, 95%CI 1.12,12.23, p=0.048). Other factors such as older age, males, single, being overweight, having children less than 18 years old, high income, low education level, professional occupation, smokers, caffeine and alcohol consumers, and exercise are prone to have short sleep. However, it did not have significant values in this study (Table 3& 4).

**Table 3** Factors associated with sleep duration among workers in UKMMC

| | Sleep duration pattern | | | |
| | Short sleepn=34 | Normal sleep n=86 | Long sleepn=8 | p Value |
|---|---|---|---|---|
| Age (years) | 33.3 (7.85) | 32.2 (6.31) | 30.5 (3.75) | 0.511[d] |
| Gender | | | | 0.225 |
| Male | 13 (36.1) | 22 (61.1) | 1 (2.8) | |
| Female | 21 (22.8) | 64 (69.6) | 7 (7.6) | |
| BMI category | | | | 0.955 |
| Normal | 17 (24.3) | 48 (68.6) | 5 (7.1) | |
| Overweight | 13 (30.2) | 28 (65.1) | 2 (4.7) | |
| Obese | 4 (26.7) | 10 (66.7) | 1 (6.7) | |
| Marital status | | | | 0.516 |
| Single | 14 (33.3) | 26 (61.9) | 2 (4.8) | |
| Married | 20 (23.3) | 60 (69.8) | 6 (7.0) | |
| Having children <18 years old | | | | 0.680 |
| Yes | 21 (26.9) | 51 (65.4) | 6 (7.7) | |
| No | 13 (26.0) | 35 (70.0) | 2 (4.0) | |
| Income (MYR) | 2019.59 (751.71) | 1735.73 (761.24) | 1828.66 ( 589.48) | 0.179[d] |
| Educational level | | | | 0.892 |
| PMR/SPM | 20 (26.3) | 52 (68.4) | 4 (5.3) | |
| STPM/Matriculation | 2 (16.7) | 9 (75.0) | 1 (8.3) | |
| Diploma /Degree | 12 (13.0) | 25 (62.5) | 3 (7.5) | |
| Occupation | | | | 0.793 |
| Professional | 2 (28.6) | 4 (57.1) | 1 (14.3) | |
| Non-professional | 32 (26.4) | 82 (67.8) | 7 (5.8) | |
| Smoking | | | | 0.497 |
| Yes | 7 (38.9) | 10 (55.6) | 1 (5.6) | |
| No | 27 (24.5) | 76 (69.1) | 7 (6.4) | |
| Consume caffeine | | | | 0.139 |
| Yes | 21 (31.3) | 40 (59.7) | 6 (9.0) | |
| No | 13 (21.3) | 46 (75.4) | 2 (3.3) | |
| Consume alcohol | | | | 1.000 |
| Yes | 1 (50.0) | 1 (50.0) | 0 (0.0) | |
| No | 33 (26.2) | 85 (67.5) | 8 (6.3) | |
| Exercise | | | | 0.227 |
| Yes | 9 (36.0) | 16 (64.0) | 0 (0.0) | |
| No | 25 (24.3) | 70 (68.0) | 8 (7.8) | |
| Late night snacking | | | | 0.018 |
| Yes | 6 (50.0) | 5 (41.7) | 1 (8.3) | |
| No | 28 (24.1) | 81 (69.8) | 7 (6.0) | |

**Table 4** Factors associated with short sleep pattern among workers in UKMMC.

| | Crude Odds Ratio | 95% Confidence Interval | P value |
|---|---|---|---|
| Gender | | | 0.172 |
| Female | 1.0 | | |
| Male | 1.80 | 0.77,4.19 | |
| Having children <18 years old | | | 0.823 |
| No | 1.0 | | |
| Yes | 1.10 | 0.48/3.68 | |
| Body Mass Index | | | 0.826 |
| Obese | 1.0 | | |

**Sleep Duration Pattern**

| | | | |
|---|---|---|---|
| Overweight | 1.13 | 0.31/4.08 | |
| Normal | 0.86 | 0.23/3.27 | |
| Status | | | 0.254 |
| Married | 1.0 | | |
| Single | 1.62 | 0.71,1.41 | |
| Occupation | | | 0.781 |
| Non-professional | 1.0 | | |
| Professional | 1.28 | 0.22, 7.34 | |
| Education | | | 0.651 |
| Diploma/Degree | 1.0 | | |
| STPM/Matriculation | 1.25 | 0.53, 2.91 | |
| PMR/SPM | 2.16 | 0.40, 11.59 | |
| Smoking | | | 0.210 |
| No | 1.0 | | |
| Yes | 1.97 | 0.68, 5.69 | |
| Consume alcohol | | | 0.508 |
| No | 1.0 | | |
| Yes | 2.58 | 0.16, 42.39 | |
| Exercise | | | 0.341 |
| No | 1.0 | | |
| Yes | 1.58 | 0.62, 4.02 | |
| Consume caffeine | | | 0.135 |
| No | 1.0 | | |
| Yes | 1.86 | 0.83, 4.18 | |
| Late Night Snacking | | | 0.048 |
| No | 1.0 | | |
| Yes | 3.47 | 1.12, 12.23 | |
| Age | | | 0.252 |
| 18-25 | 1.0 | | |
| 26-35 | 1.20 | 0.19, 7.77 | |
| 36-45 | 2.65 | 0.54, 12.99 | |
| 46-55 | 1.17 | 0.21, 6.48 | |

## DISCUSSION

We found that among UKMMC working population, majority of them (67.2%) are having self-reported normal sleep duration, while 26.6% of them are having self-reported short sleep duration. This result is compatible with the previous report done by Centers for Disease Control and Prevention (CDC) United States, 2010, which has shown that about 30% of the working population in United States was having short sleep duration (≤6hours)[7]. This finding was also consistent with a large number of other cross-sectional studies[8,9].

Throughout this study, we found that there are several factors that contribute to short sleep duration, including sociodemographic factors (older age, male, single, respondents with children less than 18years old, overweight), socioeconomic factors (high income, lower educational level) and health behaviours (smoking, caffeine and alcohol intake, practicing exercise, and late night snacking).

This study showed that late-night snacking had significant association with sleep duration and it had 3.5 more risk to have short sleep than those who were not. It is because those who had late night snacking usually have a longer time for eat rather than sleep[10] Thus, making their sleep duration shorter than others. It also explains why in the short sleepers, they have high BMI and subsequently become overweight/obese.

Even though there are no significant values of other variables, but these finding are mostly consistent with other studies. For age category, older age group was found to have shorter sleep duration. However, according to study in Australia, the older age group was found to have longer sleep duration (31.9 %, p= <0.001)[11]. This might be because the older age group may have hidden occupational, financial, marital, or family stress that may influence these factors. Besides that, older age group also might have undiagnosed insomnia which is also not studied in this research.

For gender, males are more prone to have shorter sleep duration. Results from present study were similar with study done in 2010[12]. The reason for this trend probably because males used to have high risk behaviours, such as going out until late at night, clubbing, consuming alcohol, smoking, and taking illicit drugs, which may eventually affect the sleep duration. In addition, males were at greater risk for being overweight or obese than their

female counterparts because it might be attribute to hormone[12].

For marital status, it is consistent with study in 2005[13].The study showed that there was a significant association between single people (OR=1.29, p<0.001) and short sleep duration compared to married people[11], which was similar to our findings (OR=1.62, p=0.254). Compared to married people, being single are less likely have to share a bedroom with others, this may results in flexibility in sleep schedule. They may do other things when they are supposed to sleep. Besides, single people may need more time to manage their household.

For family structure, it is also consistent with prior research.[13]. Our result showed that most respondents with children aged younger than 18 years old had shorter sleep duration (OR=1.09, p=0.823). In a cross -sectional analysis by Patrick et al, 2009 had showed that compared with others, those living with children aged from 2 to less than 18 years is associated with lower odds of normal or long sleep duration[14]. Shorter sleep duration in this study group was probably because those with children younger than 18 years old may need to spend more time to take care and educated them.

From our study, compared to those with normal BMI, those with higher BMI value are more likely to have shorter sleep duration (OR=1.13, p=0.826). This is consistent with a study in Korea in 2010 which stated that the mean BMI was highest among those who slept less than 5 hours per night, and lowest among those who slept 8 hours or more per night (p= <0.001)[12]. This may be because those with higher BMI are at risk to have undiagnosed health problems which may interrupt their sleep. In addition, snoring which usually occurred in people with higher BMI is a factor that can affect their sleep quality[15].

Secondly, the socioeconomic factors, including education level, income and occupation were found to have influences toward sleep duration. For education level, it showed that low education level more likely to have short sleep duration[13].This may be because higher education level may lead the people to choose a healthier lifestyle and sleep behavior. No support evidence and these statement contradict with the below statement. On the other hand, those with lower education level may have alternative job at night to increase their income which will affect their sleep duration. For income and occupation, we found that those with higher income and professional workers are having short sleep duration. This result agrees with the study in Norway, which revealed that women with high income have shorter sleep duration than those with low income[16]. Professional workers may have higher income compare to non-professional. However, they may be facing occupational stress which may shorten their sleep

duration. Thirdly, for health behavior, our finding showed that smoking, alcohol consumption, intake of caffeine and exercise had shorter sleep duration compared to those who were not. Our study found out that the risk of smoker to have short sleep duration was 1.97 more compared to non-smoker. Based on study in Korea, there was significant association between current smokers smoking more than 20 cigarettes per day and short sleep duration[17].Caffeine was most widely available, heavily marketed and socially accepted stimulant in the world[18]. Our studies found out that the crude odds ratio for caffeine intake was 1.86, which explained the risk of having short sleep duration during the period of caffeine usage. There was little correlation between reported physical activities and sleep duration, but the effect on voluntary activity cannot be conclusively excluded because of limitation of questionnaire-based measurement physical activity[19].

There are a few limitation warrants mentioning in this study. First, our data ask only about self-reported sleep duration and provide no information on daytime sleepiness or difficulty with falling asleep or staying asleep. Further, self-reported sleep duration which may not be very accurate and biased (potential of underreporting or over reporting of sleep duration seems respondents knows that they are on study). Second, only Malays that work in one hospital are included in this study. Therefore, it could not reflect whole population with presence of several potential confounders did limit our result reliability.

The findings from our study showed that late-night snacking was significantly associated with short sleep. Therefore, the intervention program should be implemented to increase the awareness among the community regarding the importance of normal sleep duration. We suggested that amount of 24-hours restaurant to be limited in the country. On the other hand, 24-hours TV programme policy should be reviewed in order to limit the number of late-night TV shows which may be associated with late-night snacking. In addition, this study can become a supplement for further studies so that more knowledge about sleeping pattern among the Malaysian can be obtained.

## CONCLUSIONS

In conclusion, late-night snacking is a significant factor for short sleep duration. Thus, it is important for the health system in Malaysia to promote adequate sleep duration as one of the health behaviour for lifestyle changing in order to improve the quality of life.

## ACKNOWLEDGEMENTS

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